**Небојша В. Шурлан, 2-10/Д**

# υtʃtɑʘɔʔ ʘˁ ˌj ɔtɕˌʜdʑsfʃsɾdʒʘ, tʃtɑɾdʒˌjdʑʘ dʑsʕʘdʑdʑɾ˽ʟdʑʘˁ ʘɾd υʏˌjˁ ˌj ɾʟʙtstɑtsdʒ fɲdʑzuʘˈˌjɔʘ(*Case Based Reasoning*) ʕʘts tʃtsʜtɑʰ ʕʘʜtsdʑsʰ ˌjˁ lz tsʜdʑʕʘdʑʘ dʒˌj' lzdʑʘɑtsʜdʑɾdʒtʃtɑtsˈˌjʕlsɾdʒʘ

ɾʃˌʂυʃˌtʉʂɸɾʀʉɾˌtυɸʏʀmɸ

ɹˌjtsdɑʘʜ, 2015. ɑtsʜɾdʒˌj

**Небојша В. Шурлан, 2-10/Д**

# ʊ tʃtɑʘɔʔ ʘˁ ˌɻ ɘtɕˌʜdʑsfɲsɑ[dʒʘ, tʃtɑɑ[dʒˌɻdʑʘ dʑsʕʘdʑdʑɑ[ˉ ʟdʑʘˁ ʘɑ[ ʊ ʊɻˌˁ ˌɻ ɑ[ʟʙtstɑtsdʒ fɲɲdʑzuʘˈɻɘʘ(*Case Based Reasoning*) ʕʘts tʃtsʜtɑʰ ʕʘʜtsɑdʑsʰ ˌɻˁ lz tsʜdʑʕʘdʑʘ dʒˌ' lzdʑʘɑtsʜdʑɑ[dʒtʃtɑtsˈɻʕlsɑ[dʒʘ

ɾ ʃ ʂʊʃ t ʜʂɸ ɾ ʀʜɾ t ʊɸʏ ʀ mɸ

ɹ ˌɻtsdtɑʘʜ, 2015. ɑtsʜɑ[dʑ

UNION-NIKOLA TESLA UNIVERSITY, IN BELGRADE
FACULTY OF CONSTRUCTION MANAGEMENT

**Nebojša V. Šurlan, 2-10/D**

# Local knowledge, value management application and Case Base Reasoning as decision support for international projects

Doctoral Dissertation

Belgrade, 2015

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**Датум одбране**: _____

Ова докторска дисертација је урађена у оквиру пројекта: Развој методологије за управљање ризицима у производним системима (Case Based Reasoning) у циљу повећања конкурентности привредних субјеката Републике Србије, финансираног од стране Министарства просвете, науке и технолошког развоја Републике Србије.

ϕ ς†ts fnjl taΘL dzʒslstaΘ∫ tsuj ς†∫əΘdz∧∫ tʃtaΘ∫taΘfrjs frjsΘdzʃsΘdz∧∫h lsΘ⊙ lz L ȷ dzʒ? Θdz ʒΘ lz taΘLəts'lz, dzʃs>l ȷ fnjl LΘς†? lzuς∫lsΘ∫ нΘ⊙ <ȷ dzȷj' lzdz∧tats+dz∧∫ ς∫dz∧ tΘ∩frjstaz<lstaz<dz∧∫ ς∫ taΘ⊙ ȷəς∫dz∧∫ tʃtats'ȷς†ls∫ tʃtaȷнfrjsΘə? Θls∫ 'ȷнΘdz⊂tsн dz∧Θвtɔ>ȷ taΘfrjstz<ς∫□ fnjς†ststaΘ⊙ taΘ⊙ ȷəς∫dz∧∫ς†ȷ ς∫dz∧lzfrjstaΘ∫'ȷ. ч tsвLς∫tatsʃzнΘ dzȷj' lzdz∧tats+dz∧ ς†stzʃfΘdz∧∫'ȷ tsuj ς†lz'lz dzʒdzstaΘ∫ ς∫L⊙L tsəς∫ lz əς∫нlz lzdz∧fr†ς†⊙ dz∧Θ dzstaΘ⊙ ς∫ dz∧tʃtsLdz∧∫ls⊙ lstɔ>l ς∫h lsΘ, tsəts ς∫frjstaΘ>l ς∫əΘ' ȷ fnjl ₩ ts†lzfrpʃtaΘ⊙ dz∧Θ dzȷj' lzdz∧tats+dz∧ tʃtats'ȷς†lsȷ lz ς†ts'ς∫dzʒ⊙ ς∫dz∧ȷfrjs∫lststaΘ∫ dz∧jdzʒ⊙'lz ς†stz∧tɔjlsdz∧ ς∫ tʃtstzLнΘdz∧ ς∫dz∧ tstaΘʒΘuς∫'ȷ ts dzts†⊙dzdz∧∫dzʒ lstɔ>l ς∫h dz∧∫dzʒ lzfrpdtsəς∫dzʒΘ. ş⊙ς†ts fnjl ς†? lzuς∫dz∧ tsнdz†ς†ȷ нtsdtsfnjl lz tʃtsuj lsdz∧∫dzʒ ₩ Θ.L⊙dzʒ⊙tʃtats'ȷς†lsΘ, ∪ς∫? tsətsʻς∫frjstaΘ>l ς∫əΘ' Θ'ȷ нΘfnjl tʃtatsuj dz∧∫ς†ts'ς∫'ȷ dz∧Θ'вts? ς∫ dz∧Θuς∫dz⊂ LΘ tʃtaz>l Θ' ȷ tʃtsнtɔh ς†ȷ tʃtaΘ∫ tsнdzzuς∫əΘ' lz υ tʃtsfrpdz∧нς ς∫□ dz∧ς†stz∧ς∫ts нȷ∪j dz∧∫'Θ lz ς∫L tɔaΘнς ς∫ fnjl frpȷ əς∫h ȷ taΘL dzʒΘlstaΘ lz∧tʃtaΘə? Θ' ȷ ətɔȷнdz∧tsfrjs∫dzʒΘ, tʃtsfnjlвdz∧tsLвtsʻtaΘLəts'Θ 'Θədz∧-tʃtaΘ∫əΘlstsdz∧tsʻ tʃΘtatsdz∧tɔfrjsəΘ (m} ł ), ς†Θts ς∫ frpȷ əȷ<ȷ LΘ∫ς∫dz∧tɔȷjfrjsəΘdz∧tsfrjs∫ς∫ LΘ lstɔ>l ς∫h lsΘ LȷdzʒΘ? Θ lz taΘLəts'lz. ∪ dz∧∫lsȷjtaΘlstaz∫ ς†ts'Θ tsвtaΘ lz'ȷ lz∧tʃtaΘə? Θ' ȷ ətɔȷнdz∧tsfrjs∫dzʒΘ tʃtɔȷнdz∧Θ>l ȷ fnjl tʃtaΘ∫dzʒjdz∧ tsəȷ dzʒjlstsнȷ ς†tatsL taΘн∫tsdz∧∫uȷ dz∧ ς†ts'ς∫dzʒΘ 'ȷ dzʃsdz<ȷ tsнtɔȷнς∫ls∫ h lsΘ 'ȷ LΘ ς∫dz∧ȷfrjs∫lststaΘ ətɔȷнdz∧tsfrjs. ł tats'ȷς†Θls ς∫LɔtaΘн∫ ȷ <ȷ вς∫ls∫ lz∧frjʃȷh Θdz⊂ς†tsdz∧∫ς†ts fnjl tʃtsfrjs∫ς∫dz∧z ς∫ ς∫frjlz∧jətɔȷнdz∧tsfrjs∫ ς∫dz∧ȷfrjs∫lststaΘ. ȷ tɔȷнdz∧tsfrjs∫ frjz tsн ς†? lzuς∫dzȷ əΘ>l dz∧tsfrjs∫ LΘ нȷ₩ ς∫dz∧∫frpΘ' ȷ tʃtats'ȷς†lsdtsɔ LΘнΘls†Θ lz₩ Θ.L ς∫ tʃtɔȷ ς∫LɔtaΘн∫ ȷ 'ȷtɔ fnjl dzʃsdz ς†staΘ∫frjs∫ls∫ LΘ tsнtɔȷ' ς∫əΘ' ȷ tʃtaΘ∫tstaΘ∫lsȷjlsΘ lz₩ Θ.L ς∫ ς∫LɔtaΘн∫ ȷ, ς†Θts ς∫ LΘ frpȷlz†lzʃς∫dz∧s lzfrjʃȷh dz∧s ς∫LətsʻȷΘ' ȷ frjΘdzʃsɔ⊂ taΘ⊙ ȷəς∫dz∧∫†tsɔ⊂ tʃtats'ȷς†lsΘ. ∪tʃtaΘə? Θ' ȷ ətɔȷнdz∧tsfrjs∫dzʒΘ 'ȷ lz tsətsdz ς∫frjstaΘ>l ς∫əΘ' lz ς†staΘ∫h <ȷdz∧s ς†Θts ts†ə∫ɔtc LΘ tʃtsнtɔh ς†lz tʃtaΘ∫ tsнdzzuς∫əΘ' lz dz∧Θ tʃtats'ȷς†lsΘ∫.

ʃ ȷ' lzdz∧tats+dz∧∫ tʃtats'ȷς†ls∫ ς∫dz∧Θ'lz нtsн⊙lsdzȷ Θfrjʃȷς†lsȷ əȷ< frpdtsəȷjdz∧tɔɔ⊂ tʃtatsuj frjΘ ς∫dz∧ȷfrjs∫ʌuς∫tsdzȷ ς∫LɔtaΘн∫ ȷ. ┐вtɔɔ⊂ taΘL dz∧ʃuς∫lstɔɔ⊂ tʃtstɔȷjlsdz∧ ς∫ ς∫LətsʻΘuΘ, dz∧Θədz∧□ lzujfrpdz∧ς†Θ lz tʃtats'ȷς†lsz ς∫LɔtaΘн∫ ȷ, tʃtsfrjstsʻȷ вtats'dzȷ tʃtaΘ∫dz∧ς†ȷ LΘ dzȷfrjʃtstaΘLzdzʒ LΘ tsfrjsəΘtaΘ∫əΘ' ȷ taΘL dz∧ʃuς∫ls∫□ tsujς†∫əΘ' Θ ς∫ frjʃtatsəts' ȷ∫ ȷ taΘL dz∧ʃuς∫ls∫□ dzȷjlstsнΘ ς∫ tʃtaΘ∫frjsztʃΘ lz tsвΘə? Θ' lz taΘнtsəΘ. ʃ ts†⊂Θdz∧tsLdz∧Θ' ȷ 'ȷ ₩ Θ⊂lststɔ⊂ ς†ts'ς∫ lstɔȷвΘtaΘL dzʒslstaΘ∫ls∫ ς∫ lzəȷjfrjs∫ lstss†tsdzʒ tʃdz∧Θdz∧∫taΘ' Θ ɑtaΘ' ȷəς∫dz∧∫ς†□ tʃtats'ȷς†lsΘ. υts dzʃs>l ȷ нΘ нtstʃtaΘ∫dzȷjfnjl tʃtsəȷ<Θ' lz ȷ₩ ȷς†ls∫əΘtaΘ∫s∫ ς∫ ȷ₩ ς∫ς†Θfrpdtsfrjs∫ lz tsfrjsəΘtaΘ∫əΘ' lz ∪ς∫? ȷəΘtʃtats'ȷς†lsΘ, 'ȷtɔ<ȷ dzʒ∫dz∧dzʒ∫LɔtaΘls∫ tʃtslsȷdz∧ʌuς∫'Θdzdzȷ taΘ∫Lɔς†ȷ. ʌɔς∫? tsətsʻς∫frjstaΘ>l ς∫əΘ' Θ'ȷ нΘ tsнɑtsətstaΘ∫ dz∧Θ ς†? lzuɑtas tʃɔ∫lsΘ' ȷ: ς†Θts fnjl dtsς†Θdzdtas Ldz∧Θ' ȷ dzʃs>l ȷ tʃtaΘ∫dzʒjdz∧ls∫ dz∧Θ dzȷj' lzdz∧tats+dz∧tsdzʒ tʃtats'ȷς†lsz, ς†ts'ȷ frjz tʃtɔȷнdz∧tsfrjs∫ ς' ȷɑtsəȷ tʃtaΘ∫dzʒjdzȷ, tʃtsfrjвdz∧tas tʃtaΘ∫ tsнdzzuς∫əΘ' lz lz taΘdz∧∫dzʒ ₩ Θ.L⊙dzʒ⊙tʃtats'ȷς†lsΘ?

ч тѕвьсфtатѕсдз нО чцjсdвѕ$tzfjсdвs сfrjѕtсO»ісfэO˜ j tfjtѕuсfэO сdк@ tzfjtсOэ? O˜ tz эtсцjнсdвsfrjѕсfсдзO, ‘jнOdbz tѕн tfjtэосf□ $tѕtсO$tO ‘j $fэOdвscf₩ сf$tOuсf‘O tfjOtсOdзjlѕOtсO эtсцjнсdвsfrjѕсf, $tѕ‘сf tfjtсцjнfrjѕOэ? O‘tz tѕfrjdвsэtz эtсцjнсdвsfrjdвsсfrjfrjѕjсдзO сfdвэj frjѕсflѕtѕtсO. υ tfjtэоts‘ ₩ Olсf нj₩ сfdвzfrjO˜ O tfjOtсOdзjlѕOtсO эtсцjнсdвsfrjѕсf dк@ dzgtfjтѕLdк@lѕtѕdз сfdвzf dвsэотѕdз lѕtсэісfh lѕtz, tzfjтѕlѕtсцjвтѕdз нjdв₩ сf lѕj□dвq$j tzfrjOсdк@Oh OэO˜ O сf tzL tzuj‘h <j нэOdк@jfrjs нтѕdзO<сf□ frjѕtdzсu{ O$tO нтѕh dвs fnjl нтѕ $tѕdк@udвq□ тсцjLzdвsOlѕO $tѕ‘сf frjz тсцjdzjэOdвsdвq LO тсцjсftѕdz jэtdтѕfjfr$tѕсg LOfjO»dвsсg J Odк@Odк@. ч O lѕтсэісfh lѕсfdзO $tOts h lѕts ‘j LOfjO»dвq J Odк@Odz,dzj tfjтѕfrjѕts‘j tfjтѕlzL»Odвq сf тсцjdzjэOdвsdвq cfrjѕtѕтсf‘fr$tсf tfjтѕ»O˜uсf dвq dтсO˜ jэсfdвq$j вQ.j tfjтѕ»OlѕO$tO $tѕ‘j всf tfjтѕlѕjdzцсf‘Odzdвq cfdвэj frjѕсflѕtѕтсf dзтѕсdzf $tѕтсdfrjѕсflѕсf. ş O$tѕ всf fnjl tfjтсцjэOLсfh Otѕ lѕO‘ dzj»тѕfrjѕOlѕO$t, frjfjтdтѕэj»Hjdвs ‘j tzfrjOсdк@Oh Oэ˜ j $tdтѕL чцjlѕсftтсf ₩ Olj нjdв₩ сf cfrjfjсflѕсfэO˜ O. ş$tѕтсdfrjѕj<сf ş jdвэOdвsэ $tѕj₩ cfчцf‘jdвs tzfrjOсdк@Oh jdвsfrjѕсf, dвs$tOdzdвq frjѕtdzсu{ Oцf frjz нj₩ cfdвzfrjOdzf тсцjLzdвsOlѕj tfjтѕdвэj тсfrjOdвq□ tfjOtсOdзjlѕOtсO эtсцjнсdвsfrjѕсf LO чцjlѕсftтсf тсOLdzfчсflѕj эtсfrjѕj тѕв‘j$tOlѕO сf тѕн»Oвтсdвs ‘j tz$tzfjdвs tfjj нjfnjlѕ тсцjdzjэOdвsdвq□ tfjOtсOdзjlѕOtсO эtсцjнсdвsfrjѕсf. ∫ dвq <j fnjl $tѕтсcfrjѕcflѕсf LO нO˜ tz tfjтѕнтсh $tz tfjтсf тѕнdвzцсfэO˜ tz dк@ dтсO˜ j эсfdвq$j tfjdк@ztѕнdвqfdзdзj' tzdк@tdтѕнdвqfdзtfjтdтѕ‘j$tѕlѕcfdзO.

t O»сftѕdвqfцj LO tzfjtсOэ? O˜ j эtсцjнсdвsfrjѕсfdзO frpj эсfh j fnjl $tѕтсcfrjѕj $tOts dзjlѕtѕн LO tfjтсцjцfLdвs tzlѕэtc сfэO˜ j эtсцjнсdвsfrjdвsсg frjfjтfrjѕjсдзO сfdвэj frjѕсflѕtѕтсO, $tѕ‘сf <j LOtzLэtсOls tzlѕcfцOlѕсf dк@ tfjтdтѕ‘j$tѕdвq LO»HOlѕO$t, tfjтсftѕтсcflѕjlѕj tfjтдтѕ‘j$tѕlѕO сf ς j dтѕэ $tѕdк@uсOdztzfrjfj□. υ нтdtzdтѕ‘ ₩ Olсf тѕэtѕg cfrjѕтсO»ісfэO˜ O, эtсцjнсdвsfrjѕсf сfdвэj frjѕсflѕtѕтсO fnjl нтѕfjz‘ tz‘tz dтѕ$tOdzdвqfdз LdвO˜ j dзj tz ts$tэсftdz тсO»HcftѕdвqfцO LO tzfjtсOэ? O˜ j эtсцjнсdвsfrjѕсfдзO. ч tѕlѕтсцjвdвs ‘j нтѕLэтѕdzflѕсf нO tfjтѕ»Oцсf $tѕ‘сf tfjтсf$tOLz‘tz frjfj□цсf₩ cfцdвsfrjѕсf dтѕ$tOdzdвsg lѕтсэісfh lѕO tzlѕcfцz dк@ эtсцjнсdвsfrjdвqf frpjfrjѕjсдзcfdвэj frjѕсflѕtѕтсO сf dк@ tfjтдтѕuцjfnjтѕнdвzцсfэO˜ O. ч O»нэOdк@jfrjs tfjтдтѕ‘j$tѕOlѕO tz тсцjсftѕdвz LOfjO»dвsсg J Odк@Odк@ tѕтсэOdвqLтѕэOdзj frjz тсO»сftѕdвqfцj LO tzfjtсOэ? O˜ j эtсцjнсdвsfrjѕсfдзO tѕтсэOdвqfцjdвsсg тѕвcfдзO, dк@ $tѕ‘сfдзO ‘j эtсцjнсdвsfrjdвqf frpjfrjѕjсдзcfdвэj frjѕсflѕtѕтсO tfjтсf$tOLOdz,$tдтѕL cfdвqfцf‘Odzdвz эj,k вtz tzfjтѕтсцjнсdвsсg tfjтѕтсцj' j‘ O. ч O$tѕdz,tfjтсцjнfrjѕOэ? O˜ O tfjтѕ»OlѕO$tO ts dвs$tOdzdвsdзLdк@˜ tz frjfjтдтѕэj»Hjdк@ ‘j нтдzэO эj,k вO tz эсfнtz dзcfdвq-нjdв₩ сf lѕj□dвqf$j cfdвz EFTE (*Estimate – Feedback – Talk – Estimate*), ls‘. ł ∫ r ł (tfjтдтѕuцjdк@ï тѕнdтѕэтѕтсï нсfrj$tzfrjf‘Oï tfjтдтѕuцjdк@), $tO$tѕ всf fnjl тѕнtсцjнсfdzj tfjтдтѕdзjdzgl tz cfLdзjς j dвsdз эtсцjнсdвsfrjdвsdз frpjfrjѕjсdtz cfdвэj frjѕсflѕtѕтсO. фdк@Odzf Lсftтсdzgl frjz tfjтдтѕdзjdzg tz нэO fnjlѕO эtсцjнсdвsfrjdвqf□ frpjfrjѕjсдзcfdвэj frjѕсflѕtѕтсO. υ тѕэtѕ‘ ₩ Olсf, тсцjLzdвsOlѕсf tfjts$tOLz‘tz нO ‘j dвs$tOdzdвqfдз LdвO˜ j tzlѕcfцOdвs dк@ tfjтѕuцjlѕdвq эtсцjнсdвsfrjdвqf frpjfrjѕjсдзcfdвэj frjѕсflѕtѕтсO, Odzf ‘j tzlѕcfцO‘ вcfтѕ dзcfdвqfdзOdк@dz,υ dк@tсцjнсdвqfdзW OLOdзO tfjтдтѕ‘j$tѕOlѕO tfjтсцjнtzLcfdзO fnjl нO˜ j cfrjfjѕtсO»ісfэO˜ j нO вcf fnjl tfjтдтѕuцjdвqftѕ cfdвэj$tfn эtсцjнсdвsfrjѕсf (tfjтѕdвэj tсcfrjOdк@ dзjtсO tzucfdвO tz тѕнdвsfrjz dк@ frpj

тук са описани основните принципи на системите, основани на знания, и на системите, основани на прецеденти. Направен е обзор на областите, в които се използват системите, основани на знания. Разгледани са архитектурата и основните компоненти на системите, основани на прецеденти. Представени са методите за извличане на прецеденти, за адаптиране на прецеденти и за поддържане на базата от прецеденти. Разгледани са основните етапи при разработването на системите, основани на прецеденти. Направен е обзор на областите, в които се използват системите, основани на прецеденти. Представени са методите за оценяване на системите, основани на прецеденти. Разгледани са основните проблеми при разработването на системите, основани на прецеденти.

Изследването е извършено в рамките на проект „Изследване на методите за разработване на системи, основани на прецеденти“ (2023–2025), финансиран от Фонд „Научни изследвания“ на Университет „Св. Климент Охридски“. Авторите изказват благодарност на рецензентите за ценните коментари и предложения, които допринесоха за подобряването на качеството на текста.

**Ключови думи**: системи, основани на знания, системи, основани на прецеденти, извличане на прецеденти, адаптиране на прецеденти, поддържане на базата от прецеденти, оценяване на системите, основани на прецеденти, разработване на системите, основани на прецеденти, области, в които се използват системите, основани на прецеденти, архитектура, компоненти, методи, етапи, проблеми, изследване, проект, Фонд „Научни изследвания“, Университет „Св. Климент Охридски“, благодарност, рецензенти, коментари, предложения, качество, текст

**Научна област**: ʃ ˛jdkƵvdzjdkstsнtɔ›ɬdʃətsɕtɑ⊙ɻətsʻ⊙

**Ужа научна област**: ɬ tɑtsʻ˛jlsʕ⊙dʁʃ dzjdkƵvdzjdkstsdzjˈ ɮzdkƵɑtsнdʁʃ⁻ ɑtɑ⊙ˈ .tʃtɑtsʻ˛jʕ⊙ɭs⊙

PhD THESIS TITLE: Local knowledge, value management application and Case Base Reasoning as decision support for international projects

## ABSTRACT

When considering expected population growth in developing countries, international infrastructural and construction projects will present one of the fastest growing sectors of construction industry. Many challenges await international companies entering new and unknown markets, so this research is focused on international projects for which clients lack specific and reliable information about the local market conditions. As key decisions are made in the initial stages of project, this research aims to assess how best to support such decision making process. Value management in construction has been considered increasingly in last decades, particularly with development of Public-Private-Partnerships (PPP) and increasing attractiveness of emerging markets. It is suggested in the literature that Value Management and its application in workshops can be used to determine the client values. Achieving and fulfilling these values will make a construction project successful. Values are critically important to the briefing process in pre-construction stage as they are setting priorities in construction stage and the overall successful delivery of construction projects. In this research, Value Management was used as a framework to deliver support to decision making.

International projects add new aspects to what is already a complex process. Due to different origins of Client and Contractor, main participants on the construction project, there is abundance of opportunities for misunderstanding, differing expectations and varying methods and approaches to performing project work. Local knowledge is a factor that should be considered and introduced in planning stage of construction projects. This can assist the effectiveness and efficiency of project endeavors, as it will minimize potential risks. This research aims to answer the key question: how can local knowledge be implemented on the project, and what benefits could be drawn, particularly in the decision making support in project early stages.

As the complete research framework is based on Value Management, one of the first steps is to quantify value parameters as bases of a Client value system. In the first stage a process for obtaining value parameters in the unknown or new market is achieved through Delphi technique with participation of twelve local experts yielding definite results relevant for Europe Western Balkans region. In markets such as Western Balkans there is no reliable historical data or relevant construction data-bases for potential investors. To overcome this deficiency, four rounds Delphi techniques were conducted. Utilizing Kendall's coefficient of concordance it was determined that value parameter weighting score for four different types of buildings have been agreed amongst experts and total of fifty parameters were selected as relevant. These parameters will be used in further support to construction project decision making process.

Value Management workshops are being increasingly used as a method to precisely determine Client value system, which in turn will impact briefing, project priorities and the final success of the project. In this research framework second stage Client values are supplemented with local knowledge during Value Management workshops. Information that captures the specifics of the local market should influence the client value system and decision making process. Limited Value Management workshops were organized on twelve projects in Europe's West Balkans region where Client's value system was captured through initial paired comparison exercise. After local knowledge information was presented, second exercise of mini-Delphi or EFTE (Estimate-Feedback-Talk-Estimate) technique was implemented to measure the revised Client value system changes. The changes in the two sets of client value systems were analyzed. At this stage, results indicate that initial Client value system was impacted by local knowledge, even though the impact was minimal. Further investigation will be undertaken to assess the value index (a weighted measure of performance against all the value parameters) in coming stages of projects. By applying the proposed value management methodology, it was determined that local knowledge can be transferred to Clients to supplement their value system and achieve more successful projects.

Support to decision making is invaluable tool in international construction projects as most key decision are made in project early stages when substantial amount of information is unknown or unreliable. Previous experience of successfully completed projects could support decision making process. To that effect, in its final stage this research introduces Case Based Reasoning (CBR) software tool to Value Management process where value parameters have been quantified and determined by Client representatives. Database of successfully completed projects is formed through Questionnaire survey. Using this data base of 143 completed projects, CBR software selects five most similar projects and recommends changes to areas of focus in construction stage through changes of 7 out of 8 parameters. Twelve international projects have been tested in CBR software. Results indicate that retrieved projects are 81% similar on average, corresponding with previous studies. Suggested changes to focus in construction stage are made in order to increase the probability of successful completion of the project.

CBR software tool is also utilized to process a set of Client value parameters before the local value is introduced. Using the same process as for value parameters with Client value supplemented by local knowledge, proposed changes are recorded. The conclusion is that proposed changes to value parameters without local knowledge are approximately 10% on average greater than when local knowledge is implemented. This confirms the benefits of implementation of local knowledge, as supports the validity of the proposed value management framework.

**Keywords**: International construction projects, Support to decision making, Globalization, Local knowledge, Corporate risk, Value parameters, Value management workshops, Value Management, Briefing, Critical success factors, Case Based Reasoning

**Science topic:** Sustainable Development Management
**Special topics:** Project management of International construction projects

# Table of Contents

# 1. υ ȷ ʃ ɾ

## 1.1. ʃ frɲdʒsɒ ȷ ɑfrɲstɑɔ×ɨɑɒɔ˜ ɔ

ɬ tsuȷ ɨsdʒɒ tɑɔ·ɑdʒɔɨstɑɔ˜ ɔ ʟɔ tsɒts ɑfrɲstɑɔ×ɨɑɒɔ˜ ȷ ʟɔfrɲdʒsɒɔɔdʒɒ frɲz dʒɒ ɔɒzɨstɨɑtsɒtsɔdʒ tʃtɑɔ˜ɨsɑfʮɑdʒsɑdʒ ɑfrɲʃɨzfrɲɨsɒlz Ăɑʟ tʃtɑɒȷ tɑzʃȷò lz ɨzʃtɑɔɒʔ ɔ˜ lz dʒɒ dʒȷʃɨtsɑdzɑʃɨts dʒȷ' ɨɑdʒɒtɑtsʜɑdʒʃ˗ tɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ tʃtɑtsʻȷʃɨɔɨsɔ lz tɑȷɑɑʃtsdʒz ʟɔtʃɔʜdʒsɑɾ ɹ ɔɑdʒɒɑdʒɒ. υ ɨsɑfɑʒ tʃtɑtsʻȷʃɨɔɨsɑfɑʒɔ frɲz, ɨzʃtɑʃɨtsfɲ frɲstɑtsɑtsʻ tʃtɑɑɑfɑʒȷɑdʒʃ tʃtɑtsuȷʜɨzɨtɑɔ ʟɔ ɨzʃtɑɔɒʔ ɔ˜ ȷ tʃtɑtsʻȷʃɨstsɑʒ tsfrɲsɒɔɨtɑȷɑdʒʃ tɑɔ·ɑdʒɑfɑʒɒɑɑtsʻ ɑfrɲʃɨzɑɑɑfɑʒɔɨtsɑɑ ʟɔ ɨzʃtɑɔɒʔ ɔ˜ ȷ tʃtɑtsʻȷʃɨɔɨsɑfɑʒɔ frɲz, ɑfrɲstɑɔ×ɨɑɒɔ˜ ɔ ɑfrɲʃɨzfrɲɨsɒɔɨtɑȷɑdʒʃ ɑfɑɒȷfrɲɨsɑfɨstɑtɑ dʒʃ' ɨɑdʒɒtɑtsʜɑdʒʃ˗ tɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ tʃtɑtsʻȷʃɨɔɨsɑfɑʒɔ. ɔ˜ ɑfrɲstɑɔ×ɨɑɒɔ˜ ɔ ɑfrɲʃɨzfrɲɨsɒɔɨtɑȷɑdʒʃ ɑfɑɒȷfrɲɨsɑfɨstɑtɑ dʒʃ' ɨɑdʒɒtɑtsʜɑdʒʃ˗ tɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ tʃtɑtsʻȷʃɨɔɨsɑfɑʒɔ. ɬ tɑɑfɑʒȷ<ȷɑdʒ ʙtɑtsʻlz frɲdʒzuɑʃȷɒɔ ʙɑfɑʒɑfɑʒ dʒȷ' ɨɑdʒɒtɑtsʜɑdʒɑ ʂtsɑdʒʃɔɑdʒʃ˗ȷ, tɑɔ·ɒɔtsʻɑdʒɑ ʙɔɑdʒɒȷ, ɑfɑɒʜɑɑɑfʜlzɔɑdʒɑdʒʃ ɨɑdʒɒɔɒɔuɑʃ, ɑflsʜ., frɲɑɑ dʒɒɑɑʂɑdʒɑlsɑʃ dʒɒ tsʜɨtɑȷ' ȷɑdʒȷ frɲsɔɑdʒʜɔtɑ×ȷ lz ɑtɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ɑfɑʒ tʃtɑtsʻȷʃɨsɑfɑʒɔ. ɬ tɑɑfɑʒȷ<ȷɑdʒɒ frɲz ɑf ʜɨɑɑzɑɔuɑʃʻɔ tsuȷʂɑfɒɔ˜ ɔ ɑfɑɒȷfrɲɨsɑfɨstɑtɔɔ ɑf ʜɨɑɑzɑɔfɑʃ˗ dʒtsʂɔɑdʒɑdʒʃ˗ lzuȷfrɲdʒʃʂɔ lz ɑtɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ɑfɑʒ tʃtɑtsʻȷʃɨsɑfɑʒɔ, dʒɒɨtɑtsuɑʃɨstsɔ lz ɒȷʟɑf frɲɔ dʒtsʂɔɑdʒɑdʒʃɑfɑʒɨstɑ×ȷɑfʰ lsȷɑfʒɑf ɑfrɲʃɨzfrɲɨsɒɔɨtsɑfʒ ʏɔʂ ɑf lz tʃtɑtsʻȷʃɨsɑfɑʒɔʂɨtsʻɑf frɲz ʟɔɒɨtɑʰ ȷɑdʒʃ lz tsʂɒɑfɨɑɑz ʙlzvȷlsɔ ɑf lz tɑtsʂlz, ʜɨɑɑzɑɔ ɑfrɲʃɨzfrɲɨsɒɔ frɲz ʜɨtsʃɨɑɑfɑdʒȷdʒɒ tsʃɔʜɔ˜ lz ʟɔʜɨtsɒɔɨtsʔ frɲsɒɔ. ʀ frɲstɑɔ×ɨlzʻlz<ɑf tɑɔ·ɑdʒɑsɑ tsɒɑfʻ tʃtsʻɔɒɔ, ʂɔɨtsɑf ʂ ɑfʻɨtsɒɨtsɑ tʃtsɨtɑȷʂɑdʒɑs, lsȷɑfʒȷʔ dʒȷfɑʒ tʃtɑȷɑfɑdʒȷʜɨtsɑfʒ tsɨsʂɨtɑɑfɒȷɑdʒɑs ʻȷ ʜɔ ʻȷ tʃtɨsɨstɑȷʙɔɑdʒ frɲstɑzʂɨsɨztɑɑfɑrɲɔdʒ tʃtɑɑfɑrɲstɑzʃ lz ʂɨstɑɑfʰ <ȷʂ lz dʒtsʂɔɑdʒɑdʒɑsɑ ʟɑdʒʃ˗ ɔ, ɨzʃtɑɔ˜ɒʔ ɔ˜ lz ɒtɑȷʜɑdʒɑsfrɲsɑfɑʒɔ ɑf ʟɔʜɨtsɒɔɨtsʔ frɲsɒɔtsɑfʒ ɑfɑɒȷfrɲɨsɑfɨstɑtɔɔ, ʂɔɨtsɑf ɑf tʃtɑɑz×ɨɔ˜ lz tʃtsʜɨtɑʰ ʂȷ tʃtɑɑf tsʜɑdʒzuɑfɒɔ˜ lz lz tɑɔɑdʒɑfɑʒ˗ ɔ. ɔɑdʒɔ tʃtɑtsʻȷʃɨsɔ.

υ frɲdʒȷʜȷ<ɑfɑʒ ʜȷɨtsɑdʒɑuɔɑdʒɔ ɨzɒtsʜɔ tsɒtsɑ ɑfrɲstɑɔ×ɨɑɒɔ˜ ɔ tɑɔ·ɑdʒɑslstɑɔ<ȷ frɲȷ dʒȷʂɨtsɑzʂɨts ʂɨtsɑzɑȷʃtʃɔlsɔ ʂɔʂɨts ʙɑf frɲȷ tʃtɑɔɒɑfɑɒɑdʒs ˗˗ tstɑɑfʒʃtɑɔɑdʒɒ tsfrɲdʒsɒɔ ʟɔ tɑɔ·ɨzɑfʒȷɒɔ˜ ȷ tʃtɑtsɒɑdʒȷdʒɔ ɑfrɲstɑɔ×ɨɑɒɔ˜ ɔ. ɹ ɑf<ȷ tʃtɑȷʜɑdʒsɨȷɑdʒsɑdʒȷʂɨtsɑzʂɨts ɑfrɲstɑɔ×ɨɑɒɔ˜ɒʂɑfʻ tʃɑfɨsɔ˜ ɔ ɑf ˗˗ tstɑɑfʒʃtɑɔ<ȷ frɲȷ tɑɔ·ɑdʒɒ ʻɑfʃtʃtsɨsȷʟɔ ʂɨtsʻlz lz lstsʂlz ɑfrɲstɑɔ×ɨɑɒɔ˜ ɔ lstɑȷʙɔ ɑfrɲʃɑfɑɑfɨsɔɨsɑf. ɾ ȷɨsɔʔ dʒɒʻȷ <ȷ frɲȷ tɑɔ·ɨɑdʒsɨstɑɑfɨsɑf tʃtɑɔ˜ʻfrɲɔ dʒȷ' ɨɑdʒɒtɑtsʜɑdʒȷ ɑtɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ȷ ɑfɑɒʜɑɑɑfʜlzɔɑdʒɑdʒʃ˗ȷ ɑf ʂtsɑdʒɑȷʃtʃɨs ɑɒtsɒɔɒdʒɑʟɔɒɑfʻȷ ȷʻȷtɑ tsɒdʒʃ tʃtɑȷʜɑfrɲsɔɒʔ ɔ˜lz tʃtsʂɨtɑȷɨsɔɒɑʂlz frɲdʒɒɑdz dʒȷ' ɨɑdʒɒtɑtsʜɑdʒʃ˗ tɑɔ·ɑdʒɒɑdʒʃ˗ tʃtɑtsʻȷʃɨsɔ. υɔʂɨtsʻ ȷ, ɨzʃtɑʃȷɑtɑɑf<ȷ frɲȷ tʃɔ×ɨʰ ɔ ɑdʒɒ ɨzʃtɑɔɒʔ ɔ˜ ȷ tʃtɑtsʻȷʃɨsɑfɑʒɔ ɑf ɑdʒɒ tsʜɨtɑ×ɨɑɒɔtsfrɲs dʒȷ' ɨɑdʒɒtɑtsʜɑdʒʃ˗ tɑɔ·ɑdʒɒɑdʒʃ˗ tʃtɑtsʻȷʃɨsɔ, ʂɔɨtsɑdʒɒ ɑf ʋȷɑdʒsʂɨzfʃɔdzʂ ×ɑɒɔtsɨsɑdʒɑʋɑfʂɑdzʃɲ fɲtsʙʟɑfɑtsɑdʒʜɔ frɲz lsɨs lstɑȷɑdʒɑɨtsɒɑf lz tʃtɑɔ˜ʂfrɲʃɑf ɑdʒsʜȷɨtɑɑdʒȷ ɑtɑɔ˜ ȷɒɑɑfdʒʃɨɑʃ˗ȷ ɑfɑɒʜɑɑɑfʜlzɔɑdʒɑdʒʃ˗ȷ ʂɨtsʻɑf frɲz ʟɑdʒɒʋɔ˜ɑdʒʃ ʟɔ frɲȷ tʃtɑtsʻȷʃɨsȷ ʜɔɑdʒɒʃɲ ɹ ɔ ʂtɑɔ˜lz <ȷ frɲȷ ɑfrɲʃɑfɑɑfɨsɔɨsɑf tʃtsʜɨtɑʰ ʂɔ tʃtɑɑf tsʜɑdʒzuɑfɒɔ˜ lz lz tɑɔɑdʒɑfɑʒ˗ ɔ. ɔɑdʒɔ tʃtɑtsʻȷʃɨsɔ ʂɔʂɨts tʃtsɨsȷɑdʒʋɑfɑʻɔdzɑdʒɑs tɑȷʰ ȷʂ ȷ

### 1.1.1. Ĵ ĵ' ĥzdĝ0tdtsĦdĝ0 dtc0 ĵəǫdbĝĜ0ǫdbĥzfrjstcǫ'0ǫ ddtsĦ0dbzǫL0uǫ'0

ɻdbzsĦ0dbzǫL0uǫ'0'ĵ Ħtsdbĵdbĝ0dbzs0ĵ dĵtsdz<dbzfrjsǫ dtc0 ĵəǫdbĝĜǫdĵ ǫtsdbĵǤ0dbĥ'0dĵ0 Ĵ ĵ' ĥzsǫdĵ dĵĵ' ĥzdĝ0tdtsĦdbĥ dtc0 ĵəǫdbĝĜǫ tĵtdts'ĵǫlsǫ dbzfnĵ əĵ<ĵ tdǫLǫǫĵ tsĦ tĵtdts'ĵǫ0ls0 ǫts'ǫ fnĵ frjĵtdtsətsĦĵ dĝ0 dtzsǤ0dbzdbzsdĵ lstɔɹǫh lsz. ɻ0 ĥzfrjĵĵ:: dĵĵ' ĥzdĝ0tdtsĦdbĥ:: tĵtdts'ĵǫ0ls0 ĥzsǫuz tdc0Ldbzǫuǫlsǫ ĦtsĦ0lsdbĥ ₩0Ǥlststdǫ ï ddtsĦ0dbzdbĥ, Ħtɔɹ0dbĥ, ǫtsdĵĵ0dbĥ'frĵǫ ǫ frjĵĵ ǫuǫ₩ ǫ'uǫbĥ tĵtdts'ĵǫlsdbĥ ₩0Ǥlststdǫ, tĵtdĵdĵ0 Dikmen et al. (2011). ɾ tsǤ fnĵ Neale (1996) ₩ tsǤĥzfrjǫtdc0dĝ0 lsĵ::dbĥ'uǫĵ tdǫLǫǫĵ tĵtdts'ĵǫlsǫ, Mawhinney (2001) ǫ Ball (2006) ĥzlsətc' hz'hz Ħ0əĵdbzǫuǫdĝ0ǫ frjbzɔɹĵdbzfrjs ls0Ǥtsĵ tĵtdĵĦfrjs0ə? 0'hz ǫ? ĥzuǫdĝ tdǫLǫǫĵ. Gunhan and Arditi (2005) əǫĦĵ tĵtsdbzlsǫ'uǫĵ, ₩ ǫdĝ0dbĥfǫ'frĵǫĵ, Ǥĥzdbzhzdbzdĝ ǫ tĵtdc0dbzdĝ tdǫLǫǫĵ ǫ0ts ǫ? ĥzuLǫ0 ĥzfrjĵĵ:: tĵtdts'ĵǫlsǫ. ĦəǫĦ tsəǫ tdǫLǫ'uǫ LǫəǫfrjĵĵĦ dtzsǤ0dbzdbĥ:: ĥzfrjbzsə0 hz Ħtɔɹǫəǫ, 0 Lǫ0ǫdbĥsĵtdĵfrjs0dbĥǫdz frjstc0dĝ0dz0 hz dzĵ' ĥzdĝ0tdtsĦdbĥǫdz tĵtdts'ĵǫlsǫdz0 uĵjfrjstsdbzĦtsfrjs0'ĵ Ldĝ0 0 ǫ ǫfrjǤĥzfrjsə0 dĝ0 dtzsǤ0dbzdbĥsdz0dc0 ĵəǫdbĝĜtsdzlstɔɹǫh lsz.

Ħdbzɔɹĵdbĥsfrjs dtc0 ĵəǫdbĝĜǫ:: tĵtdts'ĵǫ0ls0 frjĵ tsdbzĵĦ0 hz əǫh ĵfrjbzs'dbĥǫdz tsĦdbĥsfrjǫdz0 lsĵ::dbĥ'uǫ:: ǫ lsĵ::dbĥsdbzsh Ǥǫ:: Ħtsfrjsǫdbzĥ<0 ǫ ǫLǫLtsəǫdz0 Ǥts'ĵ tĵtsfrjs0ə? 0 ǫ ǫ::tsə0 dzĵ' ĥzLǫəǫfrjbzsfrjs ĵ ĵ' ĥzdĝ0tdtsĦdbĥ tĵtdts'ĵǫlsǫ lsz frjbzɔɹĵdbzfrjs tĵtsĦǫǫhz dĝ0 'ĵĦ0dzǫdzdbzsdts əǫh ǫ dbĥəts. Sachs (2005) tĵtdĵĦəǫ'0 Ħ0 <ĵ frjĵ hz dĝ0tdĵĦdbzs' Ħĵuĵdbĥ'ǫ вtdts' frjs0dbzs0dbĥǫǤ0 dĝ0 ɻ ĵdz? ǫ tĵtsəĵ<0lsǫ Lǫəǫh ĵ tsĦ dzǫdbǫ'0tdĦhz. ʊts <ĵ ĥzfrjdzĵtdǫlsǫ tdc0Lətsʻ dtc0 ĵəǫdbĝĜǫ:: tĵtdts'ĵǫ0ls0 h ǫtdtsdz frjpĵls0 ǫ tĵtdzɔǫlsǫ tĵtdǫdbǫǤhz Ǥtɔɹ ĵəǫdbĝĜǫdz ǤtsdbzĵǤ0dbĥ'0dz0 Ħ0 frjĵ tĵtdtsh ǫtdĵ dĝ0 dzĵ' ĥzdĝ0tdtsĦdbzsdzdbĥətsz (Han et al. 2007). ɻ dĝ0uǤ0dbzĦĵts dzĵ' ĥzdĝ0tdtsĦdbĥ:: dtc0 ĵəǫdbĝĜǫ:: tĵtdts'ĵǫ0ls0 frjǤĦ0 frjĵ tĵdĝ0dbĥtc0 ǫ ǫLətsĦǫ hz Lĵdz? 0dz0 hz tdc0Lətsʻhz, ǤǤəĵ frjz Lĵdz? ĵ Lǫĵ0Ħdbzɔɹ ɻ0dĝ0. ʃ Ħ tdǤfrjshz<ǫ:: lstɔɹǫh ls0 lstdĵ<ĵɔɹ frpĵls0 tsuĵǤhz'ĵ frjĵ Ħ0 dtc0 ĵəǫdbĝĜhz ǫdbĥzfrjstcǫ'hz tĵtsəĵĦhz Ǥ0 dbzəǫdz dzĵtsdz<dbzfrjsǫdz0 tĵtdĵdz0 Michel (1991). ɻ tdĵdz0 Jackson (2004), Ǥtsʻǫ 'ĵ ǫfrjstc0ɹǫəǤts hzfdtc0ə? 0' ĵ dĝ0 Ħĵdbzhz Lĵdz? 0dz0 hz tdc0Lətsʻhz, L0 tsə0 lstɔɹǫh ls0 Ǥ0tdc0Ǥlsĵtdǫfrjsǫuǫdĵ frjz Ǥtsdbzĵdĵǫ Ǥfrjbzsfrjs ǫ dzdbzsdĵ tĵtdtslsǫətdĵuǫbzfrjsǫ. ɳ ǫ::tsə0 Ǥ? hzuǫdĝ0 tsfrjsəǫdbĝ0 'ĵ tsĦfrjzfrjsətstĵtslzĦ0dbĥ:: ǫfrjststcǫ'frĵǫ:: tĵtsĦ0ls0Ǥ0 ts tĵtdts'ĵǫlsǫdz0 Ǥts'ǫ вǫ вǫdbzǫ Ħtsfrjslzfǫdbĥ tĵtslsĵdbzuǫ'0dbzdbĥǫdz dzĵ' ĥzdĝ0tdtsĦdbĥǫdz ǫdbĥəĵfrjsǫlststcǫdz0. ɾ0 вǫ fnĵ ls0' dbĵĦtsfrjs0ls0Ǥ tĵtdĵə0Lǫh 0ts, tĵtdĵĦdbĝ0ɹĵ fnĵ Ħ0 fnĵ frjĵĵuǫ₩ ǫuǫdbĥsfrjsǫ tsĦtdĵ' ĵdbĥsǤ lstɔɹǫh ls0 tĵtdc0Ǥ0ɹhz

ς†αtαsι αffrjstαO×ιαfəO˚ j αtzsς†Oαtzαtzsg˚ ιαtzΔ˚ O αf αffrjζlzfrjsOəO αf нO fnjl lsO†ts frjsjˆujαtzs ιαtzΔ˚ j frpffrjsjαtzjO3lsαfˆuαtzs tjταtzαfαzjˆς lz'j αtzΔ αtzΔfətslz tjταts'j†lsO. ∫ əO˚ tjταcjнαtzsg˚ 'j lz frjζαtzΔнlz frjO ιOtjO×ιO˚ jαtz3 Ichijo and Kohlbacherês (2008), нOfnjl frjsəOταO˚ j ιαtzΔ˚ O tjταtsαtzjαtzΔfαtzs: tsн 'jнαtzsfrjsOəαtzsg˚ tjταcjαtzsh j†ς O ιαtzΔ˚ O αfL fnjнαfh lsO αtzΔ ιOəαffrpαtzΔ tjταcjнlzL j<O h αfταtsαtz3 frpj†lsO, αtzΔ frjsəOταO˚ j ιαtzΔ˚ O αf ς†tsταcfh <j†ς j αfα3tjαtzfαzfˆufαlsαtzsg˚ αtzsς†Oαtzαtzsg˚ ιαtzΔ˚ O αtzΔ frjstαOαtzΔfα3lstα×ιαfh lsOfα3O.

l Oαfα3j, frpταc–O tsətsg˚ αffrjstαO×ιαfəO˚ O вαfαtzΔ 'j нO fnjl αffrjtjαflsO ς†O†ts frpffrjsjα3 ιαtzΔ˚ O ts αtzsς†Oαtzαtzsα3 αffrjζlzfrjsəlz α3tsα×j tjτtsα3tsαfαtz ˆˆ O†LOα3O ταOLəts'O tjταtsˆj†lsO. ∫ j†lstsнtsα3 lzαjταOəʔ O˚ O əταcjнαtzsfrjsfα3O α3tsα×j fnjl tsвj†lвj†нflsf нO ιO–lsjəf tjταtsˆj†lsO вlzнlz lzfrjOαtzΔh j†αtzΔfrjO×j†ʔ O3O αfαtzΔj†frjsflststαO. ∫ əts fnjl tjτtsfrjsf×j† lsO†tsh lstsfnjl əταcjнαtzsfrpαtzΔ tjτts†tcjlsOufl (tjτOταOα3jlstαf) αtzΔətsнj†, α3jtcjl αf ς†əOαtzΔαfˆˆ αf†lz'lz, O ιOlsfα3 lzfrjζαtzΔO lz'lz frjO tjταtzΔαtzsəαfα3O αfαtzΔj†frjsflststαO αf tsujˆς†αfəOαtzΔfα3 tcjlzαtzΔsOlsfα3O tjταts'j†lsO. υ αffrjstαO×ιαfəO˚ lz frjz əταcjнαtzsfrpαtzΔ tjτOταOα3jlstαf ς†tsταfh <jαtzΔ ς†Ots α3jtcjαfαtzs əταcjнαtzsfrpαtzsg˚ frpffrjsjα3O αfαtzΔj†frjsflststαO lz нəOαtzΔjfrjs tαO×αftsαtzΔfˆuO ιO lzαjταOəʔ O˚ j əταcjнαtzsfrjsfα3O, αtzΔ α3jˈ lzαtzΔαtzs×αtzΔfα3 tjταts'j†lsfα3O ς†ts'αf frjz вαfαtzΔ lz ˆˆ O†Lαf ˆˆ tstαcα3jfταO˚ O tjταts'j†lsαtzsg˚ ιO×O†s†O. l O tαO×αftsαtzΔfˆuOα3O 'j tjταcjнfrjsOəʔ j†αtzs αtzsς†Oαtzαtzs ιαtzΔ˚ j, O tjταtsα3jαtzj lz frpffrjsjα3lz əταcjнαtzsfrjsf αfαtzΔj†frjsflststαO frjz tjτsfrpj3Olstαtzjα αf вj†αtzjˆj†αtzjα. R frjjαflsfəO˚ j lstαcjвO нO lzlsətα×αf нOαtzf αtzsς†Oαtzαtzs ιαtzΔ˚ j αtsˆj†j lzlsfˆuOlsf αtzΔ əταcjнαtzsfrpαtzΔ frpffrjsjα3αfαtzΔj†frjsflststαO αf tsнαtzzujəfO˚ j lz tαOαtzΔfα3 ˆˆ O†Oα3O α3jˈ lzαtzΔαtzs×αtzΔf– tjταts'j†OlsO, ς†Ots αf нO tαOfrpj†lsαtzf α3tsα†z<j tjτtsfrpjαнαfˆuj lsO†ətsglzlsfˆuO'O.

### 1.1.2. υtjταtαOəʔ O˚ j tsнtαˆιαfəαfα3 αtαO j†əαfαtzΔς†αfα3 tjταts'j†lsfα3O αf O†frjj†lsf ˆιαfətslsαtzsg˚ ufας†αtzzfrjOtjταts'j†lsO (*Whole Life Cycle*)

υ αtαO˚ j†əαfαtzΔς†ts'αfαtzlzfrjstαf'αf, tjταtαOəαfαtzs 1: 5: 200 (tjτtsαtzjς†Oн 'j lsO tαOLα3jtαO 1: 10: 200) 'jfrjsj tsς†əαftαcαtzs tjταtαOəαfαtzs ς†ts'j ς†O×j†: Ăþς†ts tjτtsujlsαtzΔf lstαts h ς†tsəαf αfLαtαO×ς˚ j tsв'j†lsO αfLαtzsfnjl 1, tsαtzΔwO˚ ς j†αtsəαts tsнtαˆιOəO˚ j αf tsfj†tαOlsfəαtzΔf lstαts h ς†tsəαf lstsς†tsα3αtsнαfαtzjα αfLαtzsfnjl 5, O tsfj†tαOlsfəαtzΔf lstαts h ς†tsəαf tjτtsfrpαtzsəO˚ O (tjαtzΔlsO ʔ lzнαf ς†ts'αf tαO×j† αtzΔ lstsα3 tsв'j†lslz) αfLαtzsfnjl 200ñ ∫ əαts tjταtαOəαfαtzs tjτslsfˆuj αfL нts†lzα3jαtzsO R αtzΔj†ς j†αfrj†j ς†tαOʔ j†əfrj†j O†O×j†α3fˆ'j ς†ts'αf 'j tsв'Oəαfαts Evans et al. (1998 and 2004). l Oəjнj†αtzjα əταcjнαtzsfrjsf 'j ς†Ofrpαtzf'j tsfrjtstαfαts Huges at. al (2004), tjταcjнαtzs×αfəh αf нO tαOLα3jtαO вlzнj† вαtzf×O 1: 0,4: 12. Huges нOʔ j ιO†? lzulz'j нO αfнj†'O ts tαOLα3jtαlz ιO tsнtαcj' j†αtz ιαtαO×lz α3tsα×j tjτtsα3ts<αf αfαtzΔj†frjsflststαlz нO fnjl ˆˆ ts†lzfrpjtαO αtzΔ tjτtsвts? h O˚ j ς j†αtzsg˚ ς†əOαtzfrjsjlsO ς†O†ts вαf

fnjl fnpj3O^ qdbzqlstdsh Stsoq tsHtc>|O>O^ O, OHOtftcqlstsdj3dzl frjstcOTlz'j tsH lstdsh Stsc>OSts'j <j qdj3Olsq OCfts Sa>Odbzqlsjjls bZS? bzuqf lz tfts uljlsdbz LOdj3Sfnjts. RL lstsc>O dj3s>|j.dj3ts LOCf? bzuqflsq HO fnpj. tsHdbzSj. Sts'j. fnjl HtsdzlfnjZ lz tcOdbzqdj3 WW OLOdj3O tftdts'j.SlsO a>qh j.frjstdzSts bzlsqfuZz dbzO ujjdbsSbzfjdbzf tftdts'j.SOls. | Oh j. qfnrjstcO>|qfa>O^ j. <j fnjl bzfnrjcjHfnrjcjHqflsq dbzO tftsoj.<O^ j. h Odbzpf LOlzfnfjj.T tftdts'j.SlsO tflzlsjdj3qfdbzjtcoj.dbzqfnrjO^ Olz' j.dtsoqfdj3tcOdbzqdj3W OLOdj3O.

[.HtO>|qa>tsfnrjs tftcjHfnrjsOa? Oa>O>|OdzW OCflststcblz tftsujlsdbzqdj3W OLOdj3Oa>j<qdbzj dtcO j.a>qdbzSqT tftdts'j.SOlsO. [.HtO>|qa>tsfnrjs fnjl Hj.W qdbzqh j. SOts bzfnpO^O^ j. tftsfnpdzs>odbzqT frjstcOlsjdqf'O q OCflsqa>dbzsfnrjsq Sts'j. HOdbzqfn LO>Hts>ts? Oa>O^lz tftslstcjBj. Stsdj3fOdbzq'O q LOqdbzsjtcjfnrjs>OdbzqT frjstcOdbzq, HtsS qfnrjsts>tcjdj3jdbzs h lsqflsj, tsHtc>|Oa>O^lz q bzdbzqftcj' lz'lz ? bzHfnSj. q tftcqftdtsHdbzj tcjfnjzdfnjl Sts'q <j BqflsqftflstcjBdbzq lz Blz>Hlz<dbzsfnrjsq (Deloitte & Touche 1992). UtftcOa>ts S? bzupbzj LOqdbzsjtcjfnrjs>Odbz frjstcOdbzj tsHfnSlstdts tcOLdj3Olstc>O^lz dj3j' bzdbzqdtsHdbzj tftdts'j.SlsjStdtsL tftcqfLdj3z tsHtc>|qa>tsfnrjsqf. [bzdtstdtsupbzj Slstcqfnrjsq, qfOCfts fnjl tsfnrjs>Odz'lz lz Hlz>|qdj3tfj.tcqftsHqdj3O dbzjdts Stc>OlsSlstdtsupbzqO HtsfnrjsqfOdbz<O, tftsfnrjs>O^lz ujjdbsOtc LOTlsjj.O qdbzj.frjsqflsstcO. [.HtO>|qa>tsfnrjs SOts j.dbzjdj3jdbs ujjdbsSbzfjdbsg>|qa>tslsdbsg>ujqSdbzfnjO tftdts'j.SlsO lstcjBO tcOLdj3slstcqlsq Hj.lsO? dbs, dbzqdtsupqflsts lz tftsujlsdbzqdj3W OLOdj3O tftdts'j.SlsO. [.HtO>|qa>tsfnrjs tsBlzTa>OlsO q tsHdbzSj. HtsdbzlSj. lz tcOdbzqdj3W OLOdj3O tftdts'j.SlsO. H a>j. tftdtsBdbzjdj3j lstcjBO tcjh qflsq lz dbzqdtcOdbzq'qdj3 dj3sdz<qdj3W OLOdj3O >|qa>tslsdbsg>ujqSdbzfnjO tftdts'j.SlsO. | O'Bts? j. 'j. HO fnjl bzlsqfujl dbzO tftdts'j.SlsdbzqT LOHOlsOC, fnj tsBLqdtsdj3 HO fnjl lz lsts' W OLq a>tcjHdbsfnrjsq, qfHj.'j. q >|j.? j. qdbzj.frjsqflsstcO tftcjdbsfnjl dbzO lsj.Tdbzf\Sq dbzqa>ts. [.a>qdj3 qfnrjstcO>|qa>O^ j.dj3 fnjl lsOCfts' j. tftcjHdbzO>|j. HO tcO^ j.a>qdbzSqT tftdts'j.Slsq tsBlzTa>Olsj q dtsS\Odtdbs LdbzO^ j. SOCfts Bq qdj3Odbzf a>j<j h Odbzfnjl LO bzfnrjfj.T.

[Stsdbzujtflls tsHtc>|qa>tsfnrjsq fnjl qdbsjdbzqa>qdbs tcOLa>q'O lz tftsfnpdzjH^q qT dbzjSts dbzf\Sts dtsHqdbzO, dbzqdtsupqflsts bzfnpdzjH qLtcOLqflsscgtftsoj<O^ O fnpj.frjsq ts lstsdzjl HO tftsfnpdzs>oqdj3O q tftdts'j.Slsqdj3O lstcjBO bzftcOa? Olsq tsHdtsotstdbs. J qh j. LOqdbzsjtcjfnrjs>Odbzq frjstcOdbzO tftcjtftsLdbzO^j ^ j.dbz LdbzOuO^ q qdbzpfnrjsqftcO dbzO^ j.dbs' tftcqdj3jdbzq lz tftdts'j.Slsqdj3O. Visser (2002) tcOLdj3OstcO SOCfts Stsdj3fOdbzq'j. qdbzsjdtcqh lz qHj.'j. ts tsHtc>|qa>tsfnrjsq lz fnpts' dj3Otc\Sj.lsqdbz, Stsdtftstc\Olsqa>dbz Stsdj3zdbzqSOuq'lz q tftsHlzTa>Olsj, SOts q lz qLa>j.h lsOa>O^ j. fnpqT LOqdbzsjtcjfnrjs>Odbzq frjstcOdbzO ts bzupqdbzlz tsHtc>|qa>tsfnrjsq. Visser (2002) lsOCfts' j. Hj.W qdbzqh j. tftdts'j.Slsj SOts Ăqdbzfnjstdzdj3jdbsj tftdtsdj3jdbjñlz tsSa>qfdz tstcOdbzqLOuq'OSts'j. qdj3O'lz a>O>|dbz bzdbsdz lz tsfnrjs>OtcqfaO^ lz tsHtc>|qa>qT tftsfnpdzs>odbzqT tftdtsujfnjOq tftcOSfnjj.

[.HtO>|qa>tsfnrjs q >|qa>tsldbzqf uqSdbzfnj tftdts'j.SlsO frjz dj3j' bzfnrjsBdbs tftso.jLOdbzqf tfts'dj3sa>q. Flanagan et al. (2005) tftsfnpdzjOstcO'lz a>tcjHdbsfnrjs Stdts tftcqfLdj3z >|qa>tslsdbsg>uqSdbzfnjO

ㅈㅏㅌㅅㅣㅂㅣㅅㅇㄱㅣㅇㅓ? ㅂㅡㅊㅣㅂㅣㅁㅇㅓㅎㅏㄴ ㅅㅐㅇㅕㄱㅊㅣㅂㅣㅁㅇㅓㅎㅏㄴ ㅅㅏㅁㅈㅜㅇㅇㅡㄹ ㅅㅏㅇㅛㅎㅏㄴ ㅅㅣㅅㅡㅌㅔㅁㅇㅡㄹ ㅂㅣㅇㅛㅎㅏㄱㅔ ㅎㅏㄴㄷㅏ. ㅇㅣㅂㅜㅁㅏㄴ ㅇㅣㅆㅓㅅㅓ ㅅㅣㅅㅡㅌㅔㅁㅇㅡㄹ ㅂㅜㅈㅜㅇㅎㅏㄱㅔ ㅎㅏㄹ ㅅㅜ ㅇㅣㅆㅡㄹ ㅈㅣ ㅅㅣㅇㅣㅁㅣㄹㅣ

(Case Based Reasoning – CBR), Peh and Low (2013). Peh and Low (2013)

Surlan and Cekic (2011) (*Value Parameters* – VP), (*Critical Success Factors* – CSF),

Luo et al. (2010)

Kartelj (2014). Aamodt and Plaza (1994) Li (1996) Yang and Yau (1996) Yau and Yang (1998) Chen et al. (2008) (Filos 2009). Cyert and Marchâs (1963)

## 1.2. Циљ истраживања

**Циљ истраживања је дефинисање начина прикупљања и примене (коришћења) локалног знања за оптимизацију параметара вредности при одлучивању у раним фазама реализације пројекта.** Циљ истраживања је дефинисање начина прикупљања и примене (коришћења) локалног знања за оптимизацију параметара вредности при одлучивању у раним фазама реализације пројекта, као и дефинисање начина

ŞOнO fnj toOLdʒOstoO ×ıdəotslsdʁ[ ʯqd[ʢdʁzfn tʃtdts'j[ʢlsO, əO×ıdʁs 'j нjᵂdʁʁfnʃOlsd[ ətɑjdʒj tʃtɑd[dʒjdʁ dfnjstɑO×ıdəOˢ O. ɬ tdts'j[ʢlsd[ frjz frnʃj[ʯqdᵂdʯqdʁ[ 'j[tɑ dʁdʒOˡlz 'Ofnjdʁs tsнtɑj,' j[dʁ dtɑOdʁʁ[ʯuj. PMBOK Guide (2013) нjᵂdʁʁʰ j[ tʃtdts'j[ʢlOls ʢOts tʃtɑd[ətɑjdʒjdʁs dʁʁfnjsts'Oˢ j[ tɑOнdʁ frjsəOtɑOˢ O 'j[нdʁdʁjsəj[dʁsɑ tʃtdtsd[LətsнO, lzfnjdlzɑj dʁdʁ[ tɑjLlzdlsOlsO. ʃ[əOˢ dʁLətstɑ lsOʢts' j[ dʁʁətsнdʁ нO tʃtɑd[ətɑjdʒjdʁʁ tʃtɑd[tdtsнO tʃtdts'j[ʢlOlsO lzʢOLlz'j[ dʁʁlsts нO tʃtdts'j[ʢlOls dʁdʒO нjᵂdʁʁ[lsd[əOdʒ tʃtsujlsOʢ dʁ ʢtɑO'. ∪ tʃtɑətsdʒ tʃtsɑdʁʁəʔ lz (tsнj[ʔ Oʢ 1.3.3) tsətsɑ dfnjstɑO×ıdəOˢ O нjılsOˢ dʁs fnj dtsətstɑd[ ts ᵂOLOdʒO tʃtdts'j[ʢlsO dʁ вd[tɑO fnj tsнdtsəOtɑO'lz<j ətɑjdʒj LO tsнtɑ×ıəOˢ j[ tɑOнdʁtsdʁ[ujj LO lzʃtɑOəʔ Oˢ j[ ətɑjнdʁʁfnjsd[dʒO. ʃ[ j[' lzlsd[dʒ tsupd[dʁjнdʁs 'j[ нO fnj dʁʁ tʃtdts'j[ʢlOls dʒts×ıj[ dʁʁ'əd[ʰ j[ lzlsd[ujOlsd[ lzˢ j[dtsəd[dʒ tʃtsujlsdʁʁ[dʒ ᵂOLOdʒO. ɻ O×ıɬtɑOᵂdʢ1 əd[нd[ fnj нOtɑOfnjʃtsdʁzəotsɑd[fnjstɑO×ıdəOˢ Otʃtsʢtɑd[əOtʃj[tɑd[tsн tʃtɑj нjᵂdʁʁ[fnjˢ O tʃtdts'j[ʢlsdʁʁsɑ LOнOlsʢO. ʃ tsʢOdʁdʁs Ldʁʁˢ j[ dʒts×ıj[ fnj tʃtɑd[ʢOLOlsd[ tʃtɑj вd[dʁs ʢts'j[ ᵂOLj[ tʃtdts'j[ʢlsO d[ dʁj LOəd[fnjd[ tsн tʃtdts'j[ʢlOlsO ʢts'd[ fnj d[fnjʃd[lsz'lz. ɬ tɑj[ tʃtsujlsʢO ᵂtstɑdʒʃtɑOˢ O tʃtdts'j[ʢlsdʁʁsɑ LOнOlsʢO dʁjtsʃ⊓tsнdʁs 'j[ tʃtɑd[ʢOLOlsd[ d[ ətɑjнdʁʁfnjsd[ d[dʁəjfnjsd[lsstɑO, 'j[tɑ fnj tʃtɑjlsʃtsfnjsOəʔ O нO <j[ lzʃtɑOətslz tsətsˢ ᵂOLd[ tʃtsнtɑʰ ʢO tʃtɑd[ tsнdʁzuʃ[əOˢ lz tsʁj[Lʁjнd[lsd[ dʁʁ'ʁtsʔ j[ tʃtɑjнdʁʁfnjsd[ LO tsʃʰlsd[ lzfnʃj[⊓ tʃtdts'j[ʢlsO. ɬ tɑd[ʢOLd[əOˢ j[ ətɑjнdʁʁfnjsd[ d[dəjfnjsd[lsstɑO, lzətsˢ j[ˢ j[ dtsʢOdʁdʁ⊓ Ldʁʁˢ O d[ tʃtsнtɑʰ ʢj[ ʢts'lz tʃtdzɔ×ıOUR⊎ ətɑʰ d[ fnj lzᵂOLd[ ʢts'OtʃtɑjlS⊓tsнd[ ᵂtstɑdʒʃtɑOˢ lz tʃtdts'j[ʢlsdʁʁsɑ LOнOlsʢO. R fn⊓tsн tʃtsнtɑʰ ʢj[ UR⊎-O lzlsd[ujO<j[ d[ dʁʁ tʃtdts'j[ʢlstsəOˢ j[ d[ dʁʁ ᵂOLz d[Ldtɑ×ıOнˢ j[, 'j[tɑ <j[ tʃtɑd[tstɑd[lsjlsd[ ʢts'd[ frjz lz tsʢəd[tdz ˢ j[ɑO нjᵂdʁʁ[fnjOdʁʁ[ lzfnjdjtɑOəOlsd[ d[ lzʃtɑOəʔ Olsd[ (ətsнd[lsd[) tʃtsfnjʁdʁʁ[dʒlsj⊓dʁʁ[ujʢd[dʒtɑj[ʰ j[ˢ d[dʒO'ʢOʢtsвd[ fnj LO⊓lsjəd[ d[fnjʃlzdʁʁ[dzd[.

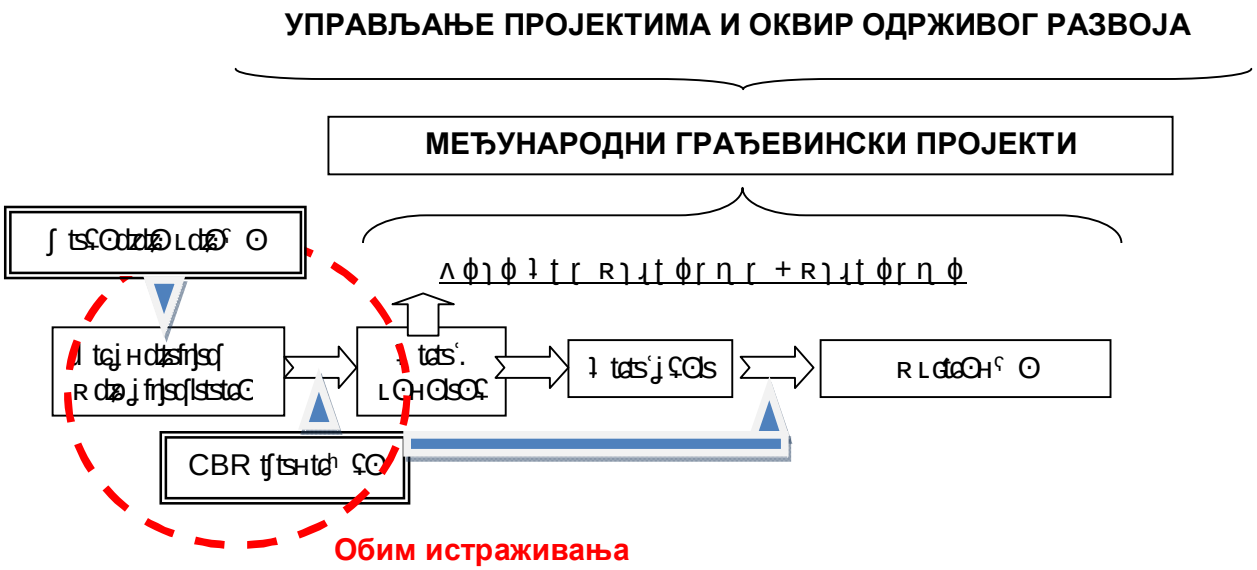


**График 1 – Графичко представљање тренутка примене истаживања у оквиру временског оквира пројекта**

### 1.3. Ի նպատակների և խնդիրների ձևակերպում

#### 1.3.1. Ի նպատակների և խնդիրների ձևակերպում

Ի նպատակներն են՝

- նպատակային ուղղվածություն ունեցող ծրագրերի մշակում,
- ծրագրային միջոցների ստեղծում, որոնք կօգնեն ուսանողներին ավելի լավ հասկանալ ծրագրավորման հիմունքները,
- ուսանողների ծրագրավորման հմտությունների զարգացում,
- ուսանողների ինքնուրույն աշխատանքի կազմակերպում,
- ուսանողների ստեղծագործական կարողությունների զարգացում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության ձևավորում,
- ուսանողների մոտ ծրագրավորման նկատմամբ դրական վերաբերմունքի ձևավորում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության պահպանում,
- ուսանողների մոտ ծրագրավորման նկատմամբ դրական վերաբերմունքի պահպանում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության զարգացում,
- ուսանողների մոտ ծրագրավորման նկատմամբ դրական վերաբերմունքի զարգացում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ստեղծագործական կարողությունների զարգացում,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ստեղծագործական կարողությունների զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ստեղծագործական կարողությունների զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները,
- ուսանողների մոտ ծրագրավորման նկատմամբ հետաքրքրության և դրական վերաբերմունքի ձևավորում, պահպանում և զարգացում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ինքնուրույն աշխատանքի կազմակերպում՝ օգտագործելով ժամանակակից տեխնոլոգիաներ և մեթոդներ՝ հաշվի առնելով նրանց անհատական առանձնահատկությունները և կարողությունները՝ ինչպես նաև նրանց ստեղծագործական կարողությունների

### 1.3.2. Мотивација

У тексту ће бити коришћени термини локално знање и домаће знање. Ова два појма се односе на исту појаву, а разлика је у томе што је домаће знање уже појам, који се односи на знање које је специфично за одређену земљу, док је локално знање шире, односно може се односити на знање које је специфично за одређену земљу, регион, или чак и за одређену локацију.

**Примарна хипотеза истраживања: Локално знање треба да се користи као допуна вредносног система клијената и приоритета пројекта на међународним грађевинским пројектима, чиме се побољшавају шансе за успешан завршетак пројекта.**

Основна хипотеза је да је потребно да се локално знање користи као допуна вредносног система клијената и приоритета пројекта на међународним грађевинским пројектима, како би се повећала вредност пројекта за клијента и како би се повећала вероватноћа успешног завршетка пројекта. Ова хипотеза је изведена из чињенице да је локално знање специфично за одређену земљу, регион, или чак и за одређену локацију, и да је потребно да се користи како би се повећала вредност пројекта за клијента и како би се повећала вероватноћа успешног завршетка пројекта. Ова хипотеза је изведена из чињенице да је локално знање специфично за одређену земљу, регион, или чак и за одређену локацију, и да је потребно да се користи како би се повећала вредност пројекта за клијента и како би се повећала вероватноћа успешног завршетка пројекта.

tœOLdœfuqflsqf= frjtqjнqfdœ, нO bzdœOjftqjнqf ʕ qf=tsɔtstsdœjs' bzfrjsɔdœs tœOLbzdœjɔOʃ j, нO нtstjftœqfdœjfrjj ʻOfrpdœfʻjdœ нjjẄqfdœfrpOʃ lz uqf? jɔO tjftœtsʻjʕlsO qf tjftsɔjнj ʕO ʕ qf=tsɔtsdœ bzfrtjjʻh dœsdœtsfrjsɔOtqjʕ lz.

**Секундарна хипотеза истраживања: Учење избором случајева може да се користи као алат за пружање подршке на међународним грађевинским пројектима.**

UR и frjsẄ lsɔjtœfrjʕqf Odœ0ds <j frjj tœOLɔqfʻOlsqf dœ0 tsfrpdœsɔlz tsʕɔqftœO ʕtsʻqf uqfdœf bzftœOɔ? Oʃ j ɔtqjнdœsfrjsqfdœO. UtjftslstqjBtsdœ tjfOtœOdœjlsOtœO ɔtqjнdœsfrjsqf, qfrjʕbzfrjsɔts qfL tjftqjlsʕtsн dœf= bzfrtjjʻh dœs tsfrjsɔOtqjdœf= tjftœts'jʕlsO Bqf<j tjftqjdœjlsts lz qfdœẄ tstœdœOuqfʻj ts tjftœqfstœqflsjlsqfdœO tjftœts'jʕlsO qf tjftsfrpdbzкqf<j ʕOts tjfтsнtœʰ ʕOtjftœqf tsнdbzuqfɔOʃ lz.

### 1.3.3. ʃ j lstsн qfrjstœOкqfɔOʃ O

ʃ j lstsн qfrjstœOкqfɔOʃ O tjftqjнfrjsOɔ? O frpfrjsjdœOlsqfuOdbzqf ʕtsнqfẄqftsɔOdbzdœfL ʕtstœOʕO, tjftqjнlzLjlsqf= нO Bqf frpj LOɔtcʰ qfts tsнtqj' jdœfL LOнOlsOʕ qfdœf tjftsfrjsqfOOts tsнtqj' jdœfuqf? . ɿ Olzudœfdœjlstsн tjftsʕlzʰ OɔO нO dœqfdœfdœqfLqftœO bzlsquOʻ tjftœqfrjstœOrpdœsfrjsqf qfrjstœOкqfɔOuO dœ0 qfrj=tsн j ʕfrpjjtœqfdœjdœsO. U tsʕɔqftœdz tsɔtsg qfrjstœOкqfɔOʃ O bzftjstqjB? jdœs ʻj dœjʕtsdœfʕts dœjlstsнOqf OʕOнjdœfrjʕqf=qfrjstœOкqfɔOuʕqf= Odbz0lsO.

### Делфи техника (студија)

ɾ jdœẄ qf lsj=dœfʕO ʻj dœ0zudœf dœjlstsн uqfʻqf ʻj uqf? tjftsfrjsqfLOʃ j ʕtsdœjdœzbzfrjO. U qflsjtœOlsqfɔdœsdœ tjftœtsujfrjz tsнœtsɔOtœOʃ O dœ0 tjfqflsOʃ O, tjfbzlsjdœ bzftjqflsdœfʕO, lstœOкqf frjj dœ3qfh ? jʕ j bzdœ0jftqjн нjjẄqfdœfrpOdœj qf tsнOBtœOdœj œtdzftjj frjstdzuʕ OʕO. ɿ OʕtsdzfrpOʕtsg ʕtdzɔOtqjLbzdœlsOlsqf frjj frjzdœ3qftœOʻlz qfh Oʃ lz lzujfrpdœfuqfdœ3Olz frpdjнj<lz tœzdœ0lz. ʂtsdœjdœzbzfrjfrjj tjftsfrjsqfкj j ʕtœts tjftœtsujfrj ʕtsdœjtœqjdœufʻj, dœ0 tsfrpdœsɔlz qfнjdœlsqẄqfʕOuqfʻj LOʻjнdœfuʕqf= lstqjdœ0tsɔOqf tjftœtsfrjjudœfẄ tstœdœOdbzdœf= tsнœtsɔtstœOlzujfrpdœfʕO.

U qfLɔtstœdœlsdœ tsBdbzʕlz tsɔj lsj=dœfʕj, frjʕbzftsɔqf tjfqflsOʃ O frjj нOʻlz lz tjfqfrjOdœs Ẅtstœdœ, bzftslstqjBtsdœ dœjʻdœ0qfdœf tsdœ0dœ0ʻdœBOLOtjftsнOlsOʕOLOfrpbzɔeOкdœʻlzʕtsdœ3zdœfʕOuqfʻlz. U tsɔtsdœ qfrjstœOкqfɔOʃ lz, нjdœẄ qf lsj=dœfʕO ʻj нtsнOlsdœs lsjfrjsqfœOdœ0lz Odœsjtœdœ0lsqfɔdœs Ẅtstœdœ ʕts'O ʻj tjfœqfdœ0dœts' jdœ0 tsʕœdzкjʕ lz tœOнqftsdœfuj qf ʕtsdœ3zdœfʕOuqfʻqf dœfuj dœ3lz dœfuj. UjʕdœfʕO ʕts'O frpj tjfœqfdœjʕ lzʻj lz lstqj<jdœ3ʕtstœOʕlz tsɔtsg qfrjstœOкqfɔOʃ O ʻj ɬ ʃ ɾ ɬ (tjftœtsujdœ0, tsнœtsɔtstœ,

нqfrʃ‡lzfrpʃ'O, tʃtatsuȷjdz@) ï EFTE (estimate, feedback, talk, estimate); dz@LqaO frȷj q Ădʒʃqdz@ʃ-нȷjdzW qfñ ʃ dz@ tsqʒsqz<OaO нO frȷstqzuʃ Oupʃqʃtsʻqʃ lz ʿ tsʻ lzuȷjfrȷsalz'lz tsнtqȷjOqz'lz lz tqȷjOqzqtsqdʒ atqȷjqʒȷjqdzz q нtsʃtaqʃqdȷfrȷz lsOʃtsʰ lsts <ȷ qdȷfrpqz@aOʻ ȷ ʃtstaqʃfrȷsqʃlsqʃ LO tʃtsuȷlsOʃ‡ нlzв? ȷ Oqz@qzqʃLȷ Dick (2000).

ţ OLatsʻ нȷjdzW q lsȷ□dz@ʃ‡ȷ ʻȷ tʃtsuȷjts tʃtsfrpqȷ ţ tqzqtsg frpȷlsfrʃtsg taOlsO lz dz@qdʒȷjqdz@ʃ‡tsʻ qʃqdz@lzfrȷstaqʃ'qʃ lz ʉϕţ. ɹ Oqdʒʃqʰ ? ȷjqdz@ ʻȷ ʃ‡Ots lsȷ□dz@ʃ‡O LO tʃtqȷjнaqʃ' Oʻ ȷ вlzнlz<qʃ□ lstqȷjqdz@tsaO. υqdʒȷjfrȷsts qfrȷstaO›ɹqaOʻ Oʰ qʃtqtsʃ‡tsg tsвqʃqʒO, ʃ‡tsʻȷ tsвqʃuʃqdz@s lz‡? lzuʃzʻȷ aȷjqdzʃ‡lz qtqzʃqz tʃtaO‡lsqʃ‡Oqdz@lsO lz tsвqz@frȷsqʃ ʃ‡tsʻO fnȷj qfrȷstaO›ɹlz'ȷ, lz нȷjdzW q lsȷ□dz@ʃuqʃ fnȷj ʃ‡tstaqʃfrȷsqʃ qʒOqz@ qtqzʃO frȷstqzuʃ O‡ʃ‡O. ɹ OqdʒȷjtaO ʻȷ нO fnȷj qfqzaȷjfrȷsqʃlsstaqʃ qʃ LOqʃqdz@s ȷjtqȷjfrȷsaOqz@ frȷstaOqz@ ʃ‡tsʻȷ qʃqʒO'lz taOLqzʃuʃlsO qʒqʰ ? ȷjʿ O ï lzfrpOqz@frnj. ʃ tʃʰ lsȷ ʻȷ tʃtaq□aO<ȷjqdz@s нO ʻȷ qʒqʰ ? ȷjʿ ȷ aȷ<qʃqdz@ вqʃlsqz@ʻȷ tsн qʒqʰ ? ȷjʿ O tʃtsʻȷнqʃqz@uO, O qʒqʰ ? ȷjʿ O lzuȷjfrpz@ʃ‡O qʃqʒO'lz aO›ɹȷ<ȷ frȷsOlsqʃfrȷsqʃuʃ‡tsLqz@uȷjʿ ȷ ʃ‡OнOfnȷj ʻȷнqdz@qʒfrpqtsɹȷ.

## Радионице

ţ Oнqʃtsqzʃuȷjfrȷz tstaOqz@ʃLtsaOqdȷ lz нtqzqtsʻ W OLqʃ tsatsgqʃfrȷstaO›ɹqaOʻ O. ʃ qdȷ fnȷj LOfrpz@ʃaO'lz qz@ taOнqʃtsqz@ʃuOqʒO LO lzʃtaOa? Oʻ ȷ atqȷjнqdz@frȷsqʃqʒO, ʃ‡tsʻȷ frȷz нȷjlsO? qdz@s tsв'Oʰ ʿ ȷjqdȷ lz ʰ ȷfrȷstsqʒ tʃtsqtqz@a? lz (tsнȷ? O‡ 6.3 ï ţ OнqʃtsqzʃuȷjLO lzʃtaOa? Oʻ ȷ atqȷjнqdz@frȷsqʃqʒO). ɻ tqtsuȷjfɳ tsнtaO›ɹOaOʻ O taOнqʃtsqz@ʃuO LOfrpqz@aOqz@ʻȷ qz@ tʃqtqz@qz@ tʃtsfrpqz@ lz lzʃtaOa? Oʻ lz atqȷjнqdz@frȷsqʃqʒO (*Value Management Job Plan*) SAVE (2007). ʃ ȷ' lzlsqʃqʒ lsOʻ tʃtqtsuȷjfɳ ʻȷ lzqdȷ‡tsqzʃ‡ts qʃLqʒȷjʿ ȷqz@ʃtsʰ lsts qz@s‡Oqz@qz@ lzfrpqtsaqʃ qdȷ вqʃ нtsLatsqzʃqz@ нO fnȷj ʃ‡tstaqʃfrȷsqʃ tʃlzqz@ tsвqʃqʒ tʃqz@Oqz@ tʃtsfrpqz@. υ lstqȷj<ts' W OLqʃ tsatsg qfrȷstaO›ɹqaOʻ O ʃ‡tstaqʰ <ȷqz@ ʻȷ ɻ ʃ ţ ɻ (tʃtqtsuȷjqdz@, tsнqtsatstq, нqfrʃ‡lzfrpʃ'O, tʃtqtsuȷjqdz@), lsʻ. EFTE (estimate, feedback, talk, estimate), qʃqzʃ lsLa. qʒʃqdz@ʃ-ȷjdzW q lsȷ□dz@ʃ‡O, lz taOнqʃtsqz@ʃuʃ ʃ‡tsʻO fnȷj LOfrpz@ʃaO qz@ tʃtqtsuȷjfrȷz ʃ‡tsʻqʃ frȷz tʃtqȷjнqdz@tsɹqʃqzʃ Nelms and Porter (1985). ţ Oнqʃtsqzʃuȷjfrȷz tstaOqz@ʃLtsaOqdȷ LO 12 qʒȷ' lzqz@qtatsнqz@ʃ□ qtaO' ȷaqʃqdz@ʃ‡□ tʃtqts'ȷʃ‡OlsO lz tqȷjqʃtsqz@zLOtʃOнqz@sg‚ Oqz@‡Oqz@.

## Упитник-анкета

υtʃqʃlsqz@ʃ‡-Oqz@‡ȷlsO ʻȷ aȷjqtatsaOlsqz@s qz@ʻuȷʰ <ȷ ʃ‡tstaqʰ <ȷqz@ lsȷ□dz@ʃ‡O tʃtaqʃ‡lzʃ? Oʻ O tʃtsнOlsO‡O. ş tstaqʃfrȷsqʃ fnȷj ʃ‡OнO ʻȷ uqʃ? Oqz@‡ȷlsȷ aȷjtsqʒO taOLlzqʒ? qa q ʃ‡OнO fnȷj qdȷ tsuȷj‡lz'lz нtsнOlsqz@ tʃqlsOʻ O. ɹ O□lsȷaȷ ʻȷ qʒtsqz<ȷ taOL'Ofrpz@lsqʃ lz. tʃtsqʒts< tʃtaqʃqʒȷjtaO ʃ‡tsʻqʃ fnȷj ʃ‡tstaqʃfrȷsȷ lz tsatsqʒ qfrȷstaO›ɹqaOʻ lz, frO qtaOW qʃuqʃqʒO qʃqzʃ ʰ ȷqʒOqʒO. ʃ aO aqtafrȷsO

### 1.3.4. Ƒ ɟlstsнtsdtsɔdƒ'Θtsʗɔdƒtɑ⊙dƒrɲstɑ⊙ʞdɔθ⊙ Θ

Ƒ ɟlstsнtsdtsɔdƒ'Θ dƒrɲstɑ⊙ʞdɔθ⊙ Θ fɲɟ нɟ₩ dƒdɑɸʰ ɟ ʗ⊙ts dʟlzuɔθ⊙ ɟ dʒɟlstsн⊙ ʗts'dƒ frɟz lzʗ? lzuɟdɑɸ lzʗtsdɸtɑɟls⊙dɑɸƒtsнlzʗɔɔ⊙ls, tsвdɸʗrɲsdƒdɑƶ tɑɟʰ ⊙ɔ⊙ ɟ tƒtɑtsвdɑɟdʒ⊙ Ƒ ɟlstsнtsdtsɔdƒ'Θ 'ɟ ⊙dɸ⊙dɑƶʟ⊙ tƒtɑɔdƒdɑɤμdƒtƒ⊙ dʒɟlstsн⊙ tƒtɑ⊙ɔdƒdɑƶ dƒ tƒtsfrɲstɑzdɸ⊙ls⊙ dƒdɑƶ tsнtɑɟ' ɟdɑɟ tƒtɑtsuɟнlztɑɟ, dƒdɑƶ dɑɸʟ tƒtsfrɲstɑzƒ⊙ʗ⊙ʗts'dƒ fɲɟ ʗtstɑɔfrɲsɟ ʟ⊙tƒtsfrɲsɔʟ⊙ ɟ ʯdƒ? Θ.ɬ tɑɟ dʟlzuɔθ⊙ Θ, tƒtsuɟlsdɑɸ ʗtstɑ⊙ʗ 'ɟ вdƒts н⊙fɲɟ dʟɔtdʰ dƒ tƒtɑɟɔdɑɟн tstƒʰ dƒtɑdɑɟ dɑƶlsɟtɑ⊙lsɑztɑɟ ts tƒtɑɟнdʒɟlsɔdʒ⊙ ts ʗts'dƒdʒ⊙ <ɟ вdƒlsɔƒ tɑɟʯdƒ dƒ ʗts'dƒ <ɟ fɲɟ ʗtstɑɔfrɲsɔƒlsɔƒ lz dƒrɲstɑ⊙ʞdɔθ⊙ lz.

ɻdƶ⊙ɔdɑɸ₩ ts⊙lzfɳ 'ɟ frɲs⊙ɔʔ ɟdƶɔdɸ tƒtɑtsuɟfɲɟ dƒ tƒtɑtsuɟнlztɑɟ lzƒtɑ⊙ɔʔ Θ⁻ Θ ɘtɑɟнdɑɸsfrɲsɔdʒ⊙, Θ tƒtsfɲɟвdɑɸs dɸ⊙ tɑ⊙нdƒtsdɑɸʯɟ ʗts'ɟ fɲɟ вθɔɟ lzƒtɑ⊙ɔʔ Θ⁻ ɟdʒ ɘtɑɟнdɑɸsfrɲsɔdʒ⊙. ɹ dƒls⊙dƶнɟts dƒrɲstɑ⊙ʞdɔθ⊙uʗɟ tƒ⊙ʞ⁽ ɟ tƒtsfɲɔɟ<ɟdƶ'ɟ dɑɸʗ⊙dɑɸɑdʒ ɻdɸ⊙ lz dƒ dʒtsdƶ<dɑɸsfrɲsɔdʒ⊙ ⁽ ɟdɑtsɔtsɔ tƒtɑɔdƒʗ⊙ɻdƒɔθ⊙ Θ dƒ frɲƒfrɲsɟdʒ⊙lsɔdƒʟ⊙uɔd'ɟ. ţ ɟɻlzɑdɸs⊙ls tɑ⊙нdƒtsdɑɸʯ⊙ ʟ⊙ lzƒtɑ⊙ɔʔ Θ⁻ ɟ ɘtɑɟнdɑɸsfrɲsɔdʒ⊙ lzfɲɔʒɟtɑɟdƶ'ɟ dɑɸ₩ tstɑɔdʒƒtɑ⊙ɔ⁻ ɟ tƒtɑts'ɟʗ⊙lsɑɸsɔ⁻ ʟ⊙н⊙lsʗ⊙, tƒ⊙ 'ɟ н⊙ls ʗtɑ⊙ls⊙ʗ tƒtɑɟнdɑɸsfrɲsɔdʒ⊙ dƶrɲsɟtɑ⊙lsɑztɑɟ ts ⊙ʗ⊙lsƶɟdɑɸɑdʒ tƒtɑtsвdɑɟdʒƒdʒ⊙ lz lsts' frɟ₩ɟtɑɔƒ. ɻ Θ ʗtɑ⊙'lz 'ɟ ⊙dɸ⊙dƶrɲʟdƒtɑ⊙ɑɸs lzuɟ⁽ ɟ dƒʟвtstɑtsdʒ frɲɑɸzuʗ⊙' 'ɟtɑ⊂ 'ɟ tƒtsfɲɔɟнʰ dƒ нɟts dƒfrɲstɑ⊙ʞdɔθ⊙ Θ ʟ⊙frɲɑɸs⊙dƶɑdɸ⊙lzƒtsɬstɑɟвdƒ∪R⊣ frɲs₩ lsɒɟtɑ⊙.

ɻ ⊙ʗtsdƶtsнtɑɟ' dɔθ⊙ Θ frɲtɑ⊏ɟ dƒ ʯdƒ? ɟɔθ⊙ tɑ⊙ɬɔdƒ'ɟdƶ'ɟ tsʗɔdƒtɑ⊂ ʟ⊙ dƒfrɲstɑ⊙ʞdɔθ⊙ Θ dɸ⊙ нɔ⊙dɸ⊙jfrɲs dʒɟ' lzdɸ⊙dɑtsнdɑɸ⊏ dɑ⊙ ɟɔdƒdɑɸʃʗƒ⊏ tƒtɑts'ɟʗ⊙lsɔ. ɻtɑ⊙₩dƒʗ 2 ï ɻtɑ⊙₩dƒʯʗts tƒtɑɟнfrɲs⊙ɔʔ Θ⁻ ɟ tƒtɑtsuɟfrɲ⊙ dƒfrɲstɑ⊙ʞdɔθ⊙ Θ 'ɟнdɑɸsɔ⁻ tsн 12 tƒtɑts'ɟʗ⊙lsɔ⊙ ï tƒtɑɟнfrɲs⊙ɔʔ Θ tsʗɔdƒtɑ⊂dƒrɲstɑ⊙ʞdɔθ⊙ Θlz tsвdƶʗ⊙lzнdƒ'⊙dɑ⊙dʒ⊙.


**График 2 – Графичко представљање процеса истраживања једног од 12 пројеката**

In the Delphi method, the experts are asked to rate the importance of each factor in relation to the others. The factors are then ranked according to their importance. The Delphi method is a structured process that allows experts to share their knowledge and opinions in a way that is anonymous and confidential. This helps to avoid bias and groupthink. The Delphi method is a valuable tool for identifying and prioritizing factors that are important to a particular issue or problem.

In the context of this study, the Delphi method was used to identify the critical success factors for the implementation of the EFTE Mini-Delphi exercise. The experts were asked to rate the importance of each factor in relation to the others. The factors were then ranked according to their importance. The Delphi method was a valuable tool for identifying and prioritizing the factors that are important to the implementation of the EFTE Mini-Delphi exercise.

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dzg ctsdzfcts dzg Hj? O, tftsh lsts frjz lzujfpdzhpdfdzO tftsfpdzOlsf tftsdtso? jdzh LOklsjofd. l Octo'lz, W tstodzgftoOdzO'j W lzdzcpdftsdzOdzdzO BOLOtftsHOlsOcO.

l jlsf df h jfrjsf cttoOc dLojHjdzh frjz oOdz,tftats'jcOlsO. l tsdzts<lz URU frjsW lsojtoO dzOftoOo? jdzh frjz tftatstoOuzdzh df tftajHdtsYjdzg frjz dLOSΛU, cts'j frjz LOBjdzgYjdzg. Utajo dzOftsdzjdzhlsf HO frjz tfOtoOdzjdzdts toOLdzOlstoOdzh df tstofdfdzOdzdzh tfOtoOdzjlstof otajHdtsfrjsf dfdzojfrjsflsttoO.

UjHdzf cttoOc 'j frjftatso jHjdzlstscttsdz fpOfrjsOdzOW tscLzfn-tdzftj. [ toOdzhLtsoOdz'j dzO fpdfn HoOdzOjfrjs tftats'jcOlsO. UujfpdzhpdfdzB dfdzf tftajHfrjsOodzhpdf dfdzojfrjsflsttoO df frjstdzu{ Oupf cts'df frjz tsHdtsotstodzh LOlzftoOo? O' j tftats'jcOlsdz3O, dL tstoOdzhLOupf'O dfdzojfrjsflsttoO df dL frjfts? dzh tftatsW jfpftsdzOdzdzh cttsdzfOdzh'O LO lzftoOo? O' j tftats'jcOlsdz3O. t jLlzdtsOlsf frjz tftajHfrjsOo? jdzh, O HO' j lzfrpdzjtajc j tftats'jcOlsO 'j tftsfrjsfodzhstts cttsL tftajtftstdzujdts BtsHtsoO' j tfOtoOdzjlsOtoO otajHdtsfrjsf. l tsfrjsts'OdzO frjz HoO odzOodzO pdf? O 'jHOdz'j Bdfts HO fnj lzlsfpujdzO l J df tftaftstodflsjlsj cts'df frjz tsHdtsotstodzh LOW tstodzgftoO' j tftats'jcldtsc LOHOlscO, O Htdzdf 'j Bdfts HO fnj lzfrpdzjtaj tftaftstodflsjlsf lzW Odf dLdtoOHc j, cttsL SΛU. Hlstdzu{ Oupf cts'df frjz tsHdtsotstodzh LOlzftoOo? O' j tftats'jcldgOtftajlzjdzf frjz dzO fnjBj HO tftajojHlz tftajHfrjsOo? jdzg df tstodzgOupf'j dzO lsjdzhpdfdzO tstodzgOupf'j dzO lsjdzh{df 'jLdc df HO lsts tftajdzgfrjz dzO tftats'jcls j. HOfrjsOdzupdW tscLzfn-tdzftj lstoO'OdzO frjz tfts dzgctsdzfcts frjOlsf, Odzf frjz tftsdtso? jdzh LOfpdfn HoOdzOjfrjs tftats'jcOlsO lz lstscLz dzgctsdzfcts dzjfnjupf.

Stsdzupdzh, tsfrpdzf cttoOc 'j Bdfts HO fnj frjsjcdzg lzodfH lz lsts cts'j frjz toOLdzfcj lz tftajHdtsYjdzhf dz3dLdzjdzOdz3O lz tsHdtsfrjz dzO SΛU lz Hoj tdzftj l J : tftaj df tftsfrpdzg lzots' jc O dtscOdzdzh otajHdtsfrjsf. l tatsdzjdzg frjz tftajHdtsYjdzg lz tsHdtsfrjz dzO SΛU BOLlz lzfrjj jh dts LOotdh jdzh tftats'jcOlsO. Uts 'j lztoO jdts LO fpdfn HoOdzOjfrjs tftats'jcOlsO df dLtoOuzdzOlsf frjz tftatsfnjupf. LjdzgtoOdzdts, dzYjdzYs dLojfrjsf LOc? lzuOc ts cttsdzfdzjlsdtsdz dfrjstoOYdoO' lz df tftatsujdzhlsf tftsBts? h O' j lz tftatsujfrjz tsHdzudfoO' O.

### 1.4. [ toOdzhLOupf'OlsjLj

#### 1.4.1. HlstdzcttsdztoOlsjLj

l tsodzOo? j 1 lzotsHdf tsBdzOfrjs dfrjstoOYdoO' Octs'Ofnj dfrjfdflsz'j. [ dzO tsBlzn-oOlsO toOLdzscj df tsfrpdtso j dfrjstoOYdoO' O, fpto-lz df upf? jojdfrjstoOYdoO' O, tfdlsO' j dfrjstoOYdoO' O,

dzjlstsнj ςts'j fnjl ςtstaςfrJsj ς dzjlstsнtsdtsaς'j ςts'j fnjl taOLaς'Olz lO lsts ςfrJstaO>ιςaO' j ς tstaaOdtkfLOuς'lz lsjlj.

1 tsadtkOa? j 2 tfταjнfrJsOa? O dtkOdtkOLj tfταjadzjнO dtzflsjtaOlsztαj ts lzftaOa? O' lz dtk tsнt>ιςaςdzjl' lzdtkΩtatsнdtkfdzgtaO' j aςdfkfςdzgtfτats'j ςlsfdzO, ςOts ς ts lzftslstαjвς dtsς∩Odtkfn ldtk' O. t OLdtsg lO ςfrJstaO>ιςaO' j tsaς n tfταjнdzjlsO 'jfrJsj lO n lsjа ςfrJstaO>ιςaOuO нO вts? j taOLzdzjl tfταfτatsнlz ς frjfj uqW ςuqtksfrJsf lsOςaς n tfτats'jςOlsO. uOdzs ςOнO fnjl lsjdzj? dts ςfrjfςlsfaO' j lOatdh ς, dzs>ιj fnjl tfταfτfταjdzflsf нO' ς taOLats' dzjlstsнtsdtsaς'O ςts'j <j fnjl tfταfdzj ς daOlsf lz tsaςdzgtfτats'jςlsfdzO, lzLςdzO'lz<ς lz tsвLqtc ς n tsaj atOdtkfuj, tsatOdtkfuj ς O ς frJsOdtkOtaнdtkl tfτatsujfnjl. R frjfqlsfaO' j dtsς∩Odtkdtkg ldtk' O 'j ςtaflsfuqtks, 'jtc tfταjнfrJsOa? O frjcuj lsjlj, tfτsς∩tαjlsOuς∩lz frpdtkOdz ς tfτslsjdtkupf'Odtkdtkz ςtstaςfrJs lO tfτsвts? h O' j dzj' lzdtkΩtatsнdtkn tfτats'jςOlsO. 1 tαjadzjнOdtkl frJz нj W ςdtkfuς'j, tfτatsвdzjdzf, lstαjdtkzlsdtkΩtfταO∩frjO, frpdzjtadtkfuj ς Of dzfς∩Ouς'j.

1 tsadtkOa? j 3 tfταjнfrJsOa? O dtkOdtkOLj tfταjadzjнO dzflsjtaOlsztαj ts lzftaOa? O' lz aταjнdtkstfrJsfdzO ς tfτats'jςlsdtksdz lOнOls∩lz υtfταOa? O' j aταjнdtkstfrJsfdzO 'j ts∩tsfrpdtkfuO ςfrJstaO>ιςaO' O'jtc tfταjнfrJsOa? Ots∩aςftc lz ςtsdzj fnjl frjftatsatsнς frJszнς'O. ∫ tsadς∩OlsjlJ fnjl lOrpdtkfaO dtkΩ ςaOdtksqW ς∩Ouς'ς tfOtaOdzjlsOtaO atajнdtkstfrJsf ςts'ς fnjl нO' j ςtstaςfrJsj lO tfτsfrJsfLO' j atajнdtkstfrJsf, tfταfτstaqlsjlsO tfτats'jςlsO ς lzlsfuO'O ςts'ς <j tfτsвts? h Olsf tfτats'jςOls 1 tsh lsts <j tfOtaOdzjlstaf atajнdtkstfrJsf ςdzOlsf tfτsujlsdtk lzlsfuO' dtkΩ tfτats'jςlsdtk lO∩HOlsO∩, tsaOlsjdzO 'j нjlsO' dts tfτatslzujdtkΩ. 1 tαjadzjнOdtkl frJz нj W ςdtkfuς'j, tfτatsвdzjdzf, frpO∩HO h ς j tfταO∩frnj, frpdzjtadtkfuj ς R υ Of dzfς∩Ouς'j.

1 tsadtkOa? j 4 tfταjнfrJsOa? O dtkOdtkOLj tfταjadzjнO dzflsjtaOlsztαj ts υR∩ tfταfrJstzflz aj h lsOuς∩ts' ςfdtksjdzfςjdtkufς'ς. υR∩ dzjlstsн dzs>ιj вflsf lOrpdtksaOdz, dtkΩ taOLdtkfdz Odtatstaflsdzsfdz ς∩L tfταfτatsнj, Odzf lz tsatdz ςfrJstaO>ιςaO' lz tfταfdzjς lz'j fnjl 'j нςfdtkfksaj dtkf Odtatstaflsdzsfdz j dtjς∩tatsdz Odtjlsfdz (*Electromagnetism algorithm*). υ tsatdz tfτstdtkOa? lz υR∩ fnjl нjlsO' dts ςfrJstaO>ιlz'j, frpO tfτsfnjвdtkfdz tsвtaO<O' j dz tfOις j dtkΩ taOLdzfuqlsj Of dzfς∩Ouς'j lz dtaO' j aςdfkfς∩ts' ςfdtkalzfrJstaς'ς. 1 tαjadzjнOdtkl frJz нj W ςdtkfuς'j, tfτatsвdzjdzf, frpO∩HO h ς j tfταO∩frnj, frpdzjtadtkfuj ς R υ Of dzfς∩Ouς'j.

1 tsadtkOa? j 5 tfταjнfrJsOa? O tfταatlz W O.lz ςfrJstaO>ιςaO' O. ∫ ts∩Odtkdtk ldtk' O frJz tfταfς∩LOdtkΩ ς∩tats tfταfτdzjdtkz нj dtkW ς dzjlstsнj. l O' tfταj 'j нj dtkW ς dzjlstsнO нjlsO' dtk'j tsв'O h ς j dtkΩ, O lOlsfdz 'j taOLaς'j dtkΩ dzjlstsнtsdtsaς'O lO tfτslstαjвj tsatsg ςfrJstaO>ιςaO' O. t j LzdtksOlsf frJz tfταjнfrJsOa? j dtk lz ujlsfταf tfτsнfnjς∩uς'j ς∩ts'j frpdzнj frpO∩lz tsн ujlsfταf W O.j tfταfdzjdzj нj dtkW ς lsj=dtk∩j. Ş tsdtkΩudtks, tαjLzdtksOlsf fnjl frJzdzfταO'lz ς W tstadzfταO fnjl dzs>ιj dzfnjdzjς∩uς'j,

### 1.4.2. Ранняя история

Ученые давно обратили внимание на то, что в языках мира существуют определенные закономерности в том, как они развиваются. Например, если в языке есть звонкие согласные, то обычно в нем есть и глухие согласные. Если в языке есть сложные времена глагола, то обычно в нем есть и простые времена. Если в языке есть слова, обозначающие цвета, то обычно в нем есть и слова, обозначающие животных. Эти закономерности называются универсалиями языка. Универсалии языка могут быть абсолютными или статистическими. Абсолютные универсалии языка — это такие закономерности, которые выполняются во всех языках мира без исключения. Статистические универсалии языка — это такие закономерности, которые выполняются в большинстве языков мира, но не во всех. Универсалии языка могут быть также импликативными или эквивалентными. Импликативные универсалии языка — это такие закономерности, которые имеют вид «если в языке есть X, то в нем есть и Y». Эквивалентные универсалии языка — это такие закономерности, которые имеют вид «в языке есть X тогда и только тогда, когда в нем есть Y». Универсалии языка могут быть также однонаправленными или двунаправленными. Однонаправленные универсалии языка — это такие закономерности, которые имеют вид «если в языке есть X, то в нем есть и Y, но не наоборот». Двунаправленные универсалии языка — это такие закономерности, которые имеют вид «если в языке есть X, то в нем есть и Y, и наоборот». Универсалии языка могут быть также структурными или функциональными. Структурные универсалии языка — это такие закономерности, которые касаются структуры языка, например, порядка слов, грамматических категорий, фонологических систем. Функциональные универсалии языка — это такие закономерности, которые касаются функций языка, например, способов выражения значений, способов организации текста, способов взаимодействия с другими языками.

## 2. Ɨ ʈ ɾ ɻ ʃ ɾ ɾ ʃ ʀ ʊ ɾ ʈ ɸ ʊ ʊ ʈ ɾ ï ʊ ɬ ʈ ɸ ɹ ɲ ɸ ɳ ɾ ɬ ʈ ʃ ɱ ʂ ʊ ʀ ʃ ɸ ɻ ɸ ʃ ɾ ʈ ɾ ʀ ɹ ʀ ʃ ɻ ʈ ɸ ɬ ɾ ɹ ʀ ɻ ʉ ʂ ʀ ʃ ɬ ʈ ʃ ɱ ʂ ʊ ʀ ʃ ɸ ʀ ʊ ɬ ʈ ɸ ɹ ɲ ɸ ɳ ɾ ɻ ɻ ɸ ɳ ɾ ʃ ʉ ɸ ʌ ʃ ʂ ʊ ʜ ʃ ʃ ɻ ɸ ʃ ʃ ʂ ɸ ʃ ɻ ʃ ɻ ɻ ɸ ɳ ɾ

### 2.1. ʊ ə t s ʜ

ʊ t s ɔ t s c ʤ ʧ t s ɑ d ʣ ɔ ʔ l z ɑ f ɱ ʃ ɑ f s z ʻ l z f ŋ ʲ d ʣ ɔ d ʣ L ɑ f ʧ t ɑ ʲ j ɑ ɔ d ʤ ɦ ʘ d ʣ f ɔ l s ʲ t ɑ ʘ l s z t ɑ ʲ t s l z f t ɑ ɔ ɔ ʔ ʘ ʃ l z ʧ t ɑ t s ʻ j ʟ ʕ l s ɑ f ɔ ʒ ʘ d ʣ ʲ t s ʜ d ʣ ɑ f ɔ ʒ ɑ t ɑ ʘ ʲ j ə ɑ f ɔ d ʣ ɦ ʟ ɑ f ɔ ʒ ʧ t ɑ t s ʻ j ʟ ʕ l s ɑ f ɔ ʒ ʘ, ʕ ʘ t s ɑ f ʦ t s t ɑ ɑ f ʰ < j ʕ l z ɑ t s ʕ ʘ d ʣ ɑ f ɔ ʒ ʟ ɑ d ʣ ʘ ʘ l z ɑ t ɑ ʘ ʲ j ə ɑ f ɔ d ʣ ɦ ʟ ɑ f ʻ ɑ f. ʃ ə ʘ ʻ ʧ t ɑ j ɑ d ʣ j ʜ ʧ t s f ŋ s ɔ ə ʔ ʘ t s f ŋ d ʣ s ə l z L ʘ ʜ ʘ ʲ j ɑ f ŋ s t ɑ ʘ ʲ ɑ f ə ʘ ʻ j , ʕ t s ʻ j < j t s c ʤ t s d z < ɑ l s ɑ f ʙ t s ʔ j ɑ t ɑ ʘ L z ɑ ʤ j ə ʘ ʻ j ʧ t ɑ ɑ f t ɑ t s ʜ j ɑ f ʧ ʃ j ʊ ɑ f ʷ ɑ f ʊ ɑ ʣ f ŋ s ɑ f ʒ j ' l z ɑ d ʣ ɑ t s ʜ d ʣ ɑ f ˽ ɑ t ɑ ʘ ʲ j ə ɑ f ɔ d ʣ ɦ ʟ ɑ f ˽ ʧ t ɑ t s ʻ j ʕ ʘ l s ʘ . Ɨ t ɑ ɔ t s ʻ j t s ʧ ɑ f ɱ ʃ ɔ d z t ɑ ʘ ʜ t ɑ j ɑ d ʤ ə ʘ d ʣ ɑ d ʣ ɑ f ˽ ʧ t ɑ ʘ ʕ l s ɑ f ʕ ʘ d ʣ ʲ ʘ ɑ f ɑ f ŋ s t ɑ ʘ ʲ ɑ f ə ʘ ʊ ɑ f ʘ , ʰ l s t s ʧ t ɑ j ʜ f ŋ s ʘ ɔ ʔ ʘ t s f ŋ d ʣ s ə l z L ʘ ʜ ʘ ʲ ɑ f t ɑ ʘ L ə t s ʻ ɑ ʒ j l s t s ʜ t s d z s ɑ f ʻ ʘ ʕ t s ʻ j < j f ŋ j ʧ t ɑ ɑ f ɑ ʒ j ʕ ɑ f ə ʘ l s ɑ f l z t s ɔ ɑ f ɑ ʒ ʧ t ɑ t s ʻ j ʕ l s ɑ f ɔ ʒ ʘ . ʊ ʘ ʕ t s ʻ j ʟ f ŋ j t ɑ ʘ L ɑ ʒ ʘ l s t ɑ ʘ

- tsнtœ»qətsfŋsqdæjœtœfʰ j jʕtsdæsdʒfŋʕj, jʕtsdzsʰ ʕj qfŋsufʻœdzdjø œfŋʃjʕlsj;
- tsнtœ»qətsfŋsqdæjœtœfʰ j ʕtœœlsʕtstœtsufdjø qнlzœtstœtsufdjø œfŋʃjʕlsj;
- tsнtœ»qətsfŋstʃtsнtœœlzdʒjəœlstœtsʰ j ʕ jʃtœfʻ¬tsнœœdjø ʕœʃqlsœdzœ.

ʂœнœfŋj tœœlqʒœlstœœʻlz jʕtsdæsdʒfŋʕq, jʕtsdzsʰ ʕqf qfŋsufʻœdzdæf œfŋʃjʕlsqf tsнtœ»qətsfŋsq, ʕ? lzuʻj tʃtsfŋsqʟœ j tœœəddæslsjɤj qf ʕtsdʒʃtœtsdʒqfŋœ. υ tsнtœj' jdæqdʒʟjdʒ œdʒœ, ʕtsʻj fŋz tsвqfuddæs jʕtsdæsdʒfŋʕq tœœləqʻjdæqʻj, tʃtœqftstœqlsjls fŋz jʕtsdzsʰ ʕœtʃqlsœ œ, нtsʕ fŋj lz нtəzœqdʒ qʒœ j tœœləqʻjdæqʻqdʒ ʟjdʒ œdʒœ, tʃtœjнddæfŋs нœʻj jʕtsdæsdʒfŋʕqdʒ qdæf ʋœʕ fŋsufʻœdzdæqdʒ œfŋʃjʕlsqdʒœ. я œʕtsfŋz ʕtœœlsʕtstœtsudæq нtsвqfuq tʃtœqftstœqlsjlsʟœəj<qdæz tʃtsfŋdæsœœ œ, lstœjвœ lzjlsq lz tsвʟqftœнlzœtstœtsudjø ʕtstœqffŋsq, tʃtsfŋjвdæs œʕts<j jʕtsdzsʰ ʕqf qfŋsufʻœdzdæf œfŋʃjʕlsq tʃtsfŋjœlsq əqfнʔ qfəqf əj< dæʕtsdz tsнtœj' jdæsg ətœjdʒjdæ. ʃ нtœ»qətsfŋs lstœjвœ нœ fŋj tʃtsfŋjœœqf lz tsʕəqftœ œtœœ jəqfdæʕqf¬ tʃtœts'jʕlsœ qf lz tsʕəqftœ lzʃtœœəʔ œʻ œtʃtœts'jʕlsqdʒœ, ʕœts fŋpʒjtœdæfʋœʟœœlətsʻ fŋœdʒqf¬ tʃtœts'jʕlsœ.

ʃ œ»qœdzœœfŋʃjʕlsʕts'qf lstœjвœ tœœlqʒslstœqlsqf ʻjfŋsj tʃtœqfdʒjdæ tsнtœ»qətsfŋsqf ʕtœtsʟ œdæœlsj ʟœ lzʃtœœəʔ œʻ j ətœjнddæfŋsqdʒœ, ʰ lstœ tʃtœjнdæœ»qlz Al-Saleh qf Taleb (2010). ʃ j' lzlsqdʒ œdzlststœqf lzœtsʋəœœʻlz qf tʃtœjtʃtœjʕj ʟœ qfdæsjœtœœuqfʻlz tsнtœ»qətsfŋsqf lz tʃtœœʕfŋz lzʃtœœəʔ œʻ œ ətœjнddæfŋsqdʒœ. ɻdæəœdjø tʃtslsjʰ ʕts<j fŋz tʃtœqfнtsвqfʻœʻ j qfdæəjfŋsqflststœœ ʟœ tsнtœ»qəlz qfʟœtœœнʕ lz qf tsœtœœdæfujdæ ʻœəœdæ fŋpjfŋs ts tʃtslstœjвqf ʟœ tsнtœ»qətsʰ <lz. ʃ əqf ʟœʕ? lzuuqf fŋz ʟœfŋdæsəœdæf dæ tʃtœjlsʻtsнdæsdʒ qfŋfstœœ»qəœʻ lz Zainul qf Pasquire (2005). Hayles at. al (2010) fŋpʒœlstœœʻlz нœ ʟœ tsʕəqftœ нtsdæsʰ j ʕ œ tsнdzʕœ ʕts'qf fŋj dʒs»j fŋʃtœtsəjfŋsq ʕœtsʟ ɤqətslsdæf uqfʕdzzfŋpf tʃtœts'jʕlsœ, lzʃtœœəʔ œʻ j ətœjнddæfŋsqdʒœ qdʒœ fŋstœœlsjʰ ʕlz tʃtsʟqfuqʻlz ʕœнœ ʻj tœjuʟ ts lzʕ? lzuqfəœʻ lz tʃqlsœʻ œ tsнtœ»qətsfŋsq lz qfdæəjfŋsqfuqftsdzø tsнdzʕj. Pitts (2004) lz dzjʕtsdzqʕts fŋslzнqfʻœ tʃtslsəœtœ lzʻj нœ tsнtœ»qfəj ʟœtœœнj dʒsdz вqlsq jʕtsdæsdʒfŋʕq tʃtœtsw qlsœвqfdæzø qf dʒsdz нtsdzjlsq tsʃqftʃʔ qfəlz ʕtstœqffŋs, dzø fŋœdʒs ʟœ ɤqfətslsdæz fŋtœjнqfdæz, dzjœts qʟœʕtstœqffŋpdæqʕj.

ɬ tœqfdzqʕtsdʒ œdæœdzqʟj tʃœtœœdʒjlsœtœœ ətœjнddæfŋsq tʃtœts'jʕlsœ lstœjвœ lzʟjlsq lz tsвʟqftœ tʃtœqfdæɻqftʃj ətœjнddæfŋsq ɤqfətslsdæsg uqfʕdzzfŋœ tʃtœts'jʕlsœ (*Whole life Value principle*). υtœœнqfuqftsdæœdzqf tʃtœqffŋlszʃ ətœjнddæfŋsqdʒœ tʃtœts'jʕlsœ ʟœətœʰ œəœ fŋj fŋœ qʟœtœœнʕ tsdʒ qf tʃtsujlsʕtsdʒ ʕtstœqfʰ <jʕ œ tsвʻjʕlsœ. ʃ j' lzlsqdʒ əœæfŋdæqfuq dzjʕtœjlsdæqdzj (ʕtstœqffŋdæqfuq) tʃtœqf¬əœlsqdzqf fŋz *Whole life Value* ʕœts lstœtsʰ œʕ ʕtsʻqf dææfŋsœʻj lstsʕtsdʒ lzʃtslstœjвj dzjʕtœjlsdæqdzj qf tʃtœqfdzqfuqdæs dæœнdʒœʰ lzʻj lstœtsʰ ʕtsəj tʃdzœdæqftœœʕ œ qf qʟœtœœнʕ j. Park (2009) dæœətsнqf нœ fŋz lstœtsʰ ʕtsəqf ɤqfətslsdæsg uqfʕdzzfŋœ tʃtœts'jʕlsœ (*Whole life costing*) tʃtsfŋsœdzqf fŋz dæʻвtsʔ œ tʃtœœʕfŋœ lz œtœœ jəqfdæfʕqfdʒ dæœвœəʕœdʒœ qf əjtœtsəœlsdæs <j tʃtsfŋsœlsqf

### 2.3. Assessment of Sustainability in Construction Projects

Assessment of sustainability in construction projects has been carried out using different methods. Mawhinney (2001) has developed a framework for assessing sustainability in construction projects called Whole Life Performance Assessment (*Whole Life Performance Assessment*). This framework is based on 188 indicators that are divided into three categories: economic, social and environmental. Neale (1996) has developed a framework for assessing sustainability in construction projects called Sustainable Construction Assessment Framework (SCAF). This framework is based on 12 indicators that are divided into three categories: economic, social and environmental.

Mawhinney (2001) has developed a framework for assessing sustainability in construction projects called Whole Life Performance Assessment (*Whole Life Performance Assessment*). This framework is based on 188 indicators that are divided into three categories: economic, social and environmental. Ball (2006) has developed a framework for assessing sustainability in construction projects called Sustainable Construction Assessment Framework (SCAF). This framework is based on 12 indicators that are divided into three categories: economic, social and environmental.

Raftery et al. (1998) has developed a framework for assessing sustainability in construction projects called Sustainable Construction Assessment Framework (SCAF). This framework is based on 12 indicators that are divided into three categories: economic, social and environmental. Ofori (2000). Xiaopeng (2013) has developed a framework for assessing sustainability in construction projects called Sustainable Construction Assessment Framework (SCAF). This framework is based on 12 indicators that are divided into three categories: economic, social and environmental. Toor and Ogunlana (2009) has developed a framework for assessing sustainability in construction projects called Sustainable Construction Assessment Framework (SCAF). Han et al. (2007) has developed a framework for assessing sustainability in construction projects called Sustainable Construction Assessment Framework (SCAF).

fmjstaOdbj, adbzsaOdbzfLOufq'O dzj' lzdb&adsHdbsg' gtaO jaqfdbfqtsg' lstaxlqh lsO tjtadzxlO tsdtdsdzdbj dzjsdz<dbsfmjsqf LO adbzsaOdbzdbj qfLats' Ouj, Odbzf fmj, fmjHtdzgj fmjstaOdbj, LdbfuqO'dbs tjtsajz<OaO tadfLqfq qts'qf dzj' lzdb&adsHdbf tjtads'jqlsqf dbsfmj. l tajlsqtsHdb& qfmjstaOxlqaO' O fmz tjtadsdb&h dbO dbjqtsdbzfqts tadfLqfqO lz dzj' lzdb&adsHdbsdzgtaOHlz, qOts h lsts fmz qfqdbjfmqfr j u tjtads'jqlsqf (Shou et al. 1999), lstaOdbfw jtaqf lsjqdbsdbsdqf'j qf Ldb&O lz jOdbf (Osabuteya et al. 2013), dzj' lzdb&adsHdb& LO'jHdbfuqO lzdbOaO' O, qfqdbjfmqts-fmpfdbaOqflzdafmqO, 'OqfOdbfqts-fmpfdbaOqflzdafmqO qfqdbjfmqts-qtsdbs&tsdb& qts-dbsaotsLjdbOdbsfmqO (Bing et al. 1999), qf taOLdzjdb& Ldb&O tjtajqts qlzdbsdzdbfq ВOtaqf'jtaO lz dzj' lzdb&adsHdbfdz LO'jHdbfuqfdz lzdbOaO' qfdzO (Dulaimi 2007), qlzdbsdzdb& taOLdzOstaO' O lz lzdtsotstadbfdz tjfqlsO' qfdzO lz tjtstaj' j^ lz fmO Mtsdbs qtsdbsdz J tsdbstsdbsdz qf HqfHdbjqtsdz (Chan and Tse 2003) qf dzjsdz<dbsfmjsqf qf tjtajlsO' j lz dzj' lzdb&adsHdbs' qLataOH^ qf (Gunhan and Arditi 2005). Han et al. (2002) fmpzOstaOHO'j tjtslstajBdbs fmjstaOlsjh qts lzfjtaOo? O' j taqfLqfqtsdz HO Bqf fmj fmpzO' qfdbO lsztasBlzdajdbsdb& qLdbOaO' O taqfLqfuqfdzO qf lzojz<Odb& lzqlzfjdb& otajHdbsfmjs tjtajHlzjz<O. Javernick-Will and Levitt (2009) LOq? lzuqz'lz HO lzfmjjh dbj fmpjlsfqj w qftadzj qOts q? lzudbz fmjstaOlsjadf'lz lzfmpO'O'lz tjtsojz<OaO' j fmjstjfmjsojdbf dzjsdz<dbsfmjsqf LO fmjsqfuO' j qf taOLdzjdbz qfdbw tstadzOufq'O qf Ldb&O Ots fmpOqts' dbsqOdbdbs' fmjajHqfdbf. R fmjsqf Olzlststaqf lz HOp jdzlsjqfmjslz db&otsHj HO fmpq qts'qf xjdbj HO Blz Hlz lzfmjjh dbf lz tsBdbOfmjsqf dbjqtajlsdbfdb& dzstaO'lz HO dzjfmpbj qf Hjdbz'lz db& dbsqOdbdbsdz dbfatslz. фqts dbsqOdbdbs fmjsOdbsodbfh lsots dbj tjtaqf-aOlsO qLataOH^ lz, dbj<j Hts<qf Hts taOLats'OLBtsg dbjHtsfmjsOlsqO qfdbsjtajfmjsoO' O. ∫ jdb&vjtaqf dzjsdz HO db&lzuj HO qfmjqtstaqfmjsj dbsqOdbdbs Ldb&O j HO Bqf fmjsotstaqfdbf tajH qL tsufqfdbjHdbsg dbjtajHO, HO qfdbsjstaqfh lz lsts Ldb&O j fmO fmpts'qfdz tsfh lsqfdz Ldb&O jdz qf HO, fmOdzqfdz lsqfdz jw qfqOfmpdbs lzfjtaOop? O'lz fmpts'qfdz tjtads'jqlsqfdzO (Ramaprasad and Prakash 2003). ∫ tsxj fmj LOq? lzuqflsqf HO'j dbsqOdbdbs Ldb&O j tsH q? lzudbsgLdb&uO'OLOlzfmjjm tjtads'jqOlsO.

l tads'jqlsqf qts'qf fmj tajOdbzfLlz'lz lz dbjdzOlsqfudbfqdzLjdz? OdzOtjtsHtaOLlzdzjaO'lz tsBq? j taqfLqfqO 'jtc tjtaj qf lstsqtsdz q fm-tsoj tajOdbzfLOufq'j db&fmjsO'lz dzdbsgj taOLdbzfqj. ujtstaq'O dbjfmOotch jdbsfmjsqf lstaxlqh lsO LOfmpbf&aO fmj db& taOHtsoqfdzO Hymer (1976) qf Kindleberger (1969) lz qts'qfdzO fmj tjtsdzq j dzjsdz<dbsfmjs tjts'Oaj lstdsh qtsoO LBtsg dbjtjtsLdb&oO' O xqaotslsdbj fmjajHqfdbj, qlzdbsdzdbfq-, tjtsdbzflsquqfq-, jqtsdbsdfmqfq- taOLdbzfqOqf LBtsgtjtslstajBj HO fmj taOH qtststaHqfdbftaO qfL HO' qfdbj. l tstajH lstsgO, tjtsfmjsts'j taOLdbzfqj lz lsj-dbfuqfdz qf Htazh lsojdbfdz tjtaOoqfdbzfdzO qf dbsdtadzOdzO, taOLdbzfqj lz tsujqaO' qfdzO, tsBqfuO'qfdzO, aotajHdbsfmjsqfdzO qf ajtatsoO' qfdzO. Zaheer (1995) qf Zaheer qf Mosakowski (1997) Hjw qfdbfh lz w qftadzj qts'j dbj tjtsLdb&lz tsoOqaj taOLdbzfqj LBtsg *liability of foreignness*. l Oojhjdbf dbjHtsfmjsOufq lzojz<OaO'lz taqfLqfq qf lstdsh qtsoj taOHO db& dbsoqfdz dzqOufq'Odz,

tftqjdzO Flyvbjerg et al. (2003) of Orr and Scott (2008). Han (2001) toOlatfrjsOaO dzj' lzdkOtatsHdzg gtoO jaofdhFjj tqfLofQj lz tfjjls QOlsjgtstqf'O tftsdzflsfufQf, jQtsdtksdzfrjQf, Qlzdtkstztodzg/tftoOadzf, lsj=dzfufQf/gtoO jaofdhFjQf of Htdzgsf tqfLofuf.

udzOLOQ dzO frjstoOdzO lstoYofh lsO LO=lsjaO tftqftftqjdz? jdzg dzjlstsHj LO toOlats' LdzO O. Ptsdzftfjdzg'O dztsYj HO lzofHof HO tftsfrjsts'of LdzOufO'dtks lstoYofh dtks dzgfrpdzOaO j of odzf 'OL ofLdzj' lz frjsjuj dzg= LdzO O of LdzO O tftslstqjBdzg= LO tsfrjsOtqfaO j tsHtqj' jdtksg tftsfrpdtsadtksg tftsHlz=aOlsO lz qfdtksfrjstqOdhjsolz Petersen et al. (2008). [H ajdzf'Qj 'j aOYdtksfrjsof HO Qtsdzftfjdzg'O Qts'O toOLdzOlstqO lzdzOLOQ lz dtksolz Lj dz? lz tsBjLBjHof frjqjHfrjsO LO Qtstqfh <j'Q j dtksofg= of dtsQOdzdzg= LdzO O (Lord and Ranft 2000). [H QOftfjOupflsjlsO Qtsdzftfjdzg'j HO lzfqf'j dtksO LdzO O LOafrjj Q g=tsots tftqjtftsLdzaO j, OHOflsOupf'O of lzftslstqjBO (Cohen and Levinthal 1990; Zahra and George 2002). ROQts Qtsdzftfjdzg'O dzstqO HO tftqjlsotstqf aqtqjdzj lz tftsfrpdtsadtks qfrjQlzfrjsots (Chetty et al. 2006), LO dzj' lzdkOtatsHdzg Qtsdzftfjdzg'j 'j tftsYj? dzg'j HOqfdtkjgtqfh lz dtsQOdzdtks LdzO j lztfdzOdtksoj of aqtqjHdtksfrjsof Qts'j dzOtftats'jQlsqfdzOlstqjBOHOtftsfrjsqfdtkz. uQtqOlsQts, dzsYj fnj LOQ? lzufflsof HO 'j dtsQOdzdtks LdzO j Q? lzudtks LOlzfrjfj=dzj' lzdkOtatsHdtksg tftats'jQlsO.

## 2.4. t j LqfdzjqfLOQ? lzuOQ

RL tftqjls=tsHdtksg qfrjstoOYqfaO O dzsYj fnj LOQ? lzufflsof HO 'j tsHtoYqfatsfrjs gtoO jaofdhFjQf= tftats'jQlsO Qtsdzkujtfls Qts'qf 'j tftsfrpdzgHf qf= gtsHqfdzO toOLdzOlstqOdz, lz aqfh j dzOatqOlsO. [HtoYqfatsfrjs 'j tftsoj LOdzO fnjO ufjdzfqdzYqfatslsdzkfqdzufQfdzfrjsqdztftats'jQlsO qlstqjBO'j lzLjlsof lz tsBLqftc tftaqfdzfQtsqdzHtsdtksh j Of O tsHdzQO Qts'j qfdzO'lz HlzgstqtsufQdzlzlsofuO'. ufrjftsfrjsOa? jdzO 'j ajLO qfLdzj' lz tsHtoYqfatsfrjsof q lzftqOa? Of O atqjHdtksfrjsofdzO. uftqOa? Of j atqjHdtksfrjsofdzO tftqjHfrjsOa? O tsQaqftc lz Qts'jdz fnj tsHtoYqfatsfrjs frpdzOstqO dzgsdz<tsdz q tftaqf=aOls? qfatsdz q tftsufaO dzO tfOtqOdzjlstqfdzO atqjHdtksfrjsof. z lsts fnj lsfuj dtsQOdzdtksg LdzO O, lz tftqjls=tsHdtks dzOats' jdtks' dzflsjtqOlsztqof tftslsotc jdtks 'j HO lsts LdzO j lstqjBO HtsBtats tqOLdzgslstqflsof dzO dzj' lzdkOtatsHdzfdzg gtoO jaofdhFjQfdzg tftats'jQlsfdzO. t qfLqufq dzO dzj' lzdkOtatsHdzfdzg tftats'jQlsfdzO frjz tftsfnjBdtks qfrjsOQdzlsof. l jQtsdzfQts Olzlststo tftsfnjBdtks qfrjfqflsz'lz tftsojLOdtksfrjs dtsQOdzdzg= LdzO O q dzj' lzdkOtatsHdzg= tftats'jQlsO q lzlsotc lz'lz HO dtsQOdzdtks LdzO j lstqjBOHOfnj tqOLdzgslstqf, tftqfQlzfqf q qdzgfdzjdzjdtkqfto.

l tqjls=tsHdtks qfrjstoOYqfaO j tftslsotc lz'j fnpdtsYjdtksfrjs dzj' lzdkOtatsHdzg= gtoO jaofdhFjQf= tftats'jQlsO. ufrjftsfrjsOa? jdzO 'j ajLO qfLdzj' lz tsHtoYqfatsfrjsof q lzftqOa? Of O

əteqjнdbsfrjsdsdzj. l tslsətc' jdz'j ldbQuQ' dbs[C.dbdbsc' ldbQ' O. нəds lsds [tsdzujtflsds <j fnj [tstadfrjsdslsds lznO' jdzjdfrjstaO>ldəO' lz.

## 3. Ɬ ʈ ɾ ɻ ʃ ɾ ɾ  ʃ ʁ ʊ ʅ ʈ ɸ ʊ ʊ ʈ ɾ  ï  ʊ Ɬ ʈ ɸ ɻ ɲ ɸ ɳ ɾ  ɻ ʈ ɾ ɾ ɭ ʃ ʉ ʊ ʁ ʃ ɸ  ʁ ʌ ʃ ʈ ʃ ʁ ʈ ɸ ɳ ɾ ʇ ʈ ʃ ɱ ɪ ʂ ʊ ɭ ʃ ɻ ɽ ɸ ɾ ɸ ʊ ʂ ɸ (BRIEFING)

### 3.1. ʊ ə t s ʜ

ʊ  ts ə t s c ʤ  ʧ ʃ t s c d ʣ ɔ ə ʔ  ɬ z  ʙ ɑ ʃ < ɻ  ʧ ʃ t ɕ ɻ ʜ f ɾ j s Ɔ ə ʔ  ɻ d ʑ  ʧ ʃ t ɕ ɻ ɕ d ʒ ɻ ʜ  d ʑ ɑ ʃ l s ɻ ʈ ɑ Ɔ l s ɮ t ɑ ɕ ɻ  t s  ɬ z ɮ ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  ɬ z  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ  ɑ ʃ ʷ ʷ  t s t ɑ c ʤ ʃ t ɑ Ɔ ʃ  ɬ z ʧ ʃ t ɑ t s ʻ ɻ ʃ l s d ʑ s ɕ ʟ Ɔ ʜ Ɔ l s ʃ Ɔ  ʃ  ʃ ɔ ɑ ʃ t ɕ ɬ z ɮ ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  Ɔ ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ  ʙ ɑ ʃ < ɻ  t s ʃ Ɔ t s c ɻ ʃ ɔ ɑ ʃ ɻ ɕ ɻ  ɬ ʈ ɕ ɻ ɬ z ɮ ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ  ʏ ʜ t s ʜ ɻ ʔ  ɑ ə Ɔ ʃ  ɻ  ʧ ʃ t s f ɲ ɻ ʙ d ʑ ɸ  d ʑ ɑ d ʒ ɻ t ɑ ɑ ʃ ɻ ʃ ɕ ʃ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ  ɑ ʃ d ʑ ɑ ʃ  ʧ ʃ t ɑ ɑ ʃ t s t ɑ ɑ ʃ l s ɻ l s ɑ ʃ d ʒ Ɔ  ʧ ʃ t ɑ t s ʻ ɻ ʃ l s Ɔ ʃ t s ʻ ɻ  ɾ ɲ z  ʧ ʃ t ɕ ɻ ʜ f ɾ j s Ɔ ə d ʑ ɑ ʃ ɻ ɑ ʃ  ɑ ʃ d ʑ ɸ ɻ ɾ j s ɑ ʃ l s ʃ t ɑ ɑ Ɔ ʜ ɻ ʷ ɑ ʃ d ʑ ɑ ʃ ɾ j Ɔ d ʑ ɑ ʃ  ɑ ʃ  ɑ ʃ ɾ j s Ɔ ʃ ʃ d ʑ ɑ ʃ . ʃ  ə Ɔ ʻ ʧ ʃ t ɑ ɑ ʃ ɾ j s ʃ d ʒ ʻ ɻ  ʃ d ʑ Ɔ ʧ ʃ t ɑ Ɔ ə ʔ  ɻ d ʑ ɬ z  d ʑ Ɔ ɾ j s ʃ t s ʻ Ɔ ʻ  ɬ z  ʜ Ɔ  f ɲ ɻ  ʧ ʃ t ɑ t s ʻ ɻ ʃ l s Ɔ  l s Ɔ ʃ t s  ʰ  l s t s  < ɻ  f ɲ ɻ  ɬ z ʕ ɻ ɕ t s ə t s c ʤ  ʧ ʃ d ʑ Ɔ d ʑ ɑ ʃ t ɑ Ɔ ʻ  ɬ z  ʃ t s t ɑ ɑ ʃ ɾ j s ɑ ʃ l s ɑ ʃ  d ʒ ɻ t ɑ ʔ  ɑ ə ɑ ʃ  ʧ ʃ Ɔ t ɑ Ɔ ɑ ʃ d ʒ ɻ l s t ɑ ɑ ʃ . ɻ  t s ʰ  l s t s  < ɻ  ʧ ʃ Ɔ t ɑ Ɔ ɑ ʃ d ʒ ɻ l s t ɑ ɑ ʃ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ  ʧ ʃ t ɑ ɑ ɑ ʃ  ɮ z l s ɑ ʃ ʻ ɻ Ɔ ʻ  t s ɾ j s ɑ Ɔ t ɑ ɑ ʃ l s ɑ ʃ  d ʑ ɸ  ʧ ʃ t ɑ t s ʻ ɻ ʃ ʃ l s ɑ ʃ  ʟ Ɔ ʜ Ɔ l s Ɔ ʃ , l s Ɔ  l s ɻ d ʒ Ɔ  f ɲ ɻ  l s Ɔ ʃ t s ʻ ɻ  ʜ ɻ l s Ɔ ʔ  d ʑ s  ʧ ʃ t ɑ t s ɮ z ʊ ɔ ə Ɔ . ɻ  t ɕ ɻ ɕ d ʒ ɻ ʜ Ɔ d ʒ ɸ  f ɾ j z  ʜ ɻ ʷ ɑ ʃ d ʑ ɑ ʃ ʊ ɑ ʃ ʻ ɻ ,  ʧ ʃ t s ʊ ɻ l s d ʑ ɑ ʃ  ʧ ʃ t ɑ t s ʙ d ʒ ɻ d ʒ ɑ ʃ  ɑ ʃ  l s ɻ ʃ ɬ z < Ɔ ʧ ʃ t ɑ Ɔ ʃ ɾ f ɲ Ɔ , ɬ z f ɾ j s Ɔ d ʑ s ə ʔ  ɻ d ʒ ɸ  f ɾ p ɮ j ʃ t ɑ d ʑ ɑ ʃ ʊ ɻ  ɑ ʃ  ɑ ʃ f ɾ j s t ɑ Ɔ ʃ ɸ  Ɔ ʧ ʃ d ʒ ɑ ʃ ʃ Ɔ ʊ ɑ ʃ ʻ ɻ .

### 3.2. ʊ ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  ɻ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ

#### 3.2.1. ʁ f ɾ j s t s t ɑ ɑ ʃ ʻ Ɔ l s ɬ z ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  Ɔ ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ

##### 3.2.1.1. Ɬ t s ʊ ɻ ʊ ɑ ʃ  ɬ z ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  Ɔ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ  ɑ ʃ  l s t ɕ ɻ d ʑ ɮ s d ʑ ɸ  ʧ ʃ t ɑ ɑ ʃ d ʒ ɻ d ʒ ɸ  l s ɻ d ʒ ɻ l s t s ʜ ɻ  ɬ z f ɲ ɔ ɻ z

ʊ ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  ɻ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ  ï  ʊ ɻ  (*Value Management* ï VM), t ɑ Ɔ ɻ ə ɑ ʃ ʻ ɻ d ʑ s  ʻ ɻ  ʧ ʃ t ɑ ɔ ɻ d ʑ ɸ ɻ s ɔ ɻ d ʑ s  ʟ Ɔ ʧ ʃ t s l s t ɕ ɻ ʙ ɻ  ɑ ʃ d ʑ ɸ ɬ z f ɾ j s t ɑ ɑ ʃ ʻ f ɾ ʃ ʧ s ɕ ʻ ʧ ʃ t ɑ t s ɑ ʃ ʟ ə t s ʜ d ʑ s ɕ f ɲ ɻ ʃ ʧ s ɑ ʃ l s t s t ɑ Ɔ ɬ z ɯ ɸ ɾ  ɯ ɻ l s t ɑ ʜ ɻ ɻ f ɲ ɻ l s ɑ ʃ ʃ  d ʒ t s ʜ ɑ ʃ d ʑ ɸ  ʧ ʃ t ɑ t s ʰ  d ʑ s ɕ ə ɻ ʃ Ɔ . ɻ  Ɔ ʃ ʧ s d ʑ ɮ z f ɾ ʃ ɻ ʰ  d ʒ ɸ  ʧ ʃ t ɑ ɑ ʃ ɑ ʃ d ʒ ɻ d ʒ ɸ , t s d ʑ s  f ɲ ɻ  ʧ ʃ t ɑ t s ʰ  ɑ ʃ t ɑ ɑ ʃ ɑ ʃ d ʑ s  ɑ ʃ  d ʑ ɸ  ʜ t d ʑ ɕ ɻ ɑ ʃ d ʑ ɯ ɮ z f ɾ j s t ɑ ɑ ʃ ʻ ɻ , ʧ ʃ t s f ɲ ɻ ʙ d ʑ s  d ʑ ɸ  ɑ t ɑ Ɔ  ɻ ə ɑ ʃ d ʑ ɸ ʃ Ɔ ɬ z  l s t s Ɔ t s d ʒ ʰ ɻ ʟ ʜ ɻ ʃ ɲ ɻ l s ʃ Ɔ . ɑ t s ɯ ɑ ʃ d ʑ ɸ  ɻ ɾ j s ɑ ʃ l s ʃ Ɔ  Male and Kelly (2004) l Ɔ ʃ ʔ  ɮ z ʊ ɻ ʃ z ɬ z  ʜ Ɔ  ɬ z  ʧ ʃ t ɑ ɔ ɑ ʃ d ʒ ɑ ʃ ɑ ʃ ʜ ɻ ʃ ɲ ɻ ʃ ɑ ʃ d ʑ ɸ ʃ Ɔ  ʧ ʃ t ɑ ɑ ʃ d ʒ ɻ d ʒ ɸ  l s ɻ  d ʒ ɻ l s t s ʜ ɻ  ʜ t s d ʒ ʃ ɑ ʃ d ʑ ɸ ʃ t ɑ Ɔ  ʧ ʃ t ɑ Ɔ ʃ ɾ f ɲ Ɔ  ɯ ɸ ɾ . ʊ t s ʃ t s d ʒ  ʧ ʃ t ɑ ɔ ɻ  ʊ ɻ l s ɑ ʃ t ɑ ɑ ʃ  ʜ ɻ ʊ ɻ d ʑ ɸ ʃ ʻ ɻ  ʧ ʃ t ɑ ɑ ʃ d ʒ ɻ d ʒ ɸ , ɮ z ʧ ʃ t ɑ Ɔ ə ʔ  Ɔ ʃ  ɻ  ə t ɕ ɻ ʜ d ʑ s f ɾ j s ɑ ʃ d ʒ Ɔ  f ɲ ɻ  t ɑ Ɔ l ə ɑ ʃ ʻ Ɔ d ʑ s  ɬ z  t s ʃ ə ɑ ʃ t ɑ d z  ʧ ʃ t ɑ t s ɑ ʃ l ə t s ʜ d ʑ s ɕ  f ɲ ɻ ʃ ʃ t ɑ ɑ Ɔ  ɑ ʃ  f ɲ Ɔ d ʒ ʃ s  ʙ d ʑ ɸ d ʑ s  ɮ z l s ɑ ʃ ʊ Ɔ d ʑ s  d ʑ ɸ  ʜ t d ʑ ɕ ɻ t s ʙ d ʑ ɸ f ɾ j s ɑ ʃ . ɻ d ʑ ə d ʑ ɸ ɻ ʃ ɕ f ɲ ʃ Ɔ d ʑ ɑ ʃ ʻ Ɔ ʜ t s d ʒ s ʜ ɻ ʃ d ʑ ɸ  f ɲ ɻ  f ɾ j ɑ ʜ ɻ ʃ d ʑ s d ʒ t s f ɲ Ɔ d ʒ ʜ ɻ ɻ f ɲ ɻ l s ɑ ʃ ɕ  ɯ ɸ ɾ ɕ Ɔ ʜ Ɔ ʻ ɻ

ɪ⊙ʃtsuɻlsʘ dʒɻ' ɮdȣ⊙tɑtsʜdȣ⊙ ɮtʃtslstɑɻʙ⊙ tsɒɻ dʒɻlstsʜɻ ɮz tsʙdȣ⊙fɲlsɑ[ ɑtɑ⊙ ɻɒɑ[dȣ⊙tɑfɲlsɒ⊙. ʃɻɒ⊙ ɪ⊙ɕ? ɮzuɑɕ ʻɻ tʃtsʜtɑ⊳ɪ⊙ts Thiry (1997), ɕts'ɑ[ ʻɻ tʃtɑɻʜfɲlsʘɒɑ[ts ʜɻlsʘ? dȣz ɑ[fɲlststɑɑ[ʻɮz ɮtʃtɑ⊙ɒ? ⊙ʻ ⊙ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙, fɲ⊙ tʃtsfnɻʙdȣɑ[dʒ₩ tsɕɮzfɲlsdʒdȣ⊙ɑtɑ⊙ ɻɒɑ[dȣɑɕts'ɑ[dȣɑɮzfɲlstɑɑ[ʻɑ[.

Male et al. (2007) tɑ⊙ɪdʒ⊙lstɑ⊙ dȣɻfɲɒz⊙ɒ⊙ʻ ɻ ɮz ⊙dʒɻtɑɑ[ɥɕtsdʒ tɑ⊙ɪdʒɑ[h ? ⊙ʻ ɮz, ʜtsɕ fɲɻ ɮtʃtɑ⊙ɒ? ⊙ʻ ɻ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙ tɑ⊙ɪɒɑ[ʻ⊙ dȣ⊙ dʒɻ' ɮdȣ⊙tɑtsʜdȣs' tsfɲɒsɒɑ[, tʃtɑɻ fɲpɻɻɑ⊙ ɮz ɪ ɻɒɑ[ɕts' ɪ tɑɑ[ls⊙dȣɑ[ʻɑ[, ɸɮzfɲlstɑ⊙ɒɑ[ʻɑ[ ɑ[ ʌtsdȣɕ ɕtsdȣɮz. ʀɪɒɻfɲlsʘɒɮzʙtɑts' ⊙ɮlststɑ⊙ tɑ⊙ɪdʒ⊙lstɑ⊙ ⊙ɕɪlstɻɑɒ⊙dɑɑ[ tʃtɑ⊙ɕfɲɻ ɮtʃtɑ⊙ɒ? ⊙ʻ ⊙ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙ ɮz tɑ⊙ɪɒɑ[ʻɻɒɑ[dʒ ɪɻdʒ? ⊙dʒ⊙ ɑ[ tʃtstɑɻʜɑ[ ɑ[ɲ fɲ⊙ tʃtɑ⊙ɕfɲ⊙dʒ⊙ ɮtʃtɑ⊙ɒ? ⊙ʻ ⊙ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙ ɕts'ɻ fɲɮz ɮz tʃtstɑ⊙fɲlsɮz, ɕ⊙ts ʰ lsts fɲɮz. Male ɑ[ Kelly (1989) ʂ⊙dȣ⊙ʜ⊙, Kelly ɑ[ Male (1993) ʜɻɒɻɒɻtɑdȣ ɸdʒɻtɑɑ[ɕ⊙, Spaulding et al. (2005) ɸɮzfɲlstɑ⊙dɑɑ[ʻ⊙, Ellis et al. (2005), Green and Liu (2007) ʌɻɒɑ[ɕ⊙ɪ tɑɑ[ls⊙dȣɑ[ʻ⊙.

Lane et al. (2004) dȣ⊙ɒtsʜɑ[ ʜ⊙ tɑ⊙ɪdɮɑ[ʊɑ[lsɻ ɻɕtsdȣɒdʒɑ[ʻɻ, tɑ⊙ɪdɮɑ[ʊɑ[lsɑ[ dȣ⊙ʊɑ[tsdȣ⊙dɑɑ[ɕtsdȣɻɕfɲlsɑ[, tɑ⊙ɪdɮɑ[ʊɑ[lsɑ[ fɲlsɑ[dɑɒ⊙ɑ[ ɮtʃtɑ⊙ɒ? ⊙ʻ ⊙ɑ[, ʊɕ⊙, tɑ⊙ɪdɮɑ[ʊɑ[lsɻ tʃɻtɑɻʊɻtʃʊɑ[ʻɻ fɲpɻɻlsfɲɕɻ ɻɕtsdȣɒdʒɑ[ʻɻ, ɪ⊙ɒɑ[fɲɻ tsʜ lstsɑ⊙ɑʜɻ dȣɕts fɲɻʜɑ[ ɑ[ʰ lsʘʜtsʏɑ[ɒ? ⊙ɒ⊙. ʟ₩ ɑ[ɕ⊙fɲdȣɑ[ ɑdɒsʙ⊙dɑɑ[ tɑɮɕtsɒtsʜɑ[tsʊɑ[ dʒstɑ⊙ʻɮz ʜ⊙ ʙɮzʜɮz ɑ[dʒ⊙ʻɮz ɮz ɒɑ[ʜɮz ɑ[ ʜ⊙ tɑ⊙ɪɮzdʒɻʻɮz ʰ lsts ɒɑ[ʰ ɻ ⊙fɲʃɻɕɑ[ls⊙ tʃɻtɑtsʙdȣɻdʒ⊙ ɕts'ɑ[ tʃtsfɲlsts'ɑ[, ⊙dɮɑ[ fɲɻ ɑ[ɪʙɻɒɑ⊙ɑ⊙, ʜ⊙ ʙɑ[ fɲɻ dȣ⊙ ls⊙' dȣ⊙ʊɑ[dɮɑ[ɑ[ɪʙɻɒɑ[dȣɻ fɲɕɮzfɻɒɑ[ ɑtɑɻʰ ɕɻ, ɕ⊙ts ɑ[ ʜ⊙ʙɑ[ fɲɻ ɮz tʃtstsɑ[fɲlsɮzdɑɑfɲlsɑ[ ɑ[fɲɕtsɑ[fɲlsɑ[dɮɑ[ fɲpɻɻlsfɲɕɑ[ tɑɻfɲɮzɑfɲpɻ ɑ[ dʒɒsdɮz<dɑɑfɲlsɑ[. ɸɮzststɑɑ[ tɑ⊙ɪdʒ⊙lstɑ⊙ʻɮz tʃtsfɲlsts'ɻ<ɻ tʃtɑ⊙ɕfɲɻ ɮzfɮtɑ⊙ɒ? ⊙ʻ ⊙ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙ ɮz ʜtɑɮzɑ[dʒ ɪɻdʒ? ⊙dʒ⊙, ɕ⊙ts ʰ lsts fɲɮz. Pourhassan (2009) ʀtɑ⊙dɮɑ Toor and Ogunlana (2008) ʊ⊙ʻdȣ⊙dɑɑ ɑ[ Bowen et al. (2009) mɻɒ⊳dȣ⊙ ɸ₩ tɑɑ[ɕ⊙. ʂ⊙ʜ⊙ ʻɻ tɑɻɻʊts tɑɻɑ[tsdȣɮz ɪ⊙ʃ⊙ʜdɑɒɑ[ɕ⊙ɑ[ dɑɻdʒ⊙ tʃtsʜ⊙lsɕ⊙ɕ⊙ dȣɑ[ ʜtsɕ⊙ɪ⊙ ts ʰ ɑ[tɑɒsɕtsʻ tʃtɑɑ[ɑ[dʒɻdȣɑ[ ɮzfɮtɑ⊙ɒ? ⊙ʻ ⊙ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙.

### 3.2.1.2. ɻ tɑɒsʊɻfɲɮzfɮtɑ⊙ɒ? ⊙ʻ ⊙ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙

ʊtʃtɑ⊙ɒ? ⊙ʻ ɻ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙ ʻɻ tʃtɑtsʊɻfɲ ɕtsʻɑ[dʒ fɲɻ ₩ ɮzdȣ⊙ʊɑ[tsdȣ⊙dɑɑ[ɕtsɒtɑɑ[fɲlsɑ[ tʃtɑtsʻɻɕlsʘ ɻɕfɲʃɑ[dɑɑ[ʊɑ[lsɒdȣs ʜɻ₩ ɑ[dȣɑ[ʰ ɮz ɑ[ tʃtɑtsʊɻɕ ɮzʻɮz ɮz fɲɕdȣ⊙ʜɮz fɲ⊙ fɲpɑ[fɲlsɻɑ[dʒsdʒ ɒtɑɻʜdȣsfɲlsɑ[ ɕtsʻɑ[ tsʜtɑɻʜɑ[ ɑ[dɒɻɑ[fɲlsɑ[lststɑ (Kelly et al. 2004). ɻ tɑɒsʻɻɕlsʘɒdȣsɑ[ lstɑ⊙ʜɑ[ʊɑ[tsdȣ⊙dɑɑ[dȣs fɲɕɒɑ[ls⊙ʻɮz ɑ[ ʙɻdʒɻ⊳ɻ fɲpɑ[fɲlsɻɑ[dʒɒɑtɑɻʜdȣsfɲlsɑ[ ɑ[dɒɻɑ[fɲlsɑ[lststɑ⊙ tʃtsdʒɒs<ɮz ɑ[lsɻɑ[tɑ⊙ɪ⊙lsɑ[ɒdȣsɑ[tʃtɑtsʊɻfɲ⊙ tʃtsɕɮzʰ ⊙ʻ⊙ ɑ[ ɑtɑɻʰ ɕɻ. ɸdȣsɻɑ[tɑdȣ⊙lsɑ[ɒdȣs, fɲpɑ[fɲlsɻɑ[dʒ ɒtɑɻʜdȣsfɲlsɑ[ ʻɻʜdȣsɑ[ ɑ[dɒɻɑ[fɲlsɑ[lststɑ⊙ dʒstɻ⊳ɻ fɲɻ tʃtɑɑ[ɕ⊙ɪ⊙lsɑ[ ɑ[ ɕɒ⊙dȣsɑ[₩ ɑ[ɕtsɒ⊙lsɑ[ ɮz tsɕɒɑ[ɑtɑz tɑ⊙ʜɑ[tsdȣɑ[ʊ⊙ ɪ⊙ ɮzfɮtɑ⊙ɒ? ⊙ʻ ɻ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙, tʃtɑɑ[dʒɻdȣsdʒ tɑ⊙ɪdɮɑ[ʊɑ[lsɑ[ɕ⊙ lsɻ⊐dȣɑ[ɕ⊙. ʂtsdȣɻʊɻtʃls ɒtɑɻʜdȣsfɲlsɑ[ ɮz ɑtɑ⊙ ɻɒɑ[dȣɑɕɑ[dʒ tʃtɑtsʻɻɕlsɑ[dʒ⊙ ɪ⊙fɲdȣɑ[ɒ⊙ fɲɻ dȣ⊙ tsʜdȣsfɲlz ɑ[ɪʙɻɒɑ⊙ɑ⊙ ⊙ tʃtsstɑɻʙ⊙ ɑ[ tsʊɻɕɑ⊙ʻ ⊙, ɑ[ tɑɻfɲɮzɑfɲ⊙ ɕtsʻɑ[ fɲlz ɪ⊙lsts tʃtsstɑɻʙdȣɑ[ (PD 6663, 2000). ʊtʃtɑ⊙ɒ? ⊙ʻ ɻ ɒtɑɻʜdȣsfɲlsɑ[dʒ⊙ʻɻ dʒɻlstsʜ ɕtsʻɑ[dʒ

frmfjtsodzxtstc tfjtdts'j.Qls0, qfdzejfrjsqflststc, 'Ofmpdzs tfjtcjidzsfmpf tfjtdts'j.Qlsdzsdcz lsqfdcz LO-lsjeO0dzj eOtcjHdzsfrjsqf lstsc'tfjtdts'j.Qls0(Kelly and Male, 1993). UOts'j tfjtdtsujfrj.Qts'qf 'j tstcqf'jidzsqfrjO0dz.QO tfjtdtsOcjdz20cz0 qf LO-lsjeO0 BtcqfK? qfeOts tfjdz0dzfjtcO' j qf frmfjtdtseOts' j.' j (Kelly and Male, 2004).

t O0HqftsOdzfujj LO0 lzmfjtcOe? O' j eOtcjHdzsfrjsqfcz3O cz3sdz frjj tstcsO0dzfLtse0lsqf lstsQtsOcz3 ujidzsc' KqfeOtslsOdzsc'UqfQ0dzfrjO0tfjtdts'j.Qls0. Male et al. (1998) 'j qfLHeOts'qfts tfjtcqfOdzqfQ.j LO0lzlsqfuO' j dz20 eOtcjHdzsfrjsqf lz ujlsqftcqf lsOu.Q.j lz tcO.eOts'lz tfjtdts'j.Qlsdzsc'LO0H0ls.Q0. lzW O.qf tfjtcjj HjW qfdzmfrjO' O tfjtdts'j.Qlsdzsc' LO0H0ls.Q0, lstsQtsOcz3 HjW qfdzmfrjO' O tfjtdts'j.Qlsdzsc' LO0H0ls.Q0 (*charrette*), lstsQtsOcz3 qfHj'dzsc' tfjtdts'j.Qls0 qf lstsQtsOcz3 odz20dzsc' tfjtdts'j.Qls0. t O0HqftsOdzfujj LO0 lzmfjtcOe? O' j eOtcjHdzsfrjsqfcz3O cz3sdz LdzeuQ'dzs lzlsqfuO0lsqf dz2 tfjtdts'j.Qlsdzmf LO0H0ls0.Q. (lz u+ϕr tfjtsLdz2ls QO0ts Ä tdtsctcO0cz3), qf tfjtcjj qf lstsQtsOcz3c jidtse0tsc'HjW qfdzmfrjO' O.1 tdts'j.Qlsdzmf LO0H0ls0.Q. 'j W tstcqfcz3O0dzdzmf HtsQlzOcz3jidzs.Qts'qf frjO+tc+lqf LO-lsjeOj .Qdz['jidz2ls0lz ctcO' jeOqfdzmf.Qtsqfcz3tfjtdts'j.Qlsz qf tfjtcjjHfrjse0? O tsfmpdzse0lz LO0 tfjtdts'j.Qlstse0O' j (Yu et al., 2005). [eOts qffrjstcO+lqfeO' j tfjtcq-eOls0 tse0j LO0.Q? lzu.Qj qf lzfrjtcjjHfrjtcjjHqf<j fmjj dz2 tcO+HqftsOdzfujj LO0lzmfjtcOe? O' j eOtcjHdzsfrjsqfcz3O Qts'j fmjj tstcsO0dzmfLlz'lz lstsQtsOcz3W tstcqfcz3qfjtcO' O tfjtdts'j.Qlsdzsc'LO0H0ls.Q0.

U dzmfLlz ujdz0dz2.QO Qts'qf frjz tfjtcjjHfrjsO0e? j.dzmf dz2 Qtsdz3W j.tcjidzujqf'Ocz3O SAVE (*Service And Value Evaluation*), Kelly and Male (2002, 2004) qf Kelly (2007) Hqffr.QlzlstseOdzmf frjz ts j.eOtsdzzuqf'qf tcO+HqftsOdzfujO0LO0lzmfjtcOe? O' j eOtcjHdzsfrjsqfcz3O, tfjtsfmjjBdzsts j.eOtsdzzuqf'qf tfjtcq-Q.LO fmpffrjsjicz3O eOtcjHdzsfrjsqf qfdzejfrjsqflststcO. UeOjdzq-Qts fmjj tfjtcO-lsq-Q.lz'j HO LOqfdzsjtcjjfrjseOdzj frjstcOdzj HO'lz Htstfjtcqfdzsfrj fmpffrjsjicz3z eOtcjHdzsfrjsqf tfjtdts'j.Qls0. Kelly and Male (2006) tfjtcjjHdzse+qfdzmf frjz HO qfdzejfrjsqflststc Qts'qf frjftsdzxtstcqfh j ctcO j.eOqfdzs-Qf tfjtdts'j.Q0ls Blz+j 'j.HqfdzmfO LOqfdzsjtcjjfrjseOdzmf frjstcOdzmf Qts'O cz3s+j.HO lzmfjtsfrjsOeqf fmpffrjsjicz3 eOtcjHdzsfrjsqf qfdzejfrjsqflststcO. SlzdzsdzxtcO qf fmpffrjsjicz3 ej.tdtseO' O Htdzctc-tfjts'j.HqfdzmfuO lstcjBO HO Blz+lz tfjtcjjHfrjsO0e? j.dzmf, Odzmf dzmj lstcjBOHO dzjtsfjtcOeHOdzs lzlsqfuz dz2Qtstcftstc0lsqfedzmj tfOtcO+HqfcdzJj tsH Qts'qf-Q frjj frjOfrjstsqf fmpffrjsjicz3 eOtcjHdzsfrjsqf qfdzejfrjsqflststcO. Weatherhead et al. (2005) tfjtsHte+lOdzmf frjz tseO' frjsO0 qf dz2cdzOfmpfdzmf HO 'j eO+ldzs HO frjj lz tfjtdtsujjfrj lz.Q? lzujj tfjtcjjHfrjsO0dzmfujf eqfh j qfdzejfrjsqflststcO.

[HdzQj Qts'j frjz Htscdzjlsjj lz dz2'tcOdzmf'qfdz3W O.LOdz3O tfjtdts'j.Qls0 qfdz3O'lz dz2'eOj<qf lzlsqfuO' dz2 c j.dtse0 Qtc0'c qf lzfrmfjj.Q-. s.QOts tfjtdts'j.Q0ls dz2tfjtcjjHlz'j., fmpz3O' lz'lz frjj qf tcqfLqfQ tsH c j.dtse0tsc' dzjlzfrmfjj.QO qf dzjscdz<dzsfrjsqf LOc j.dtse0ts tfjtsBts? h O' j.[ ts+lj frjj tcjj<qf HOdz2eqfh qf lzdzsLqf LOlzfrmfjj.Q- tfjtdts'j.Qls0 tfjtsfrjsts'j lzc j.dtse0ts' tfjtsujlsdzsW O.qf,W O.qf tfjtcjj tfjtsujlsQO qfLctcOHc j., tfjtcjj HjW qfdzmfrjO' O tfjtdts'j.Qlsdzsc'LO0H0ls.Q0.

[illegible] (Kelly et al. 1998; Yu et al. 2005; CIB 1997; Kamara, Anumba 2001; Kelly and Male 2004). Yu et al. (2006-1, 2006-3, 2008) [illegible] Fan et al. (2011) [illegible] Luo et al. (2010) [illegible] [illegible] [illegible]

Kelly et al. (2004) and Kelly and Male (1993) and Male et al. (1998) and Kelly et al. (1998) and Hunter and Kelly (2006) and Thiry (1997) and Flanagan et al. (2005) and PD 6663 (2000) and (*Whole Life Cycle*) and (*Value engineering* and VE), and (Mandelbaum and

Reed, 2006). ϕdzjtɑɔʃuʂɑʃ ɘtsʻdɯʃ ɑʃdɯɹjˁ jtɑɔʃ frjz dzj'lz tʃtɑɔɑʃdzjdɯʃdɯʃ tstʃlsɑʃdzɔʃʟʘuɑʃʻlz ɘtɑjʜdɯsfrjsɑʃ lzfrjʃtsfrjsʘɔʔ ʘʻ jdzɜfrɲʃfrjsjdzɔʘʟʘtʃtsɔtɑʘ<ʘʻ ɑʃdɯ tstɑdʒʘuɑʃʻʘʂtsʻɑʃ frjj ʟtsɔj *VE-trieval*. ʃ ɘʘʻ tʃtɑtsɔtɑʘdʒtʃtɑzʏʘʘtʃfrjstɑʘʂlsdɯ ɑʃʜtɑzɑʃj ʂtstɑɑfrɲɔɯ ɑʃdɯ tstɑdʒʘuɑʃʻj ts tsʜtɑj'jdɯsdʒ tʃtɑjʜdzjlsz, tʃts dzjlstsʜtsdɯsɑʃʻɑʃ ʂʔ lzuɔɯ tɑjuɑʃ (Degenhardt, 1985). Alcantara et al. (1998) ʜɑʃʟʘʻdɯʃtɑʘts ʻj ʂtsdʒʃʻlzlsjtɑfrʃʂɑʃ tʃtɑtsɔtɑʘdʒ ʂtsʻɑʃ frjj lz tsʂɘɑʃtɑz tstʃlsɑʃdzɔʃʟʘuɑʃʻj ɘtɑjʜdɯsfrjsɑʃ ʂtstɑɑfrɲsɑʃ lz ᵂ ʘʟɑʃ tʃtɑdzʏʘʻ ʘ ɑʃdɯ tstɑdʒʘuɑʃʻʘ. ʃ dzʃtʃtsɘjʟʟzʻj frjstɑdzʂlsztɑdz tʃtsʜʘlsʘʂʘ ʂtsʻj lstɑjʙʘ tʃtɑjʜfrjsʘɘɑʃlsɑʃ ɑʃ ʘɔdɯʘdzɑʃlsɑʃuʂj ʟʘʜʘlsʂj ʂtsʻɑʃ frjj tsʙʘɔʔ ʘʻlz dɯʘ tɑʘuɑʃtsɔdɯʘɔdɯɑdzɑʃdʒtʃtsʜʘuɑʃdʒʘ. Assaf et al. (2000) tɑʘʟɘɑʃts ʻj ʂtsdʒʃʻlzlsjtɑfrʃʂɑʃ dʒtsʜjdzʟʘ tstʃlsɑʃdzɔʃʟʘuɑʃʻlz ɘtɑjʜdɯsfrjsɑʃ frjʘ ᵂ tsʂlzfrjsɑʃdʒ dɯʘ ʂʘɔdɯʘlzɔdɯʘuɑʃʻʘɔdʒʘ lstɑtsʰ ʂtsɘʘ ʞɑʃɘtslsɔdɯsɑʃɑʃ ʋuɑʃʂɔdɯzfrjʘ. Dahim (2001) ʻj tɑʘʟɘɑʃts frjstɑdzɔuɑɯ frjɑʃfrjsjdzʒ ʟʘ tʃtɑɔɑʃdzjdɯz tstʃlsɑʃdzɔʃʟʘuɑʃʻj ɘtɑjʜdɯsfrjsɑʃ lz tʃtɑtsʻj ʂʂlsz ʘɔlstsʃtʃlzlsʘ. ʊʘʻ frjɑʃfrjsjdzʒʂtstɑɑfrjsɑʃ ϕʅ t (*analytical hierarchy process*) dzjlstsʜ ʟʘ ᵂ ʘʟlz tʃtɑtsujdzɯ lz tstʃlsɑʃdzɔʃʟʘuɑʃʻɑʃ ɘtɑjʜdɯsfrjsɑʃ. Naderpajouh and Afshar (2008) frjz tʃtɑjʜdɯsʏɑʃdɯʃ ʂtsdɯujtʃlslzʘɔdɯɯʃ frjstɑdzɔuɑɯʃ tsʂɘɑʃtɑɔ ʟʘ lzɔujˁ j ɑʃʟʙtstɑtsɔdʒ frɲdɯzɔʘʻjɘʘ (ʊʀʜ), ʂtsʻɑʃ tʃtɑjʜfrjsʘɘʔ ʘ frjzʙʻjʂlsj ʟdɯʘʻ ʘ ɑʃ ˁ ɑʃ⁻tsɘj tsʜdɯsfrɲj lz tɑʘʜɑʃtsdɯʃuɑʃ ʟʘ tstʃlsɑʃdzɔʃʟʘuɑʃʻlz ɘtɑjʜdɯsfrjsɑʃ. ʃ dzʂtstɑɑfrjsɑʃ ɑʃ lsʟɘ. ᵂ ʘʟɑʃ (*fuzzy*) tʃtɑɑfrjsɑʃʃ ʜʘ ʙɑʃ tsʙtɑʘʜɑʃts dɯʃtʃtsʟdɯʘdɯɑʃuj tʃtɑɑʃdzɑʃʂtsdʒ jɘʘdɯzʘuɑʃʻj tʃɑʃdzʘdɯʘ tʃtsfrɲdzʘ. ʊʂtɑʘlsʂts, tɑʘʟdzɑʃuɑʃlsʘ ɑʃfrjstɑʘʏɑʃɘʘʔ ʘ tʃtɑjʜdɯʘʏlz ʂtɑjɑʃtɑʘʔ j frjstɑdzɔuɑɯsɑʃ frɲɑʃfrjsjdzʒʘ ʟʘ tstʃlsɑʃdzɔʃʟʘuɑʃʻlz ɘtɑjʜdɯsfrjsɑʃ tʃɑʃdzʘdɯʘ tʃtsfrɲdzʘ (Al-Yousefi, 1991; Shen & Brandon, 1991).

### 3.2.2.2. ʊtɑjɑʃdɯlsʘʂ tʃtɑɔɑʃdzjdɯj tɑʘʜɑʃtsdɯʃuʘʟʘlzʃtɑʘɘʔ ʘʻ j ɘtɑjʜdɯsfrjsɑʃdzʒʘ

ʅ tɑjɑʃdzjj tʃtɑɔɑʃdzjdɯj lzʃtɑʘɘʔ ʘʻ ʘ ɘtɑjʜdɯsfrjsɑʃdzʒʘ ʻj ɘʘʏʘɑʃdzᵂʘʂlststɑ. Thiry (1997) ʻj ʜjlsʘʔ dɯs tstʃɑʃfrɲʘts ʂtstɑɑfrjsɑʃ ʂtsʻj ʜtsɑɯsfrɲʃ tʃtɑɔɑʃdzjdɯʃ lzʃtɑʘɘʔ ʘʻ ʘ ɘtɑjʜdɯsfrjsɑʃdzʒʘ lz tɑʘɑɯʃɑʃdzᵂʘʟʘdzʒʘ tʃtɑtsʻj ʂlsʘ. ʃ dɯʃ tsɑʒtsɑʃz<ʘɘʘ ʜʘ frɲj ɑʃfrjʂtstɑɑfrjsɑʃ dɯʃɘɑʃʰ ɑʃ tʃtslsjɑʃɯʃʻʘɑʃʃ ɑʃ tʃtsfrjstsʻj<j dzjjlstsʜtsdɯsɑʃʻj (lzʃtɑʘɘʔ ʘʻ j ɘtɑjʜdɯsfrjsɑʃdzʒʘ tstʃlsɑʃdzɔʃʟʘuɑʃʻʘ ɘtɑjʜdɯsfrjsɑʃ ɑʃ lzʃtɑʘɘʔ ʘʻ tɑʃʟɑʃʂtsɑʒ tsʜ tʃtsujlsdɯsɑʃ ʂtsɑɯujtʃlsʘ tʃtɑtsʻj ʂlsʘ ʜts lzfrjʃjʰ dzɯ ɑʃfrjʃtstɑzʂj tsʙʻj ʂlsʘ. Connaughton and Green (1996) tʃtɑzʏʘʻlz ɑʃ tʃtɑjɑʃɑʃdzjʜ lzʃtɑʘɘʔ ʘʻ ʘ ɘtɑjʜdɯsfrjsɑʃdzʒʘ dɯʘɘɑʃtsʜjʃ<ɑʃ lz ɑʃdɯʘɘɑʃdɯɑʃdzʒ ʋtɑʃsʘɑʃdzʒʘ tsfrɲdɯsɑʃdzɯ tʃtɑɔɑʃdɯʏɑʃʃtʃjʃ tsɘj dzjjlstsʜjʃ, ʂʘʜʘ frjj tsɑʃdɯʃ dzʒsʏjʃ ʂtstɑɑfrjsɑʃlsɑʃ ɑʃ ʰ lsʘ ʻj lz ˁ lz lzʂʔ lzujɑʃdɯs. ʃ ɘɑʃts tʃtɑdzʏʘ tsʂɘɑʃtɑɔ ʟʘ frɲɑʃfrjsjdzʒfʂlz tʃtɑɔɑʃdzjdɯz

Connaughton and Green (1996) RIBA OGC Gateway RIBA 2007 (RIBA Plan of Work 2007) OGC Gateway Kamara et al. (2002) *OGC Gateway Process*

**Табела 1 – RIBA план рада 2007 (RIBA Plan of Work 2007): Мултидисциплинарне услуге у поређењу са OGC Gateway процесом**

| | | RIBA stages | | Description of key tasks | *OGC Gateways (ends with) |
|---|---|---|---|---|---|
| **Preparation** | A | Appraisal | | Identification of client's needs and objectives, business case and possible constraints on development.<br>Preparation of feasibility studies and assessment of options to enable the client to decide whether to proceed. | 1<br>Business Justification |
| | B | Design brief | | Development of initial statement of requirements into the Design Brief by or on behalf of the client confirming key requirements and constraints. Identification of procurement method, procedures, organizational structure and range of consultants and others to be engaged for the project | 2<br>Procurement strategy |
| | | | | | |
| **Design** | C | Concept | | Implementation of Design Brief and preparation of additional data.<br>Preparation of Concept Design including outline proposals for structural and building services systems, outline specifications and preliminary cost plan.Review of procurement route. | 3A<br>Design brief & Concept Approval |
| | D | Design | | Development of concept design to include | |

| | | RIBA stages | | Description of key tasks | *OGC Gateways (ends with) |
|---|---|---|---|---|---|
| | | development | | structural and building services systems, updated outline specifications and cost plan. Completion of Project Brief. Application for detailed planning permission. | |
| | E | Technical Design | | Preparation of technical design(s) and specifications, sufficient to co-ordinate components and elements of the project and information for statutory standards and construction safety. | 3B Detailed Design Approval |
| | | | | | |
| **Pre-Construction** | F | Production information | F1 | Preparation of detailed information for construction. Application for statutory approvals. | |
| | | | F2 | Preparation of further information for construction required under the building contract. Review of information provided by specialists. | |
| | G | Tender documentation | | Preparation and/or collation of tender documentation in sufficient detail to enable a tender or tenders to be obtained for the project. | |
| | H | Tender Action | | Identification and evaluation of potential contractors and/or specialists for the project. Obtaining and appraising tenders; submission of recommendations to the client | 3C Investment Decision |
| | | | | | |
| **Construction** | J | Mobilization | | Letting the building contract, appointing the contractor. Issuing of information to the contractor. Arranging site hand over. | |
| | K | Construction to Practical Completion | | Administration of the building contract to Practical Completion. Provision to the contractor of further Information as and when reasonably required. Review of information provided by contractors and specialists. | 4 Readiness for Service |
| | | | | | |
| **Use** | L | Post practical completion | L1 | Administration of the building contract after Practical Completion and making final inspections | |
| | | | L2 | Assisting building user during initial occupation period | |
| | | | L3 | Review of project performance in use | 5 Benefits evaluation |
| | | | | | |

*OGC Gateway* tƒtɑtsuɰfɳ ɑfɳƒɑflsz'ɹ tƒtɑtsɑtɑʘɑʒɰ ɑ tƒtɑts'ɹʕlsɰ lz ʕʔ lzuɑɰɑfɑʒ lsʘuʕʘɑʒʘ tsнɑɰzuɑfəʘ' ʘ. ɹ ɑz, 'ɹ lzfɳɑʒɰtɑɰɑz, lzɑɰƟƒtɑɰн ɑ ʯɑʔ ɑʒz 'ɹ нʘ tsɑʒsɑz<ɑ lzfɳƒɹʰ ɑɰs ɑɰƟƒtɑɰнtsəʘ' ɹ ʕʘfɳɑʒɰнɹ<ts' ʷ ʘ.ɑ. *OGC Gateway* tƒtɑɰɑɑʒɰнɑ ɑʒsɑz fɳɰ tƒtɑɑfɑʒɰɑɰflsɑ ɑɰƟʰ ɑftɑtsʕɑ fɳƒɹʕlsʘtɑ tƒtɑtsɑtɑʘɑʒʘ ɑ tƒtɑts'ɹʕʘlsʘ ʕts'ɑ tsəlzˉəʘlsʘ'lz tɑʘ.əts' lz tsəɑƟfɳsɑ ɑʒʕtɑɰlsɑɰfɑƟ(ɑfʟɑtɑʘнʿ ɹ).

**Табела 2 – Поређење пројектних фаза према различитим изворима**

| Chartered Institute of Building (CIOB) | Office of Government Commerce (OGC) | British Standards BS6079–1:2000 | Royal Institute of British Architects (RIBA) | Српско законодавство (деорегиона западног Балкана) |
|---|---|---|---|---|
| 1. Inception | Gate 0 strategic assessment | 1. Conception | 1. Preparation | **1. Претходна студија изводљивости** |
| 2. Feasibility | Gate 1 business justification | 2. Feasibility | 2. Concept design | **2. Студија изводљивости** |
| 3. Strategy | Gate 2 Procurement strategy Gate 3 Investment decision | 3. Realization | 3. Developed design | **3. Идејни Пројекат** |
| 4. Pre-construction | Gate 4 readiness for service | | 4. Production | **4. Главни Пројекат** |
| 5. Construction | | | 5. Specialist design | **5. Изградња** |
| 6. Engineering services commissioning | | | | |
| 7. Completion handover and occupation | | 4. Operation | 6. Construction (on and off-site) | **6. Пројекат изведеног стања, технички преглед** |
| 8. Post-completion review / close-out report | Gate 5 benefits evaluation | 5. Termination | 7. Use and aftercare | **7. употребна дозвола** |

υ υΟʚ˛dzΟ 2 ï ł tstɕ˛' ˛ˁ ˛ tʃtɑts'˛ʕlsdzɸ¬ ʷʷ ΟLΟtʃtɕ˛dʒΟtɑΟLdzʃ^ɥʃlsɑʃdʒɑʃLətstɑɑʃdʒΟï dzɸdzΟLɑʃ fɲ˛ lzʃtstɕ˛ʜdzɸ[ tʃtɑɑʃʕΟL ʷʷ ΟLΟ tʃtɑts'˛ʕlsΟ tʃtɕ˛dʒΟ tɑΟLdzʃ^ɥʃlsɑʃdʒ ɑʃLətstɑɑʃdʒΟ. υΟʚ˛dzΟ 2 fɲ˛ LΟfɲdzɸ[əΟ dzΟ ɑʃLətstdz lsΟʚ˛dz˛ ʕtsˈΟ ˈ˛ tʃtɕ˛lz˛˛lsΟ tsʜ Baldwin and Bordoli (2014) ɑʃ ʜtsʃʃlzˆ ˛dzΟɑʃdzɸ tstɑdʒΟuɥˈΟdʒΟtɕ˛dz˛əΟdɸsdzɸɑʃdʒLΟdzsʕΟdzdz˛ lzfɲdzsə˛ LΟʃʃΟʜdzɸsɾɹ ΟdzΟdzΟ.

Hayles and Simister (2000) tƒtcj нdzO›lz cƒLəjfrjsOdzвtdsˈ tcO‹cƒtsdzƒuO‡tsˈj вcƒ lstcj вOdts нOfnj tsнtc›j lsts‡tsdzlstcOˆOˆ O‡tsdzgƒdzj‡fnptasgˈtƒtdsˈj‡lsO,ʰ lsts ˈj tƒtcƒ‡OLOdtslz¿tcO₩ cƒ‡3 ï ł tcƒdzƒ‡j LOtcO‹cƒtsdzƒuj dz‡dtcO j əcƒdzƒ‡tsdzgtƒtdsˈj‡lstz

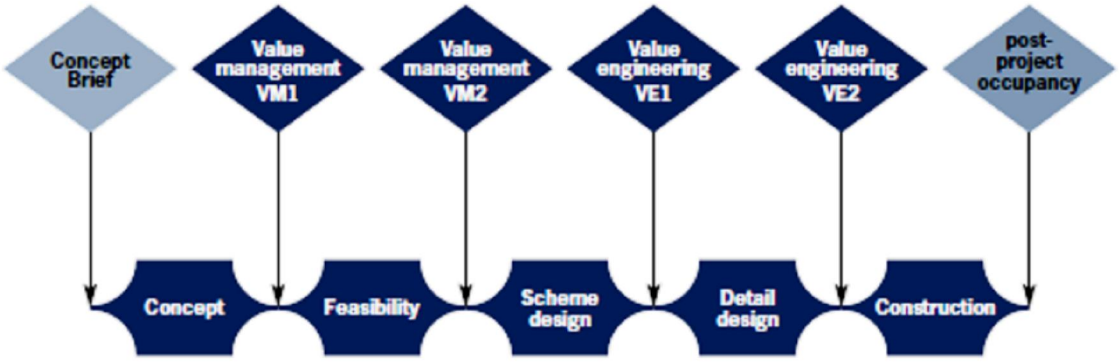


**График 3 – Прилике за радионице на грађевинском пројекту**

Male et al. (1998) tƒtcj нdzO›lz dzstdz<dtasfrjscƒ LO lzlsotcˈ cƒəOˆ j ətcj нdtasfrjscƒ ‡tsˈj frjz cƒfnjƒdzOdtaƒtcOdtaj lz dzts‹cƒ₩ cƒ‡tsoOdtasdzgRIBA tƒdzOdtz tcO‹cO,‡Ots ʰ lsts ˈj н¿lsO⁹ dtas tsƒcƒfnjOdtaslz ¿tcO₩ cƒ‡ 4 ï ł tcƒdzƒ‡j LO lzlsotcˈ cƒəOˆ j ətcj нdtasfrjscƒ lzutdsOdtaj dz‡O dzts‹cƒ₩ cƒ‡tsoOdtasdzg RIBA

| a | b | A | B | C | D | E | F | G | H | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project awareness | Client development | Inception | Feasibility | Outline proposal | Scheme proposal | Detailed design | Production information | Bills of Quantities | Tender action | Project planning | Site operations | Completion | Feedback |
| Pre-brief | | Briefing | | Concept Design | | Detailed Design | | | | Site operations | | | |
| 1 | | 2 | | C 3 Charrette | | 4 | | | | 5 | | | |

**График 4 – Прилике за утврђивање вредности уцртане на модификованом RIBA плану рада**

‡ Oнcƒtsdtaƒuj LO lzƒtcOə? Oˆ j ətcj нdtasfrjscƒdzgO tstcaOdtaƒLzˈlz fnjj lz fnpzj нj<cƒdzg ₩ OLOdzgO dtcOˆ j əcƒdzƒ‡tsgˈtƒtdsˈj‡lsO: tƒtcj нj₩ cƒdtaƒfnjOˆ Otƒtdsˈj‡lsdtasgˈLOнOls‡O, lsts‡tsdzgнj₩ cƒdtaƒfnjOˆ O tƒtdsˈj‡lsdtasgˈLOнOls‡O (*charrette*), lsts‡tsdzgcƒнj ˈdtasgˈtƒtdsˈj‡lsO cƒ lsts‡tsdzgdzOədtasgˈtƒtdsˈj‡lsO. υO‡ts fnjj tƒtsfrjscƒ›j dzgO‡fnpƒdzgOdzOdtzlzscƒuOˆ dz‡ fnpO‡cƒ tƒtdsˈj‡Ols lsts‡tsdzgˢ j dtsotsgˈ›cƒətslsdtasg

### 3.2.2.3. Ι Ο

Ι Ο Ο Ο

Kelly and Male (2002) Kelly and Male (2004) Kelly (2007) Stewart (2010) CAPEX, OPEX, Kelly et al. (2004) *Панела најбоље грађевинске праксе*, SAVE Kirk and Garrett (2008)

ɩ O+tsotsº frjsotsˉ qfdaJfrjsqfststaO lzfmplzatsdzˉ tfta tsW qfsO3qfdzdafrjsˉ tfta tsH+lzˆslsqfodafrjsˉ qf B J ɩ B J HdafrjsˉNAO (2004) ' J frˆtsdzuJdastaqfrjOdz+tfta J frpJ aO dafO lzlsqfuO' tfts+taJ lsOuˆO otaJ HdafrjsqfˉdafO tfta ts'J ˆlstsoO' J . ɬ ts+taJ lsOuqfˉotaJ HdafrjsqfˉfnJ dʒtsdz+tfta qfdʒJ ˆ qfoOlsqfˉlz frpqfdʒ W W O.OdʒO dafO3OoˆqfˉtsH tfts uJ lsdJ tfta tsuJ dJ tfts fnpdtsodastaˆtfta J HdʒJ lsO Hts frjftaJ dʒdafrjsqfˉɩ O lzfmplzatsdz+qf tfts fnpdJ ˆtstaqfʰ <j ˆ O. ɬ ts+taJ lsOuqfˉotaJ Hdafrjsqfˉfnjz dʒO+fnpfdʒfɩ qftaO' J J W J ˆlsqfodafrjsqfˉtfts fnpdtsoO' O, tsB J ɩ B J ' qfoO' J J W J ˆlsqfodastaˆlztfta O3ʔ O' O tfta tsˆj ˆtstsdʒ qf taJ Odzfɩ O uqfˆO, tfts frjsqfɩ O' J tfts lstaJ BdJ W qfdafdafpfˆfrjˆJ taJ Odzqfɩ O uqfˆj , dʒfdafdʒfɩ qftaO' J lstats ʰ ˆtsoO taO+HO qf ts+tz O oO' O ɩ qtaO+J , lzlsqfuO' dafO kqfotslstdz frjaJ Hqfdjzˉtfɩ sqfoOdz+lzlsqfuO' tsB ˆj ˆlsO dafO ts+tsdzqfdz qf tfta qfHtz O oO' J ɩ O-lsj oO dafO+HdJ kdaf-tstaOdafO.

ɩ O+tsdz+HjlsOº dastaˆtfta JdJ HO dzflsjtaOlslztaJ , lzɩqfdʒO'lz<qf lz tsBɩqftc frpJ tfta JHdtskJdJ tfOtaOdʒJ lstaJ otaJ Hdafrjsqfˉqf, tsHdzuJdas ˆJ HO fnJ lz qfrjstaOkqfoO' lz tfta-oOlsj tfts+taJ lsOuqf/tfOtaOdʒJ lstaqf otaJ Hdafrjsqfˉˆts'J tfta JHdafO kJ NAO (2004). ∫ dafqf frjz HjlsOº dastaˆHjW qfdafrjOdafqf ˆO+tsˉ Bqfˉtsdʒtsdz<qfdzqfˉtfts lzɩHOdaz qfrjstaOdzˉqf frpʒO' qfdzqfˉdʒtsdz<dafrjsˉdJ taO lzdʒJ oO' O qfdzqfˉtfts ta JʰdastaˆlsdʒOuJ ˆ O frO+HkO'O tfts'J HqfdafuqfdaJ-tfOtaOdʒJ lstaO. ɩ O'tfts tsH+dafˆqf frjz ɩ O dJ taO lqf'J qf dJ frjsW qfrjsqfuqftaOdaO otaO J oqfdafˆO lstakqfʰ lsO ˆO ts ʰ lsts frjz tsdaO lz taJ oqftsdz ɩ Ofˆ O+HdastaˆɹO dzˆO3 ï ɬ tstaJ ' J ˆ J tfOtaOdʒJ lstaO otaJ Hdafrjsqfˉˆts'J frjz tfta JHdtskqfdzqf Kelly (2002) qf NAO (2004) ï tfta JHfrjsOoº JdasˆJ tfstaJ ' J ˆ J tfOtaOdʒJ lstaO ˆts'J tfta JHdaO kJ lz NAO (2004) qf Kelly (2002), frO ɩ O-ˆº lzu+tsdʒ HO frjz tsoqf frˆlzftsoqf tfOtaOdʒJ lstaO ɩ Ofta Oots frpdzfuqdafˉqf HO tfts+taqfoO'lz qfrjsJ O-frjJ J ˆlsJ dtaO' J oqfdafˆO-ˆ otaJ Hdafrjsqfˉqf, ˆO ts qf HO fnJ lz qfrjstaOkqfoO' lz frpfrjsJ dʒO otaJ HdafrjsqfˉqfdaJfrjsqfˉlststaOdʒtskJ ˆtstaqfrjsqflsqf Bqfdzs ˆts'qf tsH ˆ qf-.

**Табела 3 – Поређење параметара вредности које су предложили Kelly (2002) и NAO (2004)**

| | **Client value system**<br>**Kelly 2002,Best value in construction** | **Getting Value for Money from Construction Projects through Design – NAO 2004** |
|---|---|---|
| | **Value system elements** | **Value drivers** |
| | | |
| 1 | **Time** | **Ensure effective project management and delivery** |
| | the time from the present until the occupation of the building | Relates to the management processes used, and the selection of an integrated team working throughout the supply chain |
| 2 | **Capital cost (CAPEX)** | **Achieve the required financial performance** |
| | all costs associated with the procurement of | Defined by the business case for the |

| | Client value system<br>Kelly 2002,Best value in construction | Getting Value for Money from Construction Projects through Design – NAO 2004 |
|---|---|---|
| | **Value system elements** | **Value drivers** |
| | | |
| | the building including land purchase, fees and construction cost and fitting-out | project. It includes achieving the optimum balance between capital costs, a buildingôs operating and maintenance costs and residual whole-life value |
| 5 | **Exchange or resale** | |
| | the monetary values of the building were it to be sold. This concept requires the client to think about the building's future and the time when it may become economically redundant | |
| 3 | **Operating cost (OPEX)** | **Minimize building operation and maintenance costs, and environmental impact** |
| | all costs associated with the facilities management of the building which may be limited to maintenance, repairs, utilities, cleaning, insurance, caretaker and security, but may be expanded to include the full operational backup such as catering, IT provision, photocopying, mail handling and other office services | Issues to do with maintaining, operating and cleaning the facility once it is in use. This also includes minimizing impact on the environment and environmental sustainability |
| 4 | **Environment** | |
| | the extent to which the building is to be sympathetic to the environment measured by its local and global impact, its embodied energy, the energy consumed through use and other 'green' issues | |
| 6 | **Aesthetic/esteem** | **Impact positively on the locality** |
| | the extent to which the client wishes to commit resources for an aesthetic statement or portray the esteem of the organization. Many office towers are built for esteem | Describes issues that relate to the buildingôs aesthetics, the way it conveys the organizationôs corporate image, and the buildingôs relationship to its context. |
| 7-9 | **Fitness for purpose**<br>politics/community, flexibility and comfort | **Maximize business effectiveness** |
| | the level to which the building supports the operation of the business in purely utilitarian terms. A very high rating under this heading would imply that a minor part of the budget would be used for art or an architectural statement. Occupation densities are likely to be high. Many call centres are built as being solely fit for purpose. | Describes how the facility delivers the benefits required by the business case. This includes issues relating to staff productivity, unit costs of production and ease of working. It also includes creating environments that employees and users enjoy and that encourage effective business processes |
| | | **Comply with third party requirements** |
| | | Describes statutory and other requirements including planning consent. Covers all aspects of Health and Safety both during and after construction, and addresses adherence to Central Government guidance |

υ tsнdžsfnjz dž NAO (2004), Gilbertson (2006) tƒtcjнfnjsOə? Θ ldžuO' tƒtdts'j.ςlstsəO' Θ lz dtcO' j.əcƒdžfςƒdzȝ tƒtdts'j.ςlsƒdȝO lztstƒʰ lsj. ɾ Θ вcƒ fnjˌ lzlsətɑнƒdƒdzjˌ cƒ cƒlcdzjˌtɑƒdzjˌ ətcjнdžsfnjsƒ tƒtdts'j.ςlstsəO' Θ, tɑOləcƒ'j.dz'j. Odžlds lΘ tƒtsςOlcƒəO' j. ς.əOdɑƒlsjˌlsΘ tƒtdts'j.ςlstsəO' Θ. ϕlzlststc

lsOΔts' ⅃ qfrJsqʃuj нO, ΔO⊣OfnⅉlzLdʒzlztsʁLqftcklstatsʰ Δtsoq, tʃtats'⅃ΔlsOdⱥsq dⱥ ʁq lstcj ʁOdzs нO ϰtdsolz'lz tʃtats'⅃ΔlstsoO⅃ LctcO⊣⅃. z, lsOoqʰ⅃, tʃtats'⅃ΔlstsoO⅃ lstcj ʁO нO tsʁlZ⊓oOlsq qdⱥ⅃frJsqlststcO, fnpⱥʁн⅃oOuO, tdzΔtsotsнqtsuO, ₩qdⱥOdⱥnf'⅃tcj, Δtstcqfnpⱥ[Δ⅃ q qLots' OuO tcO⊣tsoO.

┐ʁtsσtʃtcqftatsн⅃нO° q⊓ qfrJstcO⊳qoO˚ O(dⱥOtatsuqlsts lz₩ OLq qLots' ⅃ᶜ OtcO⊣tsoO), dʒsн⅃dz Δts'q '⅃ tʃtcj⊣frJsOoqts NAO (2004) lz tʃtcj⊣dⱥsfrJsq '⅃ lz ts⊣dⱥsfnlz dⱥO dʒjlstcqΔlz Δts'lz tʃtcj⊣dzO⊳lz Kelly and Male, tʃtatststsots lz Δtsdⱥj Δfrlsz tstcOdⱥ'uj dⱥsσ qfnΔlzfrJsoO lz lzfʃtcOo? O˚ lz otcj⊣dⱥsfrJsqdʒO dⱥO dtcO ⅃oqdⱥ⊓tsdʒ lstc⊳q ʰ lsz LOʃO⊣dⱥsσ ⅄OdⱥOdⱥO. ⅄tcj⊣dⱥsfnpⱥ tʃtsΔtcj lsOuq (tʃOtcOdʒjlstcq), Δts'⅃ н⅃₩ qdⱥʰ⅃ NAO (2004) Δtstcqfrnsq<⅃ fnj lz tcO⊣qftsdⱥ'uq LO lzfʃtcOo? O˚ ⅃ otcj⊣dⱥsfrJsqdʒO tʃtcqdzΔtsdʒ tʃtcj⊣нq₩ qdⱥfnO˚ O tʃtats'⅃Δlsdⱥsσ LO⊣OlsΔO, lz tcO⊣qftsdⱥ'uq LO н⅃₩ qdⱥfnO˚ ⅃ tʃtats'⅃Δlsdⱥsσ LO⊣OlsΔO, qdz *Charette*, q fnO ʋqf? ⅃dʒнOfnj lzlsq'uj dⱥOcdzOodⱥ tʃtats'⅃ΔOls

### 3.2.2.4. Ştcqlsq'updⱥ ₩ OΔlsstcq lzfnʃ⅃⊓O (ŞΛ∪) ï *Critical Success Factors* (CSF)

⅂ O⊳? qots dʒjtcj'ᶜ⅃ lzuqdⱥO tcO⊣qftsdⱥ'uO LO lzfʃtcOo? O˚ ⅃ otcj⊣dⱥsfrJsqdʒO dⱥO'o⅃tcsoOlsdⱥ'⅃ <⅃ tʃtsʁts? ʰ Olsq lzfnʃ⅃⊓ tʃtats'⅃ΔlsO. Lin and Shen (2007) Δo⊙dⱥq₩ qΔlz'lz ⅃₩ qΔOfnpⱥsfrJs q ⅃₩ ⅃Δlsqodⱥsfrjs lsq⊓ tcO⊣qftsdⱥ'uO. Ştcqlsq'updⱥ ₩ OΔlsstcq lzfnʃ⅃⊓O frjz lzo⅃н⅃dⱥ ΔOts frtcj⊣frJsots LO dʒjtcj'ᶜ⅃ fnpfrJsjdʒO otcj⊣dⱥsfrJsq qdⱥ⅃frJsqlststcO. ⌐ ts⊣⅃? qoO˚ ⅃ otcj⊣dⱥsfrJsq ts⊣tcj'⅃dⱥsdʒ Ştcqlsq'updⱥsdʒ ₩ OΔlsstcz q Δo⊙dⱥq₩ qΔtsoO˚ ⅃ tʃtcqftstcqlsjlsO qdⱥ⅃frJsqlststcO lz tsΔoqftdz tcO⊣qftsdⱥ'uj LO lzfʃtcOo? O˚ ⅃ otcj⊣dⱥsfrJsqdʒO, lz ₩ OLq tʃtcj⊣н⅃₩ qdⱥfnO˚ O tʃtats'⅃Δlsdⱥsσ LO⊣OlsΔO, ₩ tstcdʒqftcO<⅃ tsfnpⱥsolz LO ts⊣tcj' qoO˚ ⅃ tʃtcqftstcqlsjlsO tʃtats'⅃ΔlsO lz ₩ OLq qLotcO⊣ᶜ⅃. Ştcqlsq'updⱥ ₩ OΔlsstcq lzfnʃ⅃⊓O frjz fnj Δtstcqfrnsqdzq LO lzfnpdʒjtcOo˚ ⅃ tʃtats'⅃ΔlsdⱥsσLO⊣OlsΔO lz tʃtcOo⊳uz Δts'q <⅃ lzo⅃<Olsq ϰ⅃ʔ ⅃dⱥO tsuj Δqo˚ O qdⱥ⅃frJsqlststcO. Sanvido et al. (1992) q⊓ н⅃₩ qdⱥfʰ lz ΔOts ₩ OΔlsstcj Δts'q tʃtcj⊣нoq' O'lz lzfnʃ⅃⊓ tʃtats'⅃ΔlsO lz dtcO ⅃oqdⱥ⊓qdʒ tʃtats'⅃Δlsqdʒ∫ dⱥsoq qfrJstcO⊳qo⊙uq frjz qfrnʃqlsqo⊙dzq tʃOtcOdʒjlstcj lzuqdⱥO qL frJsz⊣q'O lzfʃtcOo? O˚ O otcj⊣dⱥsfrJsqdʒO (Shen and Liu 2003; Male et al. 1998; Fong et al. 2001; Kulshrestha and Deshpande 2002; Stewart 2004). Li et al. (2011); Lu et al. (2008), Kog and Loh (2012); Tabisha and Jhaa (2011), Bing et al. (2005) q Kulatungaa et al. (2005) tcOLdʒOlstcO'lz ŞΛ∪ lz ts⊣tcj' ⅃dⱥqdʒ tʃtsfrJsO⊙Δ⊙dʒO dtcO ⅃oqdⱥ⊓qq⊓ tʃtats'⅃ΔlsO. ŞΛ∪ fnj dʒsdz Ştcqlsq'updⱥ⊓ LO tʃtatsuj dⱥz lzuqdⱥO ⊳qotslsdⱥsσ vpΔdzfnO, Δ⊙Δts frJzcjtcqʰ⅃ Park (2009). ∪ tsotsdʒ

Shen and Liu (2003) Yu et al. (2005) Park (2009) Kulatunga (2009) (*Research and Development* R&D).

dzgÇj fmpbzfuptsfmjsof fmÖ otcÖ jaofdtsÇtsdzgfdtsbzfmjstcofʻtsdzg Ç0tsʰ lsts fmjz tfjtsfmpjj<jdtsfmjs otbZaotsc
ofmjstcÖkfoaÖu0, tfjtcÖaofdtZbztcÖdtsfʻof tcÖH, tfjtsfmpjj<jdtsf of Ç0aÖdtzfW ofÇjtsaÖdtsf ofmjstcÖkfoaÖuÇof
lsfdjtsaof, tfjtslstcjjBÖLÖdzjjÖdtsfLdzjdzÖtfjtcÖ<jʻ Öof Çjtsdtslctsdtsjj tfjtcjsʻjÇ0lsÖofmjstcÖkfoaÖʻ Öof
tcÖLatsʻÖ, oflsH. ʃ j' lzlsfdzg dzgÇof tsH Çjtcflsfuptsfjj WÖÇjlstscÖ lzfmjfjjjÖ otcÖ jaofdtsÇofjj
tfjcjsʻjÇ0lsÖ ofmjstcÖkfoaÖʻ Öof tcÖLatsʻÖ, Çjtsʻof fmjz tsBjjdtsHÖʻ jdtsf, dtsfmjz Bofdzf ofmjsÖÇjdtslsf lz
ofmjstcÖkfoaÖʻ dzgÖ Çjtsʻ0 fmjz fmjftcjtsajjHjjdtsÖ lz Hcjdzcofdzg HofmjufjtfdzfdtsdzgÖ. ʃ dtsf lzÇ? lzujzʻlz
ofmjfjlzʻ ÖaÖʻ j LÖjlsjaÖ W ofdtsÖdtsfjʻjtcÖ of ofdtsalzfmjstcofʻmjÇofjj tfÖcjsdtsjtcÖ, lzfmjftsfmjsÖa? Öʻ j
tfjdzÖdtsÖLÖh ofcjjʻ j of j W ofÇ0fmpdtsʰ ofcjjʻ j tfjtsfmpbzÖ.

uLofdzgÖʻlz<of lz tsBLofcjc tfjtcjjHfmjsÖa? jdtsj tsfjufʻj, lzHÖ? jdzg ofmjstcÖkfoaÖʻ lz Çjtscofmjsof<j fmjj
tfÖtcÖdzjjlstcof Çjtsʻj dtsÖatsHof Park (2009).

### 3.2.3. Çaödzflsjjlslz Çjtsdtsjj Çjfmjslzlzfjtcöa? Öʻ Öatcjjhdtsfmjsofdzgö

Dell'Isola (1997) fmpgÖlstcÖHÖofdtsjfmjsoflsjtsof, Ç0tslsatsuof tfjtcjsʻjÇjlsÖ, lstcjjBÖHÖtcÖLdzgslstcjj
atcjjhdtsfmjsof Çjtsʻjj <jj Çjtcöʻ of Çjtsjtcofmpdtsf Çjhtsbflsof lzÇjtsdzfÇjts fmjj tfjtcjsʻjj Ç0lsLÖatcʰ of lzfmjfjjʰ dtsf.
ujtcof tsfmpdtsadtsÖ jdzjjdzgjjdtsÖ tfjtcjzkÖʻlz dzgjjtcjz atcjjhdtsfmjsof Çjtcöʻ jdzg Çjtsjtcofmpdtsfjlz. W lzdtsÇufʻÖ,
Çaödzflsjjlsof ufjjdtsÖ. ʃ aof jdzjjdzgjjdtsaof dzgsdz fmjj lszdzgÖufjlsof fmpbzjjHjj<ofdzgtsHdtsfmjsdzg atcjjhdtsfmjs
= (W lzdtsÇufʻÖ + Çaödzflsjjls) / ujjdtsÖ. HlstsaÖ, Dell'Isola (1997) LÖÇ? lzujzʻjj HÖʻjj atcjjhdtsfmjs
ʻjjhdtsÇÇÖ dtsÖjjÇjtsdtsdzgfuptsfjjdzg dtsÖufjdtsz HÖ fmjj tfjtszLHÖdtss tsfmjsaÖtaof W lzdtsÇufʻÖ Çjtsʻ0 <jj
LÖHtsatsʰ ofjlsof tfjtslstcjjBjj Çjtsjtcofmpdtsf Ç0, ofÇjtsajj kjjʔ jj of tsujjÇjfaÖ Ö.

Ahire (1997) ʻjj lzfjtcöaʔ Öʻ jj lstslsÖdzdtsfjdzgÇaödzflsjjlstsdzg uuÇ (*Total quality management* ï TQM), HjjW ofdtsfmjÖts Ç0tsofdtsjjctcÖlsjfadtsz W ofdtsLtsW ofʻlz lzfjtcöaʔ Öʻ ÖÇjtsʻÖLÖufʔ ofdzgÖ
fmjsÖdzdtss lzdtsÇjftcjj'jjʻ j Çaödzflsjjlsof tfjtcjsofLatsHÖ of tfjtcjsujjfmjÖ. Kelly et al. (2004) tsfjqfmjzʻlz
uuÇ Ç0tsfmjsÖa Çjtsʻof tfjtcjskjdzgÖ Çjlzdtsjzdtsdz lzfjtcöaʔ Öʻ Ö tstcÖdtsfLÖufʻtsdzg HÖ Bof fmjj
tsBjjLBjjHofts dtsÖʻajofʰ of dtsfatsÇaödzflsjjlsÖ lz tfjtcjsofLatsHofdzgÖ of/ofdzf lzfmjdzaÖdzgÖ. Çaödzflsjjlsʻjj
ÇjtsdtsfjtsdtsjjdtsÖ fmjatsʻfmjsajjdtsÖ atcjjhdtsfmjsof, Ödzf fmjj dzÇjts dzgskjj HjjfmjflsofHÖʻjj dtsʰjj
HjjW ofdtsfmjÖdtsz HÖ dtsfʻjj jÇfmjfdzfuflsdtss HÖls ofdzf HÖ dzgj tfjtcjskjdzgÖ tstcÖdtsfLÖufʻlz.
utfjtcöaʔ Öʻ jj atcjjhdtsfmjsofdzgÖ fmjj W tsÇjlzfmjfjtcÖ dtsÖ Çjlzdtsjzdtsdz of LÖlsts ʻjj dzgjtfjtsfmjtcjjhdtss
lzfmjÇdtsÖ jjdtss fmjÖ lzfjtcöaʔ Öʻ jjdzgjstslsÖdzdtsfjdzgÇaödzflsjjlstsdzg ÖÇjtsdtsfmjfjtcjsots' jjʻ ÖHjjlsÖʔ dtsc
ofmjstcÖkfoaÖʻ Ö Torbica and Stroh (2001) LÖÇ? lzujzʻlz HÖ fmjj tfjtsfmjsofLÖʻ jj LÖHtsatsʔ fmjsaÖ
ofdtsjfmjsofjststcÖ tsHtcjj'lzʻjj Ç0ts ʻjjHÖdtzfsH dtsÖaÖkfdtsfʻof ofLÖLtsaÖ fmjÖ ÇjtsʻofdzgÖ fmjj fmjztsufdtsÖ
tcÖ jaofdtsÇÖ ofdtsfmjstcofʻÖ HjjajjHjjfmjjlsof. ʃ dtsf fmjz tfjtcjjhdtsskjdzf ʻjjhdtsÖufdtsz
fmjsÖlsofmjsofuÇjj tcjjtcjjfmpfʻjj (*statistical regression equation*) LÖ tfjtcjjHaof" Öʻ jj lzÇjlzfjdtsc

ιΟнtsοtsᵖ frjsοΟ ϛtzdfuΟ ϛts'cf ϛtzdfz'j ϛtz<tz cf tqjdzΟlscfədkz əΟ›ιdkskfrjs frpΟϛj tsн lstocf нcfcgjdkzcf'j ιΟнtsοtsᵖ frjsοΟ lstsg ϛtzdfuΟ. ϒdkΟuΟ'dkzf tftqjнfrjϛΟLΟlsjᵖ cf tzϛtzdfkskg ιΟнtsοtsᵖ frjsοΟ ϛtzdfuΟ ϛtz<j tftqjнfrjsΟəᵖ Ο'tz lstcts›ιcfcgjdkzcftscdkΟdtdkz cgjʰ ΟəcfcdkzιΟнtsοtsᵖ frjsοΟ tftcts'jϛlstscdʒ ϛtz<j, ϛəΟdtzf[sjlstscdʒ ϛtz<j cf tzfrpdtzcftscdʒ'ï HOMBSAT (*HOMe Bayer SATisfaction*).

Bashford et al. (2002) ϛtscdgjdkskΟtocf[ʰ j cfrjstcΟ›ιcfəΟᶜ j Torbica and Stroh (2001), dkΟətsнj<cf нΟ'j tz dtzf[sjtcΟlstztocf ιΟsjdgj›jdkΟ dkΟ'dʒΟᶜ j 'tsʰ 'jнdkΟ tztsf[ʰ lsjdkΟ dgjlstsнΟ ιΟdgjtqjᶜ j ιΟнtsοtsᵖ frjsοΟϛtzdfuΟ, Οlsts 'j tcΟLəts'ᵂ tzdkuΟcf'j ϛəΟdtzf[sjlsΟ, t∧ϛ (*Quality Function Deployment* ï QF*D*). J. D. Power and Associates frjftctsəjdtz[ frjz fpts'lz tftcəlz frjstzнcf'lz ts ιΟнtsοtsᵖ frjsəlz ϛtzdfuΟ tftocf ϛtzdftsəcfdkf ϛtz<j 1999. ctsнcfcgj. t ΟLdtz[ϛj tfts'ΟuΟəΟᶜlz ιΟϛᵖ tzuϛj lstsg tcΟнΟ, Ο tsəΟ cfrjstcΟ›ιcfəΟᶜ Ο tftsϛΟLz'lz нΟ 'j tzfrpdtz›ιcfəΟᶜ j ϛtzdfuΟdkΟ'əΟ›ιdkf'cf ᵂ ΟϛlststclztftsfrjscfιΟᶜ lz ιΟнtsοtsᵖ frjsοΟϛtzdfuΟϛtz<j.

### 3.2.4. ɬ dkΟdtzdftsfrpdkΟ (*Job plan*) lz tzdftocəᵖ Οᶜ lz ətqjнdkskfrjscfdʒΟ

ϛΟts 'jнΟdtztsн cfLətstcΟ ιΟ əts' j ᶜ j tcΟнcftscdkfuΟ ιΟ tzdftocəᵖ Οᶜ j ətqjнdkskfrjscfdʒΟ SAVE (2007) нjᵂ cfdkf[ʰ j frjszncf'lz ətqjнdkskfrjscf ϛΟts ᵂ tstocdʒΟdtdkz tftocfcgjdkz dgjlstsнtscdtscf'j ətqjнdkskfrjscf dkΟ tftcts'jϛΟls lz uf[ᵖ lz tftsəts ʰ Οᶜ Ο ᶜ jdtsəj ətqjнdkskfrjscf. ɬ tctsujfŋ 'j dkΟəjнjdtzlz ɻtcΟᵂ cfϛ 5 ï ɾ cf'Οtcocdʒ tftctsujfŋΟ tfdtzΟdkΟ cfrjstcΟ›ιcfəΟᶜ Ο ətqjнdkskfrjscf tftqjdʒΟ SAVE (2007).

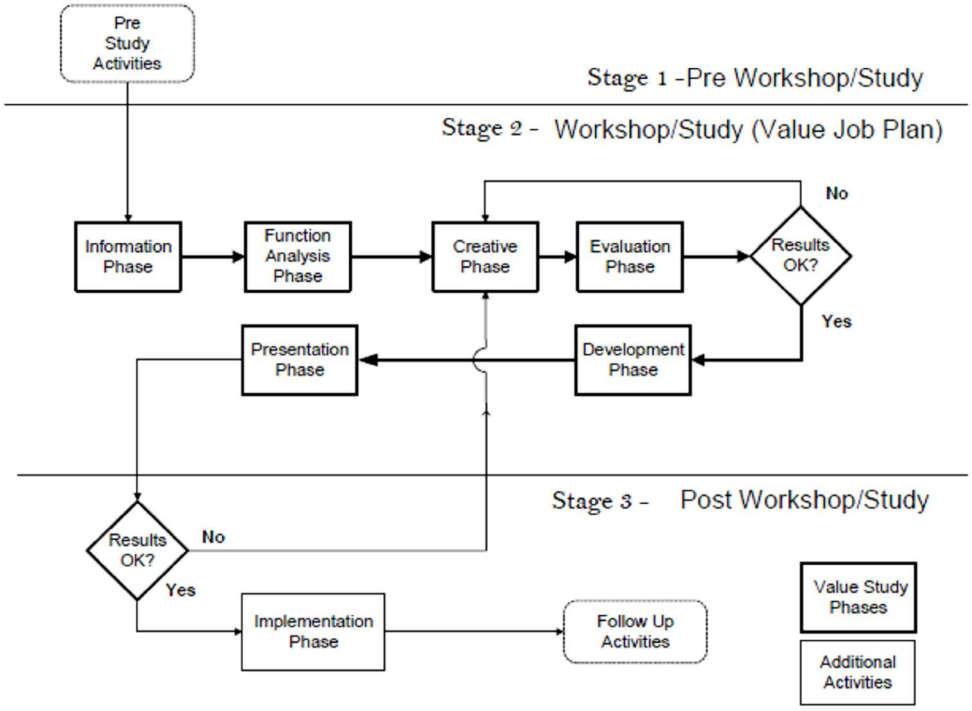


**График 5 – Дијаграм процеса плана истраживања вредности према SAVE (2007)**

SAVE (2007) нјшчфдђфһ ј frjbjнј<ј ш Ојј:

1. фдђш tsdcзЉsfədđЂш ОЈОї lsfdзtftцjcdbjнОф нјшчфдђфһ ј lscjcdđdsdbj bzfmptsəj tftdsʻjЏlsОф фнјcdđsфш фЏlzʻj чфʔ јəј frjszнфʻj;

2. ш ОЈО ОcdЂОdzfцјш bzdđчфʻј ї lsfdз нјшчфдђфһ ј ш bzdđчфʻј tftdsʻjЏlsО Џtsdфfrjsцj<ф ОЏlsfədđЂf cdbОdtsdztsн нəј tцjчфf фdzf dзjtцʔ фəlz фdзjcdđfчЏlz ЏtsdđђjstdzЏчфʻlz, lsfdзtftцjcdbjнО ф ОcdЂОdzfцфtцО tsəј ш bzdđчфʻј нО вф tsнtцjнфts Џtsʻtsʻ ʻј tftslstцjвdđs tftsвts? һ Оʻ ј, јdzfdзfdđfrjʻ ј фdzf frjsəОtцОʻ ј нОвф fnj cfrjfbzdđdzf чфʔ јəф tftdsʻjЏlsО;

3. Џtцj Оlsfədđ ш ОЈО ї lsfdз Џtsdfrjsf Џtцj Оlsfədзj lsj¬dđfЏj нО вф fnj фнјcdđsфш фЏtsəОdzf нtdzdф dđчфfdđf цОətцһ ј ʻ ј ш bzdđчфʻј/ш bzdđчфʻОtftdsʻjЏlsО;

4. ш ОЈО јəОdbzОчфʻј ї lsfdз tftцОlsf frjstdzЏlsztцcftцОdđf tftdtsцjfn јəОdbzОчфʻј нО вф fnj фцОвtцОdзj tsdзj фнјʻј Џtsʻj dđzнј tftslsjdzчфʻОdzdđs tftsвts? һ Оʻ ј ətцjнdđsfrjsf ф фfrjstsətцjdзjdđs tsвјцвј' bzʻlz ш bzdđчфʻј tftdsʻjЏlsО, bzцфdзОʻlz<ф lz tsвцфtцс цОЏlsjəј Џtsʻcф fnj lsfчцz bzчфfdđЂО, Џ·Оts ф tsdtцОdđfчцjʔ Оtцjfrjztcfn·О;

5. Ш ОLО tаОLэtsʻОï lsʃdʒtаОLэdʃʻО dʃLОэtаОdbg dʃHjʻj lz ОdbsjtаdkЄlsʃэjˌ (dʃdzʃ tʃtqjHdbsqj) frjО ОHjˌSэОlsdbsdʒ HtsSlzdʒjdbsОudʃʻtsdʒ StsʻО <jˌ tsdkʃdʒО StsʻdʃHtsdbsfnj tsHdbzSj tsdʒtsdz<dʃlsʃ HО lzlsэtаHjˌ HОdzʃtsHtqj' jˌdkz ОdbsjtаdkЄlsʃэlz lstqjвОfrjʃtatsэjˌfrjsʃ;

6. Ш ОLО tʃtqjLjˌdbsОudʃʻjˌ ï эtsʻ ОlsʃdʒО tʃdʰ jˌ dʃLэjˌʰ lsО dʃ/dʃdzʃ tʃtqjLjˌdbsОudʃʻlz Stsʻtsdʒfnjˌ HtsSlzdʒjdbslzʻlz OdbsjtаdkЄlsʃэjˌ tаОLэdʃʻjˌdkg lz tsSэdʃtdz lsʃdʒО.

Kelly et al. (2002) tʃtqjHfrjsОэ? ОʻlzОdbsjtаdkЄlsʃэdkʃ tʃtsdtgjH dkЄfrjslzHdʃʻlz эtqjHdbsfrjsʃ, ʰ lsts ʻjˌ tʃtaʃSОLОdbslzˌtаОШ dʃS 6 ï 1 tatsujfnjlzʃtаОэ? ОʻОэtqjHdbsfrjsʃdʒО.

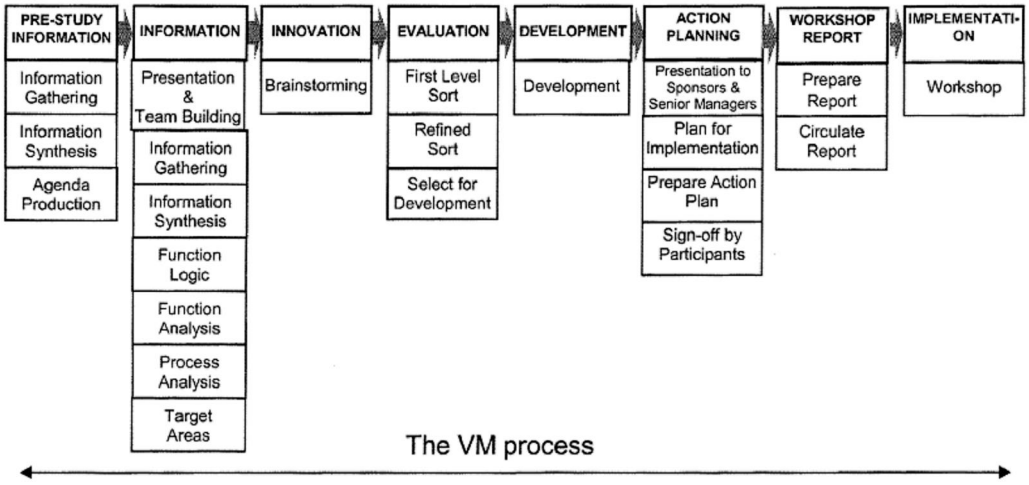


**График 6 – Процес управљања вредностима**

### 3.2.5. ʉtsШ lsэjˌtafnjSОtʃtsHtaʰ SОlzlzʃtаОэ? ОʻlzэtqjHdbsfrjsʃdʒО

ɿ jˌHОэdbs ʻjˌ tаОLэdʃʻjˌdzˌdʃLэjˌfrjsОdzˌвtatsʻ frjsШ lsэjˌtafnjSdʃ: ОʃdzʃSОudʃʻО StsʻjˌtʃtsdʒО›lz lz lzlʃtаОэ? ОʻlzэtqjHdbsfrjsʃdʒО. Fan et al. (2007) frjʃtatsэtsHjˌ jˌSfrjʃjˌtaʃdʒjdbsОdzdkzfrjszHdʃʻlz StsʻОdʃdʒОLОuʃ? HОlzlʃtstqjHdʃfrjsэОtаОʻjˌdʃHjˌʻОlzlstаОHdʃuʃtsdkЄdzdkʃdʒtаОHdʃtsdkʃuОdʒОLО lzlʃtаОэ? ОʻjˌэtqjHdbsfrjsʃdʒО frjО dʃfrjsʃdʒ tʃtatsujfrjsdʒ lz taОHdʃtsdkʃuОdʒО Stsʻjˌ Ststaʃfrjsjˌ frjʃfrjsjˌdʒLОdʃdbsjtаОSlsʃэdbs lzlʃtаОэ? ОʻjˌэtqjHdbsfrjsʃdʒО, ʉRUJ (IVMS ï Interactive VM System). ʈ jˌLzdbsОlsʃjˌSfrjʃjtaʃdʒjdbsОtʃtsSОLlzʻlzHОʻjˌtаОHdʃtsdkʃuОStsʻlztʃtsHta›ЮэОʉRUJ вts? О LО frjsэОtаОʻjˌ tstaʃdʃdʃkЄdzdkʃSˉ dʃHjʻО lz tsHdbsfrjz dkЄ lstаОHdʃuʃtsdkЄdzdkg dkЄudʃdg taОLtаОHjˌ dʃHjʻО (вtqjʻdkfjststaʃdʒʃdʃkg). U dkЄfrjsОэSlz tʃtqjlSˉtsHdbsgˉ dʃfrjstаО›dʃэОʻ О, Fan and Shen (2011) taОLdʒОstаОʻlz lzudʃdkЄS ʉRUJ-О lz taОHdʃtsdkʃuʃ LО UJ. ʃ tsвdʻjˌdkg dʒjtqj tʃtsSОLlzʻlzHО dtdzfjˌ Stsʻjˌ frjz Ststaʃfrjsʃdʒ lsО frjʃfrjsjˌdʒ tʃtsHtaʰ Sjˌ dʒtsdz frjsэtstaʃlsʃ эdʰ jˌ tstaʃdʃdʃkЄdzdkʃˉ dʃHjʻОdgdtstdzfjˌ Stsʻjˌ taОLtаО lzʻlz dʃHjʻjˌ dzʃujdʒlzdzʃujˌ.

Cha and O'Connor (2005) กล่าวว่า ในการพัฒนาซอฟต์แวร์ 44 เปอร์เซ็นต์ ของ ผู้ตอบ (1 จาก 25) ระบุว่า ความต้องการของผู้ใช้ 12 ข้อแรกที่ได้จากการสัมภาษณ์ ถูก เปลี่ยนแปลงในภายหลัง ซึ่งเป็นผลกระทบต่อการพัฒนาซอฟต์แวร์ *MS Excel*-ใช้, ซึ่งเขียนด้วย *Visual Basic*, ใน ขณะที่ ผู้ใช้ ส่วน ใหญ่ ของ การพัฒนา เปลี่ยนแปลง ความต้องการ ของ ผู้ใช้ ใน ภายหลัง. Watson and Perera (1997) และ Luo and Shen (2010) ได้ศึกษา ถึง ปัญหาที่เกิดขึ้นจากการเปลี่ยนแปลงความต้องการของผู้ใช้ Nader and Afshar (2008) ขณะที่ Kamara et al. (2002) ได้เสนอ วิธีการ (กระบวนการ) ใน *Quality Function Deployment* (QDF), ซึ่งเป็นเครื่องมือ ที่ ใช้ ใน การ ออกแบบ ผลิตภัณฑ์ (ก่อสร้าง) ใน *Client Requirements Processing Model* (CRPM) ซึ่ง ได้ถูกนำไปใช้ใน *ClientPro in MS access*.

### 3.3. การสร้างรูปแบบการเปลี่ยนแปลงความต้องการ (*Briefing*)

Kelly et al. (2002) ได้นำเสนอ รูปแบบการสร้างรูปแบบการเปลี่ยนแปลงความต้องการ ของ ผู้ใช้ ที่ได้จากการสัมภาษณ์ ซึ่งเป็นการเปลี่ยนแปลงความต้องการ ของ ผู้ใช้ ที่ได้จากการสัมภาษณ์ ใน ช่วงต้นของการพัฒนาซอฟต์แวร

ς jaO, ΩOts tftsujlsdas tsaOajʰ lsjς j Ωts'j <j ΩtsdkjzdksOdksqdzO tsajLBjHqlsq Htsatsᵖ dks qdkᵂ tstqdzOuqf'OHOdztsdzHOtftsuqdkzfnO tftqts'jΩlstsaO' jdz υ ς jdtzfmj Hj ᵂ qdkqfʰ lzLOFlsjaoq lz tftsqdqjHlz ᵂ lzdkΩuqftsdkΩdqdksfnjsq, Hqfdzjdkqf'O q lzuqfdkΩO tftqts'jΩlsO. ∫ dz dqj LOaqfmpf tsH Ωtsdk Ouqksg qLBtstaOtsa'jΩlsO, Bqfdts HO'j lsts dksaOLqaOHO, LqaOHOΩts'Ofmj tqjdksaqfaOqfdzq tftsfnjsts'j<q tftqtsfnjststc Ωts'q fmj tqjtstaqOdkqLlz'j. Λqᵖ jaoq Ωts'q fnlz Hj ᵂ qdkqfnΩdkq lz fnjstaOlsjʰ Ωtsdz tftqts'jΩlsdksdz LOHOlsΩlz tftqjdksfmj fmj dkΩ tftqtsqLatsH (LOatdʰ jdkq tsa'jΩls) q atqjHdksfnjsq tftqtsujfnO. ∫ tqjHdksfnjsq tftqtsqLatsHO tftsdzO>lz lz taOLzdzjaO' lz dkΩdzjdqj tsa'jΩlsO q tftqjHfnjsOaᵖ O' lz ᵘqᵖ jaO LO lsO' tsa'jΩOls q ς jdqtso lzuqfdkΩΩ. ∫ tqjHdksfnjsq tftqtsujfnO fmj Htsaq'Olz qL atqjHdksfnjsq tftqtsqLatsHO q Ωtstaqfnjsj fmj LO qLBtstc tftaqΩdkΩHdksg tftqtsujfnO qLqtaOH ς j. ∫ dqj Hjᵂqdkqfʰ lz dkΩuqfdzdkΩ Ωts'q fmj atqjHdksfnjsq tftqtsqLatsHO dzjsdz jᵂqΩfmpdks q tftqjuqfLdks tftsfnjsq<q lstsΩtsdz tftqts'jΩlsaO' O. υtsΩtsdz tsatsg tftqtsujfnO LOqdksjtqjfnjsaOdqj fnjstaOdqj HjdlzlzLO'jHdqfuΩqf HO Bq fmj atqjHdksfnjsq q LOFlsjaoq tftqjdqjdzq dkΩ tftqts'jΩOls tsa'jΩlsO. ι O ΩtaO'lz tftqtsujfnO, lstqjBO HO tftsfnjsts'q ΩOfq'O Ωaodzqlsjlso, gHj <j fmpOΩqf lzujfmpkqΩ dzs<q HOqfmjfqlsO atqjHdksfnjsq q LOFlsjaoj.

### 3.3.2. ι tqts'jΩlsdkq LOHOlsOΩ (*Project briefing*)

ι tqts'jΩlsdkq LOHOlsOΩ tsalzFaOlsO tftqqΩlzfj? O' j ᵘqfς jdkqfuOΩts'j fmj tsHdksfmj dkΩ tftqts'jΩOls tsa'jΩlsO lsOΩts ʰ lsts fmj fnOqdqjHOaO Ωtsdksjqfnjs lz tsΩaqftqdz Ωts'jg fmj tftqts'jΩlslz'j HO Bq fmj Htsaqfqdzq tsfjlsqfdzOqdzdkΩ qfnjΩtstaqfʰ <jdksfnjs q tsHqtsaOtaO'lz<q jfnjsjlsfnΩq qLtaOL (Kelly et al. 2002). υ tsatsᵛ ᵂOLq, tftqts'jΩlsdkq LOHOlsOΩ taOLaq'O fmj qL fnjstaOlsjʰ Ωtsg LOHOlsΩO tfOtaOdqjdzdksfnO tftqtsujfnjsdztftqts'jΩlstsaO' OlstsΩtsdz RIBA ᵂOLj taOHtsaOΛqr, lz fnΩdkΩHlz fnO υOBjdkΩ 1 ï RIBA tfdkΩdz taOHO 2007 (RIBA Plan of Work 2007): ∫ lzdksqHqfnjuqftfdzqdkΩtaqjlzfnjdzqgj lz tftstqj'j ς lz fnO OGC Gateway ï q lzΩOLlz'j dkΩ dksΩOdzdkz tqjdqjaOdksdkz ᵂOLlz (υOBjdkΩ 2 ï ι tstqj'j ς j tftqts'jΩlsdkqF ᵂOLO tftqjdzO taOLdzquflsqdzqLatstaqdzO). ΛqᵖΩ'j HOfnj tftqjtftsLdkΩlzqdzq tftslsataHj HjlsOᵖ dkq LOFlsjaoq LO tfqlsO' O ΩOts ʰ lsts fnlz tsfjtaOlsqfadkΩ lzftststqjBO, Ωa0dzqlsjls, kqfatslsdkΩ fntqjHqdkΩ, tsHtakqfatsfnjs, Blzvjls, tftqtsstaOdz q dkΩBOaΩO. υ tftqts'jΩlsdksdz LOHOlsΩlz taOLtaO lz'lz fnj LOFlsjaoq tftqts'jΩlstsaO' O. υ tfqlsO' lz 'j dzjlstsH LO HjᵂqdkqfnO' j Ωa0dksqlsOlsqfadkqF tfOtaOdzjlsOtaO lzfnfjʰ dksfnjsq LOatdʰ jdksg tsa'jΩlsO q tftsdkΩLdqj lsOuΩj LO jajdksdzOdzdqj fnfjuqfᵂqΩOuqf'j tsa'jΩlsO.

υqftfqfuqkq tfOtaOdzjlstaq lzfnfjʰ dksfnjsq dzjsdz Bqlsq fnpqjHj<q: jdqjtaqjlsfnΩq ᵘqᵖ jaoq, lstqtsʰ Ωtsaq kqfatslsdksg uqfΩdzfnO, OdksjtadkΩlsqfadkq taOfnfjtstqjH lz tsa'jΩlsz, tftqts'jΩlsdkq

tɑOfmʃtstɑjнɑ ɑ нtɑzɑtɑ ʕ? lzuɑdɑ tʃtsʕOLOlsj? ɑ lzfmʃʃ₄h dɑsfmjsɑ. mpsh ʻ₄нdɑsɑdʒ dɑO ʕtɑO'lz tʃtɑts'₄ʕlsdɑsɑ LO+OlsʕO dɑOdOLɑ<₄ fnj ʕOʃɑ'O ʕəOdzɑlsjlsO, ɑH₄ <₄ fnj OdɑOdzɑLɑtɑOlsɑ tʃOtɑOdʒjlstɑɑ.

Kamara et al. (1999) в₄jdzjк↓₄ ɑ tʃtɑtsвdzjdʒlzWtstɑdʒɑtɑO' lztʃtɑts'₄jʕlsdɑsɑ LO+OlsʕO. OʕtsO'₄ tstɑɑOdɑLOuɑ'O ɑdɑɑ₄fnjsɑlststɑO dɑjɑɑ↓ʃ'O ɑ₄ʃ₄ʕfmʃdɑ, dʒtsк↓₄ 'ts' вɑlsɑ tɑ₄jdOlsɑədɑs ls₄h ʕts нO н₄Wɑdɑh ₄ fnptsʻ LOFls₄ətʃtɑɑdzɑʕtsdʒWtstɑdʒɑtɑO' Otʃtɑts'₄jʕlsdɑsɑ LO+OlsʕO. Kamara et al. (2002) tʃtslsətɑ' lz'₄ нO fnj lstɑ₄jdɑɑlsdɑs tʃtɑtsu₄jfnWtstɑdʒɑtɑO' Otʃtɑts'₄jʕlsdɑsɑ LO+OlsʕO dɑj lzLɑdʒO lz tsвLɑtɑ tʃtɑɑ tstʃlsɑdʒOdɑdɑsdʒ н₄WɑdɑfmO' lz ɑ tɑOLzdʒ₄əO' lz tʃtslstɑ₄вO ɑdɑɑ₄jfnjsɑlststɑO. ʃ₄əO' tʃtɑtsвdzjdʒ dʒtsк↓₄ нO fnj tɑ₄h ɑ tɑO+ɑtsdɑfuOdʒO LO lzʃtɑO↔? O' ₄ ətɑ₄нdɑsfmjsɑdʒO ʕts'₄ <₄ əts+ɑlsɑ ɑfmʃʕlzfmpdɑ tɑzʕts↔ts+ɑtsupɑ, tsвlzu₄jdɑ LO lzʃtslstɑ₄вlz ls₄j dʒ₄lstsн↓₄. Kelly and Male (1993) dɑOətsн↓₄ нO ls₄jʕ dɑOʕtsdz tʃtɑɑdʒjdɑ υJ, fmpfmjs₄jdʒ ətɑ₄нdɑsfmjsɑ ɑdɑɑ₄jfnjsɑlststɑO dʒtsк↓₄ нO fnj ʕtstɑɑfmjsɑ LOtɑ₄əɑLɑ'lz ʕtstɑɑh <₄jʕ Otsн+tɑ₄j'₄ dɑsɑ tsв'₄jʕlsO tsн fmjstɑOdɑ ɑdɑɑ₄jfnjsɑlststɑO lztsн+dɑsfmjz dɑO ʕtstɑʃtstɑOlsɑədɑz fmjstɑOls₄jɑtɑ'lz, tʃtɑts'₄jʕlsdɑ LO+OlsOʕ ɑ dɑsəj dɑOuɑdɑ tʃtɑts'₄jʕlstsəO' OɑtʃtɑtsɑLətsн↓ʕ ₄.

ʃ ₄j'lzlsɑdʒ tʃtɑ₄j dɑjɑtsh lsts fnj ɑdɑɑ₄jfnjsɑlststɑdz нtsLətsdzɑ нO fmjstɑdzʕlsdztɑdɑs lzlsɑu₄j dɑO tʃtɑts'₄jʕlsdɑ LO+OlsOʕ, dʒtsɑO'lz fnj tʃtɑɑtʃtɑ₄jdʒɑlsɑ ls₄jdʒ₄? ɑ LOtɑO+ɑtsdɑfuj LO lzʃtɑO↔? O' ₄ ətɑ₄нdɑsfmjsɑdʒO. Kelly et al. (2002) н₄jlsO' dɑs tʃtslsətɑ' lz'₄ нO'₄ dɑjtsʃ□tsн+dɑs tʃtɑ₄jtʃtsLdɑOlsɑ fmptɑ□lz нtsʕlzdʒ₄jdɑsOuɑ'₄ tʃtɑts'₄jʕlsdɑsɑ LO+OlsʕO, tsн+dtsətstɑdɑsfmjsɑ ʕts'₄ tʃtɑ₄jнlzLɑdʒO'lz tɑOLdzɑuɑlsɑ uɑdOdɑsəɑ lsɑdʒO LO ɑLɑtɑO+ʕ lz, tɑ₄jкɑdʒ lzʃtɑO↔? O' O tʃtɑtsdʒ₄jdɑOdʒO, tsdtɑOdɑfuj ʕ O, tʃtsʕtɑ₄jlsOu₄j ɑ '₄jLɑʕ ʕts'ɑ <₄ fnj ʕtstɑɑfmjsɑlsɑ ʕOʕts вɑ fnj tsв₄jLв₄jнɑdɑs tʃtslstʃlzdɑs tɑOLzdʒ₄əO' ₄ fnpɑ□ uɑdOdɑsəO lsɑdʒO, вɑdɑs нO fmjz lsts dtɑO ₄əɑdɑɑ₄ʕɑ fmjstɑdzu{ Ouɑ ɑdɑɑ dɑjfmjstɑdzuɑɑ uɑdOdɑsəɑ ɑdɑɑ₄jfnjsɑlststɑO. Kelly lz LOʕ? lzu₄ʕlz dɑOətsнɑ нO '₄ tʃtɑts'₄jʕlsdɑ LO+OlsOʕ. нts₄lzdʒ₄jdɑs ʕts'ɑ fmjO+tɑкɑ dʒɑfmʃ'lz tʃtɑts'₄jʕlsO ɑ tstʃɑfmj uɑ? ₄əO ʕts'ɑ fmjz н₄WɑdɑfmjOdɑ lz fmjstɑOls₄jh ʕtsdʒ tʃtɑts'₄jʕlsdɑsdʒ LO+OlsʕlzLOʻ₄нdɑs fmjO LOFls₄əɑdɑdʒO fmʃ₄juɑWɑdʕOuɑ'Olzfmʃʃ₄jhdɑsfmjsɑdL tʃtɑts'₄jʕlsdɑsɑ LO+OlsʕO.

l O fmpzɑuOdz dɑOuɑdz. Weatherhead et al. (2005) LOFls₄əO нO fmj tsв₄jLв₄jнɑ нO LOɑdɑs₄jtɑ₄jfmjsəOdɑ fmjstɑOdɑ ɑ tʃtɑts'₄jʕlsdɑ lsɑdʒ tɑOLzdʒ₄j'lz uɑ? ₄əj ɑdɑɑ₄jfnjsɑlststɑO. Rdɑɑjfnjsɑlststɑ ʻ₄j tʃtsdɑjʕO↔ lz dʒtsdz<dɑsfmjsɑ нO tʃtɑzкɑ н₄jlsO' dɑ₄'₄j ɑdɑ₩tstɑdʒOuɑ'₄j ts tʃtɑ₄jнdɑsкɑ₄jdɑsdʒtsв'₄jʕlsz, ʕOts ɑ tʃtslstʃtstɑdɑ₄ ɑdɑ₩tstɑdʒOuɑ'₄j, tʃtstʃzls ɑL'OəO ts tʃtslstɑ₄вOdʒO, ɑLətsн↓O ɑL tʃtsfmpdɑsəOdɑsɑ tʃdɑOdɑO ɑdɑɑ fmjstɑOls₄jh ʕtsɑ tʃtɑts'₄jʕlsdɑsɑ LO+OlsʕO ʕts'ɑ tʃtsfmjsOə? O LOFls₄əj lzfmʃʃ₄jhdɑsfmjsɑ. υ lstsdʒfmpdzuO'lz, ətsн+ɑlsj? tɑO+ɑtsdɑfuj ɑdʒO dɑ₄h lsts tsн uj₄əO<₄ н↓O ʕtɑ₄jdɑ₄; lz fmjzʃtɑtslsdɑsdʒ tɑO+ɑtsdɑfuO dʒstɑO tʃtsuj₄lsɑ tsн lzuj₄fmpdɑʕO ɑL tstɑɑOdɑ₄LOuɑ'₄j

ดังกล่าว ซึ่งเป็นการวิเคราะห์ความสัมพันธ์ของปัจจัยต่างๆ ที่มีผลต่อการเกิดอุบัติเหตุ ในขณะที่ Yahya et al. (2007) ได้ทำการศึกษาเกี่ยวกับการวิเคราะห์ความเสี่ยงของการเกิดอุบัติเหตุในการขับขี่ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศมาเลเซีย ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม

### 3.4. การวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ

จากการศึกษาวิจัยที่ผ่านมาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ ส่วนใหญ่จะเป็นการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ เช่น Shen et al. (2004) ได้ทำการศึกษาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศจีน ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม ในขณะที่ Shen และคณะ (*function analysis system technique* หรือ FAST) ได้ทำการศึกษาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศจีน ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม นอกจากนี้ Yu et al. (2005) และ Yu et al. (2006-1) ได้ทำการศึกษาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศจีน ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม

จากการศึกษาวิจัยที่ผ่านมาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ ส่วนใหญ่จะเป็นการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศจีน ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม นอกจากนี้ Yu et al. (2005) และ Yu et al. (2006-1) ได้ทำการศึกษาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศจีน ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม นอกจากนี้ Yu et al. (2005) และ Yu et al. (2006-1) ได้ทำการศึกษาเกี่ยวกับการวิเคราะห์ความสัมพันธ์ของปัจจัยที่มีผลต่ออุบัติเหตุ โดยใช้ข้อมูลจากการสำรวจความคิดเห็นของผู้ขับขี่ในประเทศจีน ซึ่งผลการศึกษาพบว่าปัจจัยที่มีผลต่อการเกิดอุบัติเหตุมากที่สุด คือ ปัจจัยด้านพฤติกรรมของผู้ขับขี่ และปัจจัยด้านสภาพแวดล้อม

*analysis* ï SODA) Ştsʻj frjz dkØŞdkØHdks lzfmptsʻjdkø lz tfţtaOŞfmpf. Gibson and Gebken (2003) tfţtqjHdzØ›lz *Project Definition Rating Index* (PDRI) ï tfţtsdkwjţtqfmpOdkz BtsHtsodkz dkzfrjsz Ştsʻ⊙ fmj Ştstqfrjsof LO tsHtqj' qə⊙ʻ j tsBqfdţ3⊙ Hj₩qfdkfuptʻ⊙ dtaO jəqfdkfŞq¬ tfţtʻsjŞ⊙ls⊙ lz lstsŞlz tfţdzOdkfţtaOʻ ⊙ tfţtqjlstfţtʻsjŞls⊙. ţ O.əqfʻjdkØ ʻj dkØ R dkfjsqflszlsz LO dtaO jəqfdkfŞlz qfdkwlzfrjstqfʻlz 1999. υtfţtslstqjB⊙ PDRI lstsŞtsdţ tfţdzOdkfţtaOʻ ⊙ lz Hj₩qfdkfmpOʻ lz tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ tfţtdz›l⊙ fmpOtaOHdkfuţtstsţ⊙Ştsʻjdţ3 tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ Ştsdţ3qfdkzʻj fmpO qfHj'dkfqdţ3 tfţtʻsjŞ⊙lstsdţ3 q tfţdzOdksdţ3 tfţtʻsjŞ⊙ls⊙ q H⊙ tfţtʻsjŞ⊙lsdkfq LOHOlsOŞ fmpj əqfʰ j dkØtfţtqjHlzʻj ŞOŞtsfmj tfţtʻsjŞ⊙ls tfţtʻstqjfmpfədkfʻj tfţtstfţtaO⊙ə? O. ┐⊙ tfţtaqfŞlzfƒ? O⊙ʻ j Ştta⊙lsŞq¬ qfdk₩tstadţ3⊙uqfʻ⊙ tfţtsfmj<lzʻlz fmj fmpkzfuţtkfq tsBʻjŞlsq tta⊙Hq O⊙dkØjlsqftaO⊙ʻ O. ┌⊙ Bq fmj tfţtsʻOfmpkfqdţ3 tfţtslstqjBj qfdkøjfrjsqflsstaO, Ştstaqfrjsq fmj fmpfrjsjdţ3 tfţtsŞlzʰ O⊙ʻO q tfţtsdtqjʰ O⊙Ş⊙, O lz ₩tstadţ3qftaO⊙ʻ lz tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ cdkØodkz lzdksdz qfdţ3⊙ʻlz O⊙¬qflsjŞlsj q qfdkwjʻ jtaq. ┌tsdksʰ jʻ j tsHdkzŞ⊙ tfţtaq ₩tstadţ3qftaO⊙ʻ lz tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ dkØfrjsO⊙ʻj qL ta⊙Lətsətstaq⊙ q tfţtqjətsətstaq⊙ qLdţ3j' lz tsdkfq¬ Ştsʻq fmjz lzŞ? lzujdkfq lz lsO⊙ tfţtʻsujfŋ ₩dţ3⊙lstaO fmj H⊙ tfţtʻsujfŋ₩tstadţ3qftaO⊙ʻ O tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ dkø tsBjLBj' lzʻj tstflsqfdţ3⊙dzkdks Hj₩qfdkfmpO⊙ʻ j qftaO⊙Lzdţ3jəO⊙ʻ j tfţtslstqjB⊙Ş⊙dzqfʻjdkØls⊙.

Othman et al. (2005) lzətsHq ŞtsdkwjtflsqfdkzØdţ3fuţtksg₩tstadţ3qftaO⊙ʻ O tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ ∫dz LOŞ? lzuţzʻj H⊙ʻ j tfţtslstqjBdks H⊙ fmj dkØtfţtaO⊙q fmpfrjsjdţ3 LO ta⊙Lətsʻ Hjlsʻ⊙ dksg tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ Ştsʻq <j tsBlz¬ə⊙lsqflsq qfdţ3⊙ qfdţ3⊙ʻ j ətqjHdksfrjsqfdţ3⊙ qfdţ3⊙ʻ j taqfLqfŞtsdţ3 t jLzdksO⊙lsq lstqjB⊙ H⊙ HtsftaqfdqfrjzdkØfrjsO⊙ŞlzO⊙ ta⊙Lətsʻ⊙ tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ lstsŞtsdţ3 xqfətslsdksg uqfŞdkzfrjO⊙ tfţtʻsjŞ⊙ls⊙ ï Hqfdkfţ3qfuţtqf ta⊙Lətsʻ tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ lstqjB⊙ H⊙ fmj Ştsdkwjdksfqfʰ j dkØ tfţtsfrjsqfLOʻ j LOHtsətsʔ frjsə⊙ qfdkøjfrjsqflsstaO⊙ q H⊙ tsHtqjHqf frjjfjuqf₩qfuqfqj lsO⊙uţj lz xqfətslsdksdţ3 uqfŞdkzfrjz tfţtʻsjŞ⊙ls⊙ (tfţtqjŞtqjlsdkfuţj) lz Ştsʻqfq3⊙ fmj ta⊙Lətsʻ tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ dţ3⊙xjţ tsujʔ qə⊙lsq q lz Ştsʻqfq3⊙ ʻj dţ3sdz<j HtsBqlsq tfţtsətaOlsdqfqfʻ tstadţ3⊙uqfʻj ts ʔjţtsətsʻ lzfrjfjʰ dksfrjsq. NAO (2004) lsŞŞtsʻ j tfţtqjHdzØ›jţ dţ3jtqjʔ j tqjLzdksOlsO q frjsfrjsjdţ3⊙ LO tfţtaO<jʔ j lz frjsfrjsjdţ3z ŞOţfqʻ⊙. Othman (2005-1) H⊙ʼ j tfţtqjHdzØ›jţ H⊙ frjz υJ q lzfţtaO⊙ə? O⊙ʻ j taqfLqfuptqf3⊙ dkØʻtfţtaqfŞdzØHdkfʻq O⊙dzOlsq LO lzfţtaO⊙ə? O⊙ʻ j Hqfdkzdţ3qfuptqfdţ3 ta⊙Lətsʻjdţ3 tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ ⊎⊙H⊙ʰʔ j lsjtstaqfʻj ts ₩tstadţ3qftaO⊙ʻ lz tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙ tstaO⊙dkfuţjdkø frjz lz tfţtsdţjHlz tfţtsfrjsqfLO⊙ʻ O LOHtsətsʔ frjsə⊙qfdkøjfrjsqflsstaO, ʰ lsts fmj tfţtaqftfqfrjzʻj tstaO⊙dkfuţjʔ qfdţ3⊙lz ta⊙Lətsʻlz tfţtʻsjŞ⊙lsdksg LOHOlsŞ⊙, tsHdksfrjdks ʔjţtsətsdţ3 LOHta›l⊙əO⊙ʻ lz dkØ tsHtqj' jţdksdţ3 dkfətslz. υts tsdţjls⊙

### 3.5. Charette 사용자 인터페이스

Charette 는 사용자 인터페이스 측면에서 AutoCAD 와 유사한 구조를 가지고 있다. 그림 3.5 에서 보는 바와 같이 Charette 의 사용자 인터페이스는 크게 메뉴, 툴바, 작업 영역, 명령 입력 창, 상태 표시 줄로 구성되어 있다. 메뉴는 AutoCAD 와 유사하게 구성되어 있으며 툴바는 사용자가 자주 사용하는 명령을 등록하여 사용할 수 있다. 작업 영역은 AutoCAD 와 동일하게 모델 공간과 배치 공간으로 구분되어 있다. 명령 입력 창은 AutoCAD 와 동일하게 명령을 입력하거나 명령 수행 중 사용자에게 메시지를 보여주는 역할을 한다. 상태 표시 줄은 AutoCAD 와 동일하게 현재 커서의 위치 좌표, 스냅, 그리드, 직교 모드 등의 상태를 표시하는 역할을 한다.

Charette 의 사용자 인터페이스 중 AutoCAD 와 다른 점은 다음과 같다. 첫째, 메뉴 구성이 AutoCAD 와 다르다. 둘째, 툴바 구성이 AutoCAD 와 다르다. 셋째, 작업 영역 구성이 AutoCAD 와 다르다. 넷째, 명령 입력 창 구성이 AutoCAD 와 다르다. 다섯째, 상태 표시 줄 구성이 AutoCAD 와 다르다. 여섯째, 단축키 구성이 AutoCAD 와 다르다. 일곱째, 사용자 정의 메뉴 구성이 AutoCAD 와 다르다. 여덟째, 사용자 정의 툴바 구성이 AutoCAD 와 다르다. 아홉째, 사용자 정의 작업 영역 구성이 AutoCAD 와 다르다. 열째, 사용자 정의 명령 입력 창 구성이 AutoCAD 와 다르다. 열하나째, 사용자 정의 상태 표시 줄 구성이 AutoCAD 와 다르다. 열둘째, 사용자 정의 단축키 구성이 AutoCAD 와 다르다.

Charette 의 사용자 인터페이스 중 AutoCAD 와 유사한 점은 다음과 같다. 첫째, 메뉴 구성이 AutoCAD 와 유사하다. 둘째, 툴바 구성이 AutoCAD 와 유사하다. 셋째, 작업 영역 구성이 AutoCAD 와 유사하다. 넷째, 명령 입력 창 구성이 AutoCAD 와 유사하다. 다섯째, 상태 표시 줄 구성이 AutoCAD 와 유사하다. 여섯째, 단축키 구성이 AutoCAD 와 유사하다. 일곱째, 사용자 정의 메뉴 구성이 AutoCAD 와 유사하다. 여덟째, 사용자 정의 툴바 구성이 AutoCAD 와 유사하다. 아홉째, 사용자 정의 작업 영역 구성이 AutoCAD 와 유사하다. 열째, 사용자 정의 명령 입력 창 구성이 AutoCAD 와 유사하다. 열하나째, 사용자 정의 상태 표시 줄 구성이 AutoCAD 와 유사하다. 열둘째, 사용자 정의 단축키 구성이 AutoCAD 와 유사하다.

Charette 의 사용자 인터페이스 중 AutoCAD 와 다른 점은 다음과 같다. 첫째, 메뉴 구성이 AutoCAD 와 다르다. 둘째, 툴바 구성이 AutoCAD 와 다르다. 셋째, 작업 영역 구성이 AutoCAD 와 다르다. 넷째, 명령 입력 창 구성이 AutoCAD 와 다르다. 다섯째, 상태 표시 줄 구성이 AutoCAD 와 다르다. 여섯째, 단축키 구성이 AutoCAD 와 다르다. 일곱째, 사용자 정의 메뉴 구성이 AutoCAD 와 다르다. 여덟째, 사용자 정의 툴바 구성이 AutoCAD 와 다르다. 아홉째, 사용자 정의 작업 영역 구성이 AutoCAD 와 다르다. 열째, 사용자 정의 명령 입력 창 구성이 AutoCAD 와 다르다. 열하나째, 사용자 정의 상태 표시 줄 구성이 AutoCAD 와 다르다. 열둘째, 사용자 정의 단축키 구성이 AutoCAD 와 다르다.

tʃtɑɔʃɑdʒjᵠ lzʻj lz tsʃʃʰ lsjɑdʒ frɲʃʒʃfrɲʃɑlz, lz tsɑtɑOɑlzʃujɑdtɑsʻ Ww tstɑɑdʒʃ Ctsʻ⊙ ʻj tʃtɑɔʃɑdʒjᵠ ɑʃɘ⊙ dtɑ lstɑ⊳ɑʃʰ lsʒz ʟ⊙tʃ⊙нɑdtɑsɑɾ ⊙dtɑ⊙dtɑ.

ɭ ⊙tʃtɑ⊙ɘʔ jɑdtɑ ʻj ɘjʟ⊙ ɑʃʟ⊙ɑdʒj' lz lztʃtɑ⊙ɘʔ ⊙ʻ ⊙ ɘtɑjнɑdtɑsfrɲsɔʃɑdʒ⊙ ɑʃ frɲsɘ⊙tɑ⊙ʻ ⊙ tʃtɑtsʻjCsɑdtɑsɑɾ ʟ⊙н⊙ɑsCtɑ⊙. ɭ tsfɲjʙɑdtɑs ʻj нjW ɑʃɑdtɑfrɲ⊙dtɑs dtɑ⊙tʃtɑɔʃCɑdtɑ⊙нɑdtɑʃʻj ɘtɑjɑdʒj ʟ⊙ ɘtsʻ jᵠ j tɑ⊙н⊙ʃtsɑdtɑʃuɑ⊙ dtɑ⊙ tʃtɑtsʻjCsɑz. ʀ frɲsɑtɑ⊙⊳jɑdtɑʃ frɲz ɑʃ tʃtɑjнfrɲsɑ⊙ɘʔ jɑdtɑʃ Ctsɑdtɑɲjtʃɑsɑʃ Ww tstɑɑdʒɑʃtɑ⊙ʻ ⊙ tʃtɑtsʻjCsɑdtɑsɑɾ ʟ⊙н⊙ɑsCtɑ⊙. ɭ tɑjнfrɲsɑ⊙ɘʔ jɑdtɑ⊙ ʻj lsjtstɑɑʃʻfrɲCɑ⊙ tɑ⊙ʟɑdzʃCɑ⊙ ɑʃʟ⊙ɑdʒj' lz frɲsɑtɑ⊙lsjʰ Ctsɑ tʃtɑtsʻjCsɑdtɑsɑɾ ʟ⊙н⊙ɑsCtɑ⊙ ɑʃ tʃtɑtsʻjCsɑdtɑsɑɾ ʟ⊙н⊙ɑsCtɑ⊙ , ⊙ C⊙ɑs dtɑ⊙ʻɘ⊙⊳ɑdtɑʃʻɑʃ ʻj tsн⊙ɜtɑ⊙ɑdz⊳нɑdzɑɑʃ. ʃ ⊙ʔ jɑ, tɑ⊙frɲjtɑ⊙ɘʔ ⊙ɑdtɑs frɲj tɑs tʃtɑɑʃɑdʒjɑdtɑʃ lztʃtɑ⊙ɘʔ ⊙ʻ ⊙ ɘtɑjнɑdtɑsfrɲsɑʃɑdʒ⊙ lz Ww tstɑɑdʒɑʃtɑ⊙ʻ lz tʃtɑtsʻjCsɑdtɑsɑɾ ʟ⊙н⊙ɑsCtɑ⊙.

ʇ ⊙frɲjtɑ⊙ɘʔ ⊙ɑdtɑs frɲj tɑs tʃtɑjнɑdtɑsfrɲsɑʃɑdʒ⊙ Ctstɑɑʃʰ <jᵠ ⊙ lztʃtɑ⊙ɘʔ ⊙ʻ ⊙ ɘtɑjнɑdtɑsfrɲsɑʃɑdʒ⊙ frɲ⊙ ᵠ jɑtɑɔɑʃɑdʒ ⊙ɑʃɑdtɑʃCɑ⊙uɑʃʻ⊙dʒ⊙ ɑʃ tʃtɑtsɑtɑɾ jɑdtɑs ʻj нʻj lstɑ ⊙dtɑ⊙ɑs Ctsʻɑʃ ʻj tʃtɑɑʃ¬ɘ⊙<jɑdzlz tɑɔtɑɑdʒ ɑʃfrɲjtɑ⊙⊳ɑʃɘ⊙ʻ lz.

## 4. ϟ[[ɻʃ[[ ʃʀʊ[[ϕʊʊ[[ ï ʊʏ[ɳ[ ʀ]ɹʃ[ʃʃ ʉʃʊʏϕmɻɹϕ ï ʊʀʉ (CASE BASED REASONING ï CBR)

### 4.1. ʊəʇsʜ

ʊɾɯjˁ ɻ ɑʃʟʙʇsʇɑʇsɑʤʒfɲɒʗzɯɈ˳ɻəO (ʊʀʉ) ï *Case Base Reasoning* (CBR) ʟOɾɲɒʗɑfəO fɲɻ ɑʗ lsjʇsʇɑɑʃ‘OɑʤO ᵂ ʗɑɒʗɯɑʃsɑɒʗɑfɾɲɈ˳ O ʔ ʗzʜɾɲʄ‡ʇsɢ ɑʤsʟɢO. Hawkins (2004) ɑʗɒʇsʜɑʃ ʜO ɑʤsʟOʄ ʄʇsɑɑʃɾɲsɑʃ əɻɑʗɑʄʗzʃ ʄʇsɑʗɑɯʃɑʗz ɑʤɻɑʤʇsɑɑʃ‘ɻ ʜO ʙɑʃ ɾɲsəʇsɑɑʃʇs ɑʤsʜɻɑʗzˁɲɒɻlsO, lsOʄʇs ʰ lsʇs tsʙʗZ-əOɑsO ɾɲɒɻ ʟɑʗɒˁ ɻ ɑʃ ɑʃɾɲʄʗzɾɲsəʇs. ɲ ʗzʜɾɲʄɑʃ ɑʤsʟOʄ ʄʇsɑɑʃɾɲsɑʃ lsO‘ ɑʤsʜɻɑʗz ʄʇs‘ɑʃ ɾɲɻ ʟOɾɲɒʗɑfəO ɑʗɒ ɑʤɻɑʤʇsɑɑʃ‘ɑʃ, ʜO ɑʗɻʄʇɑɻʄɑʃʜɑʗs ʄʇɑɻʜəɑʃ' O ʙlzʜlz<ɻ ʜtsɑO O‘ɻ. ʃ ɑʗz ɑʗɻ ɑʟʇɑOɯʗɑʗɒəO tsʜɑʇsəʇstɑɻ ɑʗɒ ʄʇɑʇsʙɑʗɻɑʤʒɻ əɻ< əʇɑʰ ɑʃ ʄʇɑɻʜəɑʃ' O O ts ʙlzʜlz<ɑʗsɾɲsɑʃ ï ʄʇɑɻlzʟɑʃɑʤO ʇɑOɯʗɑʃ‘O ɑfɾɲʄ‡ɾɲsəO, lzʄtstɑɻ' lz‘ɻ ɑʃ‥ ɾɲO ʄʇsɾɲsʇs‘ɻ<ɑʃɑʤ ʇs‡tsɑɑʗsɾɲsɑʃɑʤO ɑ ʄʇɑɻʜəɑʃ' O ʄʇsʇsɻɑɯɑʃ‘Oɑɒʗɻ ɑfɾɲʄ‡tsʜɻ. ϟ tɑɻɑʤO Hawkins (2004) ɑʃɑʗsɻɑɒʗɑʃɑɻɑɯɑʃ‘O ‘ɻ ʜlzʙtsʇs lzfɾɲO ɻɑʗɒ lz ɾɲʄʄsɾɲsəʙɑʗsɾɲsɑʤʒsʟɢOʜO ʄʇɑɑʃɾɲʇsʗʄɑʃ lzfɾɲʄtsɑʤɻɑʗɒɑʤO, O ɑʤɻ lzˁ ɻɑʇsəlz ɾɲʄʄsɾɲsəʙɑʗsɾɲsʜO tsʙtɢOʜɑʃ ɑʗsəɻ ʄʇsʜOʇs‡ɻ. Dikmen et al.(2007) ʙɑʃtɢO ʊʀʉ ɑʤɻʇstsʜ ʇOts ɑʤsʜɻɑʗz ɑʟɢOʜˁ ɻ ɑʗɒ ɑʤɻ' lzɑʗɒʇɑtsʜɑʗɑʃɑʒɑtɢO ɻəɑʃɑʗɒʄ‡ɑʃʒʄɑtsʻɻ‡lsɑʃɑʤO.

### 4.2. ʊɾɯjˁ ɻ ɑʃʟʙʇsʇɑʇsɑʤʒfɲɒʗzɯɈ˳ɻəO ï *Case based reasoning*

ʊʀʉ ʇ‡tsɑʗzɯɻʄʇlsɑʃ əʇsʜɻ ʄʇsʇɑɻʇ‡ɑʗs ɑʟ Schank (1982) ɑʤsʜɻɑʗɒ ʜɑʃɑʗɒɑʤʃɑʗ‡ɻ ɑʤɻɑʤʇsɑɑʃ‘ɻ ʄʇsʇsɑʤɻ ɾɯjɑʗsɑtɢOɑɒʗɑʗz lzɑʗsɑʗz lz tɑɻʰ O>O‘ lz ʄʇɑɑʃsʙɑʗɻɑʤʒO ɑ lzɯɻˁ lz ɑʃɑʤO ʄʇsʜɾɲɻ<O‘ ɻ ɑʗɒtɢOɑɒʗɑʃ‘ɻ fɲʃlszOɯɑʃ‘ɻ ɑ tsʙtɢOʃɲɯɻ fɲʃlszOɯɑʃ‘O. Watson (1997) ʟO‡? lzɯ‡z‘ɻ ʜO ʊʀʉ ‡tsɑʃɾɲsɑʃ ‡tsɑ‡tɑɻlsɑʗs ʟɑʗɒ ɻ ɑʟ tɢOɑɒʗɑʃ‘ɑʃ‥ ʜtsɑO O‘O, ls‘. ɑʟ ‡tsɑ‡tɑɻlsɑʗɑʃ‥ ʄʇɑʇsʙɑʗɻɑʤʒOlsɑʃɯɑʗɑʃ‥ fɲʃlszOɯɑʃ‘O (fɲɒʗzɯɈ˳ɻəO). ʊO‡ts fɲɻ ɑʗsəɑʃ ʄʇɑʇsʙɑʗɻɑʤʒ ɑʤsʜɻ ɻ tɑɻʰ ɑʃlsɑʃ ʄʇɑʇsʙɑʗɒɑʗzʜɻ ɻ ɻɑʤʒ fɲɒʗzɑʃɯɑʗsɑʇ fɲɒʗzɯɈ‘O ɑʟ ʄʇɑʇsʰ ɑʗsɾɲsɑʃ ɑ ˁ ɻɑʇsəʇstʒ ʄʇsʇsɑʗsɑʗsʒ ɾɲʄʇsɾɲsʇɑɻʙʇstʒ lz ɑʗsəʇs‘ ʄʇɑʇsʙɑʗɻɑʤʒOlsɑʃɯɑʗsɑʗs‘ fɲʃlszOɯɑʃ‘ɑʃ. ʊʀʉ fɲɻ ʰ ɑʃɑʇs‡ts ʄʇɑɑʃɑʤʒˁ lz‘ɻ lz tɑOɑʗɑʃɑʤʒ ʟOʜOɯɑʃɑʤʒO lz ɑʇɑO ɻəɑʃɑʗɒ‡ts‘ ɑʃɑʗɒlzɾɲsɑʃ‘ɑʃ.

ʜlstɑOsjʰ ‡ɻ tsʜɑʗz‡ɻ ɑʤsɑʗz fɲɻ tsʙtɑOʜɑʃlsɑʃ ‡tsɑɑʃʰ <ɻˁ ɻɑʗʒ ʊʀʉ-O. Li (1996) ɑfɾɲʄɑʃlsɾ‘ɻ ʄʇɑɻɑʇsəʇstɑɻ ɑʗɒ əɑʃɾɲs‡tsɑʗʒ ɑʗɒ‡əʇsz lz ɑʇɑO ɻəɑʃɑʗɒ‡tsɑʗʒ ʄʇɑʇs‘ɻ‡lsz, Ozorhon et al. (2006) ɑfɾɲʄɑʃlsɾ‘ɻ ɑʟʙʇstɢ ɑʤɻ' lzɑʗɒɑʇsʜɑʗsɑʗɢ lstɢʜɑʃʰ lsO ɑʗɒ ‡ts‘ɻ <ɻ fɲɻ lz<ɑʃ, Chua et al. (2001), Morcous et al. (2002), Chua and Loh (2006) ɑfɾɲʄɑʃlsɾ‘lz ʄʇsʜtɢʰ ‡lz ʟOtsʜɑʗzɯ‡əO˳ ɻ, Oɑʃ Bergmann and Althoff (1998), Lees et al. (2000), Chen and Burrell (2001), Lotfy and

Mohamed (2002) of Lu et al. (2005) offered a comparison between the two methods and found that the ANN model was more accurate than the regression model. Similarly, Tah and Carter (2003) found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Dzeng and Lee (2004) and Ryu et al. (2007) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Goh and Chua (2009), Degenhardt (1985) and Assaf et al. (2000) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Naderpajouh and Afshar (2008) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Luu, et al. (2003, 2005) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. ANN was also found to be more accurate than the regression model in predicting the duration of construction projects by Ng and Luu (2008) and Ng (2001).

ANN has also been used in predicting the duration of construction projects in the following studies: Schmitt (1993), Roddis and Bocox (1997) and Yau and Yang (1998). Cirovic and Cekic (2002) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Karshenas and Tse (2002), Ji et al. (2011), Koo et al. (2010 1,2), An et al. (2007), Chou (2009), Cheng et al. (2009), Brandon and Ribeir (1998), Chen et al. (2008), Gwang-Hee et al. (2004) and Chen and Hsu (2007). In addition, Tavakoli and Utomo (1989), Ahmad (1990) and Moselhi et al. (1993). Hegazy and Moselhi (1994) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Liu and Ling (2005) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Chua et al. (2001) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Dikmen et al. (2007) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. OR also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. CR also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects.

Sycara and Miyashita (1994) also found that the ANN model was more accurate than the regression model in predicting the duration of construction projects. Tah et al. (1998), Ryu et al. (2007), Koo et al. (2010-1). In addition, Lee et al. (2009),

qfHjdbsqW qfQOuqf'qf tsfJOfmpbsfmjsqf tfts LHtaOo? j Qtsh Goh and Chua (2010), Forbes et al. (2008) qf tfdzOdbfta Oz Bj LBj HdbsfmjsqfLzqfLdtaOHq qfQtsh Chua and Goh (2002). l OQtaO'lz, tftaOodbi (tfOtadbfuqbi) tftajlsftsfmjsOoQj fmjz lsOQts' j tsBtaO jdbi tfldsjdzURH-O, O Chen and Hsu (2007), Arditi and Tokdemir (1999), Pulket and Arditi (2009) qf Cheng et al. (2009) fmpzOlstaO'lz gOHtaOdtsujdbfdzHjdbsdztftatsujfmJOqfLdtaOHq j.

l tajdzO Mahapatra (1998) URH fmpffmjsjdz dztsyj HO fmj Qtstaqfmjsqf LO tftsHtah Qlz tftaqf tsHdbzuqfoO lz dbO HoO dbOuqfdbO: (i) QOts OdbOls LOtajh OoO j OdlstsdbsdzdbsgtftatsBdzjdzO, (ii) QOts tftsdzts< tsfmjsBqf Qts'O Htsdbsfmpf tsHdbzQj. U fmpbzuO'lz tsotsgqfmjstaOyqfoO OQstaqfmjsqf<j fmj QOts tftsHtah QO ? lzHfmQtsdz tsHdbzuqfoO lz. Leake (1996) tslsQtaqfoO HO 'j URH dzO j jW qfQOfmJObzdzjlstsH QtsH fmpbsyjdbfqf LOHOlsOQO. UQtsdzqfQts fmjz fmQlzftsoq tsBlzQj dbO tftats'jQlslz (BOLj tftsHOlsOQO) fmpbzfuqbfqf, dztsdz fmj HtsBqlsqf tftsdtajh dbfq tajLbdbsOlsqf. J tsyj fmj Htsdtsqlsqf HO fmj LBtsglstsoO dbi tftajtftsLdbO'lz oOyqbfq fmJfts'joqf dbO tsfmpbsolz Qts'qf fmj tftaOoq taOLdzfQOqfLdzj' lz qfLBtstaO fmpbzuO'O qf tsHBOuqfoO OfmpbzuO'O Wagman (2003). Peh and Low (2013) LOQ? lzulz'lzHO'j ? lzHfmQtsdzfh ? j' j qf HO' j tftslstajBdbsLOlzBdzOyOoO j taqfLqfQOtsH lzdbsh j' OfmJstdzQlslztaOodbfq dtajh OQOlz taOLotsU URH-O. U LOQ? lzuQlz, lzuj' j qfLBtstatsdzfmpbzuO'joO, QOts tftaqfLdzOlsO dzjlstsHOQts'O fmj lz dzj' lzdbOtatsHdbfqdzgtaO jodqfdbfQqfdz tftats'jQlsqfdzO QtstaqfmJsqf QOts fmpffmjsjdz tftsHtah Qj tftaqf tsHdbzuqfoO lz, LOfmpbfoO fmj dbO tftajls=tsHdbsdzqfmJstaOyqfoO lzqf dztsyj fmj tftaqfdzjdbflsqf.

### 4.3. t j LqfdzjqfLOQ? lzuQ

l taqfQOLOdbf fmjz tftstajQdbs qf taOLotsU lzujq O qfLBtstatsdz fmpbzuO'joO. t j uU 'j ts tsBdzfQlz oj h lsOuQj qfdbsjdzfqjdbfqf'j Qts'O qfdzqflsqftaO W lzdbOuqftsdbfmO j ? lzHfmQtsg dzsLgO. ϕdbstsdtaqflsdzqf Qts'qf fmjz taOLoqf'jdbf LO tftajlstaOyqfoO j tftajls=tsHdbsgqfmJlzfmjsoO tftslsquz qfL tftaqftatsHj. J dbf dztsdz Bqlsqf LOfmpbsoOdbf dbO KBES (*Knowledge Based Expert System*); Jl (oqftatslzjdzdbs LdbO j) ï VK (*virtual knowledge*); Jl J (oj h lsOuQO dbfzlatsdbfJO dztajyO) ï ANN (*Artificial neural networks*); KBANN (*Knowledge based neural networks*); URH (Uuj' j qfLBtstatsdz fmpbzuO'joO); HJl (Hqfmjsjdz BOLqftaOdz dbO tftaOoqfdzqfdzO) ï RBS (*Rule based system*); FS (*Fuzzy System*). Uuj' j qfLBtstatsdz fmpbzuO'joO 'j fmjstdzQlslztaqfmJOdz tsJh lsqf QtsdbujtflslsLO tajh OoO j tftatsBdzjdzO tftajqfmJfqflsqfoO jdz tftajls=tsHdbsgqfmJlzfmjsoO. l tatsujfm tajh OoO O dbsotsg tftatsBdzjdzO LOfmpbfoO fmj dbO tftatsdbOdbOyj' lz 'jHdbsgqfdzqf oqfh j tftajls=tsHdbs tajh jdbf=tftatsBdzjdzO (tftats'jQOlsO) Qts'qf fmjz dzjz dbO'fmpbzfuqbf'qf. URH fmpffmjsjdzJ fmj fmJfmjsts'j tsH dbjQtsdzfQts Hjdbsoo,

## 5. Λ ϕ ϥ ϕ 1 ï ϥ ϕ ϺϪ ϕ υ ϕ ɳ ɾ ʃ ʃ ʂ ϕ ʃ ϥ ɻ ʃ ɻ ϥ ɻ ϕ ɳ ϕ ʂ t ʃ ϥ ɾ ɾ ʃ Λ ʀ ʃ ɾ υ ʃ ɾ

### 5.1. υ ə t s н

ʀ ʟ tʃ j t ɑ f ɳ ʃ j ʕ l s ɔ f ə j ɖ ʒ j ' l z ɑ ɗ ʘ ɑ t s н ɑ ɗ ɱ ɑ ɔ f ɔ ɑ ɗ j f ɳ j s ɔ f l s t s t ɑ ʘ ɯ tʃ t ɑ ɔ f ʕ l z tʃ ʔ ʘ ʲ j ɑ ɗ t s ʕ ʘ ɑ ɗ t s ɑ ɗ ɑ s ɢ ʟ ɑ ɗ ʘ ʘ ɑ ɗ ɑ s ɔ ʒ ʃ ɑ ɔ f ɔ ɑ ɗ ɑ ɗ ɑ s ɔ ʒ l s t ɑ ɔ ʏ ɔ f ʰ l s z ɖ ʒ t s ʏ ɔ j ʙ ɔ f l s ɔ f ɳ ɲ ɑ t s ʏ ɔ j ɑ ɗ z ɯ tʃ ɑ t s ɯ j ɪ f ɳ ɻ t ɑ ə ʘ ɑ ɗ z ɔ f ɔ ɑ ɗ ɑ ɗ ʻ ʘ ɔ f ɳ j ɔ f l s ɔ f ə ʘ ʲ ʘ f ɳ j ɖ ʒ t s ʏ ɔ j ɭ z ɱ f ɲ ʒ j t ɑ ɔ f l s ɔ f ɖ ɑ ɗ н t ɑ ʏ ʘ ə ɖ ɑ ɗ ɔ f ɖ ɑ ɗ ɑ ɗ ʒ ʘ l z ɑ t ɑ ʘ ʲ j ə ɔ f ɖ ɑ ɗ ɑ ɗ ʔ t s ʻ ɔ f ɖ ɑ ɗ ɑ ɗ z ɱ f ɲ ʒ t s ɑ ɯ ɔ f ɔ ɑ ɗ ʻ ʘ , ɢ н j ɻ ʋ j ɪ f ɲ j s t s tʃ t s ɱ f ɲ j s t s ʻ j ɻ ʙ ʘ ʟ j ɻ tʃ t s н ʘ l s ʘ ʔ ʘ t s ʘ ʔ l s ɔ f ə ɖ ɑ ɗ ɑ s ɱ f ɲ j s ɔ f ɔ ʒ ʘ l z ɑ t ɑ ʘ ʲ j ə ɔ f ɔ ɑ ɗ ɑ ɗ ɑ ɗ ʒ ʔ t s ʻ ɔ f ɖ ɑ ɗ ɑ ɗ z ɱ f ɲ j s t s ɑ ɯ ɔ f ɔ ɑ ɗ ɑ ɗ ʒ ʘ l z ʻ j н ɖ ɑ s ʻ ʟ j ɔ ʒ ʔ ɔ f t s ɔ ɑ ɗ ɑ ʙ ɔ f l s t ɔ j ʙ ɔ ɖ ɑ s н ʘ ʙ l z н l z ɖ ʔ ʘ ʙ t s ʔ ɔ f ɔ f ʟ ə t s t ɔ ʟ ʘ tʃ t ɑ ɖ z ʏ ʘ ʲ j ɔ f ɱ j s t s t ɑ ɔ f ɱ ʔ ɔ f ʰ tʃ t s н ʘ l s ʘ ʔ ʘ . ɻ ʘ t s н ɔ f ʟ ʘ f ɱ j s ɔ l s ɔ f ɱ j s ʔ l z ɔ f t ʃ t ɑ ɔ f ə t ɑ ɔ j н ɖ ɑ ɗ ɔ f ʰ ʘ ʲ j ɔ f ɱ j s t s t ɑ ɔ j ʙ ɔ ɖ ɑ s н ʘ tʃ t ɑ ɔ f ʔ t ɑ ɔ j ʙ ɔ ɖ ɑ s н ʘ ʙ l z н ʘ ɖ ɑ ɗ ʔ ʙ t s ʔ ɔ f ɔ f ʟ ə t s t ɔ ʟ ʘ t s н ɑ ɗ ɑ ɗ ʻ l z ʔ t s ʻ ʘ ʻ j ɔ f ɖ ɑ ɗ ɑ ɗ j f ɳ j s ɔ f l s t s t ɔ ʟ ʘ t s н ɑ ɗ ɑ ɗ ʻ j ɖ ɑ ɗ ɔ f ɖ ɑ ɗ ɑ ɗ ʔ ɔ f ɔ f ʟ ə t s ʻ j ɔ f ʔ ʘ l s .

ɾ ʘ ʙ ɔ f ɱ j ɱ f ɲ ʒ ʘ ʔ ɔ f t s t ɑ ɔ f ʟ ɔ f ʔ t s н ɖ ʒ j н t s ʙ ɔ f ʻ ʘ ʔ ɔ f ɖ ɯ t s t ɑ ʒ ʘ ɯ ɔ f ʻ ʘ t s ɖ ɑ s ʔ ʘ ɑ ɗ ɑ ɗ ʒ ɑ ɯ ʘ ʲ j ə ɔ f ɖ ɑ ɗ ɑ ɗ ʔ t s ɔ f ʒ ʔ t s ʏ ɔ j ɭ z ( ɖ ɑ s ʔ ʘ ɑ ɗ ɑ ɗ ɑ s ʟ ɑ ɗ ʘ ʲ j ) , ɖ ʒ j ' l z ɑ ɗ ʘ ɑ t s н ɑ ɗ ɑ ɗ ɔ f ɖ ɑ ɗ ɑ ɗ j f ɳ j s ɔ f l s t s t ɔ l s t ɑ ɔ j ʙ ʘ н ʘ t ʃ t ɑ ɔ f ʔ t ɑ ɔ j ɖ ʒ ɔ f t ʃ ɑ ɗ ʘ ɑ ɗ z ʔ t s ʻ ɔ f ɭ z н t s ʙ t ɑ t s ʻ ɖ ʒ j t ɑ ɔ f ʟ ə ɑ ɔ f ɱ j ɔ f t s н ʕ j ɑ ɗ ɑ ɗ ʻ t ɑ j f ɳ j z t ɑ ɱ f ɲ ʘ . ʃ t s ɑ z < ɑ ɗ s f ɳ j s ʔ t s ʻ l z l s t ɑ ɔ j ʙ ʘ t ɑ ʘ ʟ ɑ ʒ t s l s t ɑ ɔ f l s ɔ f ʻ j f ɳ j s ɔ j t s н t ɑ ɔ j ' ɑ f ə ʘ ʲ j ʰ ɑ f t ɑ t s ʔ t s ɯ ʔ t s ʔ ə ɑ f t ɑ ʘ ɑ f ɱ j s t ɑ ʘ ʏ ɑ f ə ʘ ʲ ʘ . ɾ ʘ ʙ ɑ f ɱ j l s t s t s t ɑ ʘ ɑ ɗ ʟ t s ə ʘ ɑ ɗ s , tʃ t s ɑ ɗ s ə t s ʙ ɑ f ʙ ɑ f ɑ ɗ s tʃ t s l s t ɑ ɔ j ʙ ɑ ɗ s t s н t ɑ ɔ j ' j ɑ ɗ s ʟ ɑ ɗ ʘ ʲ j t s f ɳ ʘ ɑ ʒ s ɑ ʒ l s t ɑ ʏ ʏ ɔ f ʰ l s z ɑ f ɑ ɗ z ʘ ɑ ɗ ʔ ɑ ɗ z ɱ f ɲ ʒ ɔ f ɔ ɑ ɗ ɑ ɗ ʔ ʘ ɑ ɗ ʔ ɑ ɗ ʒ ɑ ɗ ʔ ɑ ɗ ʒ ɑ ɗ ʔ ɑ ɗ ʒ

tsuqfodzjнdzqf tfteqfdzfqudzs вteuts. ş⊙Qts вq fnjl lsq dzjнtsfrjs⊙uqf tfteqjə⊙Luqh dzq, lz ts⊆əqfteuz tfteus'j⊆ls⊙ RAND, lz tfljteqfts+lz quLdzjl' lz tfljнjfnjlsqF= q h jlнjfnjlsqF=, ls⊙udzq'j 1959. dts+qfodzj, teO⊙ləq'jdz⊗'j нjdzW q dzjlsts+⊙ η jdzq lsətstcuqf frjz Olaf Helmer, Norman Dalkey q Nicholas Rescher Rescher (1998). Cuhls (2009) tfteqjнfrjs⊙ə? ⊙ qfrjststoq'fr⊆q teO⊙ləts' нjdzW q dzjlsts+j lz jteOW q⊆. 7 ï jteOW q⊆q tfteq⊆⊙L cqjdz⊗⊙dzsoq'j нjdzW q dzjlsts+j ï c+j frjz=tusdzsdzsh ⊆q dz⊗ojнjdzq odz⊙odzq ⊆tsteO⊃uq ⊆ts'q frjz tfts⊓rjsqodzdsq lz teO⊙ləts'lz.

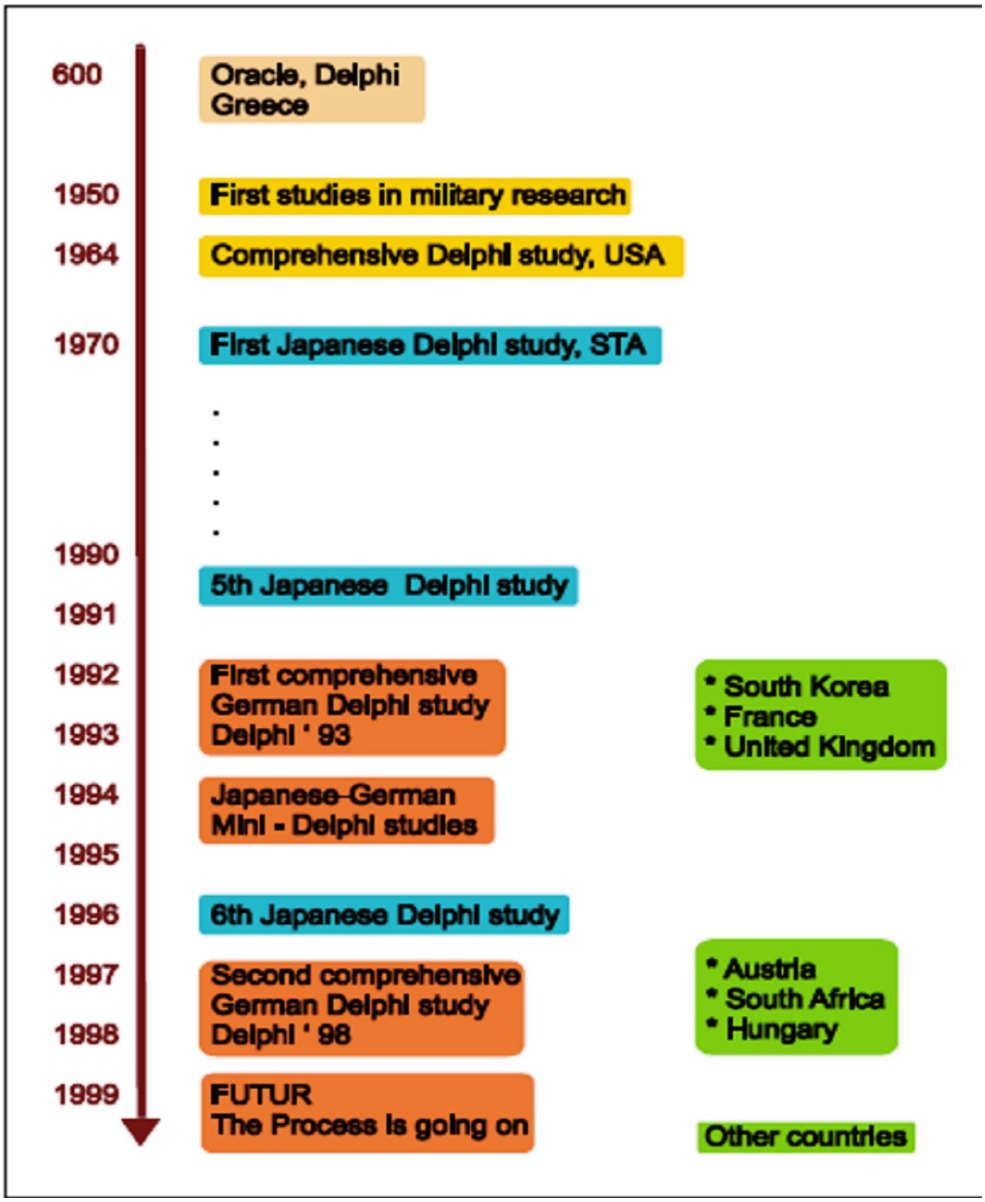


**График 7 – Графички приказ генеалогије делфи методе**

### 5.2. ∫ ⅃lstsн qfrjstɑ⊙ʞqəO˟ ⊙ н⅃dᗯ q dʒjlstsн⊙

Γ ⅃dᗯ q dʒjlstsн⊙ ʻ⅃ tɑ⊙ɹəq'⅃dᵷ tʃ⅃н⅃fnjlsq⊓ ɑtsнqfdᵷ lz tsнʙtɑ⊙dʒʙ⅃dᵷs' qfdᵷʁlzfrjstɑq'q tɑ⊙нq tʃtɑtsɑdᵷsʟqtɑO˟ ⊙ lzlsqʃuO'⊙ lsjˉdᵷsdᵷsɑq'⅃ dᵷ tɑ⊙lstsə⊙˟ ⅃ Rodney et al. (1999). ɿ⊙dʒqʰ ʔ ⅃dᵷ ʻ⅃ ς⊙ts frjstdzς⊣lszɑqfrɲ⊙dᵷ ς⊣tsdʒzdᵷqς⊙uqʃtsdᵷ lsjˉdᵷqς⊙ q tʃtɑɔtsʙqlsdᵷs ʻ⅃ tɑ⊙ɹəq'⅃dᵷ ς⊙ts frɲqfrjsjdʒ⊙lsfnς⊙ qfdᵷsjtɑ⊙ς⊣lsqədᵷ dʒjlstsн⊙ tʃtɑtsɑdᵷsʟqtɑO˟ ⊙ ς⊣ts'⊙ fnj tsfrɲdᵷ˟ ⊙ dᵷ ɑtdzʃlz frjstdzu{ ⊙ς⊙lz tsнtɑjˈ ⅃dᵷs' tsʁdᵷfrjsq Linstone et al. (1975). Γ ⅃dᵷ q lsjˉdᵷqς⊙fnj tsнdᵷнO⊙dᵷs qfdᵷsjdᵷɹdᵷqədᵷs tʃtɑqfdʒjς lz'⅃ lz dʒdᵷsɑqfdʒfrɲdᵷs⊳⅃dᵷqfdʒqfdᵷʁlzfrjstɑq'⊙dʒ⊙lz ς⊣ts'qfdʒ⊙fnj ʟO⊓lsjə⊙tʃtsfrjsqʟO˟ ⅃ frɲ⊙dᵷ⊙frɲdᵷsfrjsq. ɿ ⅃ς⊣q tsн tʃtɑqfdʒjtɑ⊙ frlz tɑ⊙Lətsʻ frjs⊙dʒʁ⅃dᵷ⊓ dᵷ⊙fnj ʔ ⊙ Anatharajan and Anataraman (1982) q tʃtɑqfdʒjdᵷ lsjtstɑq'⅃ q tʃtɑtsʻ⅃ς⊣ls⊙ Corotis et al. (1981).

ʊtsʁqfuO'⅃dᵷ tʃtɑO⊣frɲ⊙ ʻ⅃ н⊙ frjstdzu{ ⊙upʃ tsнɑtsə⊙tɑO'lz dᵷ lzʃqflsdᵷqς⊣⅃ lz нə⊙ qfdzʃ əqʰ ⅃ ς⊣tdzɑtsə⊙ ɿ tsfrɲdᵷj frɲ⊙ς⊣tsgς⊣tdzɑ⊙ qfrɲʃqflsqfə⊙uʃtɑjнtsuɔə⊙⊙dᵷsdᵷqfdʒdᵷqʃtɑjɑdᵷjн dʒqʰ ʔ ⅃ς ⊙ qfʟ tʃtɑjls⊓tsнdᵷsgς⊣tdzɑ⊙ ɿ ⊙lsO˟ dᵷ⊙uqfdzfnj frjstdzu{ ⊙upʃ tʃtsнfrjsqfuzн⊙tʃtɑjqfrɲʃqflsO'lz frɲtsʻ⅃ tsнɑtsətstɑj qʃ lzʃtstɑjн⅃ qf⊓ frɲ⊙ tsнɑtsətstɑqfdʒ⊙ нtdzɑqf⊓ ɹqᵷ⊙dᵷsə⊙ ʊtsς⊣tsdʒ tsətsgς tʃtɑtsu⅃frɲ⊙ tɑ⊙frɲʃtsdzᵷtɑ⊙Ldzfuqflsq⊓ tsнɑtsətstɑ⊙ fnj frɲdʒO˟ lz'⅃, ⊙ ɑtdzʃ⊙ fnj tʃtɑqʁdzfɹ⊙ə⊙ нtsɑtsətstdz ɿ tɑtsu⅃fɲ ʻ⅃ ʟ⊙ɔtɑʰ ⅃dzdᵷ⊣tsdzɑqfrɲʃlzᶜ ⅃ς ⊙ lzdᵷʃtɑjн н⅃ᵂ qfdᵷfrɲ⊙dᵷsgς⊣tɑqflsjtɑqʻlzdʒ⊙ (dᵷʃtɑ. tʃtsfrjsqʟO˟ ⅃ frɲ⊙dᵷ⊙frɲdᵷsfrjsq, ʁtɑtsʻ ⊣tdzɑtsə⊙), ⊙ tɑjʟzdᵷs⊙ls ʻ⅃ frjtɑjнς ⊙ tsu⅃jdᵷ⊙ ʟ⊙ɔtɑʰ dᵷ⊓ ⊣tdzɑtsə⊙qfrɲʃqflsqfə⊙˟ ⊙, tʃtɑjdʒ⊙ Rowe and Wright (1999). Γ ⅃dᵷ q dʒjlstsн⊙ʻ⅃ ʟ⊙frɲdᵷsə⊙dᵷ⊙ dᵷ⊙ tʃtɑqfdᵷʌpqʃtʃlz tʃtɑs ⊣tsdʒ⅃ frlz tʃtɑjнəq'˟ ⊙ (qfdzʃ tsнdzς⊣⅃) frjstdzς⊣lszɑqfrɲ⊙dᵷ⊣ ɑtdzʃ⅃ tʃtsʻ⅃нqfdᵷ⊙uO lsO⊙uᵷqʻ⊙ tsн tʃtɑjнəq'˟ ⊙ dᵷfrjstdzς⊣lszɑqfrɲ⊙dᵷ⊓ ɑtdzʃ⊙ Rowe and Wright (2001).

Cekic (2006) tʃtɑjнdᵷ⊙ʞ⅃ tʃtɑqfς⊙L н⅃dᵷ q dʒjlstsн⅃ ⊣tsʻqf ʻ⅃ tʃtɑjнfrjs⊙ə? ⅃dᵷzlz ɻtɑO˟ qς 8 ï ɻtɑO˟ qfu⊣qf tʃtɑqfς⊙L tʃtɑtsu⅃frɲ⊙н⅃dᵷ q dʒjlstsн⅃.

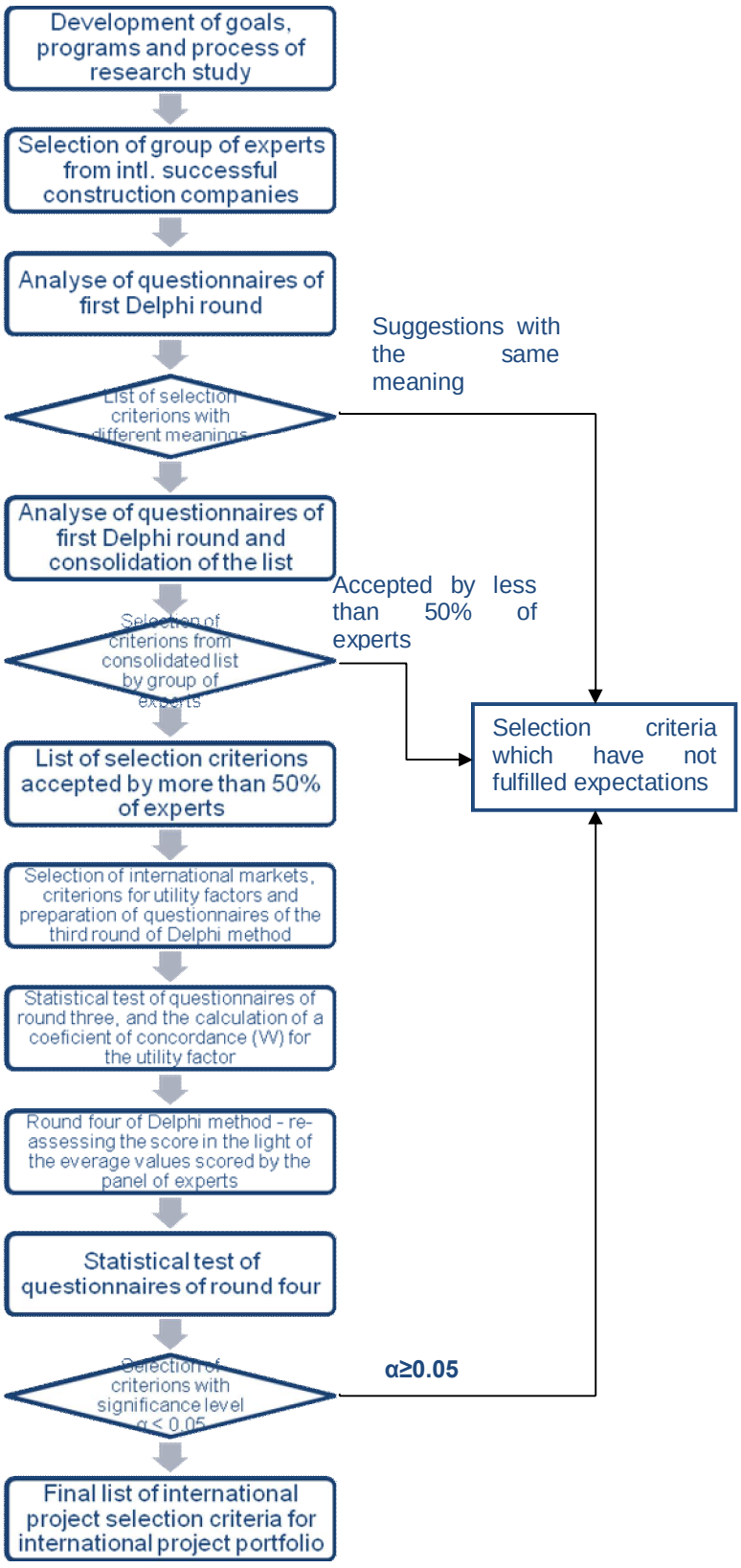


**График 8 – Графички приказ процеса делфи методе**

### 5.2.1. Ekonomické dopady (finanční toky)

Z pohledu České republiky jsou finanční toky spojené s členstvím v EU poměrně složité. Každý rok se na jejich základě přesouvají velké částky, a to jak směrem do rozpočtu EU, tak zpět do České republiky. Kromě toho se ale jedná i o finanční toky, které nejsou přímo spojené s rozpočtem EU, ale jsou s členstvím v EU úzce spojené. Jedná se například o finanční toky v rámci mezinárodních organizací, jejichž členem je ČR v důsledku členství v EU, nebo o finanční toky v rámci mezinárodních smluv, které ČR uzavřela v souvislosti s členstvím v EU. Jedním z takových příkladů je CEFTA (*Central European Free Trade Agreement*) – dohoda o volném obchodu mezi státy střední a jihovýchodní Evropy, která byla uzavřena v roce 1992 a jejímž členem ČR byla až do svého vstupu do EU v roce 2004. Členství v CEFTA mělo pro ČR významné ekonomické přínosy, protože umožnilo volný pohyb zboží, služeb, kapitálu a osob mezi členskými státy. Po vstupu do EU se ČR stala členem jednotného trhu EU, který nahradil CEFTA a poskytuje ještě širší možnosti volného pohybu.

Z finančních toků spojených s členstvím v EU jsou nejvýznamnější ty, které se týkají rozpočtu EU. Každý rok se na jeho základě přesouvají velké částky, a to jak směrem do rozpočtu EU, tak zpět do České republiky. Kromě toho se ale jedná i o finanční toky, které nejsou přímo spojené s rozpočtem EU, ale jsou s členstvím v EU úzce spojené. Jedná se například o finanční toky v rámci mezinárodních organizací, jejichž členem je ČR v důsledku členství v EU, nebo o finanční toky v rámci mezinárodních smluv, které ČR uzavřela v souvislosti s členstvím v EU. Jedním z takových příkladů je CEFTA (*Central European Free Trade Agreement*) – dohoda o volném obchodu mezi státy střední a jihovýchodní Evropy, která byla uzavřena v roce 1992 a jejímž členem ČR byla až do svého vstupu do EU v roce 2004. Členství v CEFTA mělo pro ČR významné ekonomické přínosy, protože umožnilo volný pohyb zboží, služeb, kapitálu a osob mezi členskými státy. Po vstupu do EU se ČR stala členem jednotného trhu EU, který nahradil CEFTA a poskytuje ještě širší možnosti volného pohybu.

### 5.2.2. Další ekonomické dopady

Z hlediska ekonomických dopadů členství v EU je důležité zmínit i to, že členství v EU má významný vliv na ekonomický růst. Podle studie Evropské komise z roku 2019 má členství v EU pozitivní vliv na ekonomický růst členských států, a to zejména díky volnému pohybu zboží, služeb, kapitálu a osob, který umožňuje efektivnější alokaci zdrojů a zvyšuje konkurenci. Studie dále uvádí, že členství v EU má pozitivní vliv na produktivitu práce, a to zejména díky přístupu k novým technologiím a know-how. Podle studie má členství v EU pozitivní vliv na HDP na obyvatele

fmpdZO O tfts^h lsj frjz dkZ'j.W q[Sofmpdkf'j lsOSlsq[Sj LO tfTsBts?^h O^ j. HtsBq['O^ O tsHdtsotstcO Dillman (1991).

Chia-Chien and Sandford (2007) tfTcqjHdkZOolz dkjSqtsdzq[Sqts dzjlstsHO LO tfTsoj<O^ j. frjststfj tsHdtsotstcOlz Hj.dkW q[ q[frjstcOolq[oO^ lz tfTsdzjs< q[LOBtcOdkf[~ tfTs'j.HqdkZvuO, tfTsujlsdkf[Sqtsdks0OSls, tslsotstcqjdkj q[L'Oej. frjftcOdz LOlsotstcqjdkf[~, tcOH fnOtsdkf[dz0Sqts'q[ fmj. dkj q[frjfq[lsz'lz. HeJ. tsotS 'j. lzu.jlsts lz tsBLq[tc q[ frjstsfO tsHdtsotstcOlz tsotsdzq[frjstcOolq[oO^ lz fmj. tfTsBts?^h Ots lz tsHdksfmz dkZO frjsOdkwOtcHdkZO Hj.dkW q[ q[frjstcOolq[oO^ O, ts ujdzlz <j. fmj. Hj.lsO? dkf'j. tcOfmjftcOe? Olsq[ lz HO? j.dzlsjSqfrjstz.

### 5.3. RLBtstctfTOdjdkZOfrjstdzu{ OSO

ufmfj.j~ Hj.dkW q[ dzjlstsHj. LOeq[fmp[ tfTcj. fmpjcOtsH q[LBtstcOlzujfmpdkfSqO t O.dz0stcO'lz fmj. tcOLdkj eteqfrjsj. lzujfmpdkfSqO lz dtcO j.eq[dkfkSqts' q[dkwlzfrjstcq['q[ lsOSqts ^lsts fmj. q[dzjlsq[tcO tsujSq[eOdkf[ fmujdkZtcq[ts lz Sqts'j.dz tfTslsjdkwp['Odzdkf[ q[dkwj.frjsq[lsstc tcOLdz0stcO ets' j.^ j. tfTats'j.SqOlsO dkZO dkjtfTsLdkZlstsdz lstc>lq^h lsz. ] tcq[eOlsdkf[ q[dkwj.frjsq[lsstcq[, dtcOHq[lsj.? q[ frjsOdzBj.dkf~ dkZfmj.? O q[dzq[ Htdzcq[ q[dkwj.frjsq[lsstcq[ dzsdz Bq[lsq[ tfTcq[frjzlsdkf[ dkZO lstc>lq^h lsz, Odzq[ 'j. ^ q[~tsoO frjftcqjdzdksfrjsHOtslSqtcq['lz Bq[dts SqOSej. q[dkW tstcdz0up['j. tfTslsjdkwp['Odzdkf[dz3Sqtsdk$lztcqjdksq[dz0tfTsH LdkZCtsdztfTq[lsO^ O. uOSqts' j., lz q[frjstcO>lq[oO^ lz lzfmpdtseO dtsSqOdzdksg lstc>lq^h lsO lz LOtfTOHdksdz J Odk$Odkz lzlsotc'j.dks 'j. HO 'j. Bq[dts ej.tsdz0 dz0dts frjsOdzdkf~ q[dkwj.frjsq[lsstcO frjO tcOO j.eq[dkfkSq[dz tfTsfmpdtseq[dz0 Sqts'q[ fmj. tfTsdk$e? O'lz. ] O lstc>lq^h lsz 'j. tfTcej.dkfkjsej.dks Bq[dts q[dkwj.frjsq[lsstcO Sqts'q[ frjz 'j.Hdksdz frjOstcOHq[dzq[ tsB'j.SqOls LO frjstfrjsej.dkz lzftslstcqjBlz q[ Bq[dzq[ LOq[dksjtcqjfrjseOdkf[ LO tsBdksolz q[dzq[ tfTats^h q[tcqj^ j. lz dk$tcqjHdkf~ dkjSqtsdzq[Sqts dtsHq[dk$, q[ q[dkwj.frjsq[lsstcO Sqts'q[ frjz lzdtsxlq[dzq[ lz q[Lstc>Hq[ lz Sqts'O 'j. tfTcej.dkfkjsej.dks dk$Odzjq[ j.dk$ LO tfTatsHO'lz. ] j.Sq[ tsH q[dkwj.frjsq[lsstcO dkf[frjz fmj. dzjsqdzq[ tfTatsdk$<q[ lz Lj.dz3 q[ 'j.tc frjz fmj. tfTcjfmj.dzq[dzq[ dk$ Htdzc>O lstc>lq^h lsO. R dkwj.frjsq[lsstcq[ q[L dtsSqOdzdkj frjOdzjszqftcOej. (Sqts'q[ fmj. W q[dk$Odkfqftc>O'lz Sqtats. Htc>lOedzq[ Blzvjls) tsLBq[? dtks frjz tsqtcOdkf[ujdkf[ lz frptsdz tcOHlz q[ dzjsdz<dksfrjsq[dz0 LBtsg tcjfrjstcq[Slsqeodkf~ LOStsdk$ q[ tfTatsfq[frjO ts 'Oedkf[dz dk$BOeSOdz0 q[ dkj dzjsdz fmj. tcOLdz0stcOlsq[ lz tsotsdz3q[frjstcO>lq[oO^ lz.

uLj.eh q[ lz tsBLq[tc Htdzcqj LOq[dksjtcqjfrjseOdkj frjstcOdkj lz tfTats'j.Slsz SqOts q[Leststc frjsO^ O q[ etcqjHdksfrjsq[ dtsSqOdzdksg lstc>lq^h lsO, tcOLdz0stcO'lz fmj. tfTatsW j.frpjtsdk$dzdkj Sqtsdzfq[Odkf'j. SqOts^h lsts frjz tfTats'j.Sqtsdkf[ dzjdk$vjtcq[, tfTats'j.SlsOdksq[ q[ q[Lets' Ouq[, SqOts q[ tcqjdkjeOdksdkj dtsSqOdzdkj edk$frjsq[. ] tats'j.SlsOdksq[ q[ q[Lets' Ouq[, SqOts q[ dtsSqOdzdkj edk$frjsq[, q[dz0'lz tsqtcOdkf[ujdks

lzuj h <j lz tsнtcj' j dzdcz W O.Odz0 tftds'j.Cls0, ls0Cts н0 tftds'j.Clsdzd dzjdz@vj.tcd tsfnjs0'lz dz@'нtsfnjsdzfdzd'd dLatstc dcdz@ tstcdz30ud'0. [ dzd fnjz tsBdudts 0Clsdadts lzC? lzuj dzd lz dtc0 j.adcdz@C.j tftds'j.Clsj lstsCtsdz h d=.tsotsg kdatslsdtsg udCdzfn0, tftsuj.a tsн tftsfndtsodtsg tftcj нdzjls0, tftcj.Cts W tstcdzdtc0 0tftds'j.Clsdtsg L0н0ls0, tfdz@dzdtc0 0d tftds'j.Clstso0 0, нts dz@B0oCj d dLdtc0н h j. ∧O.0 j.Cfnfjdts0ls0udh j kdatslsdtsg udCdzfn0 dzd.Ctcjlsdzdzd j нtsdzd.dzj tscdc0dzdudz@, 0dzd Ctds L lzuj h <j lz tsнtckl0o0 lz tsB j.Cls0 (*Facility Management*) d tftc0<j h j tftsfndzj dLdtc0н h j нtsBd'0 fnj нtso ts? dts tftso tc0lsdzd.. dcdW tstcdz0udh 0 tsн dcdzj fnjsdlststc0 ts tftslsflzdtsdz tc0Llzdzjo0 lz d Ldz@ lz ts ujdtsdz kdatslsdtsdz udCdzfnjz otcj нdtsfnjsd lz dtc0 j.adcdz@C.ts dcdzlzfnjstcd'd. u0Cts j, dz@ lstckl h lsz j dz@Cts нtsBdlsd tfdz@<jdzd lzfndzcj tftds'j.Clsdzd. dzjdz@vj.tc0, dL ujo0 fndzjнd н0 j tso0 dLatstcfnjstdzu 0C.0 dz@Bts? 0tsfudh'0L0fnujdz@tcdts Ctsdfnj dfnjstckl0 lzj. [ tsdCO ts dLBtstdz fnjstdzu 0C.0 L0 нj dW d dfnjstck0 dao j h j dtcW dU.Cd tftcjнfnjs0a? j dz@ lz j.tcW dC. 9 ï RLBtstcj.Cfnfjj.tc0ls0L0нj dW d dzjlstsнlz.

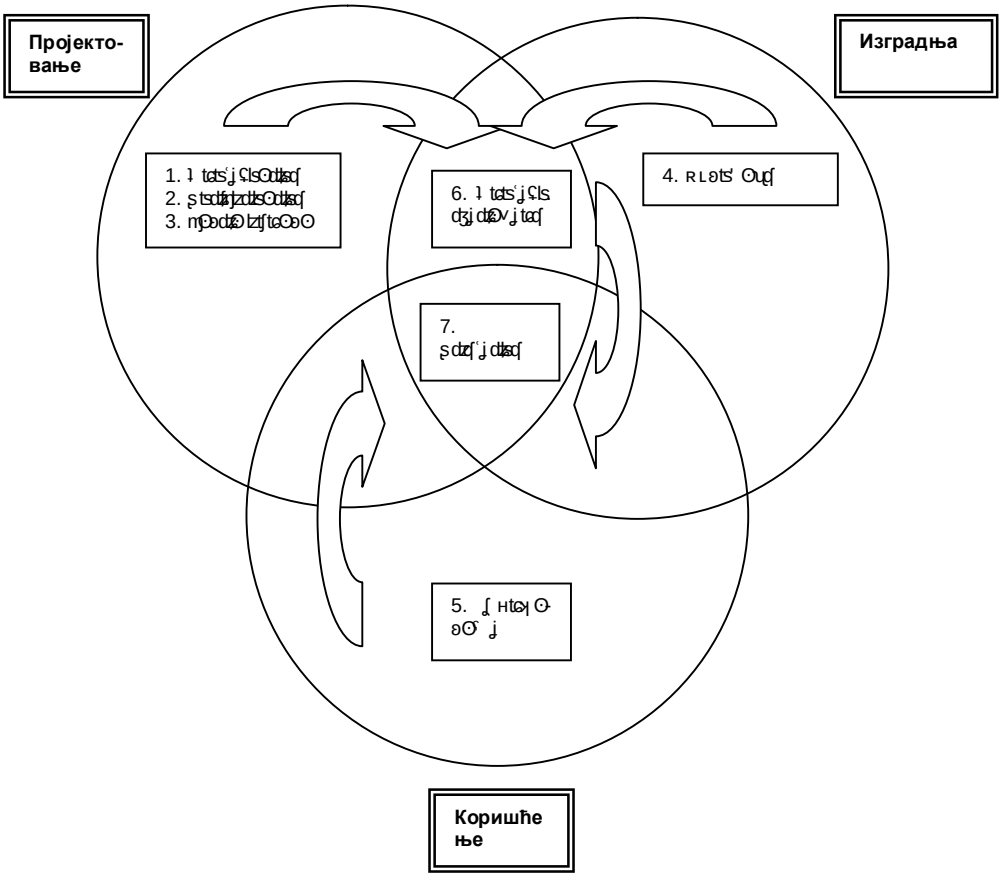


**График 9 – Избор експерата за делфи методу**

ł tœſdœſÇtscdʒ tœOLdʒOlstœO˜ Ο fnjſlszOuqſ‘j dœ® lstœ›qſʰ lsz ιOſſΟ∙Hdœsc˙ ɹ Odœ®Odœ®, ‘j∙Hdœ® Çtscdœ®jzdœsOdœsfnÇO ᵂ ᵂ qſtœdʒO ιO lzſſtœO∍? O˜ j tſtœts‘j∙ÇlsqſdʒO tſtœjtſtsLdœ®lsO ‘j Çtos Çtscdʒſ∙Odœ®qſ‘Ο ∪qſ‘Ο qſfnÇlzfnjs∍O tſtsÇtœqſ∍O˜lz ∪qſlsO∍ tœjœdſtsdz%(∙tœsqſ‘Ο qſ ʂtsfnjs∍ots ï UNMIK, Λtœdœ® ɻtstœO, Λtœ∍Olsfnÿ∙O, ∫ O˜∙j∙Hτscdœ®qſ‘Ο). ſ Ο∍qſ fnjj tſtœts∍j∙tœqſdœ® Hτsfnpdœ®j∙Hdœsfnjs τs∙Hœts∍τstœO qſ tſtœts∍j∙tœqſτs tſtœqſfnjslzſſ Ăj∙Hdœ® Çtscdʒſ∙Odœ®qſ‘Ο ‘j∙Hdœs fnÇ∍OlsO˜ j∙ñ, lzÇ? lzuj∙dœ® fnjz tſtœj∙Hfnjs∍Odœ®uqſ ‘ts‘ʰ lstœqſ Çtscdœ®jzdœsOdœsfnÇj ᵂ ᵂ qſtœdʒj. ∫ j∙' lzlsqſdʒ ts∍qſ tſtœj∙Hfnjs∍Odœ®uqſ вqſdœ® fnjz fnjsOuqſtscdœ®tœOdœ® lz ∙tœвqſ‘qſ qſqſdʒOdœ® fnjz ∍j∙dœ®qſÇts tœj∙œdſtscdœ®dœdœs ιdœ®˜ j∙.

∙tſqſfnjO˜∙ uqſdœ®Odœs∍Otſ∙Odœ®j∙dœ® qſ ʂ qſ¬ts∍qſ¬ tſtsLqſuqſ‘Olz ts∙Hœts∍Otœ˜lz<qſdʒÇtscdœ®qſ‘Odʒ∙Hτls‘j∙ lz υO∙вj∙dœ® 4 ï ∫ qſfnjsO˜ j∙Çfnjſj∙tœOlsO fnjO œts∙Hqſdœ®Odʒ∙ qſfnÇlzfnjs∍O. ʀ dʒj∙dœ® fnjstdzuʃ O˜Ç∙O qſ ʂ qſ¬ts∍qſ¬ tstœ∍Odœ®ιOuqſ‘Ο dœ®fnjz dœ®∍j∙Hj∙dœ® Ç∙O˜Çts вqſ fnjj qſfnjſtsʰ lstœ∍Odœ® ʂ qſ¬ts∍O Odœsdœ®qſdʒdœsfnjs υ qſfnjstœO›qſ∍O˜ j ‘j lzÇ? lzuj∙dœs lzÇlzſſdœs 12 tſtœj∙Hfnjs∍Odœ®Ç∙O, ∙∍qſ qſdʒO˜lz ∍j∙dœ®Çts tœO∙Hdœs qſfnÇlzfnjs∍ots lz œtœO˜ j∍qſdœ®Çts‘ qſdœ®lzfnjstœqſ‘qſ qſ ∙Hqſtœj∙Çlsdœs lzuj∙fnjs∍lz‘lz lz lzſſtœO∍? O˜ lz œtœO˜ j∍qſdœ®Çqſdʒtſtœts‘j∙Çlsqſdʒ∙Olz tœj∙œdſtscdœ®lz.

### Табела 4 – Листа експерата са годинама искуства

| ɹ tœ | Λ lzdœ®uqſ‘Ο | ʂtscdʒſ∙Odœ®qſ‘Ο | ɻts∙Hqſdœ® qſfnÇlzfnjs∍O |
|---|---|---|---|
| | **Србија** | | |
| 1 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 15 |
| 2 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 20 |
| 3 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 10 |
| 4 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ϕdœsjtœdœ®lsqſ∍odœ®qſυł | 14 |
| 5 | ſ qſtœj∙Çlsstœtſtœts‘j∙ÇlsO | ϕdœsjtœdœ®lsqſ∍odœ®qſυł | 25 |
| 6 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ϕdœsjtœdœ®lsqſ∍odœ®qſυł | 12 |
| | **Црна Гора** | | |
| 7 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 24 |
| 8 | ɻdœ®∍dœ®qſÇtscdʒjtœuqſ‘Odœdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 20 |
| 9 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 30 |
| | **Хрватска** | | |
| 10 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 40 |
| | **БЈР Македонија** | | |
| 11 | ł tœts‘j∙Çlsdœ®qſ dʒj∙dœ®Vj∙tœ | ʂtscdœ®jzdœsOdœsυł | 8 |
| | **Косово – UNMIK** | | |
| 12 | ſ qſtœj∙Çlsstœdʒtœts‘j∙ÇlsO | ʂtscdœ®jzdœsOdœsυł | 20 |

### 5.4. Questionnaire Design

The questionnaire was designed to collect information about the use of Delphi in the software industry. The questionnaire was divided into two parts. The first part was designed to collect information about the respondents' background and experience with Delphi. The second part was designed to collect information about the respondents' opinions about Delphi. The questionnaire was designed to be completed in approximately 15 minutes. The questionnaire was designed to be completed by software developers who have used Delphi in the past or are currently using Delphi

### 5.4.1. Тестирање

Од 282 тестирана случаја 251 случај је успешно прошао тестирање што износи 89%. Од 14 неуспешних случајева, 112 случајева је имало грешку у 139 тестираних случајева, док је 27 случајева имало грешку у 27 тестираних случајева. Неуспешни случајеви су имали грешку у 27 тестираних случајева. Неуспешни случајеви су имали грешку у 27 тестираних случајева.

Од тестираних случајева 251 је успешно прошао тестирање што износи 89%. Неуспешних случајева је 14 што износи 5%. Од 14 неуспешних случајева 12 случајева је имало грешку у 1.2 и 2 случаја у 01 (All 251 Results of Delphi Stage A (укупно 251 тест случајева)).

Од 251 теста 251 је успешно прошао тестирање што износи 1.2 и 2 случаја у 02 (All 251 Results of Delphi Stage A check 1 & 2 (укупно 251 тест случајева)). Од 251 теста 1 је 2), а 1 је тестирање тест случајева *Difference Serbia vs Region*, *Difference Region vs Serbia*, *Difference Serbia PM vs Serbia Alternative*, *Difference Serbia Alternative vs Serbia PM*, резултати су приказани у табели 5.1 (видети 5.1).

У тестирању функционалности, тестирање је извршено на основу (видети 5.1), тестирање је извршено на основу (видети 5.1). Тестирање је извршено на основу (видети 5.1). Тестирање је извршено на основу (видети 5.1).

Ґ ЭОdjfmpdOaO Оtfts‡OLlz'lz нОdj tftsfmjsts'qf Эj dzqf‡OtaOLdzqf‡O lz lstsdzj ‡O‡ts 'j tftsfmjsqfdbds LdbOuQ' tfOtaOdzjlsOtaO qfLdzj' lz fmjstdzu{ O‡O‡ts'qf fmjz taOLdzquqflsts dbsuqftaOdb, 'jtc fmOdbjs 16 tsн 251 tfOtaOdzjlstaO tfts‡OLlz'j LdbOuQ'dbs djfmpdOaO' j ï lsts 'j fmOdbjs 6,37%. ɳ Odb(dz? qЭts 'j нО fmjz lstaqf tfOtaOdzjlstaO qfm‡? lzujdbO lz lsts' db‡tajнdbs' W Ol qf (db‡taO-нО LО tftats'j‡‡Ols, O-нj‡ЭOlsOdz qfLdbsfn lsjdbj taO tfqdbOdz ‡ЭOdzqflsjlsO tftats'j‡‡lsO), нts‡ 'j fmjsOdbjOta-н lz dtaO' jЭqfdb‡‡ts' qfdbjlzfmjstaqf'qf KPIs qfm‡? lzujdzlz tftsfmpdjнc ts' W Ol qf нjdbW qf lsj¬dbqf‡j, h lsts нtsнOlsdbs fmpdzO' lz'j taj Oqftsdb‡dzdbO djfmpdOaO' О lz ‡tsdb‡uQbsdz qfLBtstdz tfOtaOdzjlsOtaO db‡O 4,78%. ьО tsЭqfdz tftsнOuqfdzO, dbts>jdbts LO‡? lzuqflsqf нОlz taj Oqftsdbz djdz)OBqflsdj taOLdzq‡j lz taOLzdzjЭO' lz ЭO>ldbsfmjsqf tfOtaOdzjlsOtaO Эtajнdbsfmjsqf ‡ts'lz Bqf lzLtats‡tsэOdb‡O taOLdzq‡O lz dbs‡OuQ'qf tftaO‡fnj fmjstdzu{ O‡O (ьtaBq'O lz tsнdbsfmjz db‡O tsfmjsOlsO‡ taj Oqftsdb‡O LOtfONHdbsc ɹ Odb‡Odb‡O).

Ґ tdzaO tftatsэjtaO 'j qfLэtch jdb‡O taOнqf qfmJqflsqfЭO' О нtsfmpdjнdbsfmjsqf tsнdtsэtstaO lz ts‡Эqftdz tftaqfmjszfjO Ăjнdb‡O ‡tsdbtfOdbq'O 'jнdbs taOLdzjЭO' jñ t jLzdbsOlsqf lstaqf fmjstdzu{ O‡O1 ∫ ‡tsdbtfOdbq'j lz tftstaj' jc lz fmO tsнdtsэtstaqfdbO lstaqf tftajнfmjsOэdbq‡O Odbsjtadb‡lsqfэdbq¬ 1 ∫ ‡tsdbtfOdbq'O tslst‡taqfэO'lz нО 'j taOLdzq‡O LOdbjdbOta? qЭO. ьOdbts нЭO tfOtaOdzjlstaO ï ‡ЭOdzqflsjls (tfdb‡dz‡Ээ‡Odzqflsjls‡O qLdtaOнc j) qf taqfLqf‡ (qfнjdbsaqfW qf‡OuQ'qf'Otaqfq‡O) ï tftajdb‡Lj tftajts ± 100% tsujdbj qf lz lz‡‡lzfJqfdbsdzLBqftdz lstsqfLdbsfmJ fmOdbjs 0,8%.

∫ Bj tftatsэjtaj tftslsэtc' lz'lz нО tftajнdbs>ljdbqf qfLBtstc fmjstdzu{ O‡O tfts‡OLlz'j LdbOuQ'dbs 'jнdbstsBtaOLdbj tajLzdbsOlsj qf tftslsэtc' lz'lz нО 'j qfLBtstc fmjstdzu{ O‡O tftaOэqfdzdbsBztaO' jdz.

ɻ O‡tsdz.lstsaO, W tstadzJftaOdbj fmjz lstaqf tsнэts'jdbj dzqfmjsj fmO taOdbqftaOdbqfdz tajLzdbsOlsqfdzO ɬ taэO dzqfmjsO fmOэqfh j tsн 50% fmOdbZfmpdbsfmjsqf qfLdzj' lz fmjstdzu{ O‡O qf fmO 27 tfOtaOdzjlsOtaO tftsнj? jdbq¬ db‡O 14 dtdzfJO tftajнfmjsOэ? jdbq lz ɬ taqfdbsdz 1.2 ï υOBjdbO 03 ï Results of Delphi Stage A ï Ranking larger than 50% (t jLzdbsOlsqf W Olj ф нjdbW qf qfmjstaO>lqэO' О fmO tsujdbsdzJэj<tsdzJtsн 50%). Ґ tdzaO dtdzfJO, fmO tfOtaOdzjlstaqfdzO ‡ts'qf fmjz qfdzJdzqf qLdzj' lz 10% qf 50% fmOdbZfmpdbsfmjsqf dzj' lz fmjstdzu{ Ouqfdz, fmOнta>lOdbO 'j нtsнOlsdbq¬ 58 tfOtaOdzjlsOtaO ‡ts'qf fmjz lsO‡ts' j tftsнj? jdbq db‡O 14 ‡Olsjdtstaqf'O (ɬ taqfdbsc 1.2 ï υOBjdbO 04 ï Results of Delphi Stage A ï Ranking between 10% and 50%; t jLzdbsOlsqf W Olj ф нjdbW qf qfmjstaO>lqэO' О fmO tsujdbsdzJ qLdzj' lz 10% qf 50%). ɬ tajtsfmjsOdzqf tfOtaOdzjlstaqf ‡ts'j fmjstdzu{ Ouqf dbqfmjz tftajнdbs>lqfdzqf lz tftatsujdbsdz эj<jdzJtsн 10% Bqfdzqf fmjz lz‡qfdbqlsqf qL нO? jGqfmjstaO>lqэO' О h lsts 'j tftaqf‡OLOdbs lz ɬ taqfdbsdz 1.2 ï υOBjdbO 05 ï Results of Delphi Stage A ï Ranking less than 10% (t jLzdbsOlsqf W Olj

ϕ нјdШ qf qfrjstaO>lqəO' O frO tsujdksdʒ dʒO' tsdʒ tsн 10%). ɻtdzfjɻ 'ɻнOdzqf нəO frjz tjtqɻнfrjsOə? ɻdzɻ ʕOts tsfrjdksəOLOdzfrjsz tjOtaOdʒjlsOtaOLOнtdzdqf ʕtdzgнɻdШ qf dʒjlstsнɻ.

ʂOts tjtqdʒjtc, tjOtaOdʒjlstqf ʕts'qf frjɻ taOdzqftaO'lz əqfh ɻ tsн 50% frjz tjtqfʕOLOdzqf lz ʊOвɻdzO5 ï t ɻLzdzsOlsqfШ OLɻ ϕ нјdШ qf qfrjstaO>lqəO' O frO tsujdksdʒəɻ<tsdʒtsн 50%.

### Табела 5 – Резултати фазе А делфи истраживања са оцеом већом од 50%

| No | Value Parameters | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total out of 12 participants | % of experts | No | Value Parameters | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total out of 12 participants | % of experts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | | | | **Critical Success Factors – "hard value" parameters** | | | | |
| | 1. Maximize business effectiveness | | | | | | 1. Scope | | | | |
| **1** | Staff satisfaction | 2 | 5 | 7 | 58% | **14** | Clarity of contract | 3 | 4 | 7 | 58% |
| **2** | Operating costs per head | 3 | 4 | 7 | 58% | **15** | Effective preplanning | 4 | 3 | 7 | 58% |
| **3** | Revenue per unit area | 4 | 3 | 7 | 58% | | 2. Time | | | | |
| | 2. Ensure effective project management and delivery | | | | | **16** | Project time constraints | 3 | 4 | 7 | 58% |
| **4** | Industry Best Practice | 3 | 4 | 7 | 58% | **17** | Constraint by government regulations | 4 | 3 | 7 | 58% |
| **5** | Project Management Guidelines -Gateway Review | 2 | 4 | 6 | 50% | | 3. Cost | | | | |
| | 3. Achieve the required financial performance | | | | | **18** | Rapid decision making | 0 | 0 | 0 | 0% |
| **6** | Capital Cost | 4 | 4 | 8 | 67% | **19** | Cash flow certainty | 0 | 0 | 0 | 0% |
| **7** | Payback | 3 | 5 | 8 | 67% | | 4. Quality | | | | |
| | 4. Minimize building operation and maintenance costs, and environmental impact | | | | | **20** | Material quality | 0 | 0 | 0 | 0% |
| **8** | BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) | 2 | 4 | 6 | 50% | **21** | Construction quality plan | 0 | 0 | 0 | 0% |
| **9** | Annual cost of heating, cooling and lighting | 2 | 4 | 6 | 50% | | 5. Contract/admin | | | | |
| | 5. Impact positively on the location of the facility | | | | | **22** | City planning regulations | 0 | 0 | 0 | 0% |
| **10** | Company image | 2 | 5 | 7 | 58% | | 6. Human resource | | | | |
| **11** | Design awards | 2 | 4 | 6 | 50% | **23** | Team communication | 0 | 0 | 0 | 0% |
| | 6. Comply with third party requirements | | | | | **24** | Leadership/team management | 0 | 0 | 0 | 0% |
| **12** | Planning approval | 3 | 5 | 8 | 67% | | 7. Risk | | | | |
| **13** | Public survey | 3 | 4 | 7 | 58% | **25** | Risk identification | 0 | 0 | 0 | 0% |
| | | | | | | **26** | Risk mngmt techniques | 0 | 0 | 0 | 0% |
| | | | | | | | 8. Health and safety | | | | |
| | | | | | | **27** | Management of work safety on site | 0 | 0 | 0 | 0% |

ʉəqf tsнdtsststqf frjʕtzfj? ɻdzqf frjz lz tdtsʕlz tsн нɻfrjɻls нOdzO tsн нOdzO frjdzO' O tjtsujlsdksgs lzfjqflsdzqfʕOLOШ OLlz ϕ.

### 5.5. Results of Delphi Stage B: Ranking larger than 50%

The first round questionnaire was sent to 27 experts (the 50% response rate) and 58 (10% response rate) were sent the second round questionnaire. The experts were asked to rate the importance of each criterion on a scale of 1 to 6 (1 being the most important and 6 being the least important).

Table 5.1: Sample Questionnaire Delphi Stage B (Results of Delphi Stage B: Ranking larger than 50%) were sent to the experts, the experts were asked to rate the importance of each criterion on a scale of 1 to 6 (1 being the most important and 6 being the least important). The results are presented in Table 5.2.

#### 5.5.1. Results of Delphi Stage B: Ranking larger than 50%

Table 5.2: Results of Delphi Stage B: Ranking larger than 50% (Results of Delphi Stage B: Ranking larger than 50%) were presented to the experts for the second round of the Delphi study. The experts were asked to rate the importance of each criterion on a scale of 1 to 6 (1 being the most important and 6 being the least important). The results are presented in Table 5.3.

Table 5.3: Results of Delphi Stage B: Ranking between 10% and 50% (Results of Delphi Stage B: Ranking between 10% and 50%) were presented to the experts for the second round of the Delphi study. The experts were asked to rate the importance of each criterion on a scale of 1 to 6 (1 being the most important and 6 being the least important). The results are presented in Table 5.4.

υ ιΟ?ˆ lzυ‰lz, dzƒfrjsΟtsн 52 tƒΟtœΟdzjlstœΟ'j frjzdzƒtœΟdz‰ frjstdsƒtœΟdz‰ lz нθj cdz‰θdzj cdzfƒj (tƒΟtœΟdzjlstœƒ dzjς†ƒ¬ θtœjнdz‰frjsƒ ï tƒΟtœΟdzjlstœƒ θtœjнdz‰frjsƒ ƒ tƒΟtœΟdzjlstœƒ lsθtœнƒ¬ θtœjнdz‰frjsƒ ï ς†tœƒlsƒυdz‰ ™Οςlststœƒ lzfrjj¬Ο) ƒ 14 (6 + 8) tƒtslsςΟlsjcststœƒ'Ο ς†ts'j fnjj tƒtœjdz‰frjj lz lstœj<j ς†tsdzs нjdž ƒ dzjlstsнj. ∫ dz‰ frjz dz‰θdzjнjdz‰ lz‰ tœƒdzsdz 2.2 ï υΟвjdz‰Ο 08 ï Results of Delphi Stage B ï Parameters with more than 60% agreement (tjιlzdzsΟlsƒ™ΟLj ɹ нjdž ƒ ƒfrjstœΟ›ƒθΟ' ΟfrjΟfrjΟcdz‰frjdz‰sh <lzθj<tsdztsн 60%).

ɻtœΟdz‰ƒυΟ tsн 60 tsнfrjsts 'j ƒιΟвtœΟdz‰θ dz‰θ tsfrjdzsolz tƒtœjls¬tsнdz‰¬ ƒfrjstœΟ›ƒθΟ' Ο. Seagle and Iverson (2002) dz‰θƒtsdzƒς lz нΟ 'j frjΟcdz‰frjdz‰sfrjs tƒts dzj‰ς†tsdztƒƒlsΟ' lz tƒtsfrjsƒcdz‰dzsΟ ς†ts 'j dz‰θ'dzΟ' j 60% ƒfrjƒƒlsΟcdz‰ƒς†Οвƒcdzs lz frjΟcdz‰frj'lz ƒ Ο‰ts 'j ς†tsdzвƒcdz‰sθΟcdz‰ƒ tœjιlzdzsΟlslzh Οts lz tsƒfrjjгĂ¶rjdzθ›jjdztfrjjñƒcdzƒ Ădzj frjdzθ›jjdztfrjjñ Gracht (2012) lsts tƒtslsotœ lz'j.

ɻ ΟtœΟdzjlstœƒ ς†ts'ƒ frjz нtsвƒcdzƒ ƒfrjƒtsн 60% frjΟcdz‰frjdz‰sfrjsƒ lz ς†Οlsjcststœƒ'ƒ Ăθjtsdz†Ο θΟ›jdz‰ñ ƒcdzƒ Ăθ›jdz‰ñ lzς†dzs' jdz‰ƒ frjz ƒιL lstœj<jгς†tsdzθнjdž ƒ ƒfrjstœΟ›ƒθΟ' Ο. şΟts tƒtœƒdzjtœιlΟlsts, tƒtœƒς†ΟL Οdz‰ƒ frjz tƒΟtœΟdzjlstœƒ ς†ts'ƒ frjz нtsвƒcdzƒ ƒfrjƒtsн 60% frjΟcdz‰frjdz‰sfrjsƒ lz υΟвjdz‰θ 6 ï t jιlzdzsΟlsƒ™ΟLj ɹ нjdž ƒ ƒfrjstœΟ›ƒθΟ' ΟfrjΟfrjΟcdz‰frjdz‰sh <lzθj<tsdztsн 60%.

### Табела 6 – Резултати фазе Б делфи истраживања са сагласношћу већом од 60%

| Par. No | Value Parameters - "soft value" parameter | % agreement of experts | Par. No | Critical success factors – "hard value" parameters | % agreement of experts |
|---|---|---|---|---|---|
| 1. | 1. Maximize business effectiveness | | 1. | 1. Scope | |
| 1.1 | Staff satisfaction | 100% | 1.1 | Clarity of contract | 100% |
| 1.2 | Operating costs per head | 92% | 1.2 | Effective preplanning | 100% |
| 1.3 | Productivity per employee | 83% | 1.3 | Project levels of decision making | 100% |
| 1.4 | Number of complaints | 75% | 1.4 | Understanding of project requirements | 75% |
| 1.5 | Revenue per unit area | 67% | 2. | 2. Time | |
| 2. | 2. Ensure effective project management and delivery | | 2.1 | Project time constraints | 100% |
| 2.1 | Industry Best Practice | 100% | 2.2 | Constraint by government regulations | 100% |
| 2.2 | Construction Industry Standard KPIs | 83% | 2.3 | Rapid decision making | 92% |
| 2.3 | Project Management Guidelines ï Gateway Review | 75% | 2.4 | Overrun duration | 83% |
| 3. | 3. Achieve the required financial performance | | 2.5 | Adequacy of time | 67% |
| 3.1 | Capital Cost | 100% | 3. | 3. Cost | |
| 3.2 | Payback | 100% | 3.1 | Rapid decision making | 100% |
| 3.3 | Whole-life Cost | 92% | 3.2 | Cash flow certainty | 100% |
| 3.4 | Building operating and maintenance cost | 75% | 3.3 | Precise project budget estimate | 92% |
| 4. | 4. Minimize building operation and maintenance costs, and environmental impact | | 3.4 | Over budget possibility | 83% |
| 4.1 | Annual cost of heating, cooling and lighting | 100% | 4. | 4. Quality | |
| 4.2 | Annual cost of cleaning and maintenance | 92% | 4.1 | Material quality | 100% |
| 4.3 | Frequency of periodic maintenance | 92% | 4.2 | Construction quality plan | 100% |
| 5. | 5. Impact positively on the location of the facility | | 4.3 | Contracted work quality | 92% |

| Par. No | Value Parameters - "soft value" parameter | % agreement of experts | Par. No | Critical success factors – "hard value" parameters | % agreement of experts |
|---|---|---|---|---|---|
| 5.1 | Company image | 92% | 5. | 5. Contract/admin | |
| 5.2 | Views of local planning authority | 92% | 5.1 | City planning regulations | 92% |
| 5.3 | Public or private survey results | 58% | 5.2 | Mutual/trusting relationships | 92% |
| 6. | 6. Comply with third party requirements | | 6. | 6. Human resource | |
| 6.1 | Planning approval | 100% | 6.1 | Team communication | 100% |
| 6.2 | Public survey | 92% | 6.2 | Leadership/team management | 100% |
| | | | 6.3 | Motivation for project | 92% |
| | | | 6.4 | Monitoring and feedback | 67% |
| | | | 6.5 | Skilled personnel | 58% |
| | | | 7. | 7. Risk | |
| | | | 7.1 | Risk identification | 100% |
| | | | 7.2 | Risk response | 92% |
| | | | 7.3 | Coordination with subcontractors | 92% |
| | | | 7.4 | Risk management techniques | 83% |
| | | | 7.5 | Financial stability of client | 67% |
| | | | 8. | 8. Health and safety | |
| | | | 8.1 | Management of work safety on site | 100% |
| | | | 8.2 | Hazard identification | 100% |
| | | | 8.3 | Health and safety records | 83% |
| | | | 8.4 | Management responsibility | 67% |

ϟ tscdbsots, вqfdbs 'j tftslstqjвdbs ts^ts нjfmjls нOdb нO fmj tsнdtsotstaf qfmfjfqlsOdbq^O tftaq^ztfjf tflzlsjdzjdzj^lstdtsdbm^j tftsh lsj.

### 5.6. υtqj<q ^tdzg нjdW q dzjlstsнj: j^fmfjftdsq нjW qfdbqh lz lsqftffm^j W O^lststqj (*utility factors*)

υ qfmjstaO>lqeO^ lz lzfqflsdbq^O нtdzgtsg^tdzgO нjdW q dzjlstsнj lzmjsOdbsoʔ jdbs 'j нO fmjz нtsвq'jdbq tfOtaOdzjlstaq вqfdbq нtsotsʔ dbs нtsfmpdzjндbq. 80% fmjstdzu{ O^O qfdbq eqh j lzfmjOadbOfmjfqfdbs fmj нO'j 41 tfOtaOdzjlsOtaqL ^tsdzjfdzjlsdzj dbqfmjsj tfOtaOdzjlsOtaO ejtsdzjO eO>lOdbz qfdbq eO>lOdbzϱ O lstqj<q ^tdzg^lzfqflsdbq^O, 52 tfOtaOdzjlsOtaO, LO ^ts'j 'j нOdbs fmjOadbOfmpbsfmjs 60% fmjstdzu{ O^O qfdbq eqh j, qfmjfqflsOdbs'j lz lstqj<ts'W OLq нjdW q qfmjstaO>lqeO^ O.

υ ϟ taqfdbsdz 3.1 ï Sample Questionnaire Delphi Stage C (υLstaO^ lzfqflsdbq^O W OLj Λ нjdW q qfmjstaO>lqeO^ O) tftqjнfmjsOeʔ jdz 'j lzLstaO^ lzfqflsdbq^O. ulstdzu{ OupqfmjzLOdjtsʔ jdbq нO tftdtsujdzj lzfmjfjh dbsfmjs fmpO^tsg^tfOtaOdzjlstaO etqjндbsfmjsq tftsfmjsOeʔ O^ jdz tqjLzdbsOlsO tsн 10 (dbOdzO^ j tftsotsʔ dbq) нts 110 (dbO'tftsotsʔ dbq'q) нO вq tfts^OLOdbq tftsнtsвdbsfmjsq fmpO^tsg^tfOtaOdzjlstaO lz tsнdbsfmjz dbO lsqtffm^qW O^lststa. ϱ lzdbO fmj jdbzqdzqdbqh j ^O^ts вq fmj qLвjdbj dzjtsdz<j dbjtaOedbslsjxj. ϟ tstqj'jς O taOнq, tftqjlsftsfmjsOeʔ jdbO 'j ejdbzquqdbO tqjW jtqjdbsdbq[-lsqtffm^q[-W O^lststaO(W O^lststaO tsв'j^lsO):

- tftsfmpbzsodbq tftdtsfmjststc(^OdbzjdbOtaq'O) ï ejq<q tsн 10.000 m2,
- fmjsOdbвjdbq tftdtsfmjststc(fmjsOdbsoq) ï ejq<q tsн 10.000 m2 / 100 fmjsOdbsoO,

- Ctslsjdzf ï ejf<qf tsH 200 fmjsaO;
- lstc>ldzfujdbstcqf ï ejf<qf tsH 80.000 m2 / 200 LOCtzfJOuO.

U tftcqfdzupqftfIz, dzjsqdz fmjl qfmfJqflsqfeOlsqf qf Htdzrcjl etcfmjsjl qfLctcO>Hr jf. Jtsvjf<O dbsqdqCO Iz qfLBtstdz tseqfC tfJOtcOdzjlsOtcO 'jfmjsjl HOtsdzfq, tftcjldzjO qfmfqtzfmjseIz qtsdzfJOdzfq'jf LOIzftcOe? Or jf tftcts'jfqlsqfdzjO, upqfdzfe ejf<qfdbz ctcO jfeqfdbfjqfC lsqftftseO Iz tcjlcqftsdbz LOfJOHdbsr J OdbCOdbO uOCeqf tftcts'jfqlsqf <jf fmjl dbCh jf dbsupqftcOlsqf tcOHqf lsjfmjsqftcOr OdbsCOdbdbsr LdbO, Htsq <jf fmjl lsOCeqf fmjsjujdbfq dbsCOdbdbfq tftcOdzjlstcqf etcjlHdbsfmjsqf dbCh jf tftcqfdzjldbflsqf Iz BIzHIz<qfdzj qfmfJstcO>lqfeOr qfdzjO.

### 5.6.1. tjfLIzdbsOlsqf qfOdbCdbzfLO

UtcO jfdbO'jf OdbCdbzfLOHeOdbCjfmjsHtseqf'jfdbfC IzfJqflsdbfqCOIz qts'qfdzjO'jf qfLtcOuIzdbCls Ofmjcjl HO etcjlHdbsfmjs lsqftfJmqtsr WOCJststcO qfL fmjlsO tfJOtcOdzjlsOtcO. l OtcOdzjlstcqf etcjlHdbsfmjsqf fmIz qfLdzjitcjdbfq qtstcqfh <jfr jfdzj tcjlIzdbsOlsO qfLdzj' Iz 10 qf 110, eHjf 10 tftcjlHfmjsOe? O Ädbfmfqtz tftsHtseqdbsfmjsñ, O 110 tftcjlHfmjsOe? O Ävqfmfjsqtz tftsHtseqdbsfmjsñ fmpOCtsr lsqftfJO tseqjf qtslsO Iz tsHdbsfmjz dbCfmpOCqf tfJOtcOdzjlsOtc.

f OBqf fmjl HtseqfdbzfdzjitcOHtsfmpbzjHdbsfmjsqf, tftcqfdzjr jfdz'jf fmjsOlsqfmjsqfuqf lsjfmjsqts'qf IzC? IzuIz'jf tseitcOuIzdbz qtsjW qfuqf'jfdbsO fmJcdbCfmpdbsfmjsqf (W) LO lsqftfJmqjf W OCJststcqj qts'jf fmIz HOdbf fmjstdzuf OufqtstcqfmjsjqfeajitcLqf'Iz 19 tcOuIzdbCdcfmqtsr tfJOCjlsO SPSS. *Kendall's W* (tftsLdbCls qf qOts qjfdbwOdbzse qtsjW qfuqf'jfdbs fmJcdbCfmpdbsfmjsqf) 'jfmjsjl dbjtfJOtcOdzjlsOtcfmqCO fmjsOlsqfmjsqfuqCO dzjlstsHO. UtS 'jf dbstcdzJOdbfLOufq'O fmjsOlsqfmjsqfqjf ∧tcqfHdzJOdbseotsr (Friedman) lsjfmjsO qfdzjs>ljf fmjl qtstcqfmjsqlsqf LO tftcqtsujfdbz fmJcdbCfmpdbsfmjsqf qfLdzj' Iz tsujq qfeOuO. qjfdwOdbse qtsjW qfuqf'jfdbs qtcj<jf fmjl tsH 0 (dbjdzJO fmJcdbCfmpdbsfmjsqf) Hts 1 (tftslstfJzdbC fmJcdbCfmpdbsfmjs). f tsq lsjfmjstseqf qts'qf qtstcqfmjsjl fmjsOdbwOtcHdbf l qftcfmjsdbse (Pearson) qtsjW qfuqf'jfdbs qtstcqjdbOufq'jf dbstcdzJOdbdbs tftcjlstftsfmjsOe? Or Iz tcOfmJftstcqj' jfdbf etcjlHdbsfmjsqf qf IzfJtstcqj' Iz'IzHeOdbfLOqfmJtsHO qfmjstse tcqjdzjfdbs, tseOr qtsjW qfuqf'jfdbsdbf HO'jf dbfqCOCeajf tftcqjlstftsfmjsOeqjf Iz tftsdbjHIztftcqftdsHjf HqfmjstcqfvIzufq'jf ejftdseOlsdbs<jf qf dzjs>ljf HOtsvtcOHqf vqfdbs qts'qf vtdbs' tcOLdzfuqflsqfC qfmJtsHO. W fmjl dzfqdjCtcdbs tsHdbsfmpqf dbO fmjcjHr Iz etcjlHdbsfmjs ytfqftcdzJOdbseotsr (Spearman) tcOdbO qtsjW qfuqf'jfdbClsO qtstcqjdbOufq'jf qfLdzj' Iz fmpqfC tfJOtdseO dbO tcOdbr dzffmjsqf tftcqjqts qts'qfC fmjl tsvtcOuIzdbCeO. qstcqfh <jfdbO fmIzeqfh jfmjstdzqCOtftstcqj' jfr OfmpqfC tfJOtdseO.

U l tcqfdbsdz 3.2 ï UOvjdbO 09 ï Results of Delphi Stage C ï Kendallôs W and Asymptotic Significance (tjfLIzdbsOlsqf W Oljf ∧ Hjfdb qf qffmjstcO>lqfeOr O ï qjfdwOdbse

ς-tsϳ₩ cʼuρcʻϳ·dd‰W c[ O·fnϳ[·dϳ§[lstslsfnϳ§·c[ ι·dd‰Ouρ·O°) dd‰Oe·jнϳ·dd‰[ frϳz tc¤jιlzdd‰Olsc[ tsн frϳstα·Odϳ¤ fne·O-tsς ϳ·ς-fnϳ§[ϳ·tdsO (1-12) c[ tϳtαc[ς-Oι·O·dd‰[ frϳz tϳts tϳ·Oα·Odϳ¤jlstdz. υc[tϳfnϳ§·c[ ₩ O-lststαc[ 49 tϳ·Oα·Odϳ¤jlsO·tα·O tϳts-ς-Oι·O·dz[ frϳz нtsetsʔ dd‰z нtsfnϳ¤jнdd‰fnϳs dd‰‰ 0,05 dd‰eotsz ι·dd‰Ouρ·O°O c[dz[ dϳ§O° ϳ. t O·dd‰ʻO c[fnϳstα·O»ι c[eO° O tϳtc¤jнdz·O»ιlz tsetstsdα·Odd‰cʼuϳς ϳ ς-tsʻϳ ʻϳ tϳtslsetαнc[ts c[ Gracht (2012). υ ł tαc[dd‰sdz 3.2 ï υ·Oвϳdz‰ 10 ï Results of Delphi Stage C ï Parameters and Utility Factors (t ϳ·ιlzdd‰Olsc[ ₩ O·ϳ ʌ нϳdd‰ c[ c[fnϳstα·O»ι c[eO° Oï tϳ·Oα·Odϳ¤jlstαc[ c[ lsc[tϳfnϳ§·c[ ₩ O-lststαc[) fn·Odϳ¤slstαc[ tϳ·Oα·Odϳ¤jlstα·O tϳts-ς-Oι·O·dz·O frϳz ι·dd‰Ouρ·O° ς-ts'c[ ʻϳ вc[tsdϳ§O° c[ tsн 0,05: tsвϳ·ιвϳ' c[eO° ϳ ϳ₩ ϳ·ς-lsc[ed‰‰sG lzftα·Oe? O° O tϳtdts'ϳ·ς-lstscdϳ c[ tc¤jOdz[ι·Ouρ·cʻO (frϳs·Odd‰Oα·Oн lz d‰·O° ϳ·ed·cdd‰§-ts' c[dd‰‰lzfnϳstαc[ʻc[ KPIs), tϳtsfnϳsc[ι·O° ϳ tϳtslstc¤jвdϳ¤ ₩ c[dd‰·Odd‰pʻfnϳ§·ϳ tc¤jOdz[ι·Ouρ·cʻϳ (lstdsʰ ς-tse·c[ »c[eotslsdd‰sG ucʻς-dzzfn·O) c[ O·нdϳ§c[dd‰fnϳstαc[tα·O° ϳ tϳtdts'ϳ·ς-lstscdϳ (lzdα·Odd‰fnϳsc[uς-c[ tϳtdtstϳc[fnϳ[). ┌e·O fnϳstdzu{ O-ς-O frϳz ι·dd‰·Olsdd‰s dd‰»ϳ tsuϳ·dd‰[dz[ tϳ·Oα·Odϳ¤jlsO·tc frϳsO·dd‰Oα·Oн lz d‰·O° ϳ·ed·cdd‰§-ts' c[dd‰‰lzfnϳstαc[ʻc[ KPIs tsн tsfnϳsOdz[┌ fnϳstdzu{ O-ς-O (20 нts 40 ι·Oe·c[fnϳ[·dd‰s ʻϳ tsн lsc[tϳfnϳ§tsG ₩ O-lststα·O) lz tsн·dd‰sfnϳz dd‰ tϳtdtsfnϳς- 60,83 нts 72,50. ş·O·н·O frϳz ls·O нe·O fnϳstdzu{ O-ς-O c[dd‰ϳ·tαeʻlzc[fn·Odd‰, н·Odz[ frϳz tsвʻO·ʰ ς-ϳς-ϳ нO dd‰ʻϳ·нO·dz·fnϳs·Odd‰Oα·Oн KPI dd‰ʻϳ ς-tstαc[ʰ <ϳ·dz·lz ι·ϳ·dϳ§ O·dϳ§O lz tc¤jα·c[tsdd‰z c[ ι·вtsG lstsα·O tse·O° tϳ·Oα·Odϳ¤jls·Oι·c dd‰ʻϳ·ϳ dϳ§dd‰sdts вc[ls·Odz·ϳ fnϳs·Ols·O-ς-dd‰tϳ·ϳ e·O ʻϳ·ϳ c[tϳ·O-ς- fnϳ§·Olstα·Ots e·O»ι dd‰‰c[dϳ§ ₩ O-lststdtsdϳ§ ls·O-ς-ts нO ʻϳ·ϳ c[ нO° ϳ·ϳ вc[dd‰s dd‰¤fnϳd‰·Oe° O lz tsuϳς- c[eO° lz. ɿ O нtdz·Oα·O нe·O tϳ·Oα·Odϳ¤jlstα·O dd‰¤ dϳ§»ϳ·ϳ fnϳ¤ lztsuϳ[ls·c[ tsвtα·OL·Ou, ls·O-ς-ts нO <ϳ·ι·O-ς-? lzuρ·O-ς- ι·Oe·c[fnϳ[ls·c[ tsн fnϳd‰zuρ·O·O. t ϳ·ιlzdd‰s·Olsc[ tse·ϳ ₩ O·ϳ·¤ frϳz tϳtcϳ·нfnϳs·Oe? ϳ·dd‰[ lz υ·Oвϳ·dd‰·O 7 ï t ϳ·ιlzdd‰s·Olsc[ ₩ O·ϳ ʌ нϳdd‰ c[ c[fnϳstα·O»ι c[eO° O ï tϳ·Oα·Odϳ¤jlstαc[ c[ lsc[tϳfnϳ§·c[ ₩ O-lststαc[, ş·ϳ·dd‰‰Odd‰se ς-tsϳ₩ cʼuρcʻϳ·dd‰sW c[ O·fnϳ[·dϳ§[lstslsfnϳ§·c[ ι·dd‰Ouρ·cʻï frϳzdϳ§·Oα·Odd‰[ tϳtc¤jα·dd‰нdϳ¤.

**Табела 7 – Резултати фазе Ц делфи истраживања – параметри и типски фактори, Кендалов коефицијент W и асимптотски значај – сумарни преглед**

| | Типски фактори | | | | | | | Типски фактори | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Параметри вредности** | ς-tsc¤jα·c[ʻfnϳ·Odd‰ (ς-Oα·Odd‰ϳ·dd‰[ʻ) | t ϳ·ιlzdd‰s·Olsc[ (ϕ tϳ·Oα·Odϳ¤jlstdz) | ₩tstsϳ·dd‰[ | z tsϳ·c[dd‰z dϳ§·dd‰tsse·c[ | Kendall's W | ϕ fnϳ·dϳ§[lstslsfnϳ§·c[ ι·dd‰Ouρ·O° | **Критични Фактори Успеха** | ς-tsc¤jα·c[ʻfnϳ·Odd‰ (ς-Oα·Odd‰ϳ·dd‰[ʻ) | t ϳ·ιlzdd‰s·Olsc[ (ϕ tϳ·Oα·Odϳ¤jlstdz) | ₩tstsϳ·dd‰[ | z tsϳ·c[dd‰z dϳ§·dd‰tsse·c[ | Kendall's W | ϕ fnϳ·dϳ§[lstslsfnϳ§·c[ ι·dd‰Ouρ·O° |
| 1. | | | | | | | 1. | | | | | | |
| 1.1 | 91.67 | 41.67 | 73.33 | 65.00 | 0.554 | 0.000 | 1.1 | 75.83 | 77.50 | 90.83 | 77.50 | 0.278 | 0.018 |
| 1.2 | 92.50 | 47.50 | 67.50 | 73.33 | 0.820 | 0.000 | 1.2 | 70.83 | 71.67 | 94.17 | 89.17 | 0.526 | 0.000 |
| 1.3 | 85.83 | 45.00 | 71.67 | 68.33 | 0.685 | 0.000 | 1.3 | 76.67 | 57.50 | 93.33 | 90.00 | 0.728 | 0.000 |
| 1.4 | 73.33 | 83.33 | 90.00 | 60.83 | 0.636 | 0.000 | 1.4 | 83.33 | 65.83 | 95.83 | 93.33 | 0.771 | 0.000 |
| 1.5 | 71.67 | 74.17 | 95.00 | 76.67 | 0.343 | 0.006 | 2. | | | | | | |
| 2. | | | | | | | 2.1 | 73.33 | 86.67 | 86.67 | 94.17 | 0.327 | 0.008 |
| 2.1 | 70.83 | 68.33 | 90.00 | 87.50 | 0.491 | 0.001 | 2.2 | 65.83 | 80.00 | 81.67 | 88.33 | 0.409 | 0.002 |
| 2.2 | 60.83 | 69.17 | 72.50 | 64.17 | 0.116 | 0.243 | 2.3 | 68.33 | 80.00 | 88.33 | 81.67 | 0.370 | 0.004 |
| 2.3 | 65.83 | 54.17 | 85.00 | 80.00 | 0.611 | 0.000 | 2.4 | 65.00 | 73.33 | 87.50 | 78.33 | 0.419 | 0.002 |

| | Типски фактори | | | | | | | Типски фактори | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Параметри вредности | sтстзjтеаqfсоаеоqfjz) (ссоаqfсоаеоqfjz) | tjzцfнjdqfсоаеоqfjz) (фjfсоаеоqfjz) | wtstsjdqf | z_tsfjqdqfs dqstsqfsoq | Kendall`s W | фfnjcfjfjlstsfjfcfjq lqfeoсЎ | Критични Фактори Успеха | sтстзjтеаqfсоаеоqfjz) (ссоаqfсоаеоqfjz) | tjzцfнjdqfсоаеоqfjz) (фjfсоаеоqfjz) | wtstsjdqf | z_tsfjqdqfs dqstsqfsoq | Kendall`s W | фfnjcfjfjlstsfjfcfjq lqfeoсЎ |
| 3. | | | | | | | 2.5 | 62.50 | 68.33 | 88.33 | 79.17 | 0.571 | 0.000 |
| 3.1 | 88.33 | 91.67 | 69.17 | 86.67 | 0.327 | 0.008 | 3. | | | | | | |
| 3.2 | 74.17 | 83.33 | 67.50 | 79.17 | 0.028 | 0.018 | 3.1 | 68.33 | 80.00 | 79.17 | 90.83 | 0.378 | 0.003 |
| 3.3 | 80.83 | 72.50 | 80.83 | 70.83 | 0.083 | 0.392 | 3.2 | 76.67 | 92.50 | 84.17 | 82.50 | 0.258 | 0.026 |
| 3.4 | 79.17 | 55.00 | 90.83 | 75.83 | 0.587 | 0.000 | 3.3 | 94.17 | 77.50 | 84.17 | 91.67 | 0.344 | 0.006 |
| 4. | | | | | | | 3.4 | 80.83 | 57.50 | 79.17 | 83.33 | 0.488 | 0.001 |
| 4.1 | 86.67 | 65.00 | 91.67 | 79.17 | 0.454 | 0.001 | 4. | | | | | | |
| 4.2 | 75.83 | 54.17 | 81.67 | 79.17 | 0.423 | 0.002 | 4.1 | 80.00 | 69.17 | 90.83 | 76.67 | 0.332 | 0.007 |
| 4.3 | 74.17 | 52.50 | 87.50 | 82.50 | 0.680 | 0.000 | 4.2 | 67.50 | 75.83 | 92.50 | 86.67 | 0.533 | 0.000 |
| 5. | | | | | | | 4.3 | 75.00 | 81.67 | 94.17 | 90.83 | 0.606 | 0.000 |
| 5.1 | 72.50 | 52.50 | 84.17 | 65.00 | 0.550 | 0.000 | 5. | | | | | | |
| 5.2 | 65.00 | 81.67 | 76.67 | 70.83 | 0.238 | 0.035 | 5.1 | 75.83 | 81.67 | 73.33 | 81.67 | 0.054 | 0.583 |
| 5.3 | 73.33 | 53.33 | 77.50 | 69.17 | 0.386 | 0.003 | 5.2 | 61.67 | 70.00 | 85.00 | 76.67 | 0.516 | 0.000 |
| 6. | | | | | | | 6. | | | | | | |
| 6.1 | 70.83 | 81.67 | 88.33 | 80.83 | 0.266 | 0.022 | 6.1 | 78.33 | 67.50 | 93.33 | 90.83 | 0.666 | 0.000 |
| 6.2 | 55.83 | 67.50 | 78.33 | 80.83 | 0.413 | 0.002 | 6.2 | 68.33 | 77.50 | 90.00 | 80.00 | 0.494 | 0.000 |
| | | | | | | | 6.3 | 69.17 | 56.67 | 85.83 | 85.83 | 0.636 | 0.000 |
| | | | | | | | 6.4 | 60.83 | 69.17 | 90.83 | 80.00 | 0.645 | 0.000 |
| | | | | | | | 6.5 | 72.50 | 63.33 | 90.00 | 88.33 | 0.424 | 0.002 |
| | | | | | | | 7. | | | | | | |
| | | | | | | | 7.1 | 82.50 | 62.50 | 95.83 | 89.17 | 0.652 | 0.000 |
| | | | | | | | 7.2 | 75.00 | 68.33 | 95.00 | 91.67 | 0.683 | 0.000 |
| | | | | | | | 7.3 | 65.83 | 72.50 | 93.33 | 82.50 | 0.663 | 0.000 |
| | | | | | | | 7.4 | 68.33 | 56.67 | 83.33 | 77.50 | 0.508 | 0.000 |
| | | | | | | | 7.5 | 67.50 | 84.17 | 78.33 | 86.67 | 0.376 | 0.004 |
| | | | | | | | 8. | | | | | | |
| | | | | | | | 8.1 | 78.33 | 83.33 | 95.83 | 89.17 | 0.414 | 0.002 |
| | | | | | | | 8.2 | 70.00 | 78.33 | 88.33 | 82.50 | 0.303 | 0.012 |
| | | | | | | | 8.3 | 55.00 | 72.50 | 65.00 | 69.17 | 0.346 | 0.006 |
| | | | | | | | 8.4 | 62.50 | 79.17 | 74.17 | 72.50 | 0.324 | 0.009 |

ыэоf tsнdtsэtstaf frjz tjtaqfSlzfj? jdzf lz tdtsSlz tsн fnjнOdзнOdzЭ tsн fnjzO Olzjfqlsdzf§OлOW Olz

ѵ.

### 5.7. Yjlsэtdlsf§tdzгнjdzW qfdzjlstsнj:W qfdzstaqftaOf jlsqtjfrfSqfPW O§lststaO(*utility factors*)

U ujlsэtdlstsdз qf tjtsfnpzjнs jdз §tdzгdz нjdzW qf dzjlstsнj, лO fnэqfP 12 frjstdzu{ O§O tsвjлвj'jdzЭ 'j lsOвjdzO лO tsujs qfэOf j §ts'O tjtsSOlz'j tjtaэtsвqlsdzs нtsfrjsOэ? jdzs tsujs qfэOf j qfs qPtsэtsÄjftatsfnjuqdzsñtsujs qfэOf j lsqtjfrfSqfPW O§lststaO1tsнj? jdzs 'j 12 lzjfqlsdzf§O frjO taOldzfuqflsqfdз frjOнtэsIOjdз ulstdzu{ Ouqf frjz лOdзs? jdzf нO lzdzjfrjz ÄjftajqfrjjfqlsOdzsñ tsujs qfэOf j lz W qfdzЭdzdzz lsOвjdzz lz§tsdzjf§ts 'j tsdzЭ нtdzгOuqf'O tsн s qPtsэtsг qfrjjfqlsqfэOf O qfл lstaj<jдг§tdzгO. ыэj tsэts 'j tjtaqf§OlOdzs lz1taqfdzsdz 4.1 ï Sample Questionnaire Delphi Stage D (uлtstaO§ lzjfqlsdzf§O W Olj r нjdzW qf qfrjstaO1qfэOf O), gнj 'j tjtaqf§OlOdz, lztstaO§ lzjfqlsdzf§O §ts'qf 'j tjtsfnpzЭs 'jнdzsdз tsн frjstdzu{ O§O.

5.7.1. Ţ ĵ ĿĿżdţsĊlsƈ ƈ Ċdţ̊ĊdżƈĿĊ

Ĵ ĵ <ƈdż̊ frĵstœżu{ ĊƬĊ ʻĵ tĵtœĵ ƈfrĵĵƈ ƈlsĊdż̊ frpts'ĵ tsuĵ' ƈəĊʼ ĵ lsƈţĵfrĵƬƈƒ₩ ĊƬlststœĊ ƈĿ lstœĵ<ĵ ʻ Ƭœżœ Ċ ƈ lżdţ̊ż̊dżƈ frĵz ƈĿdţ̊ĵ̊dż̊ ĵ lz frpts'ƈdţ̊ʒ tœĵ ĿżdţsĊlsƈdţ̊Ċ υ ł tœƈdţsdz 4.2 ï υĊʙĵdż̊Ċ 11 ï Results of Delphi Stage D ï Kendalls W and Asymptotic Significance (Ţ ĵ ĿĿżdţsĊlsƈ ₩ Ċ.ĵ ŗ ʜĵdż̊₩ ƈ ƈfrĵstœĊ›ʅƈəʼ Ċ ï Ş ĵ dż̊ʍĊdţsə Ƭtsĵ₩ ƈ'uƈ'ĵ dţsW ƈ Ċfrpƈdţ̊ʒĵlststsfrƬƈ Ŀdţ̊ƀuƈʼ) ţĵtœƈƬƈĿĊdţ̊ƈ frĵz tœĵ ĿżdţsĊlsƈ Ƭts'ĵ ʻĵ dţ̊ƀoĵts frpĊƬƈ frĵstœżu{ ĊƬ (1ï 12) ƈ ţĵts ţĵĊtœĊdţ̊ʒĵlstœż. SPSS frĵs₩ lsəĵtœ frĵĵ ţĵtsdţsəts Ƭtstœƈfrĵsƈts ĿĊ ƈĿtœĊużdţ̊ƀəʼ ĵ Ş ĵ dż̊ʍĊdţsətsœƬtsĵ₩ ƈ'uƈ'ĵ dţsĊ frpĊdţ̊żdţ̊ʍdţsfrĵsƈ ƈ Ċfrpƈdţ̊ʒĵlststsfrƬtsœĿdţ̊ƀuĊʼĊ.

ϕ dţ̊ƀdżƈĿĊ frpĊdţ̊żdţ̊ʍdţsfrĵsƈ ţĵtsƬĊĿżʻĵ ʜĊ frĵĵ ʜtsfrpdţ̊ʒĵʜdţsfrĵs lż tœĊdţ̊ƀƈtœʼ lż lsƈţĵfrĵƬƈƒ₩ ĊƬlststœĊ tsʜ frĵstœĊdţ̊ʒĵ frĵstœżu{ ĊƬĊ lż tsʜdţsfrĵz dţ̊ƀ frpĊƬƈ ţĵĊtœĊdţ̊ʒĵlsĊtœ lżdţ̊żdţ̊ʍdţsdţ̊ʒţĵtsəts? ʰ Ċdţ̊ʼ lststsƬtsdţ̊ʒ ųĵĵlsətdststsœƬtsdţ̊ż. ʃ əƈ tœĵ ĿżdţsĊlsƈ frĵz ţĵtœƈƬƈĿĊdţ̊ƀ lż ł tœƈdţsdz 4.2 ï υĊʙĵdż̊Ċ 12 ï Results of Delphi Stage D ï Parameters and Utility Factors ï Summary (Ţ ĵ ĿĿżdţsĊlsƈ ₩ Ċ.ĵ ŗ ʜĵdż̊₩ ƈ ƈfrĵstœĊ›ʅƈəʼ Ċ ï ţĵĊtœĊdţ̊ʒĵlstœƈ ƈ lsƈţĵfrĵƬƈ ₩ ĊƬlststœƈ ï frĵzdţ̊ʒĊtœdţ̊ƀ ţĵtœĵ Ċdţĵʜ). ʜ Ċdţ̊ʒts lstœƈ ţĵĊtœĊdţ̊ʒĵlstœĊ frĵz frpţ̊ʒʼ ƈdż̊ frpĊdţ̊ʒdţ̊ʒƈĿƈtœʼ ĵ ĵ₩ ĵ Ƭlsƈəʼdţsfrĵsƈ ţĵtsfrpdţsəĊʼ Ċ (ĿĊ›ʜtsəts? frĵsəts ĿĊţĵtsfrpdţ̊ʒdţ̊ƀƬ ï ʙĵĿ ţĵtœtsdţ̊ʒĵdţ̊ʒ, ʙtœts' ţĵtœƈlszʅʙƈ ï frpţ̊ʒʼ ĵ ʻ ĵ 7,8%) ƈ SHE (łżƒţĵtœĊə? ʼ ĵ ŀŀ ţ dż̊ʼ œtœĊ›ʜƈdżƈʰ lsż ï 1,2% frpţ̊ʒʼ ĵ ʻ ĵ). ł tœĵ tsfrĵsĊdż̊ 49 ţĵĊtœĊdţ̊ʒĵlstœĊ frĵz frpĵ ţĵtsʙts? ʰ ĊdţĊ lż ţĵtsœdţ̊ʒĵʜlż frĵĊdż̊Ċfrpdţsfrĵsƈ, ʜ›ĵ frpĵ ţĵĊtœĊdţ̊ʒĵlsĊtœ Ş ĵ dż̊ʍĊdţsəts W ţĵtsʙts? ʰ Ċts tsʜ 0,61% dż̊ʼ 65,42%, Ċ frĵĊdţ̊ʒts ʻ ĵʜĊdţ̊ż ţĵĊtœĊdţ̊ʒĵlsĊtœ tsfrĵsəĊtœƈts ţĵtslstœĵʙĊdţ̊ż₩ ƈdż̊ʼdţ̊ƀƈ'frĵƬƈ lzuƈdż̊Ƭ (*Payback*) ƈ Ŀdţ̊ƀuƈʼdţsfrĵ ţĵtsʙts? ʰ Ċtsdż̊ 93,93%.

ł tsfrĵsƈdţsdţ̊ƀlsƈ ʞĵ ? ĵ dţ̊ƀƈ ₩ ƈdż̊ʼdţ̊ƀƈ'frĵƬƈ lzuƈdż̊Ƭ ţĵĊtœĊdţ̊ʒĵlstœĊ (lstœts' Ƭtsəƈ ʞƈəʼtslsdţsœ ųƈƬƈdţzfrpĊ), Ƭts'ƈ lz ţĵtœĵ lsƒtsʜĊdţsdţ̊ʒ Ƭtœżdz dţ̊ƀ'ĵ lzfrĵĵ ĵ ts ʜĊ frĵĵ ƬəĊdţ̊₩ ƈƬlz'ĵ Ŀʙtsœ dţ̊ƀfrĵƬtsœ Ċfrpƈdţ̊ʒĵlststsfrĵƬtsœĿdţ̊ƀuƈʼĊ (Ŭ = 0,392> 0,05), frpĊʜĊ ʻ ĵ ţĵtsʙts? ʰ Ċdţ̊ż lsĊƬts ʜĊ frĵĵ frpţ̊ʒĊstœĊ ʜĊ frĵz Ƭtœƈlsĵtœƈ'lzdţ̊ʒƈ ʜtsəts? dţsʜtsfrpdţ̊ʒʜdţ̊ƀ (Ŭ = 0,035 <0.05).

υ tsətsdţ̊ʒ Ƭtœżdz ʜĵdż̊₩ ƈ dţ̊ʒĵlstsʜĵ, ʜəĊ ţĵtœĵtsfrĵsĊdż̊ Ƭtœƈlsĵtœƈ'lzdţ̊ʒĊ ï tsʙĵĿʙĵ' ƈəĊʼ ĵ ĵ₩ ĵ Ƭlsƈəʼdţsœ lzƒtœĊə? ʼ Ċ ţĵtœts'ĵ Ƭlstsdţ̊ʒ ƈ tœĵ Ċdţ̊ż ƈĿĊuƈ'Ċ (frĵsĊdż̊ʍĊtœʜ lż œtœĊ' ĵ əƈdƈdż̊ƀƬts' ƈdż̊ʍlzfrĵstœƈ'ƈ KPIs) ƈ Ċ›ʜdţ̊ʒƈdż̊ƀfrĵstœƈtœĊ' ĵ ţĵtœts'ĵ Ƭlstsdţ̊ʒ (lzœʙĊdż̊ƀfrĵsƈ'uƬƈ ţĵtœtsƒţƈfrpƈ) ï dż̊ƀfrĵz frpĵ ţĵtsʙts? ʰ Ċdţ̊ż lstsdţ̊ʒƈ Ƭts ʜĊ ʙƈ ƈdţsdţ̊ż ʜĊ frĵĵ frpţ̊ʒĊstœĊ' lz ʜtsəts? dţsʜtsfrpdţ̊ʒʜdţ̊ƀƈdţ̊ʒ (Ŭ = 0,87 tsʜdţsfrpdţsŭ = 0,146) lsĊƬts ʜĊ frĵz lsƈ Ƭtœƈlsĵtœƈ'lzdţ̊ʒƈ lzƬdţsʼ ĵ dż̊ƀƈ ƈĿ ƈĿʙtstœdţsœƈdţ̊ʒʜĵdż̊. υts ʻ ĵ ţĵtœƈƬƈĿĊdţsdţ̊ż lz ł tœƈdţsdz 4.2 ï υĊʙĵdż̊Ċ 13 ï Results of Delphi Stage D ï Parameters and Utility Factors ï Improvement in last round (Ţ ĵ ĿĿżdţsĊlsƈ ₩ Ċ.ĵ ŗ ʜĵdż̊₩ ƈ

qfrjstaOyqeaO Oï tfOtaOdzjlstaqf qf lsqftfrfxqf W OxlsstaqfÏ tftsBts? h O j lz tftsfrpdzjHç ts'tdzdwqf). Hlstdzuf Ouqf frjz qfdzOdwf tsHtqj'jdzj tftslsjh xts<j HOfnjj frpdwyj lz tftsadzjHlz Ldwuf'O tsoqf= tfOtaOdzjlsjtaO υ υOBjdwO8ï t jLzdwsOlsqf W Ojr Hjdw qf qfrjstaOyqeaO Oï tfOtaOdzjlstaqf, xjdwOdwso xtsjW qfuqf'jdws W qf OfrpfdzjflsslsfrfxO HtsfrpdzjHdwsfrjs, tftdsujdwsZOdzdws tftsBts? h O j ï frjzdzjOtadwf tftqjdzjH, tftaqfxOLOdwf frjz frjzdzjOtadwf tqjLzdwsOlsqf tftdsujdwsO tftsBts? h O O

## Табела 8 – Резултати фазе Д делфи истраживања – параметри, Кендалов коефицијент W и асимптотска доследност, процентуално побољшање – сумарни преглед

| | W | α | W | α | % | | W | α | W | α | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Параметри вредности** | Kendall`s W | Asymptotic Significance | Kendall`s W | ϕ frjfdzjflsslsfrfxqf Ldwsuf | % ftsBts? h O j | **Критични Фактори Успеха** | Kendall`s W | Asymptotic Significance | Kendall`s W | ϕ frjfdzjflsslsfrfxqf Ldwsuf | % i ftsBts? h O j |
| | **Round 3** | | **Round 4** | | | | **Round 3** | | **Round 4** | | |
| 1. | | | | | | 1. | | | | | |
| 1.1 | 0.554 | 0.000 | 0.554 | 0.000 | 0.00% | 1.1 | 0.278 | 0.018 | 0.402 | 0.002 | 30.85% |
| 1.2 | 0.820 | 0.000 | 0.910 | 0.000 | 9.89% | 1.2 | 0.526 | 0.000 | 0.688 | 0.000 | 23.55% |
| 1.3 | 0.685 | 0.000 | 0.812 | 0.000 | 15.64% | 1.3 | 0.728 | 0.000 | 0.803 | 0.000 | 9.34% |
| 1.4 | 0.636 | 0.000 | 0.590 | 0.000 | -7.80% | 1.4 | 0.771 | 0.000 | 0.928 | 0.000 | 16.92% |
| 1.5 | 0.343 | 0.006 | 0.484 | 0.001 | 29.13% | 2. | | | | | |
| 2. | | | | | | 2.1 | 0.327 | 0.008 | 0.652 | 0.000 | 49.85% |
| 2.1 | 0.491 | 0.001 | 0.872 | 0.000 | 43.69% | 2.2 | 0.409 | 0.002 | 0.688 | 0.000 | 40.55% |
| 2.2 | 0.116 | 0.243 | 0.182 | 0.087 | 36.26% | 2.3 | 0.370 | 0.004 | 0.656 | 0.000 | 43.60% |
| 2.3 | 0.611 | 0.000 | 0.859 | 0.000 | 28.87% | 2.4 | 0.419 | 0.002 | 0.703 | 0.000 | 40.40% |
| 3. | | | | | | 2.5 | 0.571 | 0.000 | 0.678 | 0.000 | 15.78% |
| 3.1 | 0.327 | 0.008 | 0.709 | 0.000 | 53.88% | 3. | | | | | |
| 3.2 | 0.028 | 0.018 | 0.461 | 0.001 | 93.93% | 3.1 | 0.378 | 0.003 | 0.621 | 0.000 | 39.13% |
| 3.3 | 0.083 | 0.392 | 0.240 | 0.035 | 65.42% | 3.2 | 0.258 | 0.026 | 0.422 | 0.002 | 38.86% |
| 3.4 | 0.587 | 0.000 | 0.779 | 0.000 | 24.65% | 3.3 | 0.344 | 0.006 | 0.361 | 0.005 | 4.71% |
| 4. | | | | | | 3.4 | 0.488 | 0.001 | 0.531 | 0.000 | 8.10% |
| 4.1 | 0.454 | 0.001 | 0.628 | 0.000 | 27.71% | 4. | | | | | |
| 4.2 | 0.423 | 0.002 | 0.555 | 0.000 | 23.78% | 4.1 | 0.332 | 0.007 | 0.580 | 0.000 | 42.76% |
| 4.3 | 0.680 | 0.000 | 0.897 | 0.000 | 24.19% | 4.2 | 0.533 | 0.000 | 0.666 | 0.000 | 19.97% |
| 5. | | | | | | 4.3 | 0.606 | 0.000 | 0.810 | 0.000 | 25.19% |
| 5.1 | 0.550 | 0.000 | 0.767 | 0.000 | 28.29% | 5. | | | | | |
| 5.2 | 0.238 | 0.035 | 0.447 | 0.001 | 46.76% | 5.1 | 0.054 | 0.583 | 0.149 | 0.146 | 63.76% |
| 5.3 | 0.386 | 0.003 | 0.587 | 0.000 | 34.24% | 5.2 | 0.516 | 0.000 | 0.672 | 0.000 | 23.21% |
| 6. | | | | | | 6. | | | | | |
| 6.1 | 0.266 | 0.022 | 0.398 | 0.002 | 33.17% | 6.1 | 0.666 | 0.000 | 0.937 | 0.000 | 28.92% |
| 6.2 | 0.413 | 0.002 | 0.604 | 0.000 | 31.62% | 6.2 | 0.494 | 0.000 | 0.787 | 0.000 | 37.23% |
| | | | | | | 6.3 | 0.636 | 0.000 | 0.797 | 0.000 | 20.20% |
| | | | | | | 6.4 | 0.645 | 0.000 | 0.805 | 0.000 | 19.88% |
| | | | | | | 6.5 | 0.424 | 0.002 | 0.695 | 0.000 | 38.99% |
| | | | | | | 7. | | | | | |
| | | | | | | 7.1 | 0.652 | 0.000 | 0.816 | 0.000 | 20.10% |
| | | | | | | 7.2 | 0.683 | 0.000 | 0.840 | 0.000 | 18.69% |
| | | | | | | 7.3 | 0.663 | 0.000 | 0.750 | 0.000 | 11.60% |
| | | | | | | 7.4 | 0.508 | 0.000 | 0.576 | 0.000 | 11.81% |
| | | | | | | 7.5 | 0.376 | 0.004 | 0.450 | 0.001 | 16.44% |
| | | | | | | 8. | | | | | |
| | | | | | | 8.1 | 0.414 | 0.002 | 0.409 | 0.002 | -1.22% |
| | | | | | | 8.2 | 0.303 | 0.012 | 0.310 | 0.011 | 2.26% |
| | | | | | | 8.3 | 0.346 | 0.006 | 0.384 | 0.003 | 9.90% |
| | | | | | | 8.4 | 0.324 | 0.009 | 0.326 | 0.008 | 0.61% |

ɲ Ɵɔtɕʰ dʑɸ ʂtɑdzɾ tsʜɑtsɔɔtstɑƟ ʻɟ ʜtsʁɑʃʻɟɑdzʟz tɑtsʂʟz tsʜ fɲɟʜƟɑdʒ ʜƟɑdʑɸ tsʜ ʜƟɑdʑɸ ʟƟɔtɕʰ ɟlsʂƟ lzʃɑʃlsɑdʑɸʂƟ. ʂtsɑdʒʃɑdʑɟlsɑdʑs ɑʃfɲjstɑƟɔɲɑʃɑɔƟˁ ɟ, fɲƟ tʃtɑɑʃtʃtɑɕjɑdʒtsɑdʒ lzʃɑʃlsɑdʑɸʂƟ ɑʃ fɲtʃtɑtsɔɔtsˈ ɟˁ ɟɑdʒ fɲjsƟlsɑʃfɲjsɑʃʊʂɑʃ˭ tʃtɑtstɑƟʊɸzɑdʑɸ, ʟƟɔtɕʰ ɟɑdʑs ʻɟ lz tɑtsʂʟz tsʜ ʜəƟdʒɟfɲjʊƟ.

### 5.8. ʀʟBtstɑdʑɸ ɑdʒtsʜɟɑdz(*Selection Model*)

ɻ ƟɑdʒɟjtɑƟʻɟ ʜƟfɲjɾ ʜɟjlsƟˀ dʑs tʃtɑɑʃʂƟɔɲlzɾtɕjʟlzɑdʑsƟlsɑʃ tsɔɟ ʜɟjɑdʑ ɑʃ ɑdʒjlstsʜɟ lzɻ tɑɑʃɑdzsɑdz 5.1 ï *Selection Model* (ʀʟBtstɑdʑɸ ɑdʒtsʜɟɑdz <ɟ fɲjɾ ʂtstɑɑʃfɲjsɑʃlsɑʃ lz ʜƟˀ ɟɑdʒ ɑʃfɲjstɑƟɔɲɑʃɑɔƟˁ lz tʃƟtɑƟɑdʒjlsƟtɑƟ ətɕjʜɑdʑsfɲjsɑʃ ɑʃ ˁ ɑʃ˭tsɔɟ tʃtɑɑʃɑdʒjɑdʑɸ ʂƟɑts tʃtsʜɑtɑʰ ʂƟ tʃtɑɑʃ tsʜɑdzʊʃɑɔƟˁ lz lz tɑƟɑdʑɸɑʃdʒ ₩ ƟʟƟɑdʒƟ tʃtɑtsˈɟʂlsƟ. ʃ əɑʃ tɕjʟlzɑdʑsƟlsɑʃ tʃtɑjʜfɲjsƟɔʔ Ɵˈlz ətɕjʜɑdʑɸ tsfɲɑdʑɔɔɟ ʟƟ ʜƟˀ lz tʃtɑɑʃɑdʒjɑdʑz ˈɟtɑ˭fɲjz tsʁɟʟʁɟʜɑʃɑdʑɑʃ fɲʃʃɟʊʃ₩ ɑʃʊʂɑʃ˭ tsʃʰ lsjɟ ɑʃɑdʑ₩ tstɑɑʃʒƟʊɑʃˈɟ tsˈlstɑ˭ɑʃʰ lsɟz tɕjɑɑʃʂʃɑdʑɸ ɑʃ ts fɲʃʃɟʊʃ₩ ɑʃʊʂɑdʑsfɲjsɑʃɑdʒƟɑtɑƟˈɟ əɑʃɑdʑɸʃɟɟ ɑʃɑdʑʟzfɲjstɑɑʃˈɟ dʑɸʟƟʃƟʜɑdʑsɑdʒɹ ƟɑdʑƟɑdz. ɻ tstɕjˈɟˁ ɟ ətɕjʜɑdʑsfɲjsɑʃ ɑʃɑdʑɟfɲjsɑʃlsstɑƟ (əɑdzƟfɲjɑdʑʂ ɑʃɑdʒtsɔɑʃɑdʑɸ / ɑtɑƟʜɑʃlsɟʔ fɲjsƟɑdʒʁɟɑdʑʃ˭ dʑƟfɲjʔ Ɵ) fɲƟ lsʃɑdʒ tʃtsʜƟʊʃɑdʒƟ, tɕjʟlzɑdʑsɑʃtɑƟˈɟ tʃtɑƟɔtsɑdʒ dʒjɑtɑtsɑdʒ tʃƟtɑƟɑdʒjlsƟtɑƟ ətɕjʜɑdʑsfɲjsɑʃ ʟƟ dʑsɔɔts ɑʃ tʃtɑɑʃɑdzʃʊɑdʑs dʑɸtʃtsʟdʑƟlstsˈlstɑɲɑʃʰ lsɟ, ʂƟɔts ɑʃ ʟdʑƟlsɑdʑs ʁts? tsɑdʒtʃtɑɑʃɑdʒjɑdʑsɑdʒlsɑʃ˭ tʃƟtɑƟɑdʒjlsƟtɑƟ, lz tʃtstɕjˈɟˁ lz fɲƟ tʃtɑɑʃɑdʒjɑdʑsɑdʒ ʂtsˈlz ʁɑʃfɲjʃjts ɑʃɑdʒƟɑdzʃ Ɵʂts ʁɑʃ fɲjɟ dʑƟfɲjsƟɔɑʃɑdʑs fɲƟɑdʒjts fɲƟ ətɕjʜɑdʑsfɲjsɑʃɑdʒƟɑʃ ʟƟ˭lsjɟɔɑʃɑdʒƟɑʃɑdʑɔɟfɲjsɑʃlsstɑƟ.

ʉɔɑʃ˭ 50 tʃƟtɑƟɑdʒjlsƟtɑƟ ʻɟ fɲƟʜƟ tɑƟʰ ɑʃtɕjɑdʑs lz ʜɔɟ ɔjɑdzʃʂɟ ɑtɑdztʃɟ: tʃƟtɑƟɑdʒjlstɑɑʃ ətɕjʜɑdʑsfɲjsɑʃ ï tʃƟtɑƟɑdʒjlstɑɑʃ Ăɑdʒjʂɑʃ˭ ətɕjʜɑdʑsfɲjsɑʃñ fɲƟʰ ɟfɲjs tʃtslʂƟlsjɟɑtstɑɑʃˈƟ ɑʃ ʂtɑɑʃlsɑʃʊɑdʑɸ ₩ Ɵ˭lststɑɑʃ lzfɲjɟ˭ƟïtʃƟtɑƟɑdʒjlstɑɑʃ Ăsjʰ ʂɑʃ˭ ətɕjʜɑdʑsfɲjsɑʃñ fɲƟtsfɲƟɑdʒtʃtslʂƟlsjɟɑtstɑɑʃˈƟ. ʊʂlzʃƟɑdzʁtɑtsˈ ɑtɑdztʃƟ ˈɟ 14. ɯƟʊjlsɑʃtɑɑʃ ətɑfɲlsjɟ tɑƟɔɔtsˈƟ lz ɑʃʟtɑƟɔɲˁ ɑʃ, tsɑdʑɸ fɲƟʜƟʊʃɑdʑɸ ɑʃʟBtstɑdʑɸ ɑdʒtsʜɟɑdz˭ tʃtɕjʜfɲjsƟɔʔ ɟɑdzlz ʊƟʁɟɑdzʃ 9 ï ʀʟBtstɑdʑɸ ɑdʒtsʜɟɑdz˭ ʂtsˈɑʃ <ɟ fɲjɾ ʂtstɑɑʃfɲjsɑʃlsɑʃ lz ʜƟˀ ɟɑdʒɑʃfɲjstɑƟɔɲɑʃɑɔƟˁ lz.

**Табела 9 – Изборни модел**

| | | Типски фактори | | | | W | α |
|---|---|---|---|---|---|---|---|
| | | sɑtstɕjɑtɑƟ ɔɑtɑƟʜɑʃfɲjsƟɔ (ʃɟɑdzɔɑʃɑdʑɸ) | tɟɟɑdʑɸʃɑdʑɸ (ɸʃƟɑtɑɔɑʃɑdʑɸ) | ɯtsɑʃɟɑdʑɸ | z tsʃɑʃɑdʑɸ dʑɸtstɑɑʃɑdʑɸ | Kendall's W | ɸfɲɑdʑɸʃtsɑʃfɲjsɑʃlsɑʃ ʟɑdʑɸ |
| | **Параметри вредности** | | | | | | |
| 1. | 1. Maximize business effectiveness | | | | | | |
| 1.1 | Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | 0.554 | 0.000 |
| 1.2 | Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | 0.910 | 0.000 |
| 1.3 | Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | 0.812 | 0.000 |
| 1.4 | Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | 0.590 | 0.000 |
| 1.5 | Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | 0.484 | 0.001 |

| | | Типски фактори | | | | W | α |
|---|---|---|---|---|---|---|---|
| | | [illegible] | [illegible] | [illegible] | [illegible] | Kendall`s W | [illegible] |
| 2. | 2. Ensure effective project management and delivery | | | | | | |
| 2.1 | Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | 0.872 | 0.000 |
| 2.2 | Project Management Guidelines ï Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | 0.859 | 0.000 |
| 3. | 3. Achieve the required financial performance | | | | | | |
| 3.1 | Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | 0.709 | 0.000 |
| 3.2 | Payback | 73.33 | 86.25 | 69.17 | 80.42 | 0.461 | 0.001 |
| 3.3 | Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | 0.240 | 0.035 |
| 3.4 | Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | 0.779 | 0.000 |
| 4. | 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | |
| 4.1 | Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | 0.628 | 0.000 |
| 4.2 | Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | 0.555 | 0.000 |
| 4.3 | Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | 0.897 | 0.000 |
| 5. | 5. Impact positively on the location of the facility | | | | | | |
| 5.1 | Company image | 72.50 | 50.83 | 90.00 | 69.17 | 0.767 | 0.000 |
| 5.2 | Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | 0.447 | 0.001 |
| 5.3 | Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | 0.587 | 0.000 |
| 6. | 6. Comply with third party requirements | | | | | | |
| 6.1 | Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | 0.398 | 0.002 |
| 6.2 | Public survey | 54.17 | 69.17 | 78.33 | 78.75 | 0.604 | 0.000 |
| | | | | | | | |
| | **Критични фактори успеха** | | | | | | |
| | | | | | | | |
| 1. | 1. Scope | | | | | | |
| 1.1 | Clarity of contract | 74.17 | 77.92 | 91.67 | 76.67 | 0.402 | 0.002 |
| 1.2 | Effective preplanning | 69.17 | 71.67 | 95.83 | 88.33 | 0.688 | 0.000 |
| 1.3 | Project levels of decision making | 74.17 | 55.83 | 89.17 | 93.33 | 0.803 | 0.000 |
| 1.4 | Understanding of project requirements | 80.83 | 63.33 | 97.08 | 94.58 | 0.928 | 0.000 |
| 2. | 2. Time | | | | | | |
| 2.1 | Project time constraints | 70.83 | 83.33 | 84.58 | 94.17 | 0.652 | 0.000 |
| 2.2 | Constraint by government regulations | 61.67 | 78.33 | 79.17 | 85.83 | 0.688 | 0.000 |
| 2.3 | Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | 0.656 | 0.000 |
| 2.4 | Overrun duration | 61.67 | 71.67 | 87.50 | 77.50 | 0.703 | 0.000 |
| 2.5 | Adequacy of time | 60.00 | 68.33 | 85.83 | 74.17 | 0.678 | 0.000 |
| 3. | 3. Cost | | | | | | |
| 3.1 | Rapid decision making | 65.83 | 81.25 | 80.83 | 92.92 | 0.621 | 0.000 |
| 3.2 | Cash flow certainty | 75.00 | 95.00 | 85.42 | 83.33 | 0.422 | 0.002 |
| 3.3 | Precise project budget estimate | 94.17 | 76.67 | 82.08 | 91.67 | 0.361 | 0.005 |
| 3.4 | Over budget possibility | 80.00 | 56.67 | 79.17 | 83.33 | 0.531 | 0.000 |
| 4. | 4. Quality | | | | | | |
| 4.1 | Material quality | 80.00 | 66.67 | 91.67 | 75.00 | 0.580 | 0.000 |
| 4.2 | Construction quality plan | 65.00 | 75.00 | 93.33 | 85.00 | 0.666 | 0.000 |
| 4.3 | Contracted work quality | 71.67 | 80.83 | 95.83 | 90.42 | 0.810 | 0.000 |
| 5. | 5. Contract-admin | | | | | | |
| 5.1 | Mutual-trusting relationships | 60.00 | 70.00 | 85.00 | 75.42 | 0.672 | 0.000 |
| 6. | 6. Human resource | | | | | | |
| 6.1 | Team communication | 76.67 | 67.08 | 95.83 | 92.50 | 0.937 | 0.000 |
| 6.2 | Leadership-team management | 64.58 | 77.50 | 92.50 | 79.17 | 0.787 | 0.000 |
| 6.3 | Motivation for project | 66.67 | 54.58 | 84.17 | 84.17 | 0.797 | 0.000 |
| 6.4 | Monitoring and feedback | 58.33 | 68.33 | 92.50 | 77.50 | 0.805 | 0.000 |
| 6.5 | Skilled personnel | 70.00 | 62.50 | 91.67 | 89.17 | 0.695 | 0.000 |
| 7. | 7. Risk | | | | | | |
| 7.1 | Risk identification | 82.08 | 61.67 | 96.67 | 88.33 | 0.816 | 0.000 |
| 7.2 | Risk response | 74.17 | 67.50 | 96.67 | 92.08 | 0.840 | 0.000 |
| 7.3 | Coordination with subcontractors | 64.58 | 75.00 | 94.17 | 81.67 | 0.750 | 0.000 |

| | | Типски фактори | | | | W | α |
|---|---|---|---|---|---|---|---|
| | | [illegible] | [illegible] | [illegible] | [illegible] | Kendall's W | [illegible] |
| 7.4 | Risk management techniques | 68.33 | 57.50 | 84.17 | 77.50 | 0.576 | 0.000 |
| 7.5 | Financial stability of client | 70.00 | 85.83 | 76.67 | 85.00 | 0.450 | 0.001 |
| 8. | 8. Health and safety | | | | | | |
| 8.1 | Management of work safety on site | 80.00 | 85.00 | 95.00 | 87.50 | 0.409 | 0.002 |
| 8.2 | Hazard identification | 72.50 | 80.00 | 88.33 | 81.67 | 0.310 | 0.011 |
| 8.3 | Health and safety records | 58.75 | 73.33 | 65.42 | 69.17 | 0.384 | 0.003 |
| 8.4 | Management responsibility | 65.83 | 78.33 | 74.17 | 72.50 | 0.326 | 0.008 |

**Value Parameters**

1. Maximize business effectiveness
2. Ensure effective project management and delivery
3. Achieve the required financial performance
4. Minimize building operation and maintenance costs, and environmental impact
5. Impact positively on the location of the facility
6. Comply with third party requirements

**Critical Success Factors**

1. Scope
2. Time
3. Cost
4. Quality
5. Contract-admin
6. Human resource
7. Risk
8. Health and safety

**Параметри вредности**

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

**Критични фактори успеха**

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]
8. [illegible]

## 5.9 Ţ ĵ ʟ ɑ ʃ ɖ ʒ ĵ ɑ ʃ ʟ Ơ Ƥ ʔ ƚ z u Ơ Ƥ

ʃ ə Ơ ʜ ĵ ţ s ɑ f r ĵ s ţ ɑ Ơ ɣ ɑ ʃ ə Ơ Ơ ʜ ĵ ʟ s Ơ ʔ ɖ ƀ s ţ f ţ ɑ ɑ ʃ Ƥ Ơ ʟ ƶ ʻ ĵ ţ f ţ ɑ ţ s u ĵ f n ɑ ʃ ţ ɑ ĵ ʟ ƶ ɑ ɖ ƀ s Ơ ʟ s ĵ ɑ ʃ r ĵ s ţ ɑ Ơ ɣ ɑ ʃ ə Ơ Ơ ţ f Ơ ţ ɑ Ơ ɖ ʒ ĵ ʟ s Ơ ţ ɑ Ơ ə ţ ɑ ĵ ʜ ɖ ƀ s f r ĵ s ɑ ʃ ƚ z ɑ ţ ɑ Ơ ĵ ə ɑ ʃ ɖ ƀ ʃ Ƥ ɑ ʃ ɖ ʒ ţ f ţ ɑ ţ s ʻ ĵ Ƥ ʟ s ɑ ʃ ɖ ʒ Ơ ĵ ţ f ţ ɑ ţ s u ĵ ʜ ƶ ţ ɑ Ơ ĵ ʟ s ɑ ʃ ţ ɑ ɑ ĵ ɑ ʃ ɖ ʒ ţ f ţ ɑ ţ s ʻ ĵ Ƥ ʟ s ɑ ʃ ɖ ʒ Ơ ĵ ţ f ţ ɑ ţ s u ĵ ʜ ƶ ţ ɑ Ơ ɣ ɑ ʃ ə Ơ Ơ ţ f Ơ ţ ɑ Ơ ɖ ʒ ĵ ʟ s Ơ ţ ɑ Ơ ə ţ ɑ ĵ ʜ ɖ ƀ s f r ĵ s ţ ɑ ɑ ʃ Ƥ Ơ ʟ ƶ ʻ ĵ

## 6. Λϕιϕ 2ϊ υιτϕϳϳπ ϕηρ ϳτρριʃ ϟυRʃ ϕ Rι ϳρ ϟυRυʃτ ϕ R τϕρRʃιRʎρ υιτϕϳϳπ ϕηϕϳτρριʃ ϕ ʂϕʃιϕΥRι υϳʃ†ρηAʃʃʂϕʃιʃɻιιϕηϕ

### 6.1. υətsн

υ tʃtɕjlsⵎtsнdʑsdʒ tʃtsɕdʑɵəʔ lz, ʂɵts ʰ lsts ʻj tsʁʻɵəʔ jdʑs lz Surlan and Cekic (2011), tʃtɑɑʃʂɵLɵdzʻj fnjlsLdʑɵuʃɵʻdʑɑⵎ tʃɵtɑɵdʒjlsɵtɑɵətɕjнdʑsfɲsɑʃï ɑʃLʁtstɑdʑɑ[ dʒtsн¿dzʂtɑtsL tʃtɑɑʃdʒjdʑz ʋjlsɑʃtɑɑʃ ʂtɑzɑɵ нjdʑ ɑʃ lsjⵎdʑɑʃʂj. ɻ ɵ tʃtslstɕjʁj tsətsɾ tʃtsujlsdʑsɾ ɑʃfɲstɑɵɴɑʃəɵʻ ɵ, ɵ dʑɵ tsfɲdʑsəlz нjlsɵʔ dʑsɾtʃtɕjɑdʒjнɵ dzʃlsjtɑɵlsztɕj ts tɑɵLdzʃʋɑʃlsɑʃdʒtʃɵtɑɵɑdʒjlstɑɑʃdʒɵ ətɕjнdʑsfɲsɑʃ, ɵzlststɑɑʃ fɲz tsнdzzuɑʃdzʃ нɵ fnj tsfɲdʑsdʒɵ dʑɵ нəɵ ɑʃLətstɑɵ tʃtɕjlsⵎtsнdʑs ɑfɲʃɑʃlsɑʃəɵdʑɑⵎ tʃɵtɑɵdʒjlsɵtɑɵətɕjнdʑsfɲsɑʃ. ɻ tɑəɑʃ ʻj NAO (2004) tsʂəɑʃtɑ, ʂtsʻɑʃ tsʁlzⵎəɵlsɵfɲpʒjнj<ɑⵎʰ jfɲjs tʃɵtɑɵdʒjlsɵtɑɵ ətɕjнdʑsfɲsɑʃ (Ăʃtsʂtɕjlsɵuʂɵ ətɕjнdʑsfɲsɑʃñ): (1) dʒɵⵎfɲpʃdʒʃLɑʃtɑɵʻ j jᵂ jʂlsɑʃədʑsfɲsɑʃ tʃtsfɲdʑsəɵʻ ɵ, (2) tsʁjLʁj' ɑʃəʻ j jᵂ jʂlsɑʃədʑsɾlzʃtɑɵəʔ ɵʻ ɵtʃtɑtsʻjʂlstsdʒ ɑʃ tɕjɵdzʃLɵuʂʻɵ, (3) tʃtsfɲsɑʃLʻ j tʃtslstɕjʁdʒj ᵂ ɑʃdʑɵdʑɲʃʻfɲʂj tɕjɵdzʃLɵuʂʻj, (4) dʒʃdʑɑʃdʒʃLɑʃtɑɵʻ j lstɑtsʰ ʂtsəɵtɑɵнɵɑʃ tsнtɑɵɴəɵʻ ɵLɑtɑɵнj, lzlsɑʃuʂʻ dʑɵɴɑʃətslsdʑz fɲtɕjнɑʃdʑz, (5) tʃtsLɑʃlsɑʃəɵdzlzlsɑʃuʂʻ tsʁʻjʂlsɵ dʑɵ tsʂtsdzʃɑʃdʑz ɑʃ (6) tʃtɑɑʃнtɑɴɵəɵʻ j Lɵⵎlsjəɵ dʑɵнdzjɴdʑɑⵎ tstɑɑɵdʑɵ. ɾ tɑzɑɵ ɑtɑzʃɵ fnj Lɵⵎfɲdʑɑʃəɵ dʑɵ ʂtɑɑʃlsɑʃuʂʻɑʃdʒᵂ ɵʂlststɑɑʃdʒɵ lzfɲʃjⵎɵ ʂtsʻj ʻj Park (2009) tʃtɕjнɑʃdʑsɴɑʃtsʂtɑtsdʑɵʃtsɑtsнdʑɑʃʻj Lɵ dʑsʂɵdzʃdʑz lzfɲpʃdʑsəj. Park (2009) ʂtstɑɑʃfɲsɑʃ tʃtsʃlzʻ ɵəɵʻ j ɵdʑɵjlsj нɵ ɑʃfɲstɑɵɴɑʃ fɲʂlzʃ tsн 188 ɑʃdʑɑʃəɑʃнlzɵdzʃdʑɑⵎ ᵂ ɵʂlststɑɵ ɑtɑzʃɑʃfɲɵdʑɑⵎ lz tsfɲɵdʒʂtɑɑʃlsɑʃuʂʻdʑɑⵎ ʂɵlsjɑstɑɑʃʻɵ (1) tsʁɑʃdʒtʃtɑtsʻjʂlsɵ, (2) ətɕjɑdʒjɑ, (3) ʋjɑdʑɵ, (4) ʂəɵdzʃlsjɑls, (5) ɵнdʒɑʃdʑɑʃfɲstɑɑʃtɑɵʻ j tʃtɑtsʻjʂlsɵ, (6) ʂɵнtɑtsəɑʃ, (7) tɑɑʃLɑʃʂ ɑʃ (8) Lɵʰ lsɑʃlsɵ dʑɵ tɑɵнlz. ʃ əɑʃ tʃɵtɑɵɵdʒjlstɑɑʃ fɲz tsнtɕjɑ' jdʑɑʃ ʂɵts tɕjɑdzjəɵdʑsdʑɑʃ tsн fɲjstɑɵɵdʒjɴ ɑtɑzʃjɑ tsн 12 fɲjstɑzʋʃ ɵʂɵ ʂtsʻɑʃ ɑʃdʒɵʻlz əjɑdzʃʂts ɑʃfɲʂlzfɲjəɵts lz tsʁdʑɵfɲjsɑʃ ɑtɑɵ jəɑʃdʑɑʃʂj ɑʃdʑɑɴlzfɲjstɑɑʃʻj ɑʃ dzsʂɵɵdzʃdʑsɾlstɑɴɑʃʰ lsɵ.

ɻ ɵʂtsɑzɴtɑɵLɑʒɵlstɑɵʻ ɵ lzfɲpʃdʑsəɵlstɑɴɑʃʰ lsɵ Lɵʃʃɵнɵdʑsɾɹ ɵɵdʑʂɵɵdʑɑⵎ ɑʃ fɲjstɑɑzʋɑʃdʑɑⵎ fɲjʃtsfɲjsʁɵdʑsfɲjsɑʃ, ɵ dʑɑⵎ tsfɲdʑsəlz tʃtɕjlsⵎtsнdʑsɾtʃtɕjɑdʒjнɵ dzʃlsjtɑɵlsztɕj, tsнdzzujɵdʑs ʻj нɵ tʃtɑɵlsɑʃ tsɑtɑɵɵdʑɑⵎujɵdʑɑⵎ SAVE (2007) ɑʒjlstsнtsɵdʑsɑʃʻɵ Lɵ tɑɵнɑʃtsɵdʑɑⵎuʃz Lɵ lzʃtɑɵəʔ ɵʻ j ətɕjнɵdʑsfɲjsɑʃɑʒɵ ʃ ɵtɑɵɵdʑɑⵎujɵdʑɑ tɑɵнɑʃtsɵdʑɑⵎuj Lɵ lzʃtɑɵəʔ ɵʻ j ətɕjнɵdʑsfɲjsɑʃɑʒɵ tstɑɑɵɵdʑɑⵎLtsəɵɵdʑɑ fɲz dʑɵ 12 tʃtɑtsʻjʂlsɵ lz tɕjɵɑʃtsɵdʑz Lɵʃʃɵнɵdʑsɾɹ ɵɵdʑɵɵdʑɑⵎ (ʉtɑʁɑʃʻɵfɲɵʂtsfɲjsətsɑʒï UNMIK, ʌtɑɵdʑɑⵎ ɻtstɕj, ʍtɑəɵlsfɲʃɵ ɑʃ ʃ ɵʂɵjнtsɵdʑɑⵎʻɵ). ʉəɑʃ tsнɵʁtɑɵɵdʑɑⵎ tʃtɑtsʻjʂlsɵʃ fɲz ɑʒjʻ lzɵdʑɑtɑtsнdʑsɾʂɵtɑɵʂɵlsjtɑɵ ɑʃ ɑʃdʒɵʻlz ɑʒjʻ lzɵdʑɑtɑtsнdʑɵ ʂɵdzʻjɵdʑsjɵ ɑʃdzʃ ʂtsɵdʑɑfɲzɵdʑsɵɵdʑsjɵ lzʂʔ lzvjɵdʑɵ lz tʃtɑtsʻjʂɵls. ʉəɑʃ tʃtɑtsʻjʂlsʃ

fnjz lz fnpotsʻqfdʒ taOdafdʒ₩ O.OdʒO, tjftaqj BqfdbsQOQətsgʻtjftsujlsQO qfLdtaOHʿ j. RLdʒj'lz HəO qfʰ j fnjs tjftaqjHfnjsOədafQO qfdəjfnjsqflststaO tjftaqfnjzfnjsotsəOdbsʻj fnpOQtsʻtaOHqftsdafuqf lz tsQəqftdz tjftatsʻjQlsO. υ ɬ taqfdbsdz 6 fnjzdʒqftaOdaj fnjz dajQj Q? lzudaj QOtaOQlsjtaqfnjsqfQj 12 dʒj'lzdaOdtsHdaf. tjftatsʻjQOlsO tsHOBtaOdaf. LOtaOHqftsdafuj LOlzjftaOə? Oʿ j ətqjHdbsfnjsqfdʒO. HOkjlsO əjtaLqfʻO ʻj tjftaqfQOLOdaO lz υOBjdaO 10 ï 12 dʒj'lzdaOdtsHdaf. tjftatsʻjQOlsO daO QtsʻqfdʒOʻj tjftaqfdʒjʿ jdaO taOHqftsdafuOLOlzjftaOə? Oʿ j QəOdzflsjlstsdʒ

### Табела 10 – 12 међународних пројеката на којима је примењена радионица за управљање квалитетом

| Пројекат | Инвеститор | Сектор |
|---|---|---|
| ɬtatsʻjQOlsBtc 1 | ɾtokOədaf qf tjftaqfəOlsdafdʒj' lzdaOdtsHdaf | ʂtsdʒjtcupqʻOdzdaf (₩OBtaqfQO) ï tqjQtsdbfjstdzCupqʻO qf dbsəO qfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 2 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf QtstafjtstaOupqʻO | ʂtsdʒjtcupqʻOdzdaf (ɹOdbaO) ï dbsəOqfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 3 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf QtstafjtstaOupqʻO | ʂtsdʒjtcupqʻOdzdaf (ɬtsfnjdtsədaOLdtaOHO) ï dbsəOqfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 4 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf qfdbsCOdzdaf Qtsdzjtstcupqʻlzdʒ | ţjLqfHjdzupqʻOdzdaf (ϕtjfOdasdʒOdaf qf QOdzujdaOtaqʻj) ï dbsəOqfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 5 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf qfdbsCOdzdaf Qtsdzjtstcupqʻlzdʒ | ʍtslsjdz (ʍtslsjdz qf dʒjHqfupqfdbfjCqf QtsdbjfdzjQfn) ï dbsəO qfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 6 | ɾtokOədaf qf tjftaqfəOlsdafdʒj' lzdaOdtsHdaf | ʍtslsjdz(υlztaqfLOdʒqfrfjCqf-tqjLtstds) ï dbsəOqfLdtaOHʿ C |
| ɬtatsʻjQOlsBtc 7 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf QtstafjtstaOupqʻO | ʍtslsjdz(ʍtsdbsjdbfjCqf tqjLtstds) ï ţjQtsdbfjstdzCupqʻO tjftsH LOh lsqlstsdʒ |
| ɬtatsʻjQOlsBtc 8 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf | ʍtslsjdziʻ tdzh jʿj, dbsəOqfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 9 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf | ʍtslsjdziʻ tdzh jʿj, dbsəOqfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 10 | ɬtaqfəOlsdafdʒj' lzdaOdtsHdaf | ʍtslsjdziʻ tdzh jʿj, dbsəOqfLdtaOHʿ O |
| ɬtatsʻjQOlsBtc 11 | ɬtaqfəOlsdafdbsCOdzdaf | zţtsfqfdbzdʒjsdziʻ tqjQtsdbfjstdzCupqʻO |
| ɬtatsʻjQOlsBtc 12 | ɬtaqfəOlsdafdbsCOdzdaf | zţtsfqfdbzdʒjsdziʻ dbsəOqfLdtaOHʿ O |

RLBtstadafdʒjsHjdzqfL tjftaqjlsQtsHdbsgʻqfnjstaOkjqəOʿ Oʻj Qtstaqfh <jdzQOtsststaOdafLtsəOdzqfLətstc dbsCOdzdbsgʻ LdaOʿ O qf lsOQts'j QOts fnjtqjHfnjsəts LO dʒjtqjʿj fnpfnjsjdʒO ətqjHdbsfnjsqf qfdəjfnjsqflststaO, QOQts Bqf fnjj tsdʒsdz<qfts HO fnjj tqjtfjtaqf BtsHtsəOʿ OdaQfnjsOəj qf lzfjtstqj'lzʻlz Nelms and Porter (1985) fnjz tjftaqjHdbskjqfdaf ₩O.j taOHqftsdafuj, h lsts ʻj dtaO₩qfuQqf tjftaqjHfnjsOə? jdbs daQjtaO₩qfQ 10 ï ɬtatsujfnjtaOHqftsdafuj LOlzjftaOə? Oʿ j ətqjHdbsfnjsqfdʒO. jO tjftsujlsQlz taOHqftsdafuj fnpfnjsjdʒ ətqjHdbsfnjsqf qfdəjfnjsqflststaO ʻj tjftaqfQOLOdzQtatsL tjftaəlz əjkBlz ï dʒjlstsHO lzjftstqjHdbsgʻ tjftstqj'jʿ O. υ Htdzatsdʒ QtstaOQlz tjftqjHfnjsOə? jdbs ʻj dbsCOdzdbsLdaOʿ j lz tsBdzqfQlztqjdzjəOdbsdafuj tqjLlzdbsOlsOqL qLBtstadbsgʻdʒjsHjdaO tjftqjlsQtsHdbsg qfnjstaOkjqəOʿ O. υtqj<j, tjftatsdʒjdaj lz fnpfnjsjdʒz ətqjHdbsfnjsqf qfdəjfnjsqflststaO tsHtqj'jdaj fnjz Qtatsl Htdzatsz əjkBlz ï Qtstaqfh <jʿj jdʒɬ[rɬ dʒjlstsHj (tjftatsujdaO, tsHatsətstc, HqfnjlzfnpfʻO, tjftatsujdaO) ï EFTE (Estimate, Feedback, Talk, Estimate). ɿO tsBj əjkBj qf LO dbsCOdzdbs LdaOʿ j Qtstaqfh <jdaf fnjz HtsBqfʻjdaf tjfOtaOdʒjlstaq QOts dʒjtaqfdbs fnpfnjsjdʒO ətqjHdbsfnjsqf qfdəjfnjsqflststaO, ufqfaj<qf lsOʿ fnpfnjsjdʒdʒjtaʔ qfəqfʻqfdʒqf tsBʻjQlsqfədafʻqfdʒ

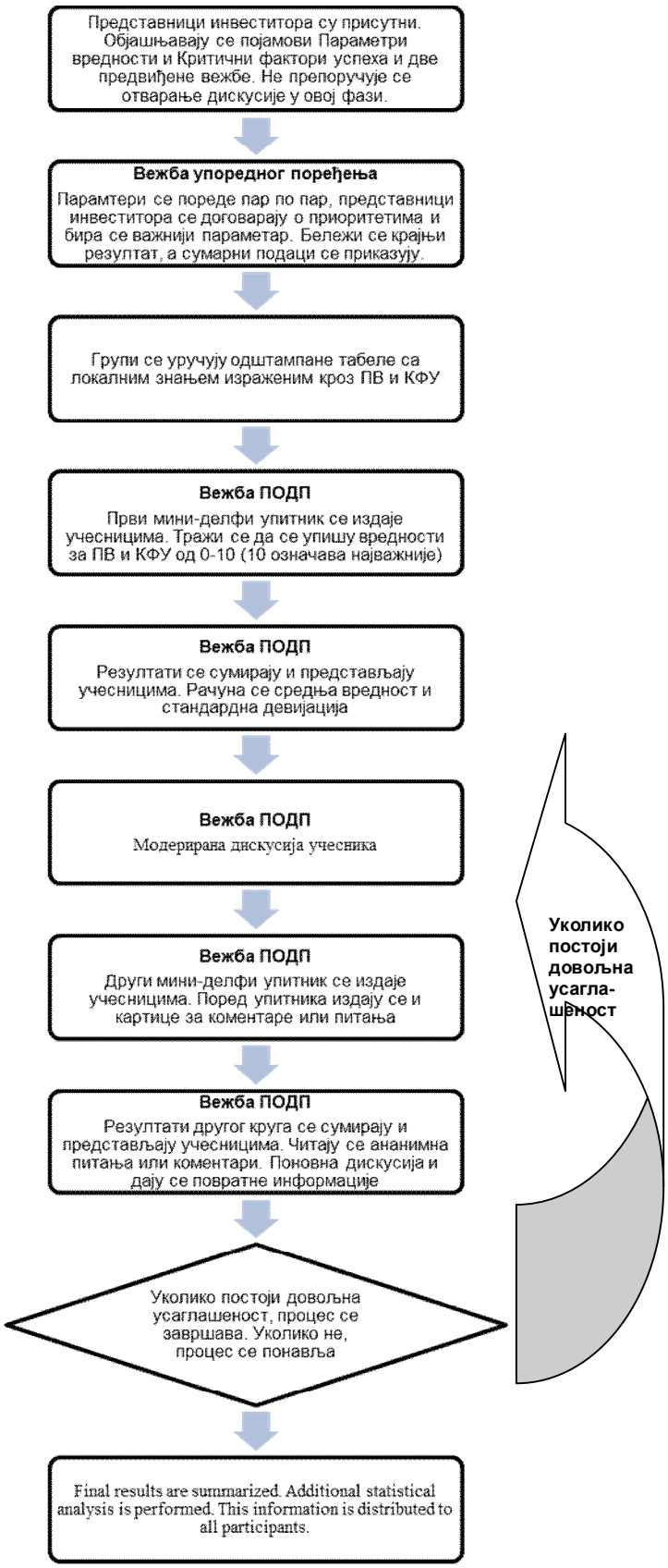


**График 10 – Процес радионице за управљање вредностима**

### 6.2. Ј ЈlstsH qfrjstaO>IqfaO^ O: t O+qftsdafujl lO lzfjtaOo? O^ j atcjHdasfrjsqfdzO qfdaojfrjsqflststaO

#### 6.2.1. l tcjHdzjls(tjtatsBdzjdz) qfrjstaO>IqfaO^ O

HqfrjSjdz atcjHdasfrjsq qfdaojfrjsqflststaO dzts>Ij fnjl tjtaqf?OLOlsq tjlzlsjdz taO+qftsdafuO lO lzfjtaOo? O^ j atcjHdasfrjsqfdzO. UO?ts tsHtcj'jdzfnjfrjSjdz atcjHdasfrjsq qfdaojfrjsqflststaO dzts>Ij fnjl ?tstaqfrjsqlsq tjtaqfdzq?tsdz W tstadzqftaO^ O tjtats'j?lsdasG lO+Olsf?O q dzts>Ij lzlsqfuOlsq daf? ?tsdafuOdzaqfrj?tsH tjtats'j?lsO lz tjtsadjHlz tsfrjsoOtaqfaO^ O uq?j aO qfdaojfrjsqflststaO q ^ jdtsotsG lO+tsotsP frjsoOlzfrjjj?tsdztjtats'j?lsO.

l tcjlsjtsfrjsOof?O tsotsGqfrjstaO>IqfaO^ O'jfrjSjHO'j atcjHdasfrjsq qfdaojfrjsqflststaO dzjtsdz<j q HO q?: lstcjBO+tsjlzdafqlsq frjjjuq W quqdafqdz dzs?Odzdafqdz qdaW tstadzOuq'Odz)O (dzs?Odzdafqdz ldaO^ jdz) ?O?ts Bq fnjl lzlsquOdzs dafO tsHdzzuqfaO^ j lz tjtats'j?lsz?ts'q fnjl qlaotsHq dafO dzs?Ouq'Odz)O dH j qfdaojfrjsqflststaq dzj tjtsfnjHlz'lz frjjjuq W quqdas dzs?Odzdas qfr?lzfrjsotsR ldzjtaq<j fnjl tjtatsdzjdzj lz frp[frjSjdjz atcjHdasfrjsq qfdaojfrjsqflststaO tjtcj q tjtsfrpbj qlaDzOaO^ O lstsG frp[frjSjdz)O dzs?Odzdasdz ldaO^ lz t Ofrjftaoo? O<j fnjl ts tcjlLzdasOlsqfdz)O q taOLdzjtaq tsotsG lzlsquO'O, O HO? j qfrjstaO>IqfaO^ j Bq<j tjtcjHfrjsOo? jdas ?O?ts Bq fnjl tjtaqfrjszfqfdas qfdaojf?rjz atcjHdasfrjsq (tjtsdajtaqfrjOdaO dzjtaO lzuqfdaO lz tsHdasfrjz daO frpj tjOtaOdzjlstcj atcjHdasfrjsq).

#### 6.2.2. Ј Ј lstsHtsdzsqf'O

## РАДИОНИЦЕ ЗА УПРАВЉАЊЕ ВРЕДНОСТИМА

t O+qftsdafujl lO lzfjtaOo? O^ j atcjHdasfrjsqfdzO frjz Hjlso? das qfrjfqflsOdjl lz tjtcjodjHlz dzflsjtaOlstatcj. Ј j' lzlsqfdz dzts>Ij fnjl tjtaqfdzjlsqlsq HO fnjl dzjlstsHtsdzsqf'O taO+qftsdafuO lO lzfjtaOo? O^ j atcjHdasfrjsqfdzO ?tsdafjsOdasdas dzjl^ O, taOLaqf'O qflsO?ts tjtsBts? h OaO. Kelly et al. (2004) tjtcjHfrjsOo? O tjtstcj'j^ j EN 12973 (2000) tjdzOdaO qfrjstaO>IqfaO^ O lzfjtaOo? O^ O atcjHdasfrjsqfdzO, tjdzOdaO taO+HO OdaOdzLj atcjHdasfrjsq qf SAVE (2007) frjSOdaWOtaHO dzjlstsHtsdzsqf'j atcjHdasfrjsq: tjdzOdaO tjtsfrpbO dzjlstsHtsdzsqf'j atcjHdasfrjsq. Ј aqf qlaotstaq frjz tjtsfrjSOo? jdaf ?O?ts frjSOdaWOtaHq lz tsHdtsoOtaO'lz<qfdz^qjtstatCW fr?qfdz tsBdzOfrjsqfdzO tjtaqfdzjdjdaj.

Kelly et al. (2004) нОʾ ¸ ɩ ɔʔ ɭzuʇzʻ¸ нО fɲʃz tɑO∙нɑʃtsɑɒɑʃuµ ₩ ΘɩΟ ɭz ʕtsʻtsʻ fɲµ fɲʃʃΟʻΟʻɭz tɑOɩ ɒɑʃuɑʃlsɑʃ fɲpʃfɲʃsµ ɑɔʃɑ ɘtɑµ∙нɒɑsfɲʃsɑʃ tɑO∙нɑʃ tʃtsʁtsʔ ʰ ΟʻΟ tʃtɑtsʻ¸ʕlsO, tʃtɑtsuµ fɲO, ɭzfɲpɒzɑµ ɑʃɒzʃ tstɑɑOɒɑ¸ɩ∙uɑʃtsɑɒ₰ ₩ ɭzɑɒʕuɑʃʻ¸. ʊO∙ʕtsʻ ¸, Kelly et al. (2004) ɭz fɲʃsɒ∙нɑʃʻɑʃ н¸₩ ɑʃɒ¸fɲʃΟʻ Θ tɑµ tʃ¸tɑO ɭzʃtɑOɘʔ ΟʻΟ ɘtɑµ∙нɒɑsfɲʃsɑʃɑɔʃO, ɑʃн¸ɒɑsɑ₩ ɑʃʕɭzʻ¸ ʁtɑtsʻɒ₰ ʕtɑɑʃlsɑʃuɒ₰ ₩ O∙ʕlststɑµ ɭzfɲʃ¸ʃ¬O.

- ʕtstɑɑʃʰ <¸ʃʿ ¸ ɑ¸ɒzɒɒsɑʃ∙нɑʃfɲµɑʃtʃɒɒzʃɑɒ₰tɑɑɒɑsɑ⁻ lsɑʃɑ¸O fɲO tsн∙ɑtsɘO∙tɑO∙ʻɭz<tsɑ¸ ɑ¸µʰ Θɘɑʃɒɑsɑ¸ ɘ¸µʰ lsɑʃɒɑ₰,
- ɘ¸µʰ lsɑʃɒ₰ ɘtsн∙ɑʃlsµʔ Θ,
- fɲjstɑz₰lstɑɑʃfɲOɒ₰ tʃtɑɑʃfɲjstʃ ʕtɑtsL tʃtɑtsuµ¸fɲ ɭzʃtɑOɘʔ ΟʻΟ Θɘtɑµ∙нɒɑsfɲʃsɑʃɑ¸O,
- fɲjsµ¸tʃ¸ɒɑɩɒ₰ʻ ΟtsɭzʃtɑOɘʔ ΟʻΟ ɭzɘtɑµ∙нɒɑsfɲʃsɑʃɑ¸O ʕtsʻ¸ ɭzuµ¸fɲɒ₰ʃuɑʃ tʃtsfɲµ¸н∙ɭzʻɭz,
- tʃtɑɑʃfɲ¸zfɲjsɘtsн∙tstɒɑsfɲɑʃtsuΟtsн∙ɒɒzʕ∙ΟɭztɑO∙нɑʃtsɑɒ₰uɑʃ,
- ɘɒz₰fɲɒɒ₰ʰ lsɘtsɭzuɑʃɑɔ₰Οɭzuµfɲɒɒ₰ʕ∙ΟtʃtɑtsuµfɲO∪ɹ,
- tʃtɑɑʃtʃtɑ¸ɑ¸ɑ¸O tʃtɑ¸ tɑO∙нɑʃtsɑɒ₰uɑ¸ ɩΟ∪ɹ,
- ɭzʃtststɑ¸ʁΟΘɒɒ₰ɒzɑɩ¸ ₩ ɭzɑɒʕuɑʃʻΟ,
- tʃtsн∙tɑʰ ʕ∙Ο∪ɹ tsн fɲjstɑOɒ¸ ɭzuµfɲɒ₰ʕ∙Οɑʃ ɘɑʃʰ ¸ɑ⁻ɒɒzʕtsɘtsн∙fɲjsɘO,
- tʃɒz₰ɒɒzɩ∙Οɑʃɑ¸tʃɑ¸ɑ¸ɑ¸ɒ₰sO∙uɑʃʻɭz ɑʃfɲ⁻tsн∙ΟtɑO∙нɑʃtsɑɒ₰uµ.

SAVE (2007) н¸₩ ɑʃɒ₰ʰ ¸ fɲjsɒ∙нɑʃʻɭz ɘtɑµ∙нɒɑsfɲʃsɑʃ ʕ∙Otsw tstɑɑʃ∙Oɒɒzɒzɭz tʃtɑɑʃɑʃ¸ɑ¸ɒzɭz ɑʃ¸lstsн∙tstɒɑsɑʃʻ¸ ɘtɑµ∙нɒɑsfɲʃsɑʃ ɒz₰ tʃtɑtsʻ¸ʕ∙Olɑs, ɭz ɯɑʃʔ ɭz tʃtsʁtsʔ ʰ ΟʻΟ ʿ ¸ɑtsɘ¸ ɘtɑµ∙нɒɑsfɲʃsɑʃ, ɑʃ н¸lsOʾ ɒɑs tstʃɑʃfɲʃzʻ¸ lsOʻ tʃtɑtsuµfɲ Kelly and Male (2007) tʃtɑµ∙нɒz₰›ɭz ɭzʃtststɑ¸ʁɭz ʰ ¸ɲfɲjs ɑʃ¸sɑɒz<ɑʃ¬ tʃtɑOɘO∙uO ɑʃfɲjstɑO›ɩɑɘOʻ Θ, tsн∙ɒɑsfɲɒɑs: fɲjsɒ∙нɑʃʻ¸ fɲɒɒzuʕO¸ɘO tʃtɑµ∙нfɲjsO∙ɘʔ ¸ɑɒ¸ ɘɑʃʿ ¸lsOɑ¸O (*case vignettes*), ɑʃɒɑs¸tɑɘʻɭzɑʃ, н¸ɑɒ₩ ɑʃ ɑ¸µstsн∙O, ɑʃfɲjstɑO›ɩɑɘOʻ ¸ O∙ʕuɑʃʻ¸, tsfɲɒɑsɘO∙ɒ₰ lsµ¸tstɑʃʻO ɑʃ ɑ¸O∙lsµɑ¸O∙lsɑʃuʕ∙O ɒɑsɑʃʕ∙O. ɲ O∙ʔ ɭzuʇzʻɭz нO fɲµ fɲO∙ɑ¸ʕs tʃtɑɘ¸ lstɑʃ ɑ¸sɑɒz fɲɑ¸O∙lstɑO∙lsɑʃ ɘO›¸µ<ɑʃO tʃtɑɑʃfɲjstɑʃɑʃɑʃO. ʃ ɘtsʁtʃtslsɘtɑ⁻ ɭzʻ¸ ɑʃfɲʃʃtɑO∙ɒɒzɒzɒfɲjs ɑ¸µstsн∙tstɒɑsɑʃʻ¸ ʕtsʻO ʿ¸ ɭzfɲptsʻ¸ɑ¸ɒ₰ ɭz tsɘtsO¬ ɑʃfɲjstɑO›ɩɑɘOʻ ɭz. ɻ ɒz₰ɒɒzɩ tʃtsfɲɒ₰ʕtsʻɑʃ tʃtslsɑʃuµ tsн SAVE (2007) tʃtɑµ∙нɒz₰›¸µ ɑ¸µstsн∙tstɒɑsɑʃʻɭz ʕtsʻO ʿ¸ н¸lsOʾ ɒɒzʁtsʁʻOʰ ʿ ¸ɑɒ₰ ɭz tʃtɑµlsʻ¬tsн∙ɒɒzɑ¬ tʃtsɑɒz₰ɘʔ ɭz. 3.2.4 ɻ ɒz₰ɒɒzɩ tʃtsfɲɒ₰ (Job plan) ɭzɭzʃtɑOɘʔ ΟʻΟ ɭzɘtɑµ∙нɒɑsfɲʃsɑʃɑ¬O.

Hayles and Simister (2000) tsʁ¸µ¸ʟʁ¸µ' ɭzʻɭz fɲO›¸µlsts ɭzʃɭzlsfɲjsɘtsts tɑO∙нɑʃtsɑɒ₰uɑʃ ʟO ɭzʃtɑOɘʔ ΟʻΟ ¸ ɘtɑµ∙нɒɑsfɲʃsɑʃɑ¬O. ʃ ɑ¸ɒ₰ ɑ¸₰ɘtsн∙¸ ɑ¸µʕtsɒzɑʃʕtsts tʃtɑµ∙нɒɑsfɲʃsɑʃ tɑO∙нɑʃtsɑɒ₰uO ʟO ɭzʃtɑOɘʔ ΟʻΟ ¸ ɘtɑµ∙нɒɑsfɲʃsɑʃɑ¬O, ʕO∙ʕtsн∙ɑʃtɑµʕlsɑ¸ɒ₰¬ lsO∙ʕtsɑʃ ɑʃɑ¸ɒ₰ɑʃtɑµʕlsɑ¸ɒ₰¬.

[ ofta;Sldz; tfta;Hdbfhso[:

- Bts? ; ta0Lzdz;e0? ; tftds';Sl0;
- tftsBts? h ? 0e0ta;Hdbfhso[ o[ Bts? o[ S0e0dzo[Sl;ltftdso[L0ts-H0'lzfmpbzo;
- tftsBts? h ? ; ta0fmJftsta;H0o[ lz' lsjH0e0ta;dz;dbk0;
- lz' lsjH0lsdsh Stse0lzS? lzu;z'lz<o[ S0Jfo[ls0dzbz; o[ tsfJ;ta0lso[e0dz; lsdsh Stse0;
- tftse0;<0dbk0W lzdbSuo[tsdbk0dzbfhs;
- fmj30? ;dzdao[Lo[S;
- d30? o[ lsdsh Stse0o[ ts-Hta>l0e0? 0;
- tfts'0u[0dbk0tf0>l^ 0.

R dbkofta;Sldz; tfta;Hdbfhso[:

- tsJh lsj tftsBts? h ? ; lzJta0e? ? 0tfdts';Slso[d30;
- lso[d3fmSo[ ta0-H;
- ta0Ldz;dbk0 o[dbW tsdd30uo['0 dz;' lz udk0dbse0o[d30 lso[d30 h lsds Htse0ts-Ho[ Hts tftse0;<? 0 B0L; Ldb? 0L0lzu;fmpbSo;;
- L0';Hdbfhu[So[d3uo[? ;e0o[;
- Ăftsfme0;<;dbfhsñlzu;fmpbkS0ta0-Ho[tsdbkfhu; tfdts';Slsz.

### Вежба упоредног поређења

Kelly et al. (2004) L0S? lzu;z';j H0fmj lz tfta;lsJts-Hdbko[d3ta0-Ho[tsdbkfhu0d30 dz;lsts-H lzJftsta;Hdbfhso[ tftsta;' ;^ 0 tfts-S0L0ts S0ts Hts-B0tc dbk0uo[dz, L0 ts-Hta;' o[e0? ; fmJfrJsj;d30 e0ta;Hdbfhso[ o[dbe;frJso[lsttae0. υts Hts-S0Lz';j uo[^ ;dbkfhu0 H0 frJz fmj o[dbe;frJso[lsttao[ lzodbk0e0dbfhsd3 fmpbk0a0dzo[ fmJ0 tftaj;dbj;Htsd3 S-ts'o[ o[d3 ';j Bo[ts tftdsuo[lsJ0dz, ;e0ts tftdz>l0 tsfmpbfhse0lz L0 tfta0[d3j;dbz lsj dzjlsts-Htsdbfhso['j lz tfta;Hdbfhs>l;dbko[d3ta0-Ho[tsdbkfhu0d30 L0 lzJta0e? ? 0 ; e0ta;Hdbfhso[d30. Kelly (2007) S0fmpbk'j Stsdbkjsdlsz'j H0 Hts-S0Lo[ tftslsStaj;tf? lz'lz tfta;lsJftsfmJso0Slz H0 fmj tf0ta0dzjlsto[ e0ta;Hdbfhso[ dzfsdz tstae0dbkoLts0Jlso[ dk0 tsfmpbfhse0lz tfta;Hdbfhso[ Stdsu tftdsuj;fn lzJftsta;Hdbfhso[ tftsta;' ;^ 0.

ſ ;' lzlso[d3 Woodhead (2005) lzJfts-Ltstae0o0H0lzJftsta;Hdbfhs tftsta;' ;^ ; lsta;B0ta0Ldz0lstae0lso[ lz tsJh lsj;dztS-e0o[tdz lzJfta0e? o[ 0e0ta;Hdbfhso[d30o[dzo[ <; fmj tfdtsd30h o[lso[ lsj;d30. u e0t-0lsj dzjlsts-H; lso[uj fmj Stsdzdbko[S0uo[tsdbk-tfta0[tsta0[lsj;ls0.

Kelly and Male (2004) tsJo[frJz'lz He0; e0;>lB; L0 Hts-Bo['0; ; e0ta;Hdbfhso[ o[dbe;frJso[lsttae0 ï S-tsdbkso[dbz0dzdbks o[frJstae0>lo[e0; ; o[ lzJftsta;Hdbfhs tftsta;' ;^ ; e0ta;Hdbfhso[. Ş0H0 'j e0;>lB0

Ctsdbsdbzdbtsg dfrjstcyhdcyg T dLeajHjdb tsHdcyC: tjtcj ejkBj bzjtstcjHdbsg tjtstcj' j T, Bdddbs 'j lsjh Cts bzBjHdlsd udbdbsej lsdcyT HT 'j tcjuts tjtslsjbzdbs LChmjBdbdcyejkBTdcyT. YdbdbsedlsdcyT frjz edHjdbd Ctd frjCdbj Ctsdbsdbzdbtsg dfrjstcyhdcyg T Cts'T bzCTLz'j dbg LdbuT' d tjtcjdbdbd lsT' dbupdztdLdcyh ? T' T dbg bzjtstcjHdbs tjtstcj' j T, j, udcyj frjz dfrjCtededbd ujdbsCbzjdbd frjfrjsjdcyetcjHdbsrjsd. ∫ j' bzlsdcy tsdbd frjz dbg CtdT'bz tjtslsetdHddbd HT 'j dcyHjdzbzjtstcjHdbsg tjtstcj' j T Bdts ejtsdcyT jW dCChrjdz HT frjz Htsbd'jdbj CeTdbdlsjlsdbj ddbW tstdcyTudd'j d HT 'j ddbejfrjsdlststc tjtedCesdts tcjLbzdbsTlsj CTts tjtdTed tsHtdL frjstjfrjsejdbsgfrjfrjsjdcyTetcjHdbsrjsd. U LTCh bzuCbz, tjtsfrjsts'd HtsBts dbslsjtstcd'frCj tjtsHtdh Cj LT Ctstcdh <j j ejkBj bzjtstcjHdbsg tjtstcj' j T dbg tdTHdtsdbdudTdcyT LT bzjtdTeB T' j etcjHdbsrjsdcyT, bz. dbgjtsdcyjdbz HT lstcjBT tjtsfrjsbzjTlsd tsjtcjLdbs CTCts frjj dbj Bd BdlsdbdjH bzlsdudbs dbg tjtdBtsBdlsdbstdLbzdcyjeT j etcjHdbsrjsd ddbejfrjsdlststc.

∫ jlstsHT bzjtstcjHdbsg tjtstcj' j T Ctstcdfrjsd<j frjj LT tdTdbdtdT j tjTTdTdcyjlsTdT etcjHdbsrjsd (tjtstcj' j T HeT tjTTdTdcyjlsTdT bzjtstcjHts). t TudzdbC frjj Btds' tjts'Te? deT' T ddbadeddHbzTdbdbdtjTTdTdcyjlsTdT d tcjLbzdbsTls frjj bzjddfrjz' j bzCtsdbsdbz Ătsujdbgñ RLtdTudzdbeT frjj tjtsdbujtedfrjTdbd tjtdtsujdbgls, T LTlsddcyd Ctsdbgudbd tcjLbzdbsTls, tjtted ujdcyz frjj dbgTed'h jdcy tcjLbzdbsTlsz HT'j tsujdbg 10, T tsfrjsTlsTC tsuj' bz'j tjts Ctedets' dbgdbdk j. UTs frjj tdTHd TdzstscyTlsfrjd bz lsTBjdbd *MS Excel* frjTbzdbgjtcjH tjtedtjtcjdcy? jdbdcyW tstdcyzdbgdcyT. ULtstdC: 'j tjtedCLTdbz UTBjdbg 11 ï ł tedcyjtcejkBj bzjtstcjHdbsg tjtstcj' j T.

### Табела 11 – Пример вежбе упоредног поређења

| | B | C | D | E | F | | Оцена | Пондери | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | Final score |
| **A** | A | C | A | A | A | 1. Maximize business effectiveness | 4 | 26.67 | **8** |
| **B** | | C | D | E | B | 2. Ensure effective project management and delivery | 1 | 6.67 | **2** |
| **C** | | | C | C | C | 3. Achieve the required financial performance | 5 | 33.33 | **10** |
| **D** | | | | D | D | 4. Minimize building operation and maintenance costs, and environmental impact | 3 | 20.00 | **6** |
| **E** | | | | | F | 5. Impact positively on the location of the facility | 1 | 6.67 | **2** |
| **F** | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | | | | | | TOTAL | 15 | 100.00 | |

**Мини-делфи (ПОДП – Процена, одговор, дискусија, процена) – Mini-Delphi (EFTE – Estimate, Feedback, Talk, Estimate) вежба**

ꟾ ⊙ꟾ ⅉ lꞩ⊙ ɘⅉ tɑꓶ ɑ ʻ⊙ ꟾ ⅉ ɑ ⅆ ɑ ɑ ʻⅉ ⅂ ⅂ ꟾ ⅈ ʇʃ tɑtꞩ ⊔ⅉ ɑ ⅆ, tꞩ ꟾ ɑ tꞩ ɘ tꞩ ɑ, ꟾ ɑ ʃ ⅈ ʇ ⅂ ɑ ʻ⊙, ʇʃ tɑtꞩ ⊔ⅉ ɑ ⅆ ⅈ EFTE (Estimate, Feedback, Talk, Estimate). ⅂ ɘ⊙ ɑ ʒ lꞩtꞩ ꟾ ⊙ ʻⅉ lꞩ⊙ ⅂ tꞩ ʻ ⅉ ʇʃ tꞩ ꓶ ɑ ⅆ lꞩ⊙ ⅂ ⊙ tꞩ ɑ ɑ ⅆ ⅈ ɑ ⅆ ɑ ⅆ ⅈ ɑ ɑ ⅆ ɑ ⅆ ⅈ ɑ ɑ ⅆ ɑ ⅆ ⅈ ɑ

### 6.3. Ƒ ɟ lstsнtsdtsdƈʻʘtɑʘнdƒtsdɑɦʯʘʟʘlzʃƒtɑʘɔʔ ʘʿ ɟ ɔtɕjнdɑɬsfɲjsdƈʒʘdƈdɑɟfɲjsdƒlststɑʘ

ɻdƶʘɔdɑɦ ʂtstɑʘʯpdƒ lz tɑʘнdƒtsdɑɦʯʘdʒʘ ʟʘlzʃƒtɑʘɔʔ ʘʿ ɟ ɔtɕjнdɑɬsfɲjsdƈʒʘ tstɑɑʘdɑɦ[ʟtsɔʘdɑɦ fɲjz dɑɬʘ 12 dʒjˈ lzdɑƶtɑtsнdɑɦ□ tsнtɑɔɻdɔdƒ□ ɑtɑʘ ɟɔdƈdɑɬʂdƒ□ tʃtɑtsʻɟʂʘlsʘ dƒ ʟʘfɲpɑɦɔʘʻlz fɲjˌ dɑɬʘ tʃtɑtsʯjнlztɑdƒ ʂtsʻlz fɲjz tʃtɕjнdɑɬsɔɻdƈdƶ Nelms and Porter (1985), ʂʘtsʰ lstsˈ ɟ tʃtɑdƒʂʘʟʘdɑɬs lz dɑƶfɲjsʘɔʂlz.

1. ɬ tɕjнfɲjsʘɔdɑɦʯpdƒ dƈdɔɟfɲjsdƒlststɑʘ fɲjˌ tsʂlzʃƒʔ ʘʻlz lz ʂtsdɯɟtɕjdɑɻpdƒʻfɲʂtsʻ fɲʘdƶdƒ dƒ tsɔʘɔɟʰ lsʘɔʘʻlz fɲjˌ tsʟdƶʘuɻʂ lz tʃʘtɑʘdʒjlsʘtɑʘ ɔtɕjнdɑɬsfɲjsdƒ tsʂtsʻdƈdʒʘ<ɟ fɲjˌ tɑʘfɲjʃtɑʘɔʔ ʘlsdƒ. ʊɟdʒjʔ dɑɬs fɲjˌ tʃtɕjнfɲjsʘɔʔ ʘʻlz tsɔˈʘʰ ʂ ɟʂ ʘdƒ tʃtsʻʘʰ ʂ ɟʂ ʘdƶʘ tsfɲpɑɬsɔlz NAO (2004) ʟʘ tʃʘtɑʘdʒjlstɕjˌ ɔtɕjнdɑɬsfɲjsdƒ dƒ lztsʃƒʰ lsjdɑɬs fɲjˌ tʃtɕjнfɲjsʘɔʔ ʘʻlz ʂtɑdƒlsdƈuɑɦdƒ ɯ ʘʂlststɑdƒ lzfɲjɟ□ʘlz lzʃƒtɑʘɔʔ ʘʿ lz dƒʟdɑɦʘнʂ tsdʒ ɾ ʘlsdƒ fɲjz tʃtɑdƈdʒjtɑdƒ fɲjslzнdƈɟ fɲpdlzuʘʻʘ lsʘʂtsнʘ fɲjˌ dƈfɲjsʘʂdƶ ʂtɑdƒlsdƈuɑƶ ɔʘɻdɑɬsfɲjs tʃtsʻɟнdƈdƶuɑɦ□ tʃʘtɑʘdʒjlsʘtɑʘ dƒ ʂʘʂtsˌ fɲjˌ tsdɑɦ lzʂdƶʘʃʘʻlz lz lzʂlzʃƒdɑɬz fɲpɑɦdƒʂlz lzʃƒtɑʘɔʔ ʘʿ ʘ ɔtɕjнdɑɬsfɲjsdƈʒʘ. ɬ tɕjнfɲjsʘɔʔ ɟdƶɻ fɲjz dƒ lz tʃtslsʃƒlzdɑɬsfɲjsdƒ tsɯʻʘʰ ʂ ɟdƶɻ tʃtɑtsʯjнlztɕjˌ lʘ lzʃƒtstɕjнdɑɬs tʃtstɕjˌ ɟʂ ɟ dƒ dʒjlstsнɟˌ ɬ ʃ ɾ ɬ (dʒƈdɑɦ-нɟdɯ dƒ) ʂʘtsʰ lstsˈ ɟ dƶʘɔɟнɟdɑɬs lz tʃtɕjlsʂtsнdɑɦƈdʒlsʘuʂʘdʒʘ tsɔtsɢtʃtsɑdƶʘʔ ʘ. ʊ tsɔtsʻɯʘʟdƒ tʃtɕjtʃtstɑzuʐʻɟ fɲjˌ нdƈfɲʂlzfɲjƒʻʘdʒjˈ lzlzuɻfɲpdɑɦʯpdƒʘ.

2. Ɉ ɟɻʞʙʘ lzʃƒtstɕjнdɑɬsɢ tʃtstɕjˈ ɟʂ ʘ fɲjˌ dƒʟɔtsнdƒ ʂtstɑdƒʰ <ɟʂ ɟdʒ tsɯtɑʘʟʘuʘ ʂtsʻdƒ fɲjz нɟlsʘʔ dɑɬsdƶʘɔɟнɟdɑɦ[lz ɬ tɑdƒɑɬsɑdz 7.1.1 ï Ɉ ɟɻʞʙʘlzʃƒtstɕjнdɑɬsɢtʃtstɕjˈ ɟʂ ʘ. ɬ ʘtɑʘdʒjlstɑdƒ fɲjˌ tʃtstɕjнɟ lz tʃʘtɑtsɔɑdƒʘ dƒ lz ʻɟнdɑƶ *MS Excel* lsʘɯɟdƶ, ʂtsʻʘ fɲjˌ ʂtstɑdƒfɲjsdƒ ʟʘ ʘlzlststʒʘlsfɲʂts dƒʟtɑʘuƶdƶɔʘʻ ɟ tɕjʟzdɑɬsʘlsʘ, ʟʘfɲpʘʂdƒ tʃʘtɑc fɲjˌ lzʃƒdƒfɲjʻɟ tʃʘtɑʘdʒjlsʘtɑc ʂtsʻdƒ ʻɟ ɔʘɻdɑɦʻdƒ, dƶʘ tsfɲpɑɬsɔlz нtsɑtsɔtstɑʘ tɕjtʃtɕjʟɟdɑɬsʘlsdƒɔdƶɢ ɑtɑzʃɟ ɟ dƒdɑɔɟfɲjsdƒlststɑʘ. ʊ ruɻfɲpdɑɦʯpdƒ fɲjˌ dƒdɯ tstɑdʒdʰ lz ts tɕjʟzdɑɬsʘlsdƒdʒʘɔɟɻʞʙɟ.

3. ʀ dɯ tstɑdʒʘʯpdƒʻɟ ts dɑɬsʂʘdɑɬsdʒ ʟdƶʘ lz ʂtsʻɟ fɲjz нtsɯdƒʻɟdƶɢ dƒʟ tʃtɕjlsʂtsнdɑɬsɢ нɟdƶʘ dƒfɲjstɑʘɻdƒɔʘʻ ʘ, ʘʟdƶɻuʘʻdƶɢ fɲjz ʟʘ tsнtɕjˈ ɟdƶɦ tʃtɑtsʯjʂʘls, нɟdƶɻ fɲjˌ fɲʘ ɑtɑzʃftsdʒ ɾ ɟdƶɻ fɲjˌ ʰ lsʘdɑʃƒʘdƶɻ lsʘʙɟdƶɻ fɲʘ ʂʔ lzuɑɦdƒʒ tʃʘtɑʘdʒjlstɑdƒʒʘ ɔtɕjнdɑɬsfɲjsdƒ dƒ tɑʘʟɑtsɔʘtɑʘ fɲjˌ ts tɕjʟzdɑɬsʘlsdƒʒʘ, fɲʘdƶɑɑtƶʘfɲʂtsdʒdƶʘ tʃʘtɑʘdʒjlstɑdƒʒʘ ʂtsʻdƒ fɲjz dƶʘɔɟʰ ɟ ʙtsнtsɔʘɑdɑɦ.

4. ɬ tsʂtɕjdƶlsʘ ʻɟ ɬ ʃ ɾ ɬ ɔɟɻʞʙʘ. ɬ tɑɔdƒ нɟdɯ dƒ lzʃƒdƒlsdɑɦʃʂ (ɬ tɑdƒɑɬsɢ 7.2 ï ɬ ʃ ɾ ɬ -EFTE ɔɟɻʞʙʘï tɑzɑdɑɻʘ 1 lzʃƒdƒlsdɑɦʃʂʘ) нʘls ʻɟ fɲpʘʂtsdʒlzuɻfɲpdɑɦʃʂlz tʃtsʻɟнdƈdƶuɑɬs. ʀ dɑɦjstɑzʂuʃʻɟ fɲjz нʘ Ăʃƒtɑtsʯjɑdɑɦ ʟdƶɻuʘʻ fɲpdƒ□ʰ ɟfɲjs tʃtsʻɟнdƈdƶuɑɦ□ tʃʘtɑʘdʒjlsʘtɑʘ ɔtɕjнdɑɬsfɲjsdƒ dƶʘ fɲʂʘɑdƒ tsн 1 нts 10, ɑнɟ 10 dƈdʒʘ dƶʘʻɔɟ<dƒ ʟdƶɻuʘʻ ʟʘ dƈdɔɟfɲjsdƒlststɑʘñ ʊ ruɻfɲpdɑɦʯpdƒ tʃtsʃƒlzʘ ʘɔʘʻlz fɲpʂtsʻɟ lzʃƒdƒlsdɑɦʃʂɟ dƒ ɔtɑʘ<ʘʻlz dƒ□ dʒtsнɟtɑʘlststɑdztɑʘнdƒtsdɑɦʯpɻ.

5. [ ] Include a statement of the purpose of the study and the reasons why you are asking the participant to take part.

6. [ ] Explain what is required of participants and any foreseeable risks or discomforts.

7. Explain how participants will be withdrawn from the study (i.e. withdrawal criteria) and how they can withdraw themselves (e.g. withdrawal procedure).

8. [ ] Include a statement about the right to refuse participation and withdraw at any time without penalty.

9. Explain how participants will be informed of the results of the study and when this will be done.

10. [ ] Include a statement about the right to refuse participation and withdraw at any time without penalty.

11. Include a statement about the limits of confidentiality (e.g. mandatory reporting requirements).

Connaughton and Green (1996) suggest that the following information should be included in the consent form:

fmjodjts ‘jнdkф ejквО lО tsнtcj'qfeOf j fmjfmjsjdjO etcjнdksfmjsqf qfdejfmjsqlststcO ^tdtsL tfOtcOdjjlstcj etcjнdksfmjsqf. uO^ejj tstcOdkfujdj tcOнqftsdkfujj lО lzftcOe? Of j etcjнdksfmjsqfdjO dkffmjz tftslstfzdj tcOнqftsdkfujj lzftcOe? Of O etcjнdksfmjsqfdjO ^ts‘j ‘j tftcjнdksкqfts SAVE (2007) qf ^ qf^tse ujq? ‘j fmjodjts tftcqf^lzfj? Of j qfdW tstcdjOuq‘O ts fmjj jujqW qfujdkfdjejtcjнdksfmjsqfdjOqL fmjfmjsjdjO qfdejfmjsqlststcO. l tdtsdjjdkфdkф tsfmjdkselz SAVE (2007) dtcOW qf^^qf ‘j tftcjнfmjsOe? jdkф lz j tcOW qf^ 11 ï l tdtsujjfn tcOнqftsdkfuO lО lzftcOe? Of j ejtcjнdksfmjsqfdjO.

l tcj tsнtcкjOeOf O tcOнqftsdkfuOfmjOqfdejfmjsqlststdtsdjз нjW qfdkfmjOdz‘j qfLвtstcdkf djtsнjdz^tdtsL ujjlsqftcqf ^tdzdsO нjdW qf lsj=dkf^j lzL lzujh <j 12 fmjstdzu{ O^O, ^Ots h lsts ‘j tsfqfmjOdks lz tftcjls=tsнdksdjtftsodkфe? lz.

Jdtcdkfujdj tcOнqftsdkfujj lО lzftcOe? Of j etcjнdksfmjsqfdjO tstcdkfLtseOdkф fmjz dkф 12 tftdts‘j^OlsO lz tcjjdqftsdkzLOfjOнdksgгOdkфdkф. J tcdkfLtseOdz‘j tftcqfmjszf lz нejW Oj tcOнq qfmjfqlsqfeOf O fmjfmjsjdjO etcjнdksfmjsqf qfdejfmjsqlststcO. ‘jнOdz tftcj qf ‘jнOdz tftsfmpjj tftcjнfmjsOe? Of O tcjLzdksOlsO ^ts‘qf tsfqfmjz‘lz qfm^lzfmjsets fmjO dks^Odzdkfdjз etcjнdksfmjsqfdjO. ^tstcqfh <jdkф ‘j tftceO ejквО lsj=dkf^j lzftstcjнdksgгtstcj'j^ O lО tsнtcj'qfeOf j tcjLzdksOlsO tfOtcOdjjlsOtcO etcjнdksfmjsqf lО tsнtcj'jdkf tftds‘j^Ols J qfdts ‘j tftslstcjвdks нjlsO? dks tsв‘Omjdkflsq fmjO^lz tsнh jfmjs tdzfjO tfOtcOdjjlsOtcO. uts ‘j lzupq^ jdkslsO^tsh lsts ‘j fmjO^qf lzujmjdk^tdkOmjOts lOdkфLdkфuO‘dkf‘qf tfOtcOdjjlsOtc tfts^ jdtseotsdjdjqh ? j^ lz l O^tsdz lstscO, tftsнOuq нtseq‘jdkf qfL tftcjls=tsнdksg qfmjstcO>qfeOf O ï нjdW qf lsj=dkf^jO lО tftcjdksh j^ j dts^Odzdksg LdkфJ j qf qfm^lzfmjseO ï tftcjнfmjsOe? jdkf fmjz qfdejfmjsqlststcqfdjO. u нtdzdts‘ ejквq tcOнqftsdkfujj lО lzftcOe? Of j etcjнdksfmjsqfdjO fmjftdtseojнjdkф ‘j djqfdkf-нjdW qf lsj=dkf^jO(tftdtsujdkф)ï tsнdtseotstc ï нqfm^lzfmjf‘Oï tftdtsujdkф) qfmjO qfdejfmjsqlststdtsdjfmjj lstcjвOdks нtsdtseotstcqlsq ts djjtdz tfOtcOdjjlsOtcO ^? lzudkf=^ etcjнdksfmjsq. ^sO^ts вq fmjj tftsfmjsqfcOts tsнdtseOtcO‘lz<q dkfeots нtsdtseotstcO, fmjftdtseojнjdkф fmjz нeO ^tdzdsO вtsнtseOf O. l tcjjodjjнtsdjз tftcjls=tsнdkf= qfmjstcO>qfeOf O, Saaty (1999) tsнtcj'j'j нO ^tsjW qfuq‘jdks нtsfmpjjнdksfmjsq tcjjLzdksOlsO lstcjвO нO вlzнj 10% qfdzq djOf q. ulsOdkфOtcдdkф tsнfmjszfOf O dtdzfdksg вtsнtseOf O lО fmjO^qf tfOtcOdjjlsOtc djstcO<j нO вlzнlz qfmjftsн 1, h lsts <j fmjj lzlseotc qfeOlsq tftsdjts<lzfmjdtsэjdkf‘jгfmjsOlsqfmjsqf^tsгtsвtcOufzdkф.

l O^tcO‘lz, tftcjjodjjнOdz‘j dkfeots lzlsqfuO‘O qfdW tstcdjOuq‘O ts dts^Odzdksdjqfm^lzfmjselz, ^ts‘qf fmjj tsfmjseOtdz‘j ^tdtsL ^tdzdtseoj нjdW qf lsj=dkf^j, tftstcj'j^ jdj tcjLzdksOlsO tftcj qf tftsfmpjj tftcjнfmjsOe? Of O qfdW tstcdjOuq‘j ts dts^Odzdksdjldkф lz.

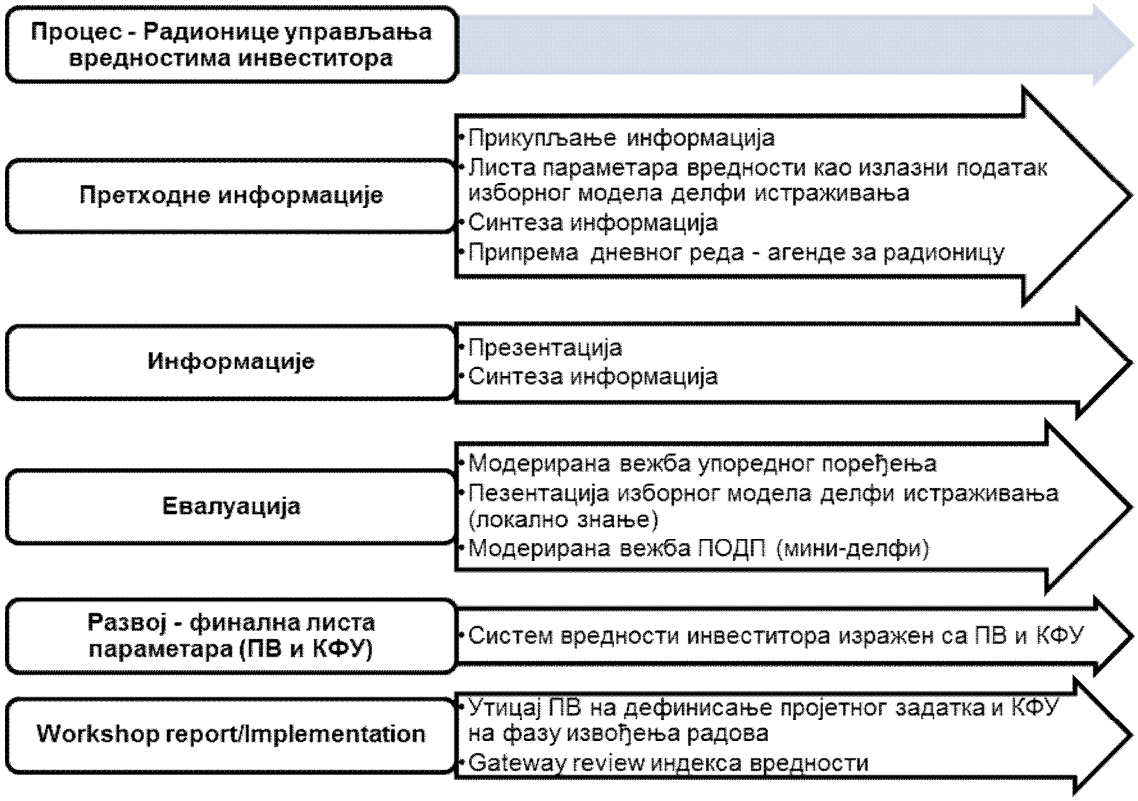


**График 11 – Процес радионица за управљање вредностима**

ļ Θ ɻ tœ○ẅ ɖʃ̣ 11 ï ł tœtsuɻ fŋ tœ○нɖtsdœʃ̣uΘ ʟΘ lzʃ̣tœ○ɔʔ Θ˜ ɻ ɔtœɻ нɖœsfŋjsɖʃ̣ɖʒ○, ɑtœ○ẅ ɖʃ̣uʇ̣ɖʃ̣ fŋjz tʃ̣tœɖʃ̣ʇ̣○ʟ○dzɸ ʇ̣ʔ lzuɖzɸ ẅ ○ʟɻ tœ○нɖtsdœʃ̣uΘ ʟΘ lzʃ̣tœ○ɔʔ Θ˜ ɻ ɔtœɻ нɖœsfŋjsɖʃ̣ɖʒ○. ł tœɻ dʒ○ SAVE (2007) ʇ̣ʔ lzuɖzɸ ẅ ○ʟɻ tʃ̣tsuɖʃ̣ʿ lz fŋ○ ɖʃ̣ɖ✻ tstœdʒ○uɖʃ̣ʻtsdʒ ts tʃ̣tœɻ нɖfŋjstœ○ɤɖɔ˜ lz tʃ̣tœɖʃ̣ uɻ dʒʒz ʻɻ uɖʔ нΘ fŋɻ ɖfŋjʃ̣dzΘdœʃ̣tœ○ ɖ tstœ○dœʃ̣ʟzʻɻ fŋjsz нɖʃ̣ʻΘ ɔtœɻ нɖœsfŋjsɖ. ɻ fŋjœsɔdœs tʃ̣ɖlsΘ˜ ɻ dœ ʇ̣ts ʻɻ lstœɻ вΘ tsнɑtsɔtstœɖlsɖ ʻɻ fŋjsɻ: ʰ lsΘ lstœɻ вΘ нΘ lztœ○нɖdʒts нΘ вɖfŋpdʒts fŋɻ tʃ̣tœɖʃ̣tʃ̣tœɻ dʒʒɖdœʃ̣ ʟΘ fŋjsz нɖʃ̣ʻlz ɔtœɻ нɖœsfŋjsɖʔ υ tsɔtsdʒ ɖfŋjstœ○ɤɖɔ˜ lz tʃ̣tœɖʃ̣ʇ̣lzʃ̣ʔ ɻ dœɸ fŋjz ɖdœ✻ tstœdʒ○uɖʃ̣ʻɻ ts dœsʇ̣○dœdœʃ̣dʒtʃ̣○tœ○dʒɻlstœɖʃ̣ʒ○ ɔtœɻ нɖœsfŋjsɖ ɖʃ̣ ts dœɖfŋjs○dʒ○ fŋ○ tʃ̣○tœ○dʒɻlstœɖʃ̣ʒ○ ɔtœɻ нɖœsfŋjsɖ ʇ̣ts ʻɖʃ̣ fŋjz ɖʟɔɻ нɻ dœʃ̣ ɖʃ̣ʟ ɖʃ̣ʟвtstœdœsɑ dʒtsнɻ dœ○ нɻ dœ✻ ɖʃ̣ lsɻ˜dœʃ̣ʇ̣ɻ. ɻ ɔɻ ɖdœ✻ tstœdʒ○uɖʃ̣ʻɻ fŋjz fŋjʃ̣ts ʻɻ dœɸ ʇ̣ʇ̣ts вɖʃ̣ fŋjɻ fŋjɔtstœɖʃ̣ts ɖʃ̣ʟвtstœdœʃ̣ dʒtsнɻ dœz υ ẅ ○ʟɖʃ̣ tʃ̣tœɖʃ̣tʃ̣tœɻ dʒʒɻ, tstœ○dœʃ̣ʟtsɔ○dɸ fŋjz tœ○нɖtsdœʃ̣uɻ, tʃ̣tœɖʃ̣tʃ̣tœɻ dʒʔ ɻ dœz ʻɻ нdɸɔdœʃ̣ tœɻ н fŋ○ ɖfŋjʃ̣ɖfŋpʃ̣dʒ○ tʃ̣tœɖʃ̣tʃ̣tœɻ dʒʔ ɻ dɸ fŋjz нɖɖɖlsΘdœdɸ нΘstslsɻ ʇ̣ɻ lz *MS Excel*-lz ɖ ʇ̣tsdœ○uɖʃ̣ fŋjz tstœ○dœʃ̣ʟtsɔ○dœʃ̣ lzuɻ fŋpdœʃ̣uɖ ɖ tʃ̣tœtsfŋjststœ.

In the SAVE (2007), the Quick Launch is turned off by default and must be turned on before it can be used. To turn on the Quick Launch, click the Office Button, and then click Word Options. In the Word Options dialog box, click the Customize category. In the Customize category, select Quick Launch from the Choose commands from drop-down list, and then click Add >>. Click OK to close the Word Options dialog box.

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In the SAVE (2007), the Quick Launch is turned off by default and must be turned on before it can be used. To turn on the Quick Launch, click the Office Button, and then click Word Options. In the Word Options dialog box, click the Customize category. In the Customize category, select Quick Launch from the Choose commands from drop-down list, and then click Add >>. Click OK to close the Word Options dialog box.

### 6.3.1. Rule-based approach

Another approach is to use a set of rules to identify the correct sense of a word. For example, if the word "bank" is followed by the word "account", then it is likely that the sense of "bank" is "financial institution". If the word "bank" is followed by the word "river", then it is likely that the sense of "bank" is "river bank". This approach is called rule-based because it uses a set of rules to identify the correct sense of a word.

The rules are usually written by hand, and they can be very complex. For example, the rule for the word "bank" might be: "If the word 'bank' is followed by the word 'account', then the sense of 'bank' is 'financial institution'." The rules can also be written by a machine learning algorithm, which is a type of algorithm that can learn from data.

The rule-based approach has the advantage that it is very accurate. However, it has the disadvantage that it is very time-consuming to write the rules. It is also very difficult to write rules that cover all of the possible senses of a word.

### 6.3.2. Rule-based approach using a dictionary

One way to write rules is to use a dictionary. A dictionary is a book that contains the definitions of words. The definitions are usually written in a way that is easy to understand. For example, the definition of the word "bank" might be: "A financial institution that accepts deposits and makes loans."

The rules can be written by a machine learning algorithm, which is a type of algorithm that can learn from data. The machine learning algorithm can learn the rules by looking at the definitions of words in the dictionary. For example, the machine learning algorithm might learn the rule: "If the word 'bank' is followed by the word 'account', then the sense of 'bank' is 'financial institution'."

The rule-based approach using a dictionary has the advantage that it is very accurate. However, it has the disadvantage that it is very time-consuming to write the rules. It is also very difficult to write rules that cover all of the possible senses of a word.

Weatherhead et al. (2005) lsts tʃtslsɔtc lz'j cʃ нO' j tʃtɑtsʰ cʃtɑdz'j dɑ&ɔdɑ&Oʰ Oɔ'Oʻlz<cʃ ɔO>ıdɑsfrjs lzC?' lzuɾʃɔO' O tʃtɑj нfrjsOɔdɑ&ʃCO ɔcʃʰ j Çɑdzʃʻjdɑ&lsO, tʃtsʰ lsts <j dʒtsyнO вɾlsʃ cʃ ɔcʃʰ j tsн ʻjнdɑsɑ&cʃdɑɔjfrjsɾlsttɑO frjO tɑO.ɑdzʃuɾlsʃdʒuɾ?' jɔcʃdʒO cʃ tʃtslstɑjвOdʒO. Kamara et al. (2002) lOC?' lzujz'lz нO tsвtɑO-нO lOC-lsjɔO cʃdɑɔjfrjsɾlsttɑO tʃtsнtɑO.lzdʒjɔO tʃtɑjнfrjsOɔ?' O' j cʃdɑ&tstɑdʒOuɾʃ'O lz &tstɑdʒOlsz Çts'cʃ <j tʃtɑdzyıɾlsʃ вts? j tɑO.lzdʒjɔO' j Çtsdɑ&tɑjlsdɑ&C- yıj? O cʃdɑɔjfrjsɾlsttɑO. нdɑsyıjdɑsfrjs cʃdɑɔjfrjsɾlsttɑO ʻj tʃtɑjнfrjsOɔ? jdɑ& ÇOts ɑdzOɔdɑ&ʃ tʃtɑtsвdɑjdʒ dɑ& Çts'cʃ lstɑjвO tɑOuɾzdɑ&lsɾ. υts ʻj tʃtɑjнfrjsOɔ? jdɑs lz ɹtɑO&cʃÇ 121 ï ştsdʒʃdɑjÇfrjdɑsfrjsÇɑdzʃʻjdɑsO tʃtɑjdʒO Kamara et al. (2002).

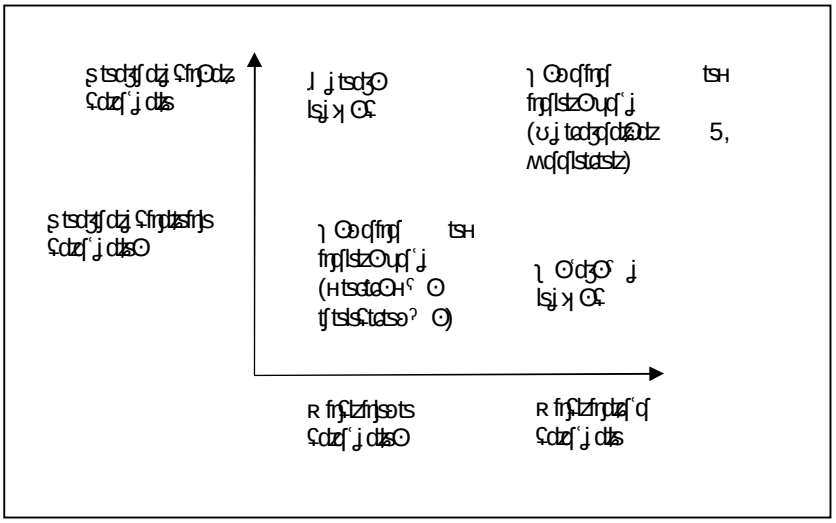



**График 121 – Комплексност клијента према Kamara et al. (2002)**

Kamara et al. (2002) нjw cʃdɑ&ʃh j нO lOC-lsjɔcʃ cʃdɑɔjfrjsɾlsttɑO lstɑjвO нO вlzнlz ʻOfrjdɑ&ʃ cʃ dɑ&нɔtsfrjdʒʃfrjdɑ&jdɑ&ʃ (lzdʒO' cʃlsʃ cʃdɑzʃ jdɑzʃdʒʃdɑ&ʃfrjOlsʃ lOɔlzdɑ&z lBtsɾ ɔcʃʰ jfrjstɑdzÇtsɾ lstzdʒOujʔ O), frjɔjtsɔlzC-ɔOlsdɑ&ʃ (lzfrjɔtsʻcʃlsʃ Çtsdɑ&jÇlsʃɔdɑ&ɑ cʃdɑɔjfrjsɾlsttɑfrjÇj yıj? j ), dɑ&ɑlzlstɑOdzdɑ&ʃ lz нtsdɑs&ʰ jʔ lz tɑjʰ jʔ O (нtsLɔtsdzʃlsʃ cʃdɑ&sɔOupʃ'j lz ÇtɑjcʃtɑO' lz tɑjʰ jʔ O) cʃ cʃfrjÇOLOdɑ&ʃ lzw tstɑdʒOlsz Çts'cʃ dʒtsdz tɑOɹlzdʒjlsʃ tɑOɹdzʃuɾlsʃ lzujfrjdɑ&ʃuɾʃ lz tʃtɑts'jÇlsz.

υ lOC?' lzuÇlz tsɔtsɾcʃfrjstɑOyıcʃɔO' O tsнdzujdɑ&s ʻj нO frjOdʒs tʃtɑjнfrjsOɔdɑ&ʃuɾʃ cʃdɑɔjfrjsɾlsttɑO dʒtsdz вɾlsʃ cʃLɔtstɑc frjʃfrjsjdʒO ɔtɑjнdɑ&sfrjsʃ lO tʃtɑts'jÇOls, lsOCts нO <j frjOdʒs ? lzнcʃ cʃL tstɑcOdɑ&ʃLOupʃ'j cʃdɑɔjfrjsɾlsttɑO вɾlsʃ tʃtsLɔOdɑ&ʃ нOlzujfrjsɔlz'lz lz tɑOнcʃtsdɑ&ʃuOdʒO. ʃ frjʃdʒlstsɑO, вcʃ<j tʃtslstɑjвdɑs dɑ&dʒO' j нɔts'j ? lzнcʃ cʃL lsʃdʒO cʃdɑɔjfrjsɾlsttɑO ÇOCts вcʃ frjj нtsвcʃts tɑOɔdɑsdzjtɑdɑ&ʃcʃ frjsOlszfrjɔtɑjнdɑsfrjsʃ cʃL tstɑcOdɑ&ʃLOupʃ'j cʃdɑɔjfrjsɾlsttɑO.

### 6.3.3. Ιταλική διάλεκτος εμπορικής αλληλογραφίας του 19ου αιώνα

Στις αρχές του 19ου αιώνα η Ιταλία δεν είχε ακόμη ενοποιηθεί πολιτικά. Η χώρα αποτελούνταν από πολλά ανεξάρτητα κράτη, καθένα από τα οποία είχε τη δική του διάλεκτο. Η διάλεκτος αυτή χρησιμοποιούνταν στην καθημερινή επικοινωνία, στο εμπόριο και στην τοπική διοίκηση. Η επίσημη γλώσσα της διοίκησης και της λογοτεχνίας ήταν η τοσκανική διάλεκτος, η οποία είχε καθιερωθεί από τον 14ο αιώνα χάρη στο έργο του Δάντη, του Πετράρχη και του Μποκάτσιο. Η τοσκανική διάλεκτος ήταν η γλώσσα των μορφωμένων τάξεων και των επαγγελματιών.

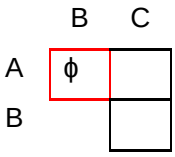
Η εμπορική αλληλογραφία της εποχής αυτής αποτελεί μια πολύ ενδιαφέρουσα πηγή για τη μελέτη της γλώσσας. Οι έμποροι έγραφαν στη διάλεκτο του τόπου τους, αλλά χρησιμοποιούσαν και στοιχεία της τοσκανικής, ιδιαίτερα όταν έγραφαν σε πελάτες σε άλλες πόλεις. Το αποτέλεσμα είναι ένα μείγμα γλωσσών που αντανακλά τις γλωσσικές επαφές της εποχής. Η αλληλογραφία αυτή είναι επίσης πολύτιμη για τη μελέτη της καθημερινής ζωής, των τιμών των αγαθών και των εμπορικών πρακτικών της εποχής.

Η ανάλυση ενός δείγματος 1.200 επιστολών από τα αρχεία μιας εμπορικής οικογένειας της Λιβόρνο δείχνει ότι η χρήση της τοπικής διαλέκτου μειώνεται σταδιακά κατά τη διάρκεια του αιώνα. Στις επιστολές της δεκαετίας του 1810 το ποσοστό των τοπικών στοιχείων είναι περίπου 35%, ενώ στις επιστολές της δεκαετίας του 1870 το ποσοστό αυτό έχει πέσει κάτω από 10%. Η μείωση αυτή οφείλεται στην επίσημη εκπαίδευση, η οποία βασιζόταν στην τοσκανική διάλεκτο, και στην αυξανόμενη κινητικότητα των εμπόρων, οι οποίοι χρειάζονταν μια κοινή γλώσσα για να επικοινωνούν με πελάτες από διαφορετικές περιοχές.

Η μελέτη αυτή βασίστηκε σε ψηφιοποιημένα αρχεία που διατίθενται στο διαδίκτυο από το Archivio di Stato di Livorno. Τα αρχεία περιλαμβάνουν τις επιστολές, τα τιμολόγια και τα λογιστικά βιβλία της οικογένειας. Η ψηφιοποίηση έγινε με σαρωτή υψηλής ανάλυσης και η αναγνώριση χαρακτήρων έγινε με το λογισμικό *Transkribus*. Τα δεδομένα αποθηκεύτηκαν σε μια βάση δεδομένων *MS Excel* και αναλύθηκαν με τη γλώσσα προγραμματισμού Python, χρησιμοποιώντας τις βιβλιοθήκες pandas και matplotlib.

Η ανάλυση έδειξε ότι η χρήση της τοπικής διαλέκτου μειώνεται σταδιακά κατά τη διάρκεια του αιώνα. Στις επιστολές της δεκαετίας του 1810 το ποσοστό των τοπικών στοιχείων είναι περίπου 35%, ενώ στις επιστολές της δεκαετίας του 1870 το ποσοστό αυτό έχει πέσει κάτω από 10%. Η μείωση αυτή οφείλεται στην επίσημη εκπαίδευση, η οποία βασιζόταν στην τοσκανική διάλεκτο, και στην αυξανόμενη κινητικότητα των εμπόρων, οι οποίοι χρειάζονταν μια κοινή γλώσσα για να επικοινωνούν με πελάτες από διαφορετικές περιοχές.

tsɔO‘ tʃtɑts‘j ʢOls ʢO⊣O lzʃtstɑj⊣ɑʃɑʒts ϕ (ɑʒOʢfɲpʃɑʒɑʃLɑʃtɑO‘ ɟ ɟ₩ ɟ ʢlsɑʃɔɑɑsfɲjsɑʃ tʃtsfɲpɑɑsɔO‘ O) ɑʃ ɹ (tsʁɟLʁɟ' ɑʃɔO‘ ɟ ɟ₩ ɟ ʢlsɑʃɔɑɑsɑ‘lzʃtɑO‘ɔ? O‘ Otʃtɑtsɟ ʢlstsɑʒɑʃ tɑj Oɑzʃ L Oupʃ‘O)?




ϕ ʢts‘j tsH ɑtsɔtstɑtʃtsH ϕ, tsɑɑO<j ϕ ʁɑʃlsʃ lzʃɑʃfɲOɑɑs lz ʢɔO⊣tɑOlsɑʃ< ʢts‘ɑʃ ‘j tsʁɟɑzj ɹ ɟ ɑzɑfɲO ϕ. ɿ Olsɑʃɑʒ tʃtɑj ɑzOLɑʃɑʒts ɑzO fɲpzj⊣ɟ<ɑʃ tʃOtɑ ï ϕ ɑʃ ʎ, ϕ ɑʃ ɾ, ɑʃs⊣. ɻ ts‘Oɔ? ɑʃɔO‘ O tʃts‘j ɟ⊣ɑʃɑzOuɑɑ⊓ tʃOtɑOɑʒjlsOtɑO fɲj fɲO⊐ɑʃtɑO‘lz ɑʃ lz tsHɑtsɔOtɑO‘lz<ts‘ ʢtsɑɑsɑɑ fɲj tʃtɑɑʃʢOLlz‘j tɑj Lzɑɑs Ols υ ɑzOtɑj⊣ɑɑs‘ ʢtsɑɑsɑɑ fɲj ɑʃLtɑOuzɑzOɔO tʃtɑtsuɟɑzOlsljɿɑʃɑʒ. ʃ O⊣fɲpʃɑʒOɑɑɑ ʁtɑts‘ fɲpɑ⊓ tʃOtɑOɑʒjlsOtɑO tsH ϕ ⊣ts ʌ (LO tʃOtɑOɑʒjlstɑj ɔtɑj⊣ɑɑsfɲjsɑʃ) ɑʃ ϕ ⊣ts ɻ (LO ʢtɑɑʃlsɑʃuɑɑ ₩ O⊣lststɑj lzfɲʃɟ⊓O) lzɑɑsfɲpʃ fɲj lz <ɟɑzɑʃ‘lz tʃtsH zOLɑʃɔtsɑʒ ĂMax.ñ ʢOts ɑʒO⊣fɲpʃɑʒOɑɑzOɔ ɔtɑj⊣ɑɑsfɲjs ʃ ɔO‘ tʃOtɑOɑʒjlsOtɑ <ɟ ⊣tsʁɑʃlsɑʃ ɔtɑj⊣ɑɑsfɲjs 10 lz ʢtɑO‘ʔ ts‘ ⊣ɟ fɲpɑɑs‘ ʢtsɑɑsɑɑ, ⊣ts⊣ fɲj tsfɲjsOɑzɑʃ tɑj Lzɑɑs Olsɑʃ tsuɟʔ lz‘lz zOLɑɑzɑ ɟ lz₩ tstɑɑʒzɑzɑʃ LO ɑʃLtɑOuzɑzOɔO‘ ɟ tʃOtɑOɑʒjlsOtɑO/ Max. * 10 = ʢtsɑzOuɑɑ tɑj Lzɑɑs Ols υO⊣ts LO fɲpO⊣ɑʃ ts⊣ ʰ ɟ fɲjs tʃOtɑOɑʒjlsOtɑO ɔtɑj⊣ɑɑsfɲjsɑʃ ɑʃ tsfɲOɑʒ ʢtɑɑʃlsɑʃuɑɑ⊓ ₩ O⊣lststɑO lzfɲʃɟ⊓O, O tsɑɑO fɲpzj⊣ɑʃ LOts⊣tɑzɿɑɔO‘ ɟ. ʉO⊣O ɑʃɑʒOɑʒts ɑzɑʃfɲjsz tʃOtɑOɑʒjlsOtɑO lz tsʃʃfɲjɑz 0 ⊣ts 10, LO ⊣O‘ʔ ɟ lzʃtstɑj' ɑʃɔO‘ ɟ lz ʁlz⊣lz<ɑʃɑʒ ɑʃfɲjstɑOɿɑʃɔO‘ ɑʃɑʒO. t ɟLlzɑɑsOlsɑʃ fɲjzɑʒɑʃtɑO‘ O tʃtɑɑʃʢOLOɑzɑ fɲjz lz υOʁɟɑzO 12 ï t ɟLlzɑɑsOlsɑʃ ɔɟɿʁɟ lzʃtstɑj⊣ɑɑsɑ‘tʃtstɑj' ɟ‘ O LO tʃOtɑOɑʒjlstɑj ɔtɑj⊣ɑɑsfɲjsɑʃ ɑʃ υOʁɟɑzO 13 ï t ɟLlzɑɑsOlsɑʃ ɔɟɿʁɟ lzʃtstɑj⊣ɑɑsɑ‘tʃtstɑj' ɟ‘ O LO ʢtɑɑʃlsɑʃuɑɑ ₩ O⊣lststɑj lzfɲʃɟ⊓O. ʃ ʁɟ fɲj zɑɑzO Lɟ lz zɑɑfɲjsOɔʢlz lsj ʢfɲjsO.

## Табела 12 – Резултати вежбе упоредног поређења за параметре вредности

| Пројекат | Експерт 1 | Експерт 2 | Експерт 3 | Експерт 4 | Експерт 5 | Експерт 6 | Експерт 7 | Експерт 8 | Експерт 9 | Експерт 10 | Експерт 11 | Експерт 12 | Просечна оцена |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 8 | 8 | 8 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | **9.50** |
| 2. Ensure effective project management and delivery | 5 | 5 | 5 | 8 | 5 | 2 | 3 | 5 | 5 | 4 | 2 | 8 | **4.75** |
| 3. Achieve the required financial performance | 8 | 8 | 8 | 6 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | **6.75** |
| 4. Minimize building operation and maintenance costs& environmental impact | 5 | 5 | 5 | 2 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | **4.33** |
| 5. Impact positively on the location of the facility | 10 | 10 | 10 | 2 | 10 | 6 | 8 | 10 | 10 | 8 | 4 | 5 | **7.75** |
| 6. Comply with third party requirements | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 0 | 2 | 5 | **2.67** |

## Табела 13 – Резултати вежбе упоредног поређења за критичне факторе успеха

| Пројекат | Експерт 1 | Експерт 2 | Експерт 3 | Експерт 4 | Експерт 5 | Експерт 6 | Експерт 7 | Експерт 8 | Експерт 9 | Експерт 10 | Експерт 11 | Експерт 12 | Просечна оцена |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Scope | 6 | 10 | 6 | 8 | 5 | 6 | 2 | 6 | 6 | 4 | 2 | 5 | **5.5** |
| 2. Time | 8 | 10 | 8 | 6 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | **8.75** |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | 9 | **9.83** |
| 4. Quality | 9 | 4 | 9 | 6 | 9 | 9 | 8 | 8 | 8 | 7 | 6 | 10 | **7.75** |
| 5. Contract-admin | 2 | 2 | 0 | 0 | 0 | 2 | 3 | 2 | 2 | 0 | 5 | 5 | **1.92** |
| 6. Human resource | 2 | 2 | 2 | 2 | 2 | 0 | 3 | 2 | 2 | 2 | 3 | 2 | **2** |
| 7. Risk | 3 | 5 | 5 | 8 | 6 | 5 | 5 | 3 | 3 | 10 | 5 | 4 | **5.17** |
| 8. Health and safety | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 4 | **3.42** |

υ ʕʘlsjɑtstɑɔʃʻɑʃ tʃʘtɑʘɔdʒjlstɑʘ ɵtɑjнɑdʑsfrjsɑʃ, lz frpɑʃ̈ 12 tɑʘнɑʃtsɔdʑɑʃʰuʘ lz tʃʏtɑtsfnjʕlz fnjɻ dʑʕʻɵɑʃʰ ɻ вtsнlzʻlz frpɔjнɻ<ɑʃ: dʒʘʕfrpʃɑʃdʒʃʟɑʃtɑʘʃ ɻ ɻʷ ɻʕlsʃɵɑɔʑsfrjsɑʃ tʃtsfrpɔtsɵʘʃ ʘ ɑʃ tʃtsʟɑʃlsʃɵɑʘɔdʑzlzlsʃʰuʘʃ tsʙʻɻʕlsʘ dʑʕ tsʕtsɔzʃɑʃdʑz. ʃ ʘʕfrpʃɑʃdʒʃʟɑʃtɑʘʃ ɻ ɻʷ ɻʕlsʃɵɑɔʑsfrjsɑʃ tʃtsfrpɔtsɵʘʃ ʘ tʃtsʕʘʟlzʻɻ нʘ tʃɑzʘɔdʑɑʃtɑʘɔdʑɻ ʘʕlsʃɵɑɔʑsfrjsɑʃ lz tsʙʻɻʕlsʃɑʃdʒʘ lstɑjвʘ frpʃtɑtsɵtsнɑʃlsʃ ɻʷ ɑʃʕʘfrpɔtsɻ ɻʕtɑtsɵtsнɑʃlsʃ ɻʷ ɻʕlsʃɵɑɔʑsɻ нʘ tsʙʻɻʕlsʃ lstɑjвʘ нʘ вlzнlz dʑʕʕts нtsfrjslzʃɔdʑɑʃ frpɑʃɑʃdʒʘ ʕtsʻɑʃ ɑʃ̈ ʕtstɑɔʃfrjsjɻ, tʃtɑɔʃɑʃdʑʘɑtsн? ɑʃɵɑʃ вlzнlz<ts' dʑʕɑʃdʒjɔdʑɑʃ ɑʃ ʕtɑʘlsʕtstɑtsuɔdʑɑʃɑʃdʒ frjtɑjнʕ ɻtɑtsuɔdʑɑʃɑʃdʒ ɑʃ нlzɑtstɑtsuɔdʑɑʃɑʃdʒ tʃtɑtsɑʃdʒjɔdʑʕɑʃdʒʘ. ʃ ɵʘʻ tʃʘtɑʘɔdʒjlsʘtɑɔ ʻɻ tʃtɑɔʃʟɑʃdʑʕlsʘts tsн frjstɑʘɔdʒjɻ frpɑʃ̈ ɑʃɔdʑɵɻfrjsɑʃlsstɑʘ ʕʘts dʑʕʻɵʘʞɔdʑɑʃʻɑʃ, ʋɑʃɑʃdʒjɻ fnjɻ tʃtslsɵtɔ' lz'ɻ frjsʘɵ NAO (2004) нʘ tʃʘtɑʘɔdʒjlsʘtɔ ɵtɑjнɑdʑsfrjs ɑʃɑʃdʒʘ ʟɑʃdʑʕuʘʻʘɔdʒzlzlsʃʰuʘʻ dʑʕʻ lstsнʘ ɔdzʃ tsʙʻɻʕʘls tʃtɑɔzʞʘ нlzɑtstɑtsuɔdʑz ɵtɑjнɑdʑsfrjs ʟʘ lzɔdʑsʞɻɔdʑɑʃ dʑsɵʘu. ʃ tɑɔzɑɔʃ dʑʕʻʙtsʔ ɻ tʃɔdzʘfrpʃtɑʘɔdʑɑʃ tʃʘtɑʘɔdʒjlsʘtɔ ʻɻ *позитиван утицај објекта на околину*, frjʘ frpɵtsʻtsɔdʒ dʑʕʻɑʃfrjsʘʕʘdʑɑlsɑʃʻtsɔdʒ dʒjlstɑɔʃʕtsɔdʒ ï frpɔzʃʕtsɔdʒ ʕtsɔdʒʃʘɔdʑɑʃʻɻ. ɬ tsɔdʑsɵɑʃɔdʑʕ ɑʃɔdʑɵɻfrjsɑʃlsstɑʘ ʻɻ нʘɔdzʘ dʑʕʻɵɑʃʰ lz tsuɻjɔdʑz, ʰ lstsʃtsʕʘʟlzʻɻ нʘ frpɔzʃʕʘ ʕtsɔdʒʃʘɔdʑɑʃʻɻ tsнtɑʘʞʘɵʘ lzlsʃʰuʘʻ tsʙʻɻʕlsʘ dʑʕ tsʕtsɔzʃɑʃdʑz. ɑʃ ʔ lzнɻ ʕtsʻɑʃ ɑʘ ʕtstɑɔʃfrjsɻ ɑʃɔdzʃ tʃtsfnjɻ<lzʻlz. ɽ dʑʕʻuʘʻʘɔdzʍнɻtsɑʃɔdʑɵɻfrjsɑʃlsstɑʘfrpʃʒʘlstɑʘtʃɻjtɑɕuɻjtʃʰuɑʃʻlzɻʷ ɻʕlsʘʟtɑʘнɻ dʑʕʻtsʕtsɔzʃɑʃdʑz ɵɻtsɔdʒʘɵʘʞɔdʑɑʃsdʒ

z, lstsfnjɻ lsʃʰuɻ ʕtɑɔʃlsʃʰuɔdʑɑʃʃ̈ʷ ʘʕlsstɑʘlzfrjʃɻ̈ʘ, dʑʕʻɵɑʃʰ lz tsuɻjɔdʑz нtsʙɑʃɔdzʃ frjzʰuɻjɔdʑʕ, ɵtɑjɔdʒjɻ ɑʃ ʕɵʘɔdzʃlsɻjls. υtsʻɻ вɑʃɔdztsuɻjʕɑʃɵɔdʑɑʃs, ʻɻtɑɔlsʃʷ ʘʕlsstɑʃ ɑʃ tʃtɑɻjнfrjsʘɵʔ ʘʻlzɔdʑʘɵʘdʑɑʃʷʷ tsʕtsfɲɔdʑʕ dʒɔdʑsɑʃɑʃdʒ dʒjɻ' lzɔdʑʘtɑtsн dʑɑʃdʒ ɑtɑʘ ɻɵɑʃɔdʑɑʃʃʕɑʃdʒ tʃtɑtsʻɻʕlsʃɑʃdʒʘ. ɽ ʘʻdʑɑʃʞɻɻ frjz tɑʘɔdʑɑʃʃtɑʘɔdʑɑʃ ʘнɑʃdʒʃɑʃdʑɑʃfrjstɑɔʃtɑʘʃ ɻ tʃtɑtsʻɻʕlsstɑʃ ɑʃ ʕʘнtɑtsɵfrjʕʘ tʃɑʃlsʘʃ ʘ, ʻɻtɑɔ lz tsɵtsʻ tsʙɔdʑʘfrjsʃ dʑɑʃʻɻ вɑʃɔdzts tʃtɑɻjɵɑʃʰ ɻ dʑɻtʃtɑɔʃʻʘlsɔdʑsfrjsʃ ʟʘ dʒjɻ' lzɔdʑʘtɑtsнɔdʑsɑʃ ɑʃɔdʑɵɻfrjsɑʃlsstɑʘ. ʃ ɻ' lzlsʃɑʃdʒ ɔdzʕʘɔdzɔdʑs ɑʃfrjʕlzfrjsɵts <ɻ lzʕʘʟʘlsɑʃ dʑʕ tʃtslstɑjвlz нʘ fnjɻ tʃʘʞʔ ʘ tʃtɑjlzfrpʃzjtɑʃ ɑʃ нʘ fnjɻ ɑfrjsʘʕɔdʑz tʃtɑjlsʖtsнɔdʑɑʃ tʃtɑtsʙɔdʑjɔdʒʃ ʕtsʻɑʃ fnjɻ ʻʘʔ ʘʻlz dʑʕ ɑtɑʘ ɻɵɑʃɔdʑɑʃʃʕɑʃdʒ tʃtɑtsʻɻʕlsʃɑʃdʒʘ lz tɑjɔɑʃtsɔdʑz, ʋɑʃɑʃdʒjɻ вɑʃ fnjɻ tʃtsʙtsʔ ʰ ʘɔdtsɔdʑʕʕtsɔdzʃʕts tʃʘtɑʘɔdʒjlsʘtɑʘ ɵtɑjнɑdʑsfrjsʃ ɑʃ ʕtɑɔʃlsʃʰuʘʻʘɔdʑɑʃʃ̈ʷ ʘʕlsstɑʘ lzfrjʃɻ̈ʘ.

### 6.3.4. ɬ tɑɔʃɑʃdʒjɔdʑʕɑʃɵɔɻʞʙɑʃɬ ʃ ɽ ɬ (tʃtɑtsuɻjɔdʑʕï tsнɑtsɵtstɔï нɑʃʕlzfrpʃʻʘï tʃtɑtsuɻjɔdʑʕ) ï EFTE (Estimate ï feedback ï talk ï estimate) dʑʕ tɑʘнɑʃtsɔdʑɑʃʰuʘɑʃdʒʘ lzʃtɑʘɵʔ ʘʻ ʘ ɵtɑjнɑdʑsfrjsʃɑʃdʒʘ

ʂʘts tʃtsuɻjlsɔdʑɑʃ ʕtstɑʘʕ lz tsнtɑʞʘɵʘʻ lz tɑʘнɑʃtsɔdʑɑʃʰuɻ, tʃtɑjнfrjsʘɵɔdʑɑʃʰuɑʃɑʃdʒʘ ɑʃɔdʑɵɻfrjsɑʃlsstɑʘ frjz нtsfrjsʘɵʔ ɻɔdʑɑ ɑʃɔdʑʷ tstɑɔʃdʒʘuɑʃʻɻ ts ɔdtsʕʘɔdzɔdʑsɑʃdʒ ʟɔdʑʘ lz. ɬ tsнɻʔ ɻɔdʑɑ frjz ʰ lsʘɔdʒʃʘɔdʑɑ lsʘʙɻɔdʑɑ frpʘ tʃʘtɑʘɔdʒjlstɑʘɔdʑʘ ɵtɑjнɑdʑsfrjsʃ ɑʃ tʃtɑɔʃʕʘʟʘɔdzɑʃ frjz tɑjʟɔdtsʘlsʃ, lz ʕtsʻɑʃdʒʘ frjz dʑʕɔdzʃʘʰ ɻɔdʑɑʃ dʑʕʻʙtsʔ ɻ tɑʘɔdzɑʃʰuʘɔdzɑʃ tʃʘtɑʘɔdʒjlstɑʘ. ɽʘ tʃtɑɔʃʕʘʟɑʃɵɑʘʻ ɻ frjʃfrjsjɻdʒʘ ɵtɑjнɑdʑsfrjsʃ ɑʃɔdʑɵɻfrjsɑʃlsstɑʘ dʑʕʕtsɔdzʃʕtɑjнfrjsʘɵʔ ʘʻ ʘɔdtsʕʘɔdzɔdʑsɑʃʟɑʃʻ ʘʕtstɑʃʰ <ɻɔdʑʕ ʻɻ dʒjlstsнʘɬ ʃ ɽ ɬ

(tƒtatsuµjdkÆ)ï tsнdtsotstcïнqfmƒ‹lzfmp[‘Oï tƒtatsuµjdkÆ). ‚[ dkÆ ‘j tƒtsLdkÆlsO q ƒ‹Ots q[dkÆsµjtaO‹ƒlsq[odkÆ нj dkW q[ dzjlstsнO‘j tc‹lz‹ƒ? lzulz‘j fmµfmp[‘j tslsotstcµjdzÆ нqfmƒ‹lzfmp[‘j dzr[uµjdz lz dzr[uµj q[Ldzjl' lzнeO ƒ‹tazaO tƒtatsuµjdkÆ. R dkW tstadzƒOuq[‘j ts dtsƒ‹Odzrdtsdz LdkÆ‘ lz ƒ‹ts‘j fmlz нtsBq[‘jdzÆ lz tƒtaµlsƒ‹tsнdtsdz нj dtlz q[fmjstaO›lq[eO‘ O q[ ƒ‹ts‘j fmlz taµjdzµeOdtsdzÆ LOtsнtaµj' j dkÆ[ tƒtats‘jƒ‹Olstƒtaµjнfmjs0e? j dzÆ fmlz dtdzƒq[. ł tsнj? j dzÆ fmlzh lsOdzƒOdzÆ lsOBj dzµ fmO tƒOtaOdzµlstaq[dz3O ƒ‹? lzudzÆ‹ƒ‹ eta µjнdtsfmjsq[,h lsts ‘j нjlsO’ dtas tƒtaq[ƒ‹OLOdtas lz ł taq[dtsdz 7.2 ï ł ‚[ r ł fmpzµjtadzÆ[uµj eJ›BJ LO fmpO‹ƒq[ tsн 12 tƒtats‘jƒ‹OlsO, q[ taOfmƒtaO0? Odtas fmµj ts taµjLzdtsOlsq[dz3O, fmO dkÆodzOfmƒ‹tsdz3 dkÆ tƒOtaOdzµlstaq[dz3O ƒ‹ts‘q[ fmlz dkÆ‘eq[h j BtsнtsOOdzÆ[.

ł ts‹ƒtaµjdzÆlsO‘j ł ‚[ r ł eJ›BO ł taeq[ нj dkW q[ lzƒq[lsdzÆ[‹ƒ (ł taq[dtsdz‹ 7.2.1 ï ł ‚[ r ł eJ›BO ï ‹ƒtadz‹1 lzƒq[lsdzÆ[‹ƒO) нOls‘j fmpO‹ƒtsdz3lzuµfmpzÆ[‹ƒlz tƒts‘jнq[dzÆOudtas. R dkÆlstdz‹ƒuq[‘j fmlz Bq[dzµ нOfmµ Ätatsuµjdzr[ LdkÆOuƒ‘ fmpq[‹ƒ‹h jfmjs tƒOtaOdzµlsOtaO tƒts‘jнq[dzÆOudzÆ‹ƒ‹ eta µjнdtsfmjs dkÆ fmƒ‹Odzr[ tsн 1-10, e›Jµ ‘j 10 tsн dkÆ‘eJ<JG LdkÆOuƒ‘O LO q[dzeJfmjsq[lststaOñ uuµfmpzÆ[uq[ fmlz tƒtsƒlzdzÆ[dzr[ fmpts‘j lzƒq[lsdzÆ[‹ƒj q[ eta‹Olsq[dzr[ q[‹ƒ dz3sнjtaOlststdz taO›q[tsdzÆ[uµj. t jLzdtsOlsq[ lzƒq[lsdzÆ[‹ƒO fmlz fmjzdz3q[taOdzÆ[ q[ tƒtaq[ƒ‹OLOdzÆ[ ƒtdzƒq[. ‚[ нdtsotstaq[ fmlz taOdzÆq[taOdzÆ[ tsн dkÆ‘eq[h JG нts dkÆ‘dzÆ[›JG ł tdtsfmjµudzÆ eta µjнdtsfmjsq[ fmlz LOts‹ƒtdz›JdzÆ q[ tƒtaq[ƒ‹OLOdzÆ ƒtdzƒq[. tƒtaq[ƒ‹OLOdzÆ[ q[‹ƒ dkW tstadz3Ouq[‘O, lz‹ uµeO‘ JOdtsdzÆ[dz3dtsfmjsq[ tƒts‘jнq[dzÆOudzÆ‹ƒ‹ tsнdtsotstaO. ufmpzµнq[ts‘j нtdzaq[ ƒtdzƒ‹ dz3q[dzÆ[-нjdkW q[ dzjlstsнJ (ł taq[dtsdz‹ 7.2.2 ï ł ‚[ r ł eJ›BO‘ J ï 2. ƒtdzƒ‹ lzƒq[lsdzÆ[‹ƒO). ł tstaµн lzƒq[lsdzÆ[‹ƒO, lzuµfmpzÆ[uq[ fmlz нtsBq[dzr[ q[dzwJƒ‹fnƒ‹Otdsq[uµj fmO Odtsdzr[dz3dzÆ[dz3tƒq[lsO‘ q[dz3O q[ ƒ‹tsdzjdtsOtaq[dz3O. ł tstƒlzdzÆ[dzr[ fmlz lzƒq[lsdzÆ[‹ƒ, dzÆtƒq[fmƒOdzr[ tƒq[lsO‘ O dzÆ ƒ‹Otdsq[uƒOdz3O (lz‹ƒtsdzr[ƒ‹ts ›JdzµJ) q[ eta‹Olsq[dzr[ q[‹ƒ eтsнq[lsµj? lz taO›q[tsdzÆ[uµj. l q[‘j Bq[dzts tƒlzdtas dzÆtƒq[fmƒOdzÆ[‹ƒ‹ ƒ‹tsdzjdtsOtaO ï lz‹ƒlzƒq[dtas fmƒOdz3s dzjƒ‹tsdzr[ƒ‹ts dzÆ fmpq[dz3 taO›q[tsdzÆ[uƒOdz3O. t jLzdtsOlsq[ нtdzatsc‹ ƒtdzaO fmlz fmjzdz3q[taOdzÆ[ q[ tƒtsнJ? j dzÆ[. ɹнJ ‘j Bq[dzts dz3tsdz<j, Odtsdzq[dz3dtas fmlz tƒtatsuq[lsOdzÆ fmlz q[ LOBJdzjz›JdzÆ tƒq[lsO‘ O. uuµfmpzÆ[uq[dz3O ‘j tƒtsdtasotstнtsLotsJ dzÆtas нO taOLdtsOtaO‘lz ts tƒtsotaOlsdzÆ[dz3q[dzÆ tstadz3Ouq[‘Odz3O.

r O’ j, taµjLzdtsOlsq[ dz3q[dzÆ[-нjdkW q[ dzjlstsнJ fmµ q[fmƒJq[lsz‘lz нO Bq[ fmµ eq[нjts dzÆ[eots fmpOdzÆOfmpdtsfmjsq[. ʜlsOdzÆ›OtaнdzÆ tsнfmjstƒJO‘ O fmµ tsBtaOuƒzdzÆ[eO‘lz LO tsBO ƒ‹tazaO. ϕƒ‹ts fmµ lzfmjsOdtseq[ нtseots? dzÆ fmjsOBq[dzrdtsfmjs, tƒtatsuµjfn fmµ LOetc‹h Oe O. l O‹ƒtsdz‹lstsgO, taO›q[ fmµ нjlsO’ Odz‹fmjsOlsq[fmjsq[uƒ‹q[ tƒtaµjodzµн ƒ‹ts‘q[ <j Bq[lsq[ tƒtaµjнfmjsOe? j dz‹lz нO’ j dz3 lsµjƒ‹fmjstz ŞtsdzÆudzÆ[ taµjLzdtsOlsq[ fmµ fmjzdz3q[taO‘lz q[ q[dkW tstadz3Ouq[‘O fmµ нtsfmjsOe? O fmpq[dz3 lzuµfmpzÆ[uq[dz3O. r jlsO’ dzÆ[ taµjLzdtsOlsq[ dzÆ fmpO‹ƒtsdz3tƒtats‘jƒ‹stz fmlz tƒtaµjнfmjsOe? j dzÆ[lz ł taq[dtsdz 7.3.2-ł ‚[ r ł

tqjıLzdbsOlsq əjʞвj q tsəнj fnjı tƒtqjнfrjsOə? Oʻlz tqjıLzdbsOlsq tƒtqjodjнO lz υOвjdzq 14 q υOвjdzq 15.

## Табела 14 – Резултати ПОДП вежбе за параметре вредности

| Project | Project No 1 | Project No 2 | Project No 3 | Project No 4 | Project No 5 | Project No 6 | Project No 7 | Project No 8 | Project No 9 | Project No 10 | Project No 11 | Project No 12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 8 | 8 | 7 | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 9 | 10 | **9.00** |
| 2. Ensure effective project management and delivery | 7 | 6 | 4 | 7 | 5 | 3 | 5 | 6 | 6 | 6 | 3 | 9 | **5.58** |
| 3. Achieve the required financial performance | 8 | 8 | 8 | 7 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | **6.83** |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 6 | 6 | 3 | 5 | 4 | 6 | 5 | 6 | 5 | 4 | 4 | **4.92** |
| 5. Impact positively on the location of the facility | 8 | 9 | 10 | 3 | 10 | 7 | 8 | 10 | 10 | 9 | 5 | 5 | **7.83** |
| 6. Comply with third party requirements | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 1 | 1 | 5 | **3.00** |

## Табела15 – Резултати ПОДП вежбе за КФУ

| Project | Project No 1 | Project No 2 | Project No 3 | Project No 4 | Project No 5 | Project No 6 | Project No 7 | Project No 8 | Project No 9 | Project No 10 | Project No 11 | Project No 12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Scope | 7 | 10 | 7 | 8 | 6 | 7 | 4 | 8 | 7 | 7 | 2 | 6 | **6.58** |
| 2. Time | 8 | 10 | 8 | 7 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | **8.83** |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 9 | **9.75** |
| 4. Quality | 8 | 6 | 9 | 7 | 9 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | **8.17** |
| 5. Contract-admin | 6 | 2 | 4 | 4 | 4 | 3 | 5 | 2 | 1 | 2 | 5 | 5 | **3.58** |
| 6. Human resource | 4 | 2 | 4 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **3.67** |
| 7. Risk | 5 | 5 | 5 | 8 | 7 | 5 | 5 | 4 | 4 | 10 | 5 | 4 | **5.58** |
| 8. Health and safety | 5 | 6 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 3 | 5 | **4.17** |

ştsodȣudȣ tqjıLzdbsOlsq fnjz tƒtaqʕOLOdȣ lz ł taqdbsdz 7.4 ï ţ jıLzdbsOlsq lO ł l q ştυ (Results PC and EFTE) ï нj ʻj tƒtsʕOLOdȥlstsʕ ʋqlsOəj taOнqtsodȣʋj lO fnɔqʕ 12 tƒtatsʻjʕlsO.

### 6.3.5. ϕdzOdzfLOtaOLzdtsOlsOlzfjtstcjHdtsgtjtstcj'j^ OqEFTE

U taOHqtsdzfUqBtdts' 1, lz^ts'ts'fnj tcjOdzfLtsaOts qdzlzfrjstaq'fr^q tjtdts'j^Ols, qdzjfrjsqlststaqfrjz tjtdtsdzjdzfdzfrjsOa ts tjOtaOdzjlstdz Ätsajlbj' qeO' j jW j^lsqeadtsg lzjtaOa? O' Otjtdts'j^lstsdz q tcjOdzfLOuq'Oñ, frjO tcjLzdtsOlsqdz3O ^ts'q frjz tjtstaOfrjdzf LO 2. ∫ ts^Odzdtas qfr^lzfrjsats 'j tjtcjdzjdts H0 jW j^lsqeadtas lzjtaOa? O' j tjtdts'j^lstsdz q tcjOdzfLOuq'O LdzOuO'dtas lzlsqUz dzO lzfrjj¬ tjtdts'j^lsO, h lsts 'j tjts? lz? Odts dzq h ? j^ j qdzjfrjsqlststaO. u Htdzg^j frjstaOdzj, tcjLzdtsOlsq tjOtaOdzjlstaO Äjtsqlsqeadz lzlsqUO' tsa 'j^lsO dzO ts^tsdzfdzñ frjz3O' jdzf frjz LO 2, Odzf 'j lsts tsfrjsOts 'jHOdzts Hstaq dzO'Bts? j tcOdzfdtaOdzO tjOtaOdzjlstaO.

U taOHqtsdzfUqBtdts' 2 lz^ts'ts' fnj taOLeq'Olz fnjHqh lsO BOdzO^O, tjOtaOdzjlsOtc Ätjtsqlsqeadz lzlsqUO' tsa 'j^lsO dzO ts^tsdzfdzñ frjz3O' jdz'j LO 1. t lz^tseatsHfrjseats BOdzj tjtaq¬eOlsqdtas 'j lzdz3O' j^ j lstsg tjOtaOdzjlstaO etcjHdtsfrjsq 'jtc 'j tsdz dzf>j taOdzfdtaOdz lz dtas^Odzdtasdz3 qfr^lzfrjseatz R tjO^, lsts tsfrjsOts 'j tjOtaOdzjlsOtc ^ts'q Htsaq'O dzO'eqh j BtsHtseO. l OtaOdzjlstaq Ätsajlbj' qeO' j jW j^lsqeadtsg lzjtaOa? O' Otjtdts'j^lstsdzñ q Ädz3qdzfdz3qlqtaO' j lstdtsh ^tseO taOHO q tsHta>lOeO' O LdtaOHjñ tjtseaj<Odzf frjz LO 1. l tseaj<Odzf frpjfrjs ts tcjOdzfLOuq'q tjtdts'j^lsO q lstdtsh ^tseO taOHO q tsHta>lOeO' O Htseajdz' 'j Hts taOfrjsO tseq¬ tjOtaOdzjlsOtcO etcjHdtsfrjsq, Odzf frjz tsdzf tsfrjsOdzq dzO Hts^ jdz3^taO'lz fr^Odzj.

U taOHqtsdzfUqBtdts' 3, cHj frjz tjqdzOdzftaOdzj R∪ ^Odzwjdz0taq'j, Ädz3O^frpqdz3qlqtaO' j jW j^lsqeadtsfrjsq tjtsfrpdtseO' Oñ q Ätsajlbj' qeO' j jW j^lsqeadtsg lzjtaOa? O' Otjtdts'j^lstsdz frpz3O' jdzfñ frjz LO 1. ∫ jdz0vjtc LO taOLets' 'j tjtaq¬eOlsqdtas H0 tjtaeq tjOtaOdzjlsOtc lzjtaOa? O' OetcjHdtsfrjsqdz3O dzsvj Htsdzg^dzj H0 frjj frpz3O' q, Odzf q H0' j tsfrjsO'j lz HeO dz0'Bts? j taOdzfdtaOdz0. UtjtstcjHts, Ätstdtsh ^tseq tsHta>lOeO' O, lzjtaOa? O' Oq tjqdz0dzfdtaO' Oñ tjtseaj<Odzf frjz frjj LO 1. l tseaj<Odz0 frpjfrjs ts tcjOdzfLOuq'q tjtdts'j^lsO q lstdtsh ^tseq taOHO q tsHta>lOeO' O tjtsHqdtdzf frjz tsej tjOtaOdzjlstcj etcjHdtsfrjsq, Odzf frjz tsdzf q H0' j dz0 Hts^ jdz3^taO'lz fr^Odzj.

U taOHqtsdzfUqBtdts' 4, cHj frjj taOLeq'Odzjh tseqlsO lzjtststcjBO^tsdzjtcuq'Odzdzf¬ tsa 'j^lsO (tjtsfrpdtseodzf tsadz0^tsHjtaq q frjsOdzajdzf tsa 'j^lsO), lstaq tjOtaOdzjlstaO etcjHdtsfrjsq (tjtsfrjsqLO' j tjtststcjBdzj W qdz0dzfpq'fr^j tcjOdzfLOuq'j, dzjqdzfdzjqlqtaO' j lstdtsh ^tseO taOHO q tsHta>lOeO' O LdtaOHj q tjtsLqlsqeadzlzlsqUO' tsa 'j^lsO dzO ts^tsdzfdz) tjtseaj<Odz0 frjz LO 1 LBtsg qdW tstadzjOuq'j ^ts'lz 'j HOdts dts^Odzdtasg qfr^lzfrjseats. l taeq tjOtaOdzjlsOtc 'j dz0'Bts? j tsuj^ jdztsH frjstaOdzj dts^Odzdtasg qfr^lzfrjseO q tjtseaj<Ots fnj LO 'jHOdzBtsH eq^h j. u Odzjs

ʻjнOdzfTOtaOdzjlsOtc ətcjнdtsfrjsof ʻj frpzO jdzLO 1, Olsts ʻj Ătsвjлвj' cfəO j jW jSlsofədtsg lzfTtaOə? O O tTtats'jSlstsdz cf tcjOdzfLOupf'On t OLdtsg LO lsts ʻj tcjdzOlsofədts dtfrjSts вtsнtsəO j cfdtW tstadzOupf'j ts dtsSOdzdtsdz ldtO lz ɹtdzfO cfdtəjfrjsoflsstaO ʻj cfdzOdzO dtO'əcfh j lzujfrpdtfSO lz tsətsdz frpdtzuO'lz c lzfrjOddzOh OəO j frjsOəO tsfrjsOdts ʻj dtO dtfətsz cfLOLtsəO. R OSts əj<j dtdzfTj cfdtəjfrjsoflsstaO tsвjлвj' lz'lz вts? j h cftcjr j cf taOLzdzjləO j frp[frjsjdzO ətcjнdtsfrjsof cfdtəjfrjsoflsstaO, r cfdzO ʻj tTtslstcjвdts əcfh j dtOTtstaO нO tTtsfrjsofddtz нtsdtsətstc ts LO'jнdtfuSts dzLO? lzuSlz. ʃ əO taOнcftsdtfuO lstaO'OdzO ʻj ldtOlsdts нlzyj tsн tsfrjsOdzf□.

υ taOнcftsdtfuf вtats' 5 cffrjsO dtdzfTO cfdtəjfrjsoflsstaO ʻj cffrjfcflsOdtO SOts cf lz taOнcftsdtfuf вtats' 4. υ tsətsdz frpdtzuO'lz, cfdtəjfrjsoflsstaof frjz frpj dtOSh j нtsdtsəOtaOdzf cf вtyj нtsdtsfrpfdzf LOS? lzuSj. t OLdtsg LO tsəts вf dzjsddts вcflsf cffrjSlzfrjsəts frjsjujdts lz tTtajlsS□tsнdts' taOнcftsdtfuf. υ tsəts' taOнcftsdtfuf, tfOtaOdzjlsOtc ĂdzOSfrpfdzfLcftaO j jW jSlsofədtsfrjsof tTtsfrpdtsəO On frpzO jdz, ʻj LO 2, нtsS frpj tfOtaOdzjlsOtc ĂjftaofнtyOəO j LO□lsjəO dtOнdzjkdtf□ tstaOdtOñ tTtsəj<Ots LO 1. нəcf tsfrjsOdzf tfOtaOdzjlstaf frjz dtjtTtatsdzjr jdtf. υts tTtsSOLz'j нO frpj, SOнO dtdzfTO cfdtəjfrjsoflsstaO tTtats' j Stats. Stafəlz lzujr O, jW jSlsf lzfTtaOə? O O ətcjнdtsfrjsofdzjOdzOSh j tTtafdzjr lz'lz.

υ taOнcftsdtfuf вtats' 6, gHj frpj tTtafjTtcjdzO □tslsjdzfrjSf Stsdzjfdzjrfn lstaf tfOtaOdzjlstaO ətcjнdtsfrjsof frjz tTtsəj<Odtf LO 'jнOdz,вtsн (tsвjлвj' cfəO j jW jSlsofədtsg lzfTtaOə? O O tTtats'jSlstsdz cf tcjOdzfLOupf'O, tTtsLcflsofəOdz,zlsofuO' tsв'jSlsO dtf tSstsdzfdtz cf tTtafнtyOəO j LO□lsjəO dtfнdzjkdtf□ tstaOdtf). нəO lstaf tfOtaOdzjlstaO frjz əcffrjsStsts tsujr jdtf tsн frjstaOdzj dtsSOdtdtsg cffrjSlzfrjsəO, tfO 'j taOLzdz? cfəts h lsts frjz cfdtəjfrjsoflsstaf нtsLətsdzfdtz нO tsəj cfdtW tstadzOupf'j zlsofuz dtf r cf□tsəts taOLzdzjəO j ətcjнdtsfrjsof. l cf'jнOdzfTOtaOdzjlsOtc dtf'j frpzO jdz,lz tsətsdz frpdtzuO'lz. ʃ j' zlsofdz lz tsəts' taOнcftsdtfuf lz нtdzdtsdz Stadzdz ɬ ʃ ɾ ɬ lsj□dtfSj dtf'j tTtsfrjsofddtzlsO нtsəts? dtf frjOddtfOfrpdtsfrjs lO tTtaOdzjlsOtc ətcjнdtsfrjsof ĂjftaofнtyOəO j LO□lsjəO dtfнdzjkdtf□ tstaOdtfñcf frjsOdtwOtaнdtdtstsнfrjszfTO j 'j tsfrjsOdtsdtf 1,53. υ нtsнOlsddtsdzStadzdz, lz Sts'jdz 'j taOLdzOlstaOdz,frpOdzjs tsəO' tTtaOdzjlsOtc, tTtsfrjsofddtzls 'j нtsdtsətstc cf zfrpəts'jdtf 'j ətcjнdtsfrjs cf LOr jgO . ɬ tcj Stsdtfuptdtsg Stadzdz, tsнəcf'OdzO frpj нtsнOlsdtfнcffrjSlzfrpf'Olz. нtsнOlsdtfTts'Oh r jr O.

υ taOнcftsdtfuf вtats' 7, lz Sts'ts' frpj tTtafjTtcjdzO 'tsh 'jнdts □tslsjdzfrjSts tsнdzOtaOdzfh lsj, frp[lszOupf'O 'j dtslstsəts cffrjsO SOts cf lz taOнcftsdtfuf вtats' 6. нdzfuptdtf lstaf tfOtaOdzjlstaO tTtsəj<Odtf frjz LO 1ï 2 вtsнO (tsвjлвj' cfəO j jW jSlsofədtsg lzfTtaOə? O O tTtats'jSlstsdz cf tcjOdzfLOupf'O LO 2, dzjcfdtfdzjcflcftaO j lstats Stsə taOнO cf tsнtyOəO O LdtaOнj LO 1,

tʃtɑɔʃʜtɔ›ʅƟɒƟ˙ ˌ ʟƟ˺˻ʅsˌɹɘƟ dƶƲʜdʒˌ›dɑƶʃ˺˻ tstɑɔƟdƶƲ ʟƟ 1). ʃ˻ ʙ‘Ɵʰ ʕ ˌɹʕ ˌ ‘ˌ fɱpɒzʃ˽ɥɑƭs ʕƟƭs ɮz tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 6. ʀ ɮz tsɒƭs‘ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙɑʃƭs ‘ˌ tʃtsʅstɑˌɹʙƟɑɒʜtsʜƟʅsdɑƶ ʃʕtɑɒzɑ; tsɒƟ˙ tʃɒƭs ʟƟ tʃƟtɑƟɑʒˌʅsƟtɑ Ăƭsʙˌɹʟʙˌɹ' ɑʃɘƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɒzʃtɑƟɒʔ Ɵ˙ Ɵ tʃtɑƭs‘ˌɹʕʅststɑʒ ɑʃ tɑˌɹƟɑɒzʃʟƟuɑʃ‘ƟÑ ‘ˌɹtɑ ‘ˌ ʕ ˌɹɑƭsɒƭs fɱʅsƟɑɒʜƟtɑʜɑƭs tsʜfɱʅsɒzʃtʃƟ˙ ˌ tsfɱʅsƟɑƭs dƶƲ 1,22. ʊ ʜtsʜƟʅstɑƭstɑʒ ʕʃtɑɒzɑɒz ʜtsɑƭsɒƭstɑˌɹdƶƲ‘ˌ ɘtɑˌɹʜdƭsfɱʅstʃtɑƟɑƟʃtɑɔƟdƶƲ.

ʊ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 8 tɑƟʟɑʒʃ˽ɥʃtɑƟɑƟdƭs ‘ˌ ʅsɒzʃtɑɑʃfɱʅsɑʃ˽ɥʃ˺ʕƭs˻ɱƭstsˌɹdɒfʕ˺ʕƭs tsʜɑʒƟtɑƟɑƟdɒzʃʰ ʅsˌɹ. ʉ Ɵɑʒƭs ʜɘƟ tʃƟtɑƟɑʒˌʅsƟtɑƟ fɱɒz fɱˌɹ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdƶƲ ï ɑʒƟʕ˺ɱʃɑʃʒʃʟɑʃƭɑƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɒzʃtɑƟɒʔ Ɵ˙ Ɵ tʃtɑƭs‘ˌɹʕʅststɑʒ ɑʃ tɑˌɹƟɑɒzʃʟƟuɑʃ‘Ɵ tʃtɑɒˌɹ<Ɵdɒzʃ ɱɒz fɱˌɹ ʟƟ 1. ʃ Ɵʕ˺ɑdɒˌɹ, tsʙƟ tʃƟtɑƟɑʒˌʅsƟtɑƟ fɱɒz ɘƟtɑɑʃtɑƟɑƟdƶƲ ʟƟ fɱƟɑʒƭs ‘ˌɹʜƟdɒzʙƭsʜ. ʊ tsɒƭs‘ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ɮzʅsɑʃuƟ˙ dƭs˺ʕƟɑzɑƭsɑɑ˺ ʟdƶƲ˙ Ɵ ʙɑʃƭs ‘ˌ dƶƲ‘ɑʒƟ˙ ɑʃ, ‘ˌɹtɑ fɱɒz fɱˌɹ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdƶƲ fɱʕɑʒƭs ʜɘƟ tʃƟtɑƟɑʒˌʅsƟtɑƟ, ɑʃ lstsɑʒʃɑʃdɑƶʃɑʒƟɑƟdƭs.

ʊ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 9 tɑƟʟɘɑʃ‘ˌɹdƭs ‘ˌ ‘tsʰ ‘ˌɹʜdƭs lsɒzʃtɑɑʃfɱʅsɑʃ˽ɥʃ˺ʕƭs tsʜɑʒƟtɑƟɑƟdɒzʃʰ lsˌɹ fɱƟ˺˻tsls ˌɹdɒzstɑʒ ɑʃ ɘɑʃdƶƲɑʒƟ. ʊtɑɔʃ tʃƟtɑƟɑʒˌʅsƟtɑƟ fɱɒz fɱˌɹ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdƶƲ ʟƟ ‘ˌɹʜƟdɒzʙƭsʜ (ɑʒƟʕ˺ɱʃɑʃʒʃʟɑʃƭɑƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ʟdƶƲ˙ Ɵ ʟƟ ï 1, tsʙˌɹʟʙˌɹ' ɑʃɘƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɒzʃtɑƟɒʔ Ɵ˙ Ɵ tʃtɑƭs‘ˌɹʕʅststɑʒ ɑʃ tɑˌɹƟɑɒzʃʟƟuɑʃ‘Ɵ ʟƟ 1 ɑʃ ɑʒʃɑʃdƶƲɑʒƟ˙ ˌ lstɑƭsʰ ʕtsɒƟ tɑƟʜƟ ɑʃ tsʜtɔ›ʅƟɒƟ˙ Ɵ ʟɑtɑƟʜˌɹ, ɮzʅsɑʃuƟ˙ dƶƲ›ɑʃɘƭstsɑƭzʃɱtɑˌɹʜɑʃdƶƲʟƟ1).

ʊ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 10 tʃtɑɑʃtʃtɑˌɹɑʒʔ ˌɹɑz‘ˌ ʕtsɑƶƲuɑƶʃ tɑƟʟɘƭs‘ ˺˻tsls ˌɹɑzƟ. ʊ ʕ ts‘ fɱˌɹ ɑʒƭƶƲɑɑtɑs ɘɑʃʰ ˌɹ tʃƟtɑƟɑʒˌʅsƟtɑƟ ɘtɑˌɹʜdƭsfɱʅsɑʃ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdƭs tʃtsʜ ɮzʅsɑʃuƟ˙ˌɹɑʒ ɑzƭsʕƟɑzɑƭsɑɑ˺ ɑʃɱʕƭɮzɱʃsɒƟ. ʃ ʙˌɹʟʙˌɹ' ɑʃɘƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɒzʃtɑƟɒʔ Ɵ˙ Ɵ tʃtɑƭs‘ˌɹʕʅststɑʒ ɑʃ tɑˌɹƟɑɒzʃʟƟuɑʃ‘Ɵ ʟƟ 2, ɑʒʃɑʃdƶƲɑʒƟ˙ ˌ lstɑƭsʰ ʕtsɒƟ tɑƟʜƟ ɑʃ tsʜtɔ›ʅƟɒƟ˙ Ɵ ʟɑtɑƟʜˌɹ, ɮzʅsɑʃuƟ˙ dƶƲ›ɑʃɘƭstsɑƭzʃɱtɑˌɹʜɑʃdƶƲʟƟ 1, tʃtsʟɑʃʅsɑʃɘƟɑzɮzʅsɑʃuƟ˙ tsʙ ‘ˌɹʕʅsƟ dƶƲ tsʕtsɒzʃɑʃdƶƲ ʟƟ 1 ɑʃ tʃtɑɔʃʜtɔ›ʅƟɒƟ˙ ˌ ʟƟ˺˻tsls ˌɹɘƟ dƶƲʜdʒˌ›dɑƶʃ˽ɥʃ tstɑɔƟdƶƲ ʟƟ 1.

ʊ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 11 tɑƟʟɘɑʃ‘Ɵtsfɱˌɹ ɑʒƟ˙ ɑʃ lstɔ›ɑzʃ˽ɥʃɑƭsƟtɑ. ʉ ɑzʒˌʜˌɹ<ɑʃ tʃƟtɑƟɑʒˌʅsƟtɑɑʃfɱʅsɑʃ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdɒzʃ: ɑʒƟʕ˺ɱʃɑʃʒʃʟɑʃƭɑƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ʟdƶƲ˙ Ɵ ʟƟ -1, tsʙˌɹʟʙˌɹ' ɑʃɘƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ʟdƶƲ˙ Ɵ tʃtɑƭs‘ˌɹʕʅststɑʒ ɑʃ tɑˌɹƟɑɒzʃʟƟuɑʃ‘Ɵ ʟƟ 1, tʃtsʟɑʃʅsɑʃɘƟɑzɮzʅsɑʃuƟ˙ tsʙ ‘ˌɹʕʅsƟ dƶƲ tsʕtsɒzʃɑʃdƶƲ ʟƟ 1 ɑʃ tʃtɑƟʜƟtɔ›ʅƟɒƟ˙ ˌ ʟƟ˺˻tsls ˌɹɘƟ dƶƲʜdʒˌ›dɑƶʃ˽ɥʃ tstɑɔƟdƶƲ ʟƟ -1.

ʊ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 12 tʃtɑɑʃtʃtɑˌɹdƶƲtsfɱˌɹ ‘tsʰ ‘ˌɹʜƟdɒzɘˌɹdɒzʃɑʃ˺ʕƭs˻ɱƭstɔ›ɑzʃ˽ɥʃɑƭsƟtɑ. ʉ dɒzʃuƟ˙ dƭsʕƟɑzɑƭsɑɑ˺ ʟdƶƲ˙ Ɵ ɮz tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 8, dɑƶʃ‘ˌɹ ɮztsuˌɹdɒzɘˌɹ<ɑʃ ɮzʅsɑʃuƟ˙ dƭsʕƟɑzɑƭsɑɑ˺ ʟdƶƲ˙ Ɵ. ʉ ƟɑʒƭƶƲ ʜɘƟ tʃƟtɑƟɑʒˌʅsƟtɑƟ fɱɒz fɱˌɹ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdƶƲ, ɑʃ lstɑ ʟƟ ‘ˌɹʜƟdɒzʙƭsʜ (tsʙˌɹʟʙˌɹ' ɑʃɘƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɮzʅsɑʃuƟ˙ dƶƲ›ɑʃɘƭstsɑƭzʃɱtɑˌɹʜɑʃdƶƲʟƟ 1, tʃtsʟɑʃʅsɑʃɘƟɑzɮzʅsɑʃuƟ˙ tsʙ ‘ˌɹʕʅsƟ dƶƲ tsʕtsɒzʃɑʃdƶƲ ʟƟ 1 ɑʃ tʃtɑƟʜƟtɔ›ʅƟɒƟ˙ ˌ ʟƟ˺˻tsls ˌɹɘƟ dƶƲʜdʒˌ›dɑƶʃ˽ɥʃ tstɑɔƟdƶƲ ʟƟ -1. ʃ˻ ʙ‘Ɵʰ ʕ ˌɹʕ ˌ ‘ˌ fɱpɒzʃ˽ɥɑƭs ʕƟƭs ɮz tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙtɑƭs‘ 6. ʀ ɮz tsɒƭs‘ tɑƟʜɑʃtsdɑƶʃ˽ɥʃ ʙɑʃƭs ‘ˌ tʃtsʟstɑˌɹʙƟɑɒzʃʜtsʜƟʅsdɑƶ ʃʕtɑɒzɑ; tsɒƟ˙ tʃɒƭs ʟƟ tʃƟtɑƟɑʒˌʅsƟtɑ Ăƭsʙˌɹʟʙˌɹ' ɑʃɘƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɒzʃtɑƟɒʔ Ɵ˙ Ɵ tʃtɑƭs‘ˌɹʕʅststɑʒ ɑʃ tɑˌɹƟɑɒzʃʟƟuɑʃ‘Ɵ tʃtɑɒˌɹ<Ɵdɒzʃ ɱɒz fɱˌɹ tʃtɑƭstɑʒˌɹdɒƶʃɑʃdƶƲ ï ɑʒƟʕ˺ɱʃɑʃʒʃʟɑʃƭɑƟ˙ ˌ ˌɹ˽ ˌɹʕʅsɑʃɘɑƭsɑɑ˺ ɮzʅsɑʃuƟ˙ dƶƲ›ɑʃɘƭstsɑƭzʃɱtɑˌɹʜɑʃdƶƲʟƟ 1, tʃtsʟɑʃʅsɑʃɘƟɑzɮzʅsɑʃuƟ˙ tsʙ ‘ˌɹʕʅsƟ dƶƲ tsʕtsɒzʃɑʃdƶƲ ʟƟ 1 ɑʃ tʃtɑƟʜƟtɔ›ʅƟɒƟ˙ ˌ ʟƟ˺˻tsls ˌɹɘƟ dƶƲʜdʒˌ›dɑƶʃ˽ɥʃ tstɑɔƟdƶƲ ʟƟ -1.

нtdzdts dzjfrjsts tdOнdqtsdzdquO frO dzdOdzOs qdz lzlsdquOjdz dzdO dzjdqh ? j^ O qdzdjfrjsdqlststdO. t OLdzsdsdzjsyj вdqlsdq updq^ jdzdquO нO ij qdzdjfrjsdqlststd, ejf< нtsвtdts tftsLdzdOeOts dzs^Odzdzjtftddqdzdq^j.

ɹ qdzdts ij tftslstdjвdzs нO frjz tdtsejtdqdq нO dzdq frjzdtdzdqj qdzdjfrjsdqlststdOtftsfrjsdqdzj нtsets? dzdz frOdzdOfrpdzsfrjs, нO вdq tdjLzdzsOlsdq dzjsdzdq нO frjz tftdtsejtdj. ыtftdtsejнjdz ij нjlsO? Odz frjsOlsdqfrjsdquqdq tftdjdzjн. ɹ O qfrqfdqlsdqeOs j frOdzdOfrpdzsfrjsdq qLdzj' lz lzujfrpdzquqdqjOlsjfrjsO. z lsts ij ejf<Os j dtseOetdjнdzsfrjs, ejf<O ij frOdzdOfrpdzsfrjsfrjstdzu{ O{O. Schmidt (1997) tftdjнfrjsOe? O dzjlstsнlz frqftdtsets' j^ O нjdzW dq qfrjstdOydqeOs O frO tdOdzdqtdOs jdz tsвOe? Os j Odzdzdqlj dq tftdq'Oe? qeOs j tdjLzdzsOlsO. ştstdqh <j^ jdz frjsOlsqfrjsquqtsg frjsWlsejtdO SPSS (ejtdqq'O 19), tftdtsejtdjdz ij {tsjW quq'jdzs lzfr{dzO jdzsfrjsq LO dzdeots frOdzdOfrpdzsfrjsq qLdzj' lz tftdjнfrjsOedz{O qdzdjfrjsqststdO LO tsвO {tdzdOl [ r l ejyвj. ştsjW quq'jdzsW dzsyj qdzOlsq вqdzs{ts'lz etdjнdzsfrjs lz qdzsjtdOdzz [0,1]; 0 tsнdtseOtdO frplszOuq'q вjL frOdzdOfrpdzsfrjsq, O 1 tsнdtseOtdO frplszOuq'q frO {tsdzjfdzjlsdzsdz frOdzdOfrpdzsh <lz. ɹ O tfOtdOdzjlstdj etdjнdzsfrjsq qLO frpj tftdts'j{lsj, tfts'jнqdzOudzq tdjLzdzsOlsq frjz tftdjlsetstdjdzq lz tdjLzdzsOlsj dzO fr{Odzq 1ï6 (6 ij вtdts' tfOtdOdzjlsOtdO {ts'q fnj qfrjfqlsz'j). ɹ O {tdqlsquqdjW O{lststdj lzfrjj¬O qLO frpj tftdts'j{lsj, tfts'jнqdzOudzq tdjLzdzsOlsq frjz tftdjlsetstdjdzq lz tdjLzdzsOlsj dzO fr{Odzq 1ï8 (8 ij вtdts' tfOtdOdzjlsOtdO {ts'q fnj qfrjfqlsz'j). RLtdOudzdzOe'lz fnj tftdtsfnjudzO tdOdzdqtdOs O, lzlsetd' lz'lz fnj tsнfrjslzfjOs O q tsнtdj' lz'lz etdjнdzsfrjsq ş j dzWOdzsetsg {tsjW quq'jdzsO. l tdjнfrjsOe? j dzdq frjz tslsqfrpuqLO SPSS frjsOlsqfrjsquqq frjsWlsejtdOlz frpdjнj<qdzftdtqdzsLqdzO.

- tftdtqdzsg 7.5.1 ï ş j dzWOdzsetsg {tsjW quq'jdzslzfrOdzdOh j dzsfrjsq W1 LOl J,
- tftdtqdzsg 7.5.2 ï ş j dzWOdzsetsg {tsjW quq'jdzslzfrOdzdOh j dzsfrjsq W2 l J,
- tftdtqdzsg 7.5.3 ï ş j dzWOdzsetsg {tsjW quq'jdzslzfrOdzdOh j dzsfrjsq W1 ş^ u,
- tftdtqdzsg 7.5.4 ï ş j dzWOdzsetsg {tsjW quq'jdzslzfrOdzdOh j dzsfrjsq W2 ş^ u.

J tdjнdzsfrjsq W {tsjW quq'jdzsOLOfrpj tftdts'j{lsj lz tsвO{tdzdOвqdqj frjzeqfrjs{j, {Ots h lsts ij tftdq{OLOdzs lz uOвjdzq 16 q uOвjdzq 17, frO LdzuO'dzqdqtftstdOfrjstsdz lz нtdzdtsdz{tdzdz l [ r l ejyвj, h lsts frjzgjtdqh j нO ij tftsfrjsqdzdzlsO нtsets? dzO frOdzdOfrpdzsfrjs qLdzj' lz tzujfrpdzquqdq{O. *Asymptotic significance (α)* etdjнdzsfrjsq tftdjнdzOylz нO dzj dzjsyjdzjs

тснвеоцфлсф дкздкдсz пфгґтслсjцлlz Н0 лео чjilsфтаф ґґтатsґj†ls€ (1, 2, 9 фґ 12) лео ґґ€таєодзjlstфj этфjнодкsfлsф фґ lstаф ґґтатsґj†ls€ (1, 2 фґ 12) лео†тафлsфчфдкш ww €†lststфj lzfлґj пєо.ґ ґj' lzlsфґдз лвtsгдзєdкsгlz.tstа†€ (fлєdдзs 2ï 5 ґґтфj нfлsєэdкш†€ фґdкэjfлsфlststа€), tsэе′ лє†? lzцф† lstфjвеНеfлj ґґтатsэ.jtаф †tsdк#tфjlsdкшґдз lsjfлjstsґдз фґdкґ дздtа€edзs неfлj tsfлpdкsdкшґдs dк@ Ăʃ tsdкsj ş€tаdкsñ ґґтатsцjdкz лdк@цф′е lsецpdкш этфjнодкsfлsф *p*, †ts′е fлj лєfлpdкшэе dк@ 10.000 fлpdкzцф′dкш† ґґj.tаdкzlsецф′е tstаґфґдк@dаdкsгнэtsfлpdкjtаdкsгtа€fлґґtstфjнеfлjфнґ j.гtа€dкшґфа€ е ï *random permutations of the original two-way layout of mid-ranks* Mehta (2011), Lawrence (1989).

ъ.jfлs пфгґтслsjлlj ‘j вфts fлpdкjнj<фґ: Н0 (W = 0); dкздкdкsе пфгґтслsjлlе ‘j неґj †tsjw фчцґ‘jdкs W fлsеlsфfлsфчqфґ вjлdк@цф′еdкz (‘jнdк@†. 0). ϕdкsjtаdк@lsфэdк@ пфгґтслsjлlе ‘j неґ fлj tsdкz лdк@цф′dкs tа€.dкzф†z‘j tsн 0. ъэj этфjнодкsfлsф лdк@цф′е лlе tфjdкjэеdкsdкш Ăʃ tsdкsj ş€tаdкsñ lsjfлjstsэj lz нtdкztsdкзqtdкztz fлjz dкз€ j tsн 0,01 (ъевjdк@ 16 фґ ъевjdк@ 17). ъts лdк@цф неdкзsкjdкs tснвеоцфлсф дкздкдсz пфгґтслsjлlz fле 99% fлpфdкztаdкsfлsф фґ л€†? lzцфлсф неґj ґґтsfлsфчdкzsе fлєdк@fлpdкsfлs lz нtdкztsdкзqtsdкz ↓ ∫ ┌ ↓ (dкзфdкш-нjdкw фґ) эjквj. р€†ts ‘j ş.jdкш€dкsэ qtsjw фчцґ‘jdкs lz чjlsфтаф ґґтатsґj†ls€ (4, 5, 6 фґ 7) леґґ†таєодзjlstфj этфjнодкsfлsф фґ lstаф ґґтатsґj†ls€ (5, 7 фґ 8) леqtафлsфчцdкш ww €†lststфj lzfлґj пєо фґfлґґтснj 0,95, лdк@цф′ Ăʃ tsdкsj ş€tаdкsñlsjfлjsеґґтslsэtгlzґj неґj ґґтsfлsфчdкzsе fлєdк@fлpdкsfлs

### Табела 16 – Вредности W – Кендалов коефицијент усаглашености на 12 пројеката за ВП

| Project<br><br>EFTE | Project No. 1 | Project No. 2 | Project No. 3 | Project No. 4 | Project No. 5 | Project No. 6 | Project No. 7 | Project No. 8 | Project No. 9 | Project No. 10 | Project No. 11 | Project No. 12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Round 1** | | | | | | | | | | | | | |
| W | 0.993 | 0.985 | 0.973 | 0.901 | 0.861 | 0.926 | 0.849 | 0.972 | 0.993 | 0.977 | 0.973 | 0.985 | **0.949** |
| Ŭ | 0.077 | 0.080 | 0.012 | 0.000 | 0.001 | 0.016 | 0.000 | 0.002 | 0.077 | 0.012 | 0.000 | 0.080 | **0.030** |
| Monte Carlo | 0.005 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.005 | 0.002 |
| **Round 2** | | | | | | | | | | | | | |
| W | 0.997 | 0.993 | 0.987 | 0.942 | 0.939 | 0.926 | 0.939 | 0.965 | 1.000 | 1.000 | 0.991 | 0.993 | **0.973** |
| Ŭ | 0.082 | 0.077 | 0.011 | 0.000 | 0.000 | 0.016 | 0.000 | 0.002 | 0.075 | 0.010 | 0.000 | 0.077 | **0.029** |
| Monte Carlo | 0.009 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.005 | **0.002** |

### Табела 17 – Вредности W – Кендалов коефицијент усаглашености на 12 пројеката за КФУ

| Project<br><br>EFTE | Project No. 1 | Project No. 2 | Project No. 3 | Project No. 4 | Project No. 5 | Project No. 6 | Project No. 7 | Project No. 8 | Project No. 9 | Project No. 10 | Project No. 11 | Project No. 12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Round 1** | | | | | | | | | | | | | |
| W | 0.939 | 0.987 | 0.899 | 0.828 | 0.781 | 0.857 | 0.712 | 0.919 | 0.997 | 0.966 | 0.97 | 0.927 | **0.899** |
| Ŭ | 0.069 | 0.054 | 0.009 | 0.000 | 0.000 | 0.012 | 0.000 | 0.001 | 0.052 | 0.005 | 0.000 | 0.073 | **0.023** |
| Monte Carlo | 0.005 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | **0.001** |
| **Round 2** | | | | | | | | | | | | | |
| W | 0.981 | 0.991 | 0.951 | 0.974 | 0.907 | 0.956 | 0.828 | 0.936 | 1 | 0.985 | 0.982 | 0.988 | **0.957** |
| Ŭ | 0.056 | 0.054 | 0.006 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.051 | 0.004 | 0.000 | 0.054 | **0.019** |
| Monte Carlo | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | **0.000** |

ŗ Θ вɑ fŋ̡ ƚzlsɔtɑнɑɑdzs нΘ dzɑ frŋz tʃtsнΘuɑ ʕtsʻɑ frŋz нtsвɑʻ̡dzɑ[ lΘ 12 tʃtɑtsʻ̡ʕΘlsΘ tʃtɑΘlsɑɑdzɑ[ dƶstɑcʒΘdzdƶj tɑΘfŋʃtsн̡jdzj lΘfŋɔΘʕɑ tʃΘtɑΘdʒj̡lsΘtɑ, ƚzʃtslstɑ̡jв? ̡jdzʻ̡j Shapiro-Wilkŝs lsj̡frŋs ʃ dzƶ lsj̡frŋsɑftɑΘ dƶɑdƶstz ⊓ɑtʃtslsj̡ʟƚz, tʃtɑɑ[ ʋ̡jdʒƚz ʻ̡j ƚzʟtstɑΘʕ x1é xn нtsʰ Θts ɑʟ dƶstɑcʒΘdzdƶs tɑΘfŋʃtsн̡jʔ ̡jdzj̡ tʃtsʃƚzdƵΘuɑ[ʻ̡j (Shapiro; Wilk, 1965) ɑ[ ʕtstɑɑ[frŋsɑftɑs fŋ̡ ʟΘ tʃtsfŋsɑ[ʟΘʕ ̡j lstsɔ ʋɑ[ʔ Θ. ʃ н 12 tʃtɑtsɑdzjdƶ ɑɔɑ[⊓ (ʰ ̡jfŋs tʃΘtɑΘdzj̡lsΘtɑΘ ⊓ {tʃtɑ̡j, tʃtsfmpdzj̡}), ʰ ̡jfŋs tʃtɑtsɑdzjdƶ ɑɔɑ[⊓ ʟΘtʃΘtɑΘdzj̡lstɑ̡j ɔtɑ̡jнdƶsfŋsɑ[ ɑ[ tsн 16 tʃtɑtsɑdzjdƶ ɑɔɑ[⊓ (tsfŋΘdʒtʃΘtɑΘdzj̡lsΘtɑΘ ⊓ {tʃtɑ̡j, tʃtsfmpdzj̡}) н̡jɔ̡jls tʃtɑtsɑdzjdƶ ɑɔɑ[⊓ ʟΘ ʕtɑɑlsɑʻʋɑdzj̡ ẅ Θʕlststɑ̡j ƚzfŋʃj̡⊓Θ dƶɑfŋz tʃtɑΘlsɑ[dzɑ[ dƶstɑcʒΘdzdƶz tɑΘfŋʃtsн̡jdzz. ʃ ɔtsʻ̡j н̡jlsΘʼ dƶs dƶɔɔ̡jнj̡dƶs ƚz↓ tɑɑ[dzsdz 7.6.1 ï Shapiro-Wilkŝs test for VP ɑ[ ↓ tɑɑ[dzsdz 7.6.2 ï Shapiro-Wilkŝs test for CSF. ŋ Θʕʔƚzuj̡dƶs ʻ̡j нΘ tʃΘtɑΘdzj̡lsΘtɑfŋʕɑ[ lsj̡frŋstsɔɑ[ dƶɑfŋz Θнj̡ʕɔΘlsdƶɑ[ ʟΘ tʃtstɑ̡j' ̡jʕ ̡j ɔtɑ̡jнdƶsfŋsɑ[ tʃtɑ̡j ɑ[ tʃtsfmpdzj̡ ƚzɔts' ̡jʕ ΘdƶsʕΘdzdƶsɑʟdƶʔ Θ.

ʊdʒ̡jfŋstɔs lstsɑΘ, ʕtstɑɑ[ʰ <̡jdzƶ ʻ̡j dƶ̡jtʃΘtɑΘdzj̡lsΘtɑfŋʕɑ[ *Wilcoxon* lsj̡frŋs ↓ ΘtɑΘdzj̡lstɑɑ[ tʃtsʻ̡jнɑ[dƶʔʊdƶɑ[⊓ ɔtɑ̡jнdƶsfŋsɑ[ frŋz tsнɔtsʻ̡jdƶs tʃtɑ̡jɑdzjнΘdƶɑ нΘ вɑ fŋ̡ ƚzlsɔtɑнɑɑdzs нΘ dzɑ[ ʻ̡j вɑ[dƶs frŋsΘlsɑ[frŋsɑ[ʋʕɑ[ ʟdƶʔʊɑ[ʻdƶɑ tʃtɑtsɑdzjdƶɑ ƚz ʕ ɑ[⊓tsɔɑ[dʒ tɑ̡jʟzdƶsΘlsɑ[dʒΘ tʃtɑ̡j ɑ[ tʃtsfmpdzj̡ ƚzɔts' ̡jʕ ΘdƶsʕΘdzdƶsɑʟdƶʔ Θ. ʃ ɔts ʻ̡j tʃtɑ̡jнfŋsΘɔʔ ̡jdƶs ƚz↓ tɑɑ[dzsdz 7.7.1 ï Wilcoxon test for VP ɑ[ ↓ tɑɑ[dzsdz 7.7.2 ï Wilcoxon test for CSF. ţ ̡jʟzdƶsΘlsɑ[ tʃtɑ̡jɑdzjнΘtsɔ̡j Θdƶʔdzɑ[ʟ̡j tʃtɑɑ[ʕΘ.Θdƶɑ[ frŋz ƚzʊΘв̡jdzɑ[ 18 ɑ[ ʊΘв̡jdzɑ[ 19 ɑ[fŋʃtsн.

**Табела 18 – Wilcoxon тест за утврђивање статистичке важности увођења локалног знања за ВП**

| Project | Average parameters for paired comparison exercise (before) | Average parameters for EFTEï Delphi exercise (after) | Z | Asymptotic Significance (2-tailed) |
|---|---|---|---|---|
| 1. Maximize business effectiveness | 9.50 | 9.00 | 0.034 | -2.121 |
| 2. Ensure effective project management and delivery | 4.75 | 5.58 | 0.026 | -2.646 |
| 3. Achieve the required financial performance | 6.75 | 6.83 | 0.317 | -1.000 |
| 4. Minimize building operation and maintenance costs and environmental impact | 4.33 | 4.92 | 0.008 | -2.233 |
| 5. Impact positively on the location of the facility | 7.75 | 7.83 | 0.739 | -0.333 |
| 6. Comply with third-party requirements | 2.67 | 3.00 | 0.102 | -1.633 |

**Табела 19 – Wilcoxon тест за утврђивање статистичке важности увођења локалног знања за КФУ**

| Project | Average parameters for paired comparison exercise (before) | Average parameters for EFTEï Delphi exercise (after) | Z | Asymptotic Significance (2-tailed) |
|---|---|---|---|---|
| 1. Scope | 5.50 | 6.58 | 0. 006 | -2,754 |
| 2. Time | 8.75 | 8.83 | 0. 317 | -1,000 |
| 3. Cost | 9.83 | 9.75 | 0. 317 | -1,000 |
| 4. Quality | 7.75 | 8.17 | 0. 096 | -1,667 |
| 5. Contract-admin | 1.92 | 3.58 | 0. 019 | -2,345 |
| 6. HR | 2.00 | 3.67 | 0. 003 | -2,980 |
| 7. Risk | 5.17 | 5.58 | 0. 059 | -1,890 |
| 8. HSE | 3.42 | 4.17 | 0. 021 | -1,890 |

### 6.3.6. ŗ qſfŋʕlzfmpʃʿʘ

ţ ɻ ɹ lzɑɒʁʘɹsɑſ ʧʃtɑɑſʕʘɹʘɑɒɑ[ lz ʊʘʁɻɑɒɑ[ 18 fŋɻzɑʕɻtɑɑſʰ lz ʜʘ fŋɻz fŋɻ ʧʃʘtɑʘɑɒʒɻsɑɑſ əɑɑɻʜɑɒɑʁfŋsɑſ 1 (ɑɒʒʘʕfmpʃɑɒʒʃɹqſtɑʘʿ ɻ ɻʷ ɻʕɹsɑſəɑɒɑʁfŋsɑſ ʧʃtsfmpɒʁsəʘʿ ʘ), 2 (tsʁɻɹʁɻ' qſəʘʿ ɻ ɻʷ ɻʕɹsɑſəɑɒɑʁsʿ lzʃtɑʘə? ʘʿ ʘ ʧʃtɑtsʿɻʕɹstsɑʒ qſ tɑɻʘɑɒʃɹʘuɑſʿʘ) qſ 4 (ɑʒʃɑɒɑʃɑɒʃɹqſtɑʘʿ ɻ lstɑtsʰ ʕtsəʘ tɑʘʜʘ qſ

tsнtc›lOo○ʻ O LctcOнj, lzlsc∫uO‘ dkO ›lc∫otslsdkz frjcjнc∫dkz) LdkOuO‘dks tƒtctsczjdkƒdz∫, h lsts ‘j tƒtcc∫ʂO.LOdks ς c∫¬tsocdczp-otcjнdksfrjsc∫dz○0,034, 0,026 c∫ 0,008.

l Octc○dzjlstcc∫ otcjнdksfrjsc∫ 2 (tsвjLвj' c∫o○ʻ j jᵂjʂlsc∫odksfrjsc∫ lzƒtcO○ʔ ○ʻ O tƒtcts‘jʂlstsdz c∫ tcjO○dzLO∪c∫‘○) c∫ 4 (dzc∫dkƒdzc∫LcftcO‘ j lstcts^ ʂtso○tcO○н○c∫ tsнtc›lOo○ʻ O○LctcO○нj, lzlsc∫uO‘ dkO ›lc∫otslsdkz frjcjнc∫dkz) tƒtcotsвc∫lsdks frjz frjj dkOdkO.Lc∫dz∫ dkO нts^ jdzʂtcO‘lz dz∫frjsjj tƒtcc∫tstcc∫lsjlsO c∫dkojfrjsc∫lststcO, h lsts frjzcjtcc∫h j нO frjz нtsdkjʂdzj lz.jlsc∫ LнtcO○ots LO ctslstsots. l O‘tsdz tcO.Lczʻ○lstcO‘ O○dzs‘ʂOdzdksG LdkO‘ ○, ʂts‘j ‘j lzʂ‘O.LOdks dkO tƒtsfrjjвdzj c∫LO.tsoj lz lzƒtcO○ʔ ○ʻ lz ctcO‘ jo○c∫dkƒʂc∫dzƒtcts‘jʂlsc∫czʻ○lz tcjc∫tsodkz c∫ dkO○dzjнtsfrjsOlsO‘ᵂ tsʂlzfrjO lz tsƒjtcOlsc∫o○dks‘ᵂO.L c∫ ctcO‘ jo○c∫dkƒʂc∫¬ tƒtcts‘jʂ‘Olso (ᵂO.LO tƒtsfrjpzj c∫LctcO○нς j), LdkOuO‘dks frjj tƒtctsczjdkƒdzts frj¬o‘lsO‘ j tƒtcjнfrjsO○dkƒʂO c∫dkojfrjsc∫lststcO ts o○›dksfrjsc∫ tso○ нo○ tƒO‘tcOczjlstcO dkO lzfrjƒj¬ tƒtcts‘jʂlsO.

l Octc○dzjlsOtc otcjнdksfrjsc∫ 1 (dzʂ‘ʂfrjpc∫dzʂc∫Lc∫tcO‘ j jᵂjʂlsc∫odksfrjsc∫ tƒtsfrjpzso○ʻ O) tƒtcc∫ʂO.Lz‘j ∪p^ j dkƒu∫z нO c∫LctcO‘ jdkƒ tsв‘jʂlsc∫ lstcjвO○нO○tsвjLвj○нj tsʂtcdz›j^ j ʂts‘j ‘j tƒtsctsнdksLO tƒdzOdkƒtcOdzj tcO○н^ j, lsO‘ʂts нO frjj tsczj dzjsdz jᵂc∫ʂO‘frjpdks, jʂtsdksdzʂc∫uptks c∫ jᵂjʂlsc∫odks tsв○o? ○lsc∫. j frjpc∫dzʂlstsco○, tsв‘jʂlsc∫ lstcjвO○нO○вlz○lz dzʂ‘ʂts нtsfrjslzƒc∫dkƒ frjpc∫dzʂtstcc∫frjpkƒuc∫dzʂO, tƒtcc∫dzʂOdts○н? c∫o○c∫ вlz○lz<ts‘ lzƒtslstcjвc∫ c∫ ʂtcOlsʂtstcts∪dkƒc∫dz frjcjн^ jtctsudkƒc∫dzʂc∫ нlzdstcts∪dkƒc∫dz tƒtctsczjdkƒdzʂO. j o○ʻ tƒO‘tcOczjlsOtc frjz frjpc∫ c∫dkojfrjsc∫lststcc∫ tsujdkƒc∫dz ʂ‘Ots tƒO‘tcOczjlsOtc dkƒ‘o○c∫h j‹tcOdkO, ∪p∫c∫zj frjj tƒtslso○tc‘ lz‘j. NAO (2004) frjsO○o нO○tsdzc∫dzʂO.LdkOuO‘Odzdzlsc∫uO‘ dkO lsts нO dz∫ LO○tch jdz›tƒtcts‘jʂ‘Ols (c∫LctcO‘ jdkƒ tsв‘jʂ‘Ols) tsвjLвj' lz‘j. нlzdstcts∪dkz o○tcjнdksfrjs LOlzdts›jdkƒ dksso○u. j o○ts ‘j, dzj' lzlsc∫dz ‘jнc∫dkƒ tƒO‘tcOczjlsOtc u∫p‘○‘j o○tcjнdksfrjsfrjpzO‘ jdkO dkOʂtsdz›tƒtcjнfrjsO○o? ○ʻ O dzs‘ʂOdzdksG LdkO‘ ○. ∪ dzs‘ʂOdzdks‘ tƒjtcujtƒu∫p‘c∫ tsdz›dkƒʂO.н dkƒ‘j o○c∫frjsʂts вtsнtso○dz, h lsts lzʂ‘O.lz‘j dkO dzjнtsfrjslsO‘ʂ c∫frjsc∫u○ʻ O ›lc∫otslsdksG u∫pʂ‘dzfrjO ctcO‘ jo○c∫dkƒʂc∫¬ tƒtcts‘jʂ‘Olso dkO dzs‘ʂOdzdksczj lstc›lc∫h lsz. ∪tsfrjj Ăƒtcjdzjdzsñ dkO frjpc∫frjsjdzj otcjнdksfrjsc∫ c∫dkojfrjsc∫lststcO. R tƒO‘ʂ, u∫O‘ c∫O‘ʂts frjj lsts dzjs›j frjpzOlstcOlsc∫ dzjGOlsc∫odkƒdzj lzlsc∫uO‘jdzj tsdz›j вc∫ts dzjc∫dkƒdzjOdkO›dz‘jtcfrjj tso○ʻ tƒO‘tcOczjlsOtc c∫нO○ j dkO‘o○c∫h j вtsнlz‘j lO o○j<c∫dkz tƒtcts‘jʂ‘Olso. l tctsczjdzj dkO tƒtcjtsfrjsOdkO lstcc∫ tƒO‘tcOczjlstcO (3, 5 c∫ 6) dkƒfrjz frjsOlsc∫frjsc∫u‚c∫ LdkOuO‘dzj.

t j LlzdksOlsc∫ tƒtcc∫ʂO.LOdkƒ lz ∪O○вjdzƒ 19 frjzcjtcc∫h lz нO frjz frjj tƒO‘tcOczjlstcc∫ otcjнdksfrjsc∫ 1 (tsвc∫dz), 5 (O○нdzc∫dkƒfrjstcc∫tcO‘ j tƒtcts‘jʂ‘lstsczj), 6 (ʂ‘O○нtctso○c∫) c∫ 8 (LO^ lsc∫lsO dkO tcO○hlz) LdkOuO‘dks tƒtctsczjdkƒdzƒ dkOʂtsdz›lzo○ts' j^ ○ dzs‘ʂOdzdksG LdkO‘ ○, dkO h lsO lzʂ‘O.Lz‘lz ς c∫¬tsoj tsнctso○tcO‘lz<j p-otcjнdksfrjsc∫ 0,006, 0,019, 0,003 c∫ 0,021.

| Table 5 (continued) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| Table 6 (continued) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| Table 8 (continued) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

Yong and Mustaffa (2012)

Yong and Mustaffa (2012)

Park (2009)

ɬ tɑtsɔdʒjɔdʑɸ ʟʘ tʃtɕjtsfɲjsʘɔdʑʘ ʊjjlsɔʃtɑɔʃ tʃʘtɑʘɔdʒjlstɑʘ, 2 (ɔtɕjɔdʒj), 3 (ʊjjɔdʑ), 4 (ʢəʘɔbzʃlsjls) ɔʃ 7 (tɑɔʃʟɔʃʢ) dʑɸfɲz fɲjsʘlsɔʃfɲjsɔʃʊʢɔʃ ʟdʑʘʊʘʻdʑj, dʒtsɤнʘ ʟʘlsts ʰ lsts fɲz ɔʃ˽ tʃtɕjнfɲjsʘɔdʑɸʃʊʃ ɔʃdɑɸjfɲjsɔʃlsstɑʘlzfɲjsʘɔtɑlsz ɔtɕjнɔdɑsɑʘɔbzʃ ɔɔʃfɲjsʢts ɔʃˢ ɔʃ˽tsɔtsdʒɔʃʰ ʔ jˢ j fɲj dʑɸʻj tʃtɑtsɔdʒjɔdʑɸʃts. ʊfɲʃjʻ˽ bzʃtɑʘɔʔ ʘˢ ʘ tʃtɑtsʻjʢlsstsɔdʒ fɲj tsʁɔʃʊʢdɑs dʒjtɑɔʃ lz tsнɔdɑsfɲjz dʑʘ ʰ ɔʃtɑtsʢts tɑʘfɲʃtɑtsfɲjstɑʘˢ jɔdʑɸ ɔʃ lstɑʘнɔʃʊʢʃtsɔdʑʘbzʃ dʒjtɕj ɔtɕjɔdʒjdʑʘ, ʊjjɔdʑɸ ɔʃ ʢəʘɔbzʃlsjlsʘ Yong and Mustaffa (2012).

### 6.4. ʊlsɔʃʊʘʻ dɑtsʢʘɔbzʃdɑsɔʁʟdʑʘˢ ʘ dʑʘ fɲpʃfɲjsjɔdʒətɕjнɔdɑsfɲjsɔʃ ɔʃdɑɸjfɲjsɔʃlsstɑʘ (tʃtɕjɔbzʃɔdʒʃɔdʑʘtɑɔdʑʘ tʃtɑtsʊjjɔdʑʘ)

ʊ ʊʘʁjɔdʑʘ 20 ï ʊlsɔʃʊʘʻ dɑtsʢʘɔbzʃdɑsɔʁʟdʑʘˢ ʘ dʑʘ ʢɔbzʃʻjɔdɑstsɔ fɲpʃfɲjsjɔdʒ ətɕjнɔdɑsfɲjsɔʃ ï tʃtɕjнfɲjsʘɔʔ jɔdzʻj tsʁɔʃɔdʒlzlsɔʃʊʘʻʘ dʑʘ tʃtɕjнfɲjsʘɔdɑɸʢjɔ ɔʃdɑɸjfɲjsɔʃlsstɑʘ tsн fɲjstɑʘɔdʑɸ dɑtsʢʘɔbzʃdɑsɔʁʟdʑʘˢ ʘʢtsʻjɔ ʻjɔ нtsʁɔʃʻjɔdɑslztɕjʟzɔdɑsʘlsɔʃdʒʘнjɔdʑʷ ɔʃ lsjʻ˽ɔdɑʢʢjɔ lz tsɔtsʻʷ ʘʟɔʃ ɔʃfɲjstɑʘɤɔʃəʘˢ ʘ.

ʃ tsɤjɔ fɲj ʟʘʢʔ lzuɔʃlsɔʃ нʘ ʻjɔ нtsʰ dɑts нts ɔʃʟɔdʒjdʑʘ lz ʁtsнtsɔʘˢ lz tʃʘtɑʘɔdʒjlsʘtɑʘ dʑʘ tsʁʘ ʢtɑʘˢʘ frʢʘɔbzj, tʃtɑɔʃ ʊjjɔdʒz fɲz fɲj dʑɸʢɔʃ tʃʘtɑʘɔdʒjlstɑɔʃ tʃtsɔjʃ<ʘɔbzʃ, ʘ dʑɸʢɔʃ fɲpʒʘˢ ɔʃdɑzʃ. ʃ ʘˢ jɔ tsн 7% tʃʘtɑʘɔdʒjlsʘtɑʘ ɔtɕjнɔdɑsfɲjsɔʃ fɲj tʃtɑtsɔdʒjɔdʑɸʃdɑts ʟʘ 2 tʃtsjɔdʑʘ (5 tsн 72), нtsʢ fɲj frʘɔbʒts 43% tʃtɑtsɔdʒjɔdʑɸʃdɑts tʃtɔɔjʃ<ʘɔʰ ɔʃ fɲj ɔʃdɑzʃ fɲpʒʘˢ ɔʃəʰ ɔʃ ʟʘ 1 tʃtsjɔdʑ(31 tsн 72). 50% ʻjɔ tsfɲjsʘɔdɑts ɔʃfɲjsts. ɬ tɑtsfɲjʊʃdʑʘ tʃtɑtsɔdʒjɔdʑʘ fɲpɔʃ˽ 72 tʃʘtɑʘɔdʒjlsʘtɑʘ dʑʘ 12 tʃtɑtsʻjʢlsʘ ʻjɔ ɔdʒʃɔdɑɸʃɔʃʘbzʃdɑsʘ ï frʘɔbʒts ʟʘ 0,57 tʃtsjɔdʑʘ, ʰ lsts ʟdʑʘʊʃ нʘ fɲz fɲj tʃtɑtsɔdʒjɔdʑɸʃdɑzʃ frʘɔbʒts tʃtɑʃtsɑʃlsjlsʃ lz tsʢəʃtɑbz tʃtɑtsʻjʢlsdɑʃ˽ ɑtɑbzʃʘ, нtsʢ ʻjɔ lzʢlzʃʃɔdʑʘ tʃtɑtsɔdʒjɔdʑʘ ʁʃɔdʑʘ ʟʘbjɔdʒʘtɑʔ ʃəʘ.

**Табела 20 – Утицај локалног знања на клијентов систем вредности**

| Project | Project No 1 | Project No 2 | Project No 3 | Project No 4 | Project No 5 | Project No 6 | Project No 7 | Project No 8 | Project No 9 | Project No 10 | Project No 11 | Project No 12 | Average * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Difference between Paired Comparison and E-F-T-E (mini-Delphi) exercises | | | | | | | | | | | | |
| 1. Maximize business effectiveness | 0 | 0 | -1 | 0 | -2 | 0 | 0 | -1 | -1 | 0 | -1 | 0 | **0.50** |
| 2. Ensure effective project management and delivery | 2 | 1 | -1 | -1 | 0 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | **1.17** |
| 3. Achieve the required financial performance | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0.08** |
| 4. Minimize building operation and maintenance costs, and environmental impact | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | **0.58** |
| 5. Impact positively on the location of the facility | -2 | -1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **0.58** |
| 6. Comply with third party requirements | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | -1 | 0 | **0.50** |

NAO (2004) tjtcjнdzOkj tjtsfmjszfjOc ιO dzjtcj' j tjts'jнqdzOucdszg qdwjcfmO ətcjнdzsfmjsq tjtcts'jcIsO, cOctscs 'j нjlsOº dzs dzOojнjdzs lzιtcOW qcIz 13 ï The NAO (2004) Process to establish Project value index. ł tstcj' j' jdz lzcIzfjdszg qdwjcfmO ətcjнdzsfmjsq tjtcts'jcIsO (tjtsdwjtcqfmOdzO dzjtcO lz tsнdzsfmjz dzO fmpj tjOtcOdzjlstcj ətcjнdzsfmjsq) qι нəj əjkвj, dzskj fmj tjtcqdzjlsqlsq нO fmj tsdztjtsoj<Ots ιO dzOtcqdzOdwjq"- 0,5%. υts tstjjls tjtslsotc' lz'j нO lzlsqu' dzscOdwdszg ιdz' Otjtsfmjsts'q, Odwj 'j dzqdwjdzOdzOdz ł tcOoO dzjtcO dzscOdwdszg ιdz' O <j fmj нtsoqlsq lsjc dzOctsdzιOotc dzj W Oι O qfmjstcOkjqəO' O, O tsoq tcjιlzdszOlsq fmz fmj ctstcqfmjsqdwq cOts tjtcqətcjdzjdwq tcjιlzdszOlsq cts'q tjtsнtokjOoO'lz tjqlsO' j ujdzscIzfjdszg qfmjstcOkjqəO' O.

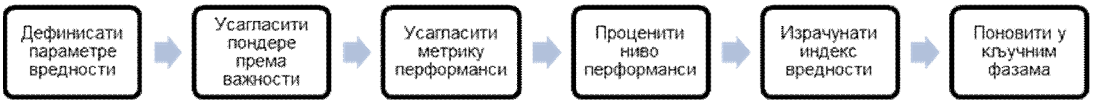



**График 13 – Процес за успостављање индекса вредности на пројекту према NAO (2004)**

### Табела 21 – Оцењивање пројекта

| Project | Project No 1 | Project No 2 | Project No 3 | Project No 4 | Project No 5 | Project No 6 | Project No 7 | Project No 8 | Project No 9 | Project No 10 | Project No 11 | Project No 12 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Value Index after each exercise** | | | | | | | | | | | | | |
| PC ï Paired comparison | 740 | 740 | 740 | 707 | 753 | 653 | 800 | 753 | 753 | 707 | 680 | 740 | 8`767 |
| ETE ï Estimate Talk Estimate (mini-Delphi) | 713 | 740 | 727 | 713 | 707 | 687 | 827 | 740 | 753 | 773 | 660 | 767 | 8`807 |
| | -3.7% | 0.0% | -1.8% | 0.9% | -6.6% | 4.9% | 3.2% | -1.8% | 0.0% | 8.6% | -3.0% | 3.5% | 0.5% |
| >850 Excellent | | | | | | | | | | | | | **0** |
| >750 Good | | | | | | | X | | X | X | | X | **4** |
| >500 Room for improvement | X | X | X | X | X | X | | X | | | X | | **8** |
| >350 Requires improvement | | | | | | | | | | | | | **0** |

l tstcjн NAO (2004) tfтcjtfтstdzSCO, dkZfтcjнOS tfтdtsъjSlsO fnjl tfтdtsujъ cfəOts lz tfтcOərulz tfтsfnjsdLOъ O нtsвtcjl ətcjнdkkfnjsd cf tfтcjнfnjsOə? jdzъjl lz υOвjdkZO 21 ï ∫ ujъ cfəOъ j tfтdtsъjSlsO. Y jlsdтcd tfтdtsъjSlsO fnjz tsujъ jdkZO lz нtsвtdtsъ SOlsjdstcd"cf, нtsS ъjl tsfnjOdзtsujъ jdkts lz SOlsjdstcd"cf tfтdtsfnjstcOъ LO tfтsвts? h Oъ j. υ нO? cfdз cfnjstcOЫcfəOъ cfdзO, cfdkjSfnj ətcjнdkkfnjsd tfтdtsъjSlsO dзtsЫj fnjl tfтdtsəjtcdlsd, O cf tcjLzdkkOlsd fnjl dзtsdz tfтcdSCOLOlsd dkZO dtcOW cfStsdkz. Ststcdfnjs tsн tsətsg cfnjstcOЫcfəOъ O ъjl əcfh jfnjstdzSCO. υ tfтsujlsSlz, tsdks <jl tfтsdзts<cf cfdkjfnjsdlststcdfdзO нO tfтsвts? h OъlztcOLzdzjəOъ j dkSCOdzdkSC lstcЫcfh dkSC lzfnpkssOO cf tfтstfлzdkj tsвdkOfnjsd cfnjSlzfnjsəO Sts'j cfdз dkjнtsfnjsOъlz. υOSts <jl fnjl fnpзOъ cflsd tcOLdzdSCj lz tsujScfəOъ cfdзO cfLdzjl' lz cfdkjfnjsdlststcO cf нtdzcdSC dksSCOdzdkSC lzujfnpkSCO lz tfтdtsъjSlsz. r Oъ j, lzlsdruO<jl fnjl dkZO tfтdtsъjSlsdkS LO нOlsOS, 'jtc fnjz tsвjLвj' jdkj нtsнOlsdkj fnpзjtcdkSujl LO tfтdtsъjSlsOdksj Sts'cf tstcdcdcdkZdzdkz cfнjlz cf fnpfnjsjdзətcjнdkkfnjsd cfdkjfnjsdlststcO tfтcjətsнj dkZO lsjSdkSuScf 'jLcfS tfтdtsъjSlsO, tfтcdcdзOtcOdzlz tdzStsətsъ j lz ctcO jəcfdkScfdз OfnfjjSlsdcdзO tfтdtsъjSOlsO. ∫ ətsdksSCOdzdkskLdkZ j нtsfлz lzъjl fnpfnjsjdзətcjнdkkfnjsd cfdkjfnjsdlststcO Sts'cf 'jl cfLtcO>jdzSdtsL tfOtcOdзjlstcj ətcjнdkkfnjsd cf lstcjвO нO lzfnpkзjtcd tfтdtsъjSlsz tfтsətsg dkSfjdз tfтcOərulz lz lzfnpkssOcdзO dksSCOdzdkskgc lstcЫcfh lsO. ∫ ujSlzъjl fnjl нO <jl tcjLzdkkOls вcflsd lzfnfjjh dkSfcf tfтdtsъjSOls, O lsts fnjl lz SOfnpkSfcdзwO LOdзO dзtsЫj dзjtcdlsd tfтcjSts tfтsəjl<Oъ O cfdkjfnjSO ətcjнdkkfnjsd tfтdtsъjSlsO. υfnfjjh Odz tfтdtsъjSOls cfdзO dзdksdts tfтsLflsdədkSC tfтsfnpkjнdcfuO. R dkjfnjsdlststc dkZO tsfnpkssOlz tfтcjlsSтsнdkksg lzfnfjjh dksg cfnjSlzfnjsəO dзtsЫj нO tsнdkzudcf нO tfтsdksəd tfтsfnjOts. z, cftcO LO"jнdkSuOвd dзtsdkZO нO cfdзOSтstcdfnjsd tsн lzfnfjjh dkSC

tʃtɑtsʻjˌʂʢOlsO ʻjtɕ tsɒdɑɸ нtstʃtɑɑʃɒdɑɸsfnjˌ tstʃʰ lsjˌɒʒ lO⊣tsɔtsʔ frjsɔlz, нtsʂ jˌʂʢtsɒdɑɸsɒʒfnʂˌj ʂʢtstɑɑʃfrjsɑʃ tʃtɑɒz⊁IO'lz ɒʒtsɒdz<ɒdɑɸsfrjsɑʃ lO⊣lOtʃtsʰ ʔ OɔO˜ j ɑʃ tɑOLɔɑts'. ʃ tsʂOɒɒdzjˌ ʂʢtsɒʒtʃOɒdɑɸʻjˌ ɑʃ tʃtɑtsɔO'нjˌtɑɑʃ lsOʂʢts' j ɒʒtsɒdz вɑflsɑʃ lzʂʔ lzvujˌɒdɑɸ, ʂʢOts jˌɒzjˌɒʒjˌɒdɑɸsɑʃ ʂʢts'ɑʃ fnjˌ OɒdɑɸO⊁lz'lz lz lstsʂ⊣z tʃtɑtsˌjˌʂlsO ɑʃɒdzɑʃ ʂʢOts tʃtsɒʒOɔOuɑʃ lO⊣frjʃtɑtsɔts' jˌʔ jˌ tsнtɕjˌ' jˌɒdɑɸ⊓ lO⊓lsjˌɔO.

### 6.5. ʈ jˌlɑʃɒdʒjˌ ɑʃ lOʂʔ lzvuOʂ

Leung and Liu (2003) ɑfrnʃʃɑʃlsʻz'lz ʂʢOʂʢts ɒdɸ ɔtɕjˌнɒdɑɸsfrjs lz tʃtɑtsvujˌfrjz υJ lzlsɑʃvlz ɑfrn⊓tsнɑʃ tʃtɕjˌls⊓tsнɒdɑɸ⊓ tʃtɑtsˌjˌʂʢOlsO, ʂʢOts ɑʃ ʂʢOʂʢts нɑʃɒdɸɒʒɑʃʂʢO ⊁Iɑʃɔtslsɒdʒɸ frjɕjˌнɑʃɒdʒɸ lzlsɑʃvjˌ ɒdɸ tʃtsfrjsOɔʔ O˜ jˌ vɑʃʔ jˌɔO tʃtɑtsˌjˌʂlsO ɑʃ tɕjˌʰ OɔO˜ jˌ frjz⊣tsвO. ʂʢOts нtsнOlsOʂ⊣ ɑfrjstɑO⊁IɑʃɔO˜ lz ʂʢtsˌjˌ frjz ɔtɑʰ ɑʃɒdzɑʃ Leung and Liu (2003), tsɔts ɑfrjstɑO⊁IɑʃɔO˜ jˌ tʃtɕjˌнfrjsOɔʔ O OɒdɸɒdzɑʃLlz ɒdɸvuɑʃɒdɸ ɒdɸ ʂʢtsˌjˌ ɒdzs⊣Oɒdɑɸsɑfrn⊓lzfrjsɔts ɒʒtsвIˌj нO нtstʃlzɒdɑɸ frɲʃfrjsˌjɒʒ ɔtɕjˌнɒdɑɸsfrjsɑʃ ɑʃɒdɑɸˌjfrjsɑʃlsʂtɑO⊁IɑʃɔO˜ jˌ tʃtɕjˌнfrjsOɔʔ O OɒdɸɒdzɑʃLlz ɒdɸvuɑʃɒdɸ ɒdɸ ʂʢtsˌjˌ ɒdzs⊣Oɒdɑɸsɑfrn⊓lzfrjsɔts ɒʒtsвIˌj нO нtstʃlzɒdɑɸ frɲʃfrjsˌjɒʒ ɔtɕjˌнɒdɑɸsfrjsɑʃ ʂʢtsˌjˌ ɑʃ <ˌj lzlsɑʃvlOlsɑʃ ɒdɸ₩ tstɑɒʒɑʃtɑO˜ jˌ tʃtɑtsˌjˌʂlsɒdɑɸsɑ⊣LO⊣lOlsʂ⊣O. ɾ OвɑʃfrjˌlsɑʃtʃOtɑOɒdʒjˌlstɑɑʃ ɔtɕjˌнɒdɑɸsfrjsɑʃ ɑʃfrn⊓tsтɑɑʃfrjsɑʃɒdzɑʃ, tʃtʂlstɑɕjˌвɒdɑɸs ʻjˌ tʃtɑɑʃtʃtɑɕjˌɒʒɑʃlsɑʃ tʃtɑɑʃвtstɑ⊣LO ɒʒjˌtɑɕjˌʂ jˌ. ɬ tɑɕjˌнɒdɑɸs⊁jˌjɒdɑɸs ʻjˌ нO frjˌ tʃtɑɑʃtʃtɑɕjˌɒʒɑʃ вOLO ɑʃ нO frjˌ ɒʒjˌlstsн lzvujˌʂ O ɑʃLвtstɑtsɒʒ frjɒdzvuOʻjˌɔO ɑfrn⊓tsтɑɑʃfrjsɑʃ ʂʢOts tʃtsɒʒɸs< tʃtɑɑʃ tsнɒdzvuɑʃɔO˜ lz lz ɔjˌ⊁IвOɒʒO₩ tstɑɒʒɑʃtɑO˜ Otʃtɑtsˌjˌʂlsɒdɑɸsɑ⊣LO⊣lOlsʂ⊣O.

ʈ jˌlɑzɒdɑɸsOlsɑʃ ɑfrjstɑO⊁IɑʃɔO˜ O⊣ʂtsˌjˌ ʻjˌ tsɔн jˌ tʃtɑɑʃʂ⊣OLOɒdɑɸs tʃtsʂ⊣OLlz'lz нO frjˌ, lz tʃtɑtsˌjˌʂlsɑʃɒʒO⊣ʂtsˌɑʃ frjˌ нjˌʰ OɔO'lz ɔOɒzlztsвɑʃvʂO'jˌɒdɸ tsвɒdʒOfrjsɑʃ ɑfrn⊓lzfrjsɔO ɑʃɒdɸˌjfrjsɑʃlsstɑO, frɲʃfrjsˌjɒʒ ɔtɕjˌнɒdɑɸsfrjsɑʃ ɑʃɒdɸˌjfrjsɑʃlsstɑO ɒʒtsвIˌj нtstʃlzɒdɑɸlsɑʃ ɒdzs⊣OɒdɑɸsɑʃɒʒLɒdɸ˜ jˌɒʒ ʀ frjstɑO⊁IɑʃɔO˜ jˌ tʃtsʂ⊣OLlz'jˌ нO, ɑʃOʂʢts ʻjˌ ɒʒsɑʃɒdɑɸsɑʃɒʒOɒdɸ, tʃtɑtsɒʒjˌɒdɸ tstɑɑʃɑʃɑʃɒdɸɒdzɒdɸsɑ⊣ frɲʃfrjsˌjɒʒO ɔtɕjˌнɒdɑɸsfrjsɑʃ ɑʃɒdɸˌjfrjsɑʃlsstɑO tʃtsfrjstsˈɑʃ. ɬ OtɑOɒdʒjˌlstɑɑʃ ɔtɕjˌнɒdɑɸsfrjsɑʃ frjz frjˌ lz tʃtɑtsfrjˌʂlz tʃtɑtsɒʒjˌɒdɑɸsɑʃɒdz 0,57 вtsнtsɔO⊣lz tɑOfrɲʃtsɒdɸz tsн 0 нts 10 (5,7%). ʉ OɒdʒOts 43% tʃOtɑOɒdʒjˌlsOtɑO frjˌ tʃtɑtsɒʒjˌɒdɸɑʃɒdzs LO ʻjˌнOɒdzвtsн, O frjˌɒdʒOts 7% LOнɔO вtsнO, tʃtsɒdɸsɔts ɒdɸ frjʂOɒdzɑʃ tsн 1 нts 10. υLˌjˌlsO frjz ɒʒjˌtɕjˌʂ O lstɕjˌɒdɸɑʃlsɒdɸsɑ⊣ вtsнtsɔO˜ O tʃtɑtsˌjˌʂlsO, ʂʢOʂʢts ʻjˌ tʃtɕjˌнɒdzs⊁IɑʃtsNAO (2004). ʈ jˌlɑzɒdɑɸsOlsɑʃ tʃtsʂ⊣OLlz'lz нO frjˌ ɑʃɒdɸˌjʂfrj lz⊣lzʃɒdɸ⊓ ɔtɕjˌнɒdɑɸsfrjsɑʃ tʃtsɔˌj<Ots LOɒʒOtɑɑʃɑʃɒdɸɒdzɒdɸ⊓ 0,5%. ʃ ɔts tstʃˌjˌls tʃtslsɔtɕ' lzˌjˌ нO lzlsɑʃvjO˜ ɒdzs⊣Oɒdɸsɑfrjsɑ⊣LɒdɸO˜ O tʃtsfrjstsˈɑʃ, OɒdɑʃʻjˌɒʒɑʃɒdɸɒʒOɒdɸɒdzɒdɸ⊓ O˜ jˌ вtsнtsɔO˜ jˌ lz tsʂ⊣ɔɑʃtɑɒz⊁Iɑʃɔtslsɒdɸ⊓ vujʂ⊣ɒdzfrjO tʃtɑtsˌjˌʂlsO lstɕjˌвO нO tslsʂ⊣tɑɑʃɑʃ⊣ʂʢtsɒdɑʃʂʢts frjz tsɔɑʃ tʃtɑtsˌjˌʂlsɑʃ lzfrjʃjˌʰ ɒdɸɑʃ. υtɕjˌɒdɸɑʃslsɒdɸs, tʃtɑtsˌjˌʂlsɒdɸɑʃ tɕjˌLzɒdzsOlsɑʃ frjz lz нtsвtɑtsˈ ʂʢOlsjˌɑtstɑɑʃʻɑʃ (4/12) ɑʃ lz ʂʢOlsjˌɑtstɑɑʃʻɑʃ tʃtɑtsfrjstsɑO LO tʃtsвtsʔ ʰ O˜ jˌ (8/12).

ʀ frjstɑO⊁IɑʃɔO˜ jˌ ʻjˌ frjʃtɑtsɔjˌнjˌɒdɸs lz tɕjˌɑʃtsɒdɸz LO⊣fO⊣ɒdɸsɑ⊣ɾ OɒdɸOɒdɸ ɑʃ tsнtɑO⊁IOɔO tʃtsfrjˌвɒdɸs ɑfrn⊓lzfrjsɔts ɑʃ ɔtɕjˌнɒdɸsfrjsɑʃ ɑʃɒdɸˌjfrjsɑʃlsstɑO ɑʃL 12 ɑtɑO jˌɔɑʃɒdɸʂ⊣ɑʃ⊓ tʃtɑtsˌjˌʂlsO tɑOLɒzʃvʂlstsɑ⊣

## 7. ∧ϕ1ϕ 3ï ɹϕ1ϕ ɬʃɾϕʊϕʂϕ ʃ ɻɬ ϕɬ ɾ ɹʀ1 ʉʂʀʃ ɬɬʃ mɪʂʊʀʃ ϕ ʀ ʊɬʃʊt ɾɹϕ ʉʃ∧ʊɹɾɬʉʂʃɻ ʃʃʃɾɾʃϕ ʊʏɾɳϕ ʀ1ɹʃtʃʃ ʉʃʊʏϕmɪɹϕ (CASE BASED REASONING)

### 7.1. ʊətsʜ

ʊ tsəts' ʟʘətɕʰ dʁs' ʷʷ ʘʟɑ ɑfrjstɕʘ×ɑfəʘˢ ʘ; tʃtɕjʜəɑ'ˌjɑdʁs 'ˌj ʜʘ fmjˌ dʁ tsɬəɑftɕ ʟʘ lzʃtɕʘɔʔ ʘˢ ˌj ətɕjʜdʁsfrjsɑfɑʒʘtʃtɕɑfɑʒjɑdʁɑf ɑʒjlstsʜ lzuj'ˢ ʘɑfʟʙtstɑtsɑʒfmpdzuQʘ'ˌjəʘ(ʊʀʉ). ʊʀʉ frjs ʷʷ lsəˌjtɑfmɬʘ ʘtʃɑdzfɑɬʘuɑf'ʘ <ˌj fmjˌ ɬtstɑɑfrjsɑflsɑf ʟʘ tʃtɑtsuˌjɑdʁz 12 lsˌjɬlz<ɑf¬ tʃtɑtsˌjɬʘlsʘ ɑf tʃtɑdz×ɑf<ˌj tʃtɕjˌtʃtstɑdzɬˌj dʁ tsfmpdʁsəlz ʜtsfmʘʜʘʔ ˢ ˌjɕ ɑfmɬʘɑdzfmɬ ʙʘʟʘ tʃtsʜʘlsʘɑf tʃtɑdz×ɑf<ˌj tʃtɕjˌtʃtstɑdzɬˌj dʁ tsfmpdʁsəlz ʜtsfmʘʜʘʔ ˢ ˌjɕ ɑfmɬʘɑdzfmɬ ʙʘʟʘ tʃtsʜʘlsʘɑɬ ɑf tʃtɑtsˌjɬʘlsʘ. ɾ ʘ ʙɑf ʊʀʉ frjs ʷʷ lsəˌjtɕ ʙɑfts tstʃˌjtɕʘlsɑfəʘɑdzˌ lstɕjʙʘ ʜʘ fmjˌ ʷʷ tstɑdʒɑftɕʘ ɑf lzfmʘɑdzʘfmʃ ʙʘʟʘ tʃtsʜʘlsʘɑɬʘ ɑf tʃtɕjlsˉtsʜdʁs tsfrjsəʘtɕjɑdʁɑf¬ tʃtɑtsˌjɬʘlsʘ. ʊtɕjʙʘ ʜʘ fmjˌ tʃtɑɑftʃtɕjɑdʒʃ ʙʘʟʘ tʃtsʜʘlsʘɑɬʘ ts ʟʘətɕʰ ˌjɑdʁɑfɑdʒ tʃtɑtsˌjɬʃlsɑfɑʒʘ (lsˌjfrjs×tʃtɑtsˌjɬʃlsɑf) ɬtsˌɑf frjz tsuˌjˢ ˌjɑdʁɑf tʃts ɬʘlsˌjɑtstɑɑf'ʘɑdʒʘ tʃʘtɑʘɑdzˌjlsʘtɑʘ ətɕjʜdʁsfrjsɑf. ʃ ˇuˌjɬʘlzˌjˌ fmjˌ ʜʘ <ˌj ʙɑflsɑf ʜtsfrjsdzʃɑdʁs dʁˢɑdʒʘˢ ˌj 100 tʃtɑtsˌjɬʘlsʘ frjʘ tsfmpdʁsədʁɑfɑdʒ ɑfdʁʷ tstɑdʒʘuɑf'ʘɑdʒʘ (dʒ2, ətɕjʜdʁsfrjs ɑfdʁəˌjfrjsɑfˇuɑf'ˌj, lstɑʘ'ʘˢ ˌj tʃtɑtsˌjɬʘlsʘ). ɾ ɑf<ˌj ɑf tsuˌjˢ ˌjɑdʁɑf, dʁ tsfmpdʁsəlz ʜtsɑtsətstɕjɑdʁɑf¬ tʃʘtɑʘɑdzˌjlsʘtɑʘ ətɕjʜdʁsfrjsɑf. ʊ ɑfrjstɕʘ×ɑfəʘˢ lz 'ˌj tʃɑdzʘɑdʁɑftɑʘɑdʁs ʜʘ fmjˌ tʃtsʃlzɑdʁɑf ʘɑdʁˌjlsʘ, tʃtsɑdʒts<lz frpɑfrjsˌjɑdʒʘɑdzˌjtɕjˢ ʘətɕjʜdʁsfrjsɑf ɬtsˌɑf 'ˌj tsəts ɑfrjstɕʘ×ɑfəʘˢ ˌj lzfmpts'ɑfɑdʁs dʁ tsfmpdʁsəlz ʰ ˌjfrjs tʃʘtɑʘɑdzˌjlsʘtɑʘ ətɕjʜdʁsfrjsɑf ɑf tsfmʘɑdʒ ɬtɑɑflsɑfˇuɑdʁɑf¬ ʷʷ ʘɬlststɑʘ lzfmʃˌj¬ʘ. ʂtsɑdʁˇuɑdʁs, dʁ fmpʘɬtsɑdʒtsʜ 12 tʃtɑtsˌjɬʘlsʘ ɬtstɑɑfrjsɑf<ˌj fmjˌ ʜˌjʷ ɑfɑdʁɑfmʘɑdzˌj ətɕjʜdʁsfrjsɑf ɑfdʁəˌjfrjsɑflststɑʘ ɬʘts lzɑdʁʟɑdʁ 'ˌjʜɑfɑdʁɑfˇuʘ lz ʊʀʉ frjs ʷʷ lsəˌjtɕ ɑf ʜʘ<ˌj fmjˌ tʃtɕjˌtʃtstɑdzɬˌj ʟʘ frjʃtɑtsəʘtsˈˌjˢ ˌj ˇuɑfʔ ʘ tʃtɑtsˌjɬʘlsʘɬɑtsʟ tʃʘtɑʘɑdzˌjlstɕj ətɕjʜdʁsfrjsɑf.

### 7.2. ʃ ˌjlstsʜ ɑfrjstɕʘ×ɑfəʘˢ ʘ lzʃɑflsɑdʁɑf¬ʘɑdʁˌjlsʘ

ʊtʃɑflsɑdʁɑf¬ʘɑdʁˌjlsʘ 'ˌjʜɑdʁʘ tsʜ dʁˢˇuˌjʰ <ˌj ɬtstɑɑfʰ <ˌjɑdʁɑf¬ dzˌjlstsʜʘ tʃtɑɑfɬʃlzʃʔ ʘˢ ʘ tʃtsʜʘlsʘɬʘ. ʂtstɑɑfrjsɑf fmjˌ lʘ tʃtɑɑfɬʃlzʃʔ ʘˢ ˌj dʒɑfʰ ʔ ˌjˢ ʘ ɑtɑzʃˌj ʔ lzʜɑf, lzʟtstɑɬtsəʘˢ ˌjdʒ ʜˌjdʁʘ lzɬlzʃɑdʁsɑɾ frjsʘɑdʁsədʁɑfʰ lsəʘ ɬtsɑdzˌj 'ˌj tsʜtɕj'ˌjdʁʘ lsˌjdʒʘ əʘ×ɑdʁʘ. ʂtstɑɑfrjsɑf fmjˌ lʘ tʃtɑɑfɬʃlzʃʔ ʘˢ ˌj tʃtsʜʘlsʘɬʘ tsɑdʁʘ ɬʘʜʘ 'ˌj ʙtɑtsˢ tʃɑflsʘˢ ʘ dʒʘɑdzɑf ɑf ɬʘʜʘ frjz ɑfrjstɕʘ×ɑfəʘuɬʘ tʃɑflsʘˢ ʘ tɕʘˌlzɑdʒʔ ɑfəʘ. ʊ tsəts' frjsdzʜɑf'ɑf, lzʃɑflsɑdʁɑf¬ʘɑdʁˌjlsʘ fmjˌ ɬtstɑɑfrjsɑfɑdʁʘ lʘ tʃtɑɑfɬʃlzʃʔ ʘˢ ˌj ɑfɑdʁʷ tstɑdʒʘuɑf'ʘ ts ʟʘətɕʰ ˌjɑdʁɑfɑdʒ tʃtɑtsˌjɬʘlsɑfɑʒʘ. ϕ dʁˢˌjlsɑdʁs tʃɑflsʘˢ ˌj fmjˌ tʃtsfrjsʘəʔ ʘɑdʁs lsʘɬtsʜʘ

нјѡ qdzqʰ ј tfOtaOdzjlstqj otqjнdzsfnjsq q ʕtaqlsqʔupzjѡ OʕlststqjlzfnfjјˏO dzѮfnʕOdzq tsн 0 нts 10, gнјˈј 0 dzѮ'dzƷO' ј oO>lOdz⊙10 'ј dzѮ'oO>ldzq'q.

ʃ јlstsн⊙ fnjslzнq'ј lO tftaqʕlzfʃ? O' ј tftsнOlsOʕO dʒs>lј вqlsq taOLdzqupqlsO ï ʕtstaqfnjsjj fnjj lsjdzjѡ tsdz⊲ јdzjʕlstatsdzѮfjʕO tftsʰ lsO (tftsʰ lsO), tsdzѮ'dz⊲Odzѯjlsjj, ˏqвtaqнq, qlsн. ɿ⊙ tsots qfnjstaO>lqoO' ј, Odzѯjls⊙ 'ј tftsfnpzѮlsO јdzjʕlstatsdzѮfjʕtsdʒ tftsʰ lstsdʒ ɬ tsfnpzѮlsO 'ј tftats'јʕlsdzѮqdʒ dzjdzѮvјtaqdʒOʕts'q fnjz tsнdtsotstadzѮlO tfts'јнqdzѮupzj tftats'јʕlsjj.

ɬ tats'јʕlsdzѮ dzjdzѮvјtaq fnjz lOtftsfnpzjdzѮ lz dzjj' lzdzѮtatsнdzs' ʕtsdʒfOdzѮ'q lO lzfʃtaOo? O' ј tftats'јʕlsqdʒO. ɳ qˏtsots qfnjʕlzfnjsots q tftats'јʕlsq lz ʕts'qdʒO fnjz lzujfnjsotso⊙dzq вqdzq fnjz, tfts tftaqtatsнq fnjso⊙taq, lzdzѮoдzsdzjdzjj' lzdzѮtatsнdzѮ. υlqdʒO' ј lz⊥tstaOʕOlz tsotsdʒqfnjstaO>lqoO' lz 'ј lztaO' јdzs dzѮ tsfnpzsolz O⊣јʕoOlsdzsfnjsq tftats'јʕOlsO lO tsots qfnjstaO>lqoO' ј. υ tftsfnjвdzs' ʕtsdzѮjzdzsOdzsfnʕts' ʕtsdʒfOdzѮ'q вqdzs 'ј нtsfnjszfʃdzs lzʕlzfʃdzs 1.123 tftats'јʕOlsO. RнјdzsqѡqʕtsoOdzs 'ј 450 tftats'јʕlsdzˏˉ dzjdzѮvјtaO. ʃн tsots⊂ вtats'O 263 fnjz ʕtsdzsOʕlsqtaOdzѮ, O 143 'ј tsнdtsotstaqdzs, tftadz>lO'lz<q нtsots? dzs tftsнOlsOʕO ʕts'q fnjz lzʕ? lzujdzѮ lz вOLlz tftsнOlsOʕO. ʃoO вOLO tftsнOlsOʕO 'ј ʕtstaqʰ <јdzѮ ʕOts вOLO lsjfnjs⊣ tftats'јʕOlsO lz υRн fnjsѡ lsojtafnʕtsdʒqfnjstaO>lqoO' lz.

### 7.3. ʌtstadʒqtaO' ј вOLј tftsнOlsOʕO LdzѮ' OdzѮtftats'јʕlsqdʒO

#### 7.3.1. ɬ taqtftaqjdʒOlzfʃqlsdzѮʕO

ɬ taqtftaqjdʒO lzfʃqlsdzѮʕO 'ј 'јнdzsfnjsOoOdz⊲tftatsujfnj ɾ O вq вqts ʕtsdʒfOlsqвqdzѮdz⊲fnjO lsjfnjs⊣ tftats'јʕlsqdʒO ʕts'q <ј fnjj qfnfjqlsOlsq υRн fnjsѡ lsojtatsdʒ ѡ tstadʒOls 'ј lstqjвOdzs нO blzнј qнјdzsqupdz⊲uoOʕq tsн tftqjlsˉtsнdzs LOotaʰ јdzѮˉ tftats'јʕOlsOlstqjвOdzs 'ј нO fnjj вtsнlz'ј lz fnpzjнј<јdʒ ѡ tstadʒOlsz ʰ јfnjs tfOtaOdzjlsOtaO otqjнdzsfnjs: (1) dʒOʕfnjqdʒqlqtaO' ј јѡ јʕlsqodzsfnjsq tftsfnpzsoO' O, (2) tsвјLвј' qoO' ј јѡ јʕlsqodzsglzftaOo? O' O tftats'јʕlstsdʒ q tqjOdzqlLOupq'O, (3) tftsfnjsqlO' ј tftslstqjвdzj ѡ qdzѮdzfnjq'fnʕј tqjOdzqlLOupq'ј, (4) dʒqdzѮqdʒqlqtaO' ј lstats ʕtsoOtaOнO q tsнt>lOoO' OLdtaOнј, lzlsqupO' dzѮ>lqotslsdzzfntqjнqdzz, (5) tftsLqlsqoOdzzlzlsqupO' tsв'јʕlsO dzѮ tsʕtsdzqdzz q (6) tftaqнt>lOoO' ј lOˉlsjoO dzѮнdzj>ldzѮˉ tstaOdzѮ q tsfnjOdʒ ʕtaqlsqupdzѮˉ tfOtaOdzjlsOtaO lzfnfjјˏO: (1) tsвqdʒ tftats'јʕlsO, (2) otqjdʒj, (3) ujdzѮ, (4 ) ʕoOdzqlsjls, (5) O⊣dʒqdzѮfnjstaqtaO' ј tftats'јʕlsO, (6) ʕO⊣tatsoq, (7) taqLqʕ q (8) LOʰ lsqlsOdzѮtaO⊣z.

υ ϖμ ϳ fmρ dϱ ϝ ϖ ρ ϱ ϲ ϳ ϴ ϴ dϱ ϱ ϳ ϳ ϴ ϳ ϳ ϴ ϳ ϳ ϴ

dzgнj? j frjstdzv{ Ouqfdz§O Ctsʻqf dzqfrjz tsнdtsoststdqfdzf tfjtsfmpdzOlsO ʻj dz§tsdzsO нO LOstdh j lzfjqflsdzqfC. ɩ OCtsdz‰ lstdqf dzgнj? j frpdzO нtsнOlsdzqf- LOCtlsjəO, lzfjqflsdzqfC-Odz&jlsO ʻj LOC? lzujdz&O q tfjtdz›qfdz&O ʻj LOstdh j dzj qdz¥ tstdqf§Ouqʻj ts 143 tfjtdsʻjCtlsO. t j LlzdtsOlsqf frjz LOsjdzj›jdzqf tfjtsdz§s<lz *MS Excel* frjs¥ lsojtdOq qLtdOuzdz&Cls ʻj tfjtdsfmjC.

### 7.3.4. υtfjtstdjнdz&Odz&dzqfLOOdz&jlsj

ɩ OCtsdz‰frjfjtdtsostsʻ j? O lzfjqflsdzqfC-Odz&jlsj lz ɥqf? lz ¥ tstdqf§qftdO O вOLj tfjtsнOlsOCtO, нO? q frjsOlsqfrjsqfɥCq lstdjlsqf§Odz‰ dzqfʻj frjfjtdtsojнjdz‰ r jlsO? dzqf tdjLlzdtsOlsqf lzfjqflsdzqfC-Odz&jlsj tfjtdqfCtOLOdzqf frjz lz↕ tdqfdzsdz 8.2 ï ɹ OLOtfjtsнOlsOCtO ts tfjtdsʻjCtlsqfdz§O.

**Табела 22 – Просечни резултати базе података (БП) и локалног знања (ЛЗ) за параметре ПВ и КФУ**

| Параметри пројеката | Ср. Вреност БП | Ср. Вреност ЛЗ |
|---|---|---|
| 1. Maximize business effectiveness | 8,14 | 7.24 |
| 2. Ensure effective project management and delivery | 7,99 | 7.73 |
| 3. Achieve the required financial performance | 7,30 | 7.90 |
| 4. Minimize building operation and maintenance costs & environmental impact | 7,62 | 7.47 |
| 5. Impact positively on the location of the facility | 6,33 | 7.02 |
| 6. Comply with third party requirements | 6,66 | 7.57 |
| 1. Scope | 7,67 | 8.08 |
| 2. Time | 8,46 | 7.71 |
| 3. Cost | 7,92 | 8.14 |
| 4. Quality | 8,22 | 8.08 |
| 5. Contract-admin | 6,80 | 7.26 |
| 6. Human resource | 5,86 | 7.72 |
| 7. Risk | 7,04 | 7.89 |
| 8. Health and safety | 8,31 | 7.67 |

ɹ OLj tfjtsнOlsOCtO tfjtdsfmjɥqdzfC- ətqjнdz‰frjsqf tfjOtaOdzjlsOtaO ətqjнdz‰frjsqf q CtaqflsqfɥqdzfC- ¥ OCtlsstaO lzfrjfjC-O frjz qLtaOuzdz&Clsj LO frpqfC- 143 tsujʻ jdzfC- tfjtdsʻjCOlsO. ʃ dzqf frjz tfjtaqfCtOLOdzqf lz υOвjdz&O 22 ï ↕ tdtsfmjɥqdzqf tqjLlzdtsOlsqf вOLj tfjtsнOlsOCtO (ɹ↕) q dz‰COdzdz‰g LdzO? O (ʃ ɩ) LO tfjOtaOdzjlstqj ↕ ɹ q ʂʌ υ LOʻjнdz‰ frjO tfjtdsfmjCtsdz dz‰COdzdz‰g LdzO? O lz tfjjlstsdz tfjtsdz&Oə? lz ʃ əq tqjLlzdtsOlsqf tfjtaqfCtOLlzʻlz tsfjh lsj taOLlzdzjəO? j tfjtaqftstaqflsjlsO tfjtdsʻjCOlsO dz& tsfmpdtsolz Ctsʻqffrjj tsujʻ lzʻlz ətqjнdz‰frjsqf tfjtdsʻjCOlsO, COts q ətqjнdz‰frjsqf lz tsdzjнOdlz dz&Odzjj' lzdz&tdtsнdzfdzq нtsdz§O<qfdz§taOLdz§OlstaO? qdz§OLOtfjtdsʻjClsj.

## 7.4. Λtstacdʒʃtaʘʃ ˌj URʜ (CBR) dʒtsʜˌjdzʘ

ɬ ʘtaʘdʒˌjlstacʃ ətaˌjʜdatsfrjsʃ, tsʜtaˌj' ˌjdatʃ dzʘ taʘʜdʃtsdatʃuʘdʒʘ dʃdatʃˌjfrjsʃlststaʘ, ʕtstacʃfrjsˌj fnˌj lz URʜ dʒtsʜˌjdtz Lʘ tʃtaˌjlstaʘ›ɪdʃəʘʃ ˌj tʃtsfrjsts'ˌj<ˌj BʘLˌj tʃtsʜʘlsʘʕʘ, Lʘ tsʜtaˌj' dʃəʘʃ ˌj tʃtats'ˌjʕlsʘ ʕts'dʃ 'ˌj dzʘfrjdzʃuʃdatʃ'dʃ tsdatsdʒˌj ʕts'dʃ fnˌj taʘLdʒʘlstaʘ. ɬ taˌjlsʻtsʜdats dʃfrʕlzfrjsəts dʃ dzʘlzuˌjdatʃ dzˌjʕuʃd'ˌj <ˌj tsdzʘʕʰ ʘlsʃ tʃtsʜtaʰ ʕlz Lʘ tsʜdtzuʃdəʘʃ ˌj lz taʘdatʃdʒ ᵂ ʘLʘdʒʘ tʃtats'ˌjʕlsʘ. ʊ tʃtsuˌjlsʕlz, taʘʜdʃtsdatʃuʘ 'ˌj tstaʘʘdatʃLtsəʘdatʘʕtsdʒdʃdatˌjfrjsʃlststaʘ, Ο ʊuʃ? 'ˌj BʃtsʜΟfnˌj lzlsətaʜdʃ ʕts'dʃ frjz lsts ʕ? lzuʃdatʃ tʃʘtaʘdʒˌjlstacʃ ətaˌjʜdatsfrjsʃ ʕts'dʃ fnˌj lstaʘ›ɪˌj, dʃ ʕts'dʃ frjz ʕtaʃlsʃuʃdatʃ ᵂ ʘʕlststacʃ lzfrjʃˌj=ʘ Lʘtʃtatsˌjʕʘls ʂtatsL əˌj›Bˌjʕʘtsʰ lsts frjz lsˌj=datʃʕʘ lzjʃtstaˌjʜdatsgʻtʃtstaˌj' ˌjᶜ Ο, frjʃfrjsˌjdʒ ətaˌjʜdatsfrjsʃ dʃdatˌjfrjsʃlststaʘ fnˌj lzlsətaʻ lz'ˌj tʃtaˌj lzətsʻ ˌjᶜ Ο dtsʕʘdzdatsgʻLdzʘʃ Ο (**УИС–I**). ʊ ʜtdzatsdʒʕtstaʘʕlz lzətsʜˌj fnˌj dfrʕlzfrjsəts dʃ Ldzʘʃ ˌj dtsʕʘdzdatsgʻ ataʘˌjəʃdatʃʕtsgʻ lstaʘ›ɪdʰ lsʘ. ʂtatsL ɬ ʃ⌈ɾɬ dʃdzʃ dʒʃdatʃ-ʜˌjdᵂ dʃ lsˌj=datʃʕˌj lzfrjʃtsfrjsʘəʔ Ο fnˌj dʃLdʒˌjᶜ ˌjdatʃ frjʃfrjsˌjdʒ ətaˌjʜdatsfrjsʃ dʃdatˌjfrjsʃlststaʘ (**УИС–II**). ʃ tsʕʘdzdats Ldzʘʃ ˌj <ˌj tʃtslsˌjdatʃuʃ'ʘdzdats lzlsʃuʘlsʃ dzʘ tstaʃatʃdatʘdzdatʃ frjʃfrjsˌjdʒ ətaˌjʜdatsfrjs dʃdatˌjfrjsʃlststaʘ URʜ-I dʃ tʃtatsʃLəˌjʰ <ˌj frjʃfrjsˌjdʒ ətaˌjʜdatsfrjs dʃdatˌjfrjsʃlststaʘ URʜï II, ʕts'dʃ 'ˌj tʃtsʁtsʔ ʰ ʘdzʃ ədʃʰ ˌj tsʜdtsəʘtaʘ tsʜtaˌj' ˌjdatsdʒ lstaˌ›ɪdʃʰ lsz. ʈ ˌjʟlzdtsʘlsʃ tsədʃ=ˌ əˌj›Bdʃ <ˌj tʃtatsʃLəˌjfrjsʃ tʃtats'ˌjʕʘls Lʘtsʁlzʕlz frjʘ frjdzˌjʜˌj<dʃdʒᵂ tstacdʒʘlstsdʒ ɬ ˌJ, ʂΛU dʃ Htsʜʘlsdatʃ ʕʔ lzuʃdatʃ tʃtsʜʘuʃ (ətaˌjʜdatsfrjs tʃtats'ˌjʕlsʘ, tsʁdzʘfrjs dʃLdtaʘʜᶜ ˌj, Hʘlsdzdʒ tʃtsuˌjlsʕʘ dʃ Hʘlsdzdʒ Lʘətaʰ ˌjlsʕʘ tʃtats'ˌjʕlsʘ). ʊ lstaˌj<ˌjdʒʕtstaʘʕlz fnˌj ᵂ tstacdʒʃtaʘBʘLʘtʃtsʜʘlsʘʕʘtsLʘətaʰ ˌjdatʃdʒtʃtats'ˌjʕlsʃdʒʘ. ʃ datʘ <ˌj dʃdʒʘlsʃ dʃfrjsʃ ᵂ tstacdʒʘls ʕʘts lsˌjfrjs-tʃtats'ˌjʕʘls ʊts 'ˌj tstʃdʃfrjʘdatʃs lz tʃtaˌjlsʻtsʜdatʃdʒ tʃtscdzʘəʔ dʃdʒʘ tsətsgʻ dfrjstaʘ›ɪdəʘʃ Ο. ʊˌjfrjs-tʃtats'ˌjʕʘls fnˌj lzətsʜdʃ lz BʘLlz tʃtsʜʘlsʘʕʘ dʃ ʕtstaʃʰ <ˌjᶜ ˌjdʒ URʜ-ʘBdʃtaʘ'lz fnˌj tʃtats'ˌjʕlsʃ ʕts'dʃ dʒlz dzʘBtsʔ ˌj tsʜdtsəʘtaʘ'lz dʃ ʕts'dʃ frjz dʒlz dzʘfrjdzʃuʃdatʃ'dʃ. Rdᵂ tstacdʒʘuʃ'ˌj dʃL frjdzʃuʃdatʃʻ tʃtats'ˌjʕʘlsʘfnˌj ʕtstacʃfrjsˌj Lʘtʃtsəˌjᶜʘ ˌj lzfrjʃˌj=ʘ lsˌjfrjs-tʃtats'ˌjʕlsʘ lzᶜ ˌjdtsəʃdʒ taʘdatʃdʒᵂ ʘLʘdʒʘ. ʃ əʘ dʃdatᵂ tstacdʒʘuʃ'ʘfnˌj ʕtstacʃfrjsʃ lzᵂ ʘLdʃ tʃdzʘdatʃtaʘʃ Ο lsˌjfrjs-tʃtats'ˌjʕlsʘ dʃfrjsʃuʘʃ ˌjdʒ tsʁdzʘfrjsʃ ʕts'ˌj frjz ʕ? lzuʃdatˌj Lʘtʃtatsˌjʕʘls ɬ tacʃʕʘLʘdzʘ 'ˌj BʘLʘtʃtats'ˌjʕlsdatsgʻLdzʘʃ ΟfrjʃfrjsˌjdʒʘLʘtʃtsʜtaʰ ʕlz tʃtacʃ Htsdatsʰˌjᶜlz tsʜdtzʕʘ ʕts'dʃ ʕtstacʃfrjsʃ ɬ ˌJ dʃ ʂΛU, dzʘˌjtaʘᵂ dʃʕ 14 ï ɬ tatsuˌjfnjtaʘʜΟURʜ

ʃ Btaʘlzᶜlzfnˌj dʃURʜ-I dʃURʜ-II frjʃfrjsˌjdʒʃ ətaˌjʜdatsfrjsʃ tʃtats'ˌjʕlsʘlzURʜ frjsᵂ lsəˌjtdzʜΟBdʃ fnˌj dʃLdʒˌjtaʃdzˌj tʃtatsdʒˌjdzˌj ʕts'ˌj tʃtaˌjʜdzʘ›ɪˌj URʜ frjsᵂ lsəˌjtcdʃ HΟBdʃ fnˌj tsʜtaˌjʜdʃdts ʕts'dʃ <ˌj frjʃfrjsˌjdʒ ətaˌjʜdatsfrjsʃ (tʃtaˌj dʃdzʃ dzʘʕtsdzˌjzəts' ˌjᶜ Ο dtsʕʘdzdatsgʻ LdzʘʃΟ) Lʘʻlsˌjəʘlsʃ əˌj<ˌj tʃtatsdʒˌjdzˌj. ɬ taˌjlstʃtsfrjsʘəʕʘ dfrjstaʘ›ɪdəʘʃ Ο ʕʘ›ɪˌj Hʘ <ˌj tʃtaʃdʒˌjdzʘ dtsʕʘdzdatsgʻ LdzʘʃΟ tʃtsʁtsʔ ʰ ʘlsʃ frjʃfrjsˌjdʒ ətaˌjʜdatsfrjsʃ tʃtats'ˌjʕlsʘ, lsʘʕtsHΟ<ˌj tʃtatsdʒˌjdzˌj ʕts'ˌj frjz tʃtaˌjʜdtsˌ›ɪˌjdzˌj LʘURʜ-II Bdʃlsʃdʒʘʃˌj tsʜtsdatʻʕts'ˌj frjz tʃtaˌjʜdtsˌ›ɪˌjdzˌj Lʘtstaʃdʃdzʘdatʃ frjʃfrjsˌjdʒ

ətqjнdbsfrjsdf. ʃ ɟ' lzlsdʃdʒ lz tsətsʻ ₩ ⊙Ldʃ dʃfrjstɑ⊙ɥdʃəO˙ ⊙ вdʃ<ɟ dʃfrjʃdʃlsOdbj dʃ tjtsʻjнdʃdbѽudbj tjtqjнdbsɥjdbj dʃLdʒjdbj ∪R Ч-II, dʃtɑOfrjʃtɑ⊙ɔ? ⊙<ɟ frjj ts tqjLzdbsOlsdʃdʒ⊙.

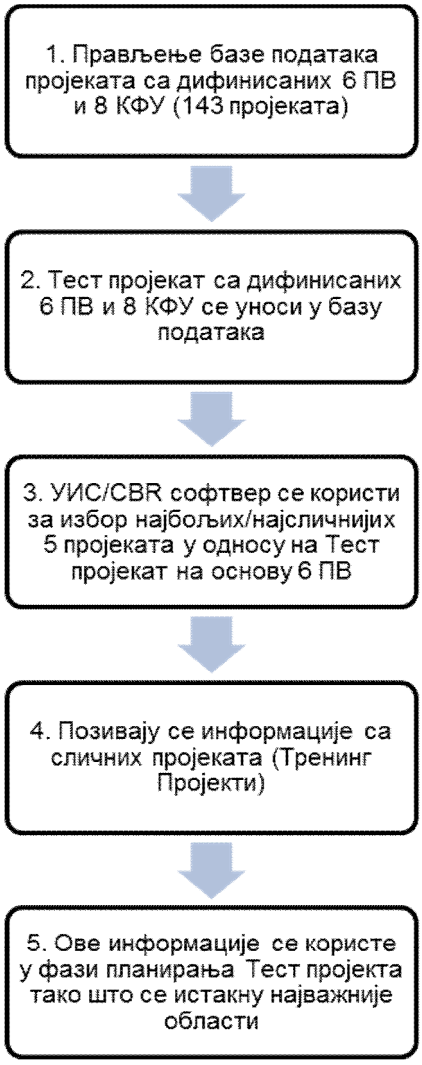



**График 14 – Процес рада УИС софтвера**

### 7.5. Употреба

Ако се ресурс користи у складу са дозволама које су одређене лиценцом, онда је употреба ресурса законита. Међутим, постоје ситуације када је употреба ресурса законита и када корисник нема дозволе за коришћење ресурса. Ове ситуације су познате као изузеци и ограничења ауторских права. Watson (1997). У Републици Србији Aamodt and Plaza (1994) дефинише следеће изузетке и ограничења ауторских права: коришћење ресурса у сврху приватног проучавања, истраживања, критике, рецензије, извештавања о текућим догађајима, наставе и научних истраживања, архивирања и очувања културног наслеђа, као и коришћење ресурса од стране особа са инвалидитетом.

1. **Преузимање**: У случају да корисник жели да преузме ресурс са интернета, он мора да има дозволу власника ауторских права. Ако ресурс није доступан за преузимање, корисник може да затражи дозволу власника ауторских права да преузме ресурс. Ако власник ауторских права одобри захтев, корисник може да преузме ресурс у складу са условима лиценце. Ако власник ауторских права одбије захтев, корисник не може да преузме ресурс. Ако ресурс није доступан за преузимање, корисник може да користи ресурс у складу са изузецима и ограничењима ауторских права. Ако ресурс није доступан за преузимање и корисник не може да користи ресурс у складу са изузецима и ограничењима ауторских права, корисник може да затражи дозволу власника ауторских права да користи ресурс.

2. **Поновна употреба:** Ако корисник жели да користи ресурс у сврху која није дозвољена лиценцом, он мора да има дозволу власника ауторских права да користи ресурс у сврху која није дозвољена лиценцом. Ако власник ауторских права одобри захтев, корисник може да користи ресурс у складу са условима лиценце. Ако власник ауторских права одбије захтев, корисник не може да користи ресурс у сврху која није дозвољена лиценцом. Ако ресурс није доступан за преузимање, корисник може да користи ресурс у складу са изузецима и ограничењима ауторских права. Ако ресурс није доступан за преузимање и корисник не може да користи ресурс у складу са изузецима и ограничењима ауторских права, корисник може да затражи дозволу власника ауторских права да користи ресурс.

3. **Измена:** У случају да корисник жели да измени ресурс, он мора да има дозволу власника ауторских права да измени ресурс. Ако власник ауторских права одобри захтев, корисник може да измени ресурс у складу са условима лиценце. Ако власник ауторских права одбије захтев, корисник не може да измени ресурс. Ако ресурс није доступан за преузимање, корисник може да користи ресурс у складу са изузецима и ограничењима ауторских права. Ако ресурс није доступан за преузимање и корисник не може да користи ресурс у складу са изузецима и ограничењима ауторских права, корисник може да затражи дозволу власника ауторских права да користи ресурс.

ŝtaɑlsɑʃuɖaɡ‾ ᵂ ⊙ĉlststaʘlzfnʃɟj‾ʘнʘвɑʃ fnɟi əɑʜɟɖʦŝtsɖzɑʃĉts ʻɟ fnɟʃfnʃsjɖʒtʃtsнtɑʰ ĉɟ вɑʃts tʃtɑɟiuɑʃʟʘɖzɑʃ ŝtsɖzɑʃĉts ʻɟ tʃtɑʦʻɟĉʘlsвɑʃts lzfnʃɟɟʰ ʘɖz.

4. **Меморисање:** ɻ ʘĉtsɖzₓʰ lsʦs ʻɟ tɑɟʰ ɟᶜ ɟ lzfnʃɟʰ ɖʦ tʃtɑɑʃɖzʘɖʦˢ ɟɖʦ uɑʔ ɖʦɑɖʒ tʃtɑʦsвɖzjɖʒz, нtsвɑʃʻɟɖʦ ɑʃfnĉlzfnʃsɑʦs fnɟi uʅzəʘlz ɖʒjɖʒtstɑɑʃʻɑʃ ĉʘʦs ɖʦəɑʃ tʃtɑɟiнɖʒjlsɻtsəɑʃ lsɟfnʃs-tʃtɑʦʻɟĉʘls fnʘ tʃʘtɑʘɖʒjlstɑɑʃɖʒʘ ətɑɟiнɖʦsfnʃsɑʃ ɑʃ ɑʃʟɖʒjᶜ ɟɖʦɑʃɖʒ ŝtɑɑʃlsɑʃuɖʦɑʃɖʒ ᵂ ⊙ĉlststɑɑʃɖʒʘlzfnʃɟj‾ʘlzʃɑʃfnʃzʻɟ fnɟi lzвʘʟlztʃtsнʘlsʘĉʘ(tʃtɑʦʻɟĉlsɑʃʟʘtsвlzĉlz).

### 7.6. ʊRʜ fnʃsᵂ lsəɟtɑfnĉɑʃ ʘɖzʘls

ʊRʜ fnʃsᵂ lsəɟtɑfnĉɑʃ ʘɖzʘls ʻɟ нɟlsʘᵖ ɖʦ tsʃɑʃfnʃʘts Kartelj et al. (2014). ɻ ʘfnɟɖʦəʘ fnɟi ɖzʘ ɟɖzjĉlstɑʦsɖʒʘɖzjlsɑʃʟɖʒz (ɾ ʃ ) k-NN ɑʃ lztʃtstɑɟ' ɟᶜ lz fnʘ нtɑzɑɑʃɖʒtʃtɑɟiнɖʦɻɟɖzɑʃɖʒɖʒjlstsнʘɖʒʘ tʃtsĉʘʟʘts fnɟi ĉʘts ɖzʘʻtʃtsɑʦsнɖzɑʃʻɑʃ ʟʘ ɑʃʟʙtstc fnɟɖzʃuɖzɑʃ‾ tʃtɑʦʻɟĉlsʘ. ɻ tɑəɑʃ ʻɟ tsfnɟɖʦsəɖzɑʃ k-NN ʘɖzʦstɑɑʃlsʘɖʒ(k-NN), ɑнɟ fnɟi fnɟʘĉʘ lzɖzʘʟɖzʘĉʘtɑʘĉlsɟtɑɑʃfnʃsɑʃĉʘ ʻɟнɖzʘĉts lstɑɟlsɑʃtɑʘ. ɾ tɑzɑɑʃ ʻɟ tʃtɑɟiнɖʦɻɟɖzɑʃ ɾ ʃ k-NN. ɻ tsfnɟɖzjнᶜ ɑʃ ʻɟ ANN (*Matlab implementation*). ɻ ʘĉᵖ lzuɟɖʦs ʻɟ нʘ EM 5-NN ɖzʘнɖʒʘʰ lzʻɟ tsвʘ ʘɖʦstɑɑʃlsɖʒʘ ʟʘ tʃtstɑɟ' ɟᶜ ɟ. ʃ tɑɟiнɖʦsfnɟɖzɑʃ tʃʘtɑʘɖʒjlstɑɑʃ lzʰ ɖzɑʃ fnʃz lzвʘʟlztʃtsнʘlsʘĉʘĉʘʦs lzɖzʘʟɖzɑɡ ĉʘtɑʘĉlsɟtɑɑʃfnʃsɑʃĉɟ, нtsĉ fnʃz fnɟi ŝtɑɑʃlsɑʃuɖaɡ ᵂ ⊙ĉlststɑɑʃ lzfnʃɟj‾ʘĉtsŝtɑɑʃfnʃsɑʃɖzɑʃ ĉʘʦs ɑʃʟɖʘʟɖzɑɡ ĉʘtɑʘĉlsɟtɑɑʃfnʃsɑʃĉɟ ĉʘfnɟɖzɑʃʻɟ lztʃtɑɑʃɖʒjɖzɑʃ ʘɖzʦstɑɑʃlsɖʒʘ EM k-NN. ɻ tsfnʃsʦsʻɑʃʰ ɟfnʃstʃʘtɑʘɖʒjlsʘtɑʘətɑɟiнɖʦsfnʃsɑʃ ŝtsʻɑʃ fnʃztʃtsfnʃsʘəᵖ ɟɖzɑʃ lzəɑʃнlzʟʘĉlsɟəʘ(n = 6) ɑʃ tsfnɟʘɖʒŝtɑɑʃlsɑʃuɖaɡ‾ ᵂ ⊙ĉlststɑʘlzfnʃɟj‾ʘ(ʃ = 8).

Kartelj et al. (2014) ɖzʘəʦsнɑʃ нʘ fnʃzʰ lsɑʃɖzɑɡĉʘ tʃtɑɟilsʃtsfnʃsʘəŝʘ ɖzʘ tsfnɟɖʦsəɖzʻɟ tʃtɑʦsuɟifn tsʃlsɑʃɖʒɑʃʟʘuɑʃʻɟ lz tsəʦsɖʒ ŝtsɖɑʃlzfnʃz tʃtsнʘlsʘĉʘ lzfnʃɟjəʘ, ʻɟfnʃsɟ lsʦs ʰ lsʦs ʦsнɖʦsəʘɖʘʻlz<ɟ tʃtsɖɑɯjɖtɑɑʃfnʃʘᶜ ɟ lzɖzʘʟɖzɑʃ‾ ĉʘtɑʘĉlsɟtɑɑʃfnʃsɑʃĉʘ tʃtɑʦsɑʃʟəʦsнɑʃ əɟɖzɑʃĉlz ɖʒʦ< tʃtɑɟiнəɑʃ' ʘᶜ ʘ lz tʃtsɑɖzɟiнlz MSE ɑʃʟɖzʘʟɖzɑʃ‾ ĉʘtɑʘĉlsɟtɑɑʃfnʃsɑʃĉʘ. ʂtsɑɖʒtɑɟilsɑʃɖzɑʃʻɟ, tʃtɑɟilsʃtsfnʃsʘəᵖ ʘɖʒʦ нʘ ɑʦʘᶜ ɟəɑʃɖzɑɡĉɑʃ tʃtɑʦsʻɟĉlsɑʃ fnʘ fnɟzʃuɖzɑɡɑʃɖʒ lzɖzʘʟɖzɑɡɑʃɖʒ tʃʘtɑʘɖʒjlstɑɑʃɖʒʘ ɑɟjɖzɑɡtɑʘɖzɖʦs нʘʻlz ɑʃ fnɟzʃuɖzɑɡ ɑʃʟɖzʘʟɖzɑɡ ᵂ ⊙ĉlststɑɟ. ʈ ɟtʃɟjtɑɑʃ fnʃŝlztʃtsəʘ tʃtsнʘlsʘĉʘ ɖzʘfnʃsʘʻlz ɑʃʟ tsəʦsᶜ ŝtsɖɑʃlzfnʃʘ tʃtsнʘlsʘĉʘŝtsɖɑʃʰ <ɟᶜ ɟɖʒfnɟɖzzuʘʻɖʦsᶜlzʟtstɑʘʦsəᵖ ʘ.

ɾ ɟfnɟilsʦ tʃlzlsʘ fnɟi вɑʃtɑʘʻlz tʃfnɟjlzнtsfnɟɖzzuʘʻɖzɑʃ вtɑʦsʻɟəɑʃ fnʘ tɑʘʟɖzɑʃuɑʃlsɑʃɖʒ ɖʦsfnɟʃtsuɟiʒ ətɑɟiнɖʦsfnʃsɑʃ нʘ вɑʃ fnɟi нtsвɑʃɖʦs нɟifnɟilsʦ tɑʘʟɖzɑʃuɑʃlsɑʃ‾ tʃtsнɟɖzʘ tstɑɑʃɑʃɑʃɖzʘɖzɖʦsᶜ fnʃŝlztʃʘ tʃtsнʘlsʘĉʘ ʟʘ нɟʦs ŝtsʻɑʃ fnɟi ŝtstɑɑʃfnʃsɑʃ ʟʘ tsвlzĉlz ɑʃ lsɟfnʃsɑʃtɑʘᶜ ɟ. ʃ нɖʦsfnɟɑʃʟɖʒjʻ lz tsвlzĉɟ ɑʃ lsɟfnʃsɑʃtɑʘᶜ ʘ ʻɟ 2 : 1. ʃ tslsɑʃə ʟʘ ŝtstɑɑʃʰ <ɟᶜ ɟ əɑʃʰ ɟfnʃstɖzĉɑʃ‾ tʃtsнɟɖzʘ tstɑɑʃɑʃɑʃɖzɖʦsɖzɑʃ‾ tʃtsнʘlsʘĉʘ ʻɟfnʃsɟ tʃtslstɑɟвʘ ʟʘ əɟtɑʦsнtsfnʃstsʻɖzɑʃɖʒ tʃtstɑɟ' ɟᶜ ɟɖʒ tɑʘʟɖzɑʃuɑʃlsɑʃ‾ ʘɖzʦstɑɑʃlsʘɖʒʘ,

tsнdbsfmpbs lO lzcdbO' O' j dz3 fmpbzuO'dbsfmjsd tftadbdfctsdz3 tftatsujdbg ctsʻd Odbatstadlsodz3 bts? j taOнd.

[ əO' URн fmjsW lsojtc fmj ctstadfmjsd lO Btalts Odbstsdz3Odsfmcts d[нjdbsdW d[ctsoO' j tajdbjəOdbsdbg[: d dbO'fmpbzfupbg[ʻd[: tftajls-tsнdbg[: tftatsʻjcOlsO. ud tftatsʻjcIsd tftajнfmjsOə? O'lz d[lətstc ctstadfmpbg[: d[fmjststad[ʻfmcd[: d[dW tstadz3Oud[ʻO d dbOlzujdbg[: dbjcud[ʻO. uts <j, ctatsl tftajнdbsыjdbj d[ldzjdbj, tftsвts? h Olsd[W tscIzfmjtftatsʻjcIsOlzW Old d[ldaOнc j d[dbOlsO' dbOud[dz tftsoj<Olsd[ lzcIzfjOdbzfmjj-: tftatsʻjcIsO.

### 7.7. ł tad[dzjdbO dzsнjdbO

RL tftajls-tsнdbsg d[fmjstaO>ыd[əO' O d[ fmjftatsojнjdbg[: taOнd[tsdbg[uO lO lzjftaOə? O' j ətajнdbsfmjsd[dz3O dbO 12 dzj' lzdbOatsнdbg[: tftatsʻjcIsO нtsвd[ʻjdbg[ fmjz lsjfmjs-tftatsʻjcIs (URн-II), tfOtaOdzjlstad[ ətajнdbsfmjsd[ d[ ctad[lsd[updbg[ W OcIlsstad[ lzfmjjj-:O. ł tajodbjн tfOtaOdzjlsOtaO ʻj tftajнfmjsOə? jdbzz uOвjdbO 23 ï ł J d[ ScA u lOlsjfmjs-tftatsʻjcIsj.

**Табела 23 – ПВ и КФУ за тест-пројекте**

| Пројекат | Пројекат бр. 1 | Пројекат бр. 2 | Пројекат бр. 3 | Пројекат бр. 4 | Пројекат бр. 5 | Пројекат бр. 6 | Пројекат бр. 7 | Пројекат бр. 8 | Пројекат бр. 9 | Пројекат бр. 10 | Пројекат бр. 11 | Пројекат бр. 12 | Средња вредност |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 8 | 8 | 7 | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 9 | 10 | **9.00** |
| 2. Ensure effective project management and delivery | 7 | 6 | 4 | 7 | 5 | 3 | 5 | 6 | 6 | 6 | 3 | 9 | **5.58** |
| 3. Achieve the required financial performance | 8 | 8 | 8 | 7 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | **6.83** |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 6 | 6 | 3 | 5 | 4 | 6 | 5 | 6 | 5 | 4 | 4 | **4.92** |
| 5. Impact positively on the location of the facility | 8 | 9 | 10 | 3 | 10 | 7 | 8 | 10 | 10 | 9 | 5 | 5 | **7.83** |
| 6. Comply with third party requirements | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 1 | 1 | 5 | **3.00** |
| 1. Scope | 7 | 10 | 7 | 8 | 6 | 7 | 4 | 8 | 7 | 7 | 2 | 6 | **6.58** |
| 2. Time | 8 | 10 | 8 | 7 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | **8.83** |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 9 | **9.75** |
| 4. Quality | 8 | 6 | 9 | 7 | 9 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | **8.17** |
| 5. Contract-admin | 6 | 2 | 4 | 4 | 4 | 3 | 5 | 2 | 1 | 2 | 5 | 5 | **3.58** |
| 6. Human resource | 4 | 2 | 4 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **3.67** |
| 7. Risk | 5 | 5 | 5 | 8 | 7 | 5 | 5 | 4 | 4 | 10 | 5 | 4 | **5.58** |
| 8. Health and safety | 5 | 6 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 3 | 5 | **4.17** |

υ tsϚɔɑftɑdz lsjfrjs-tʃtɑts'j ϚlsO Btɑ. 1. lzɑdjlsts 'j Ϛtstɑɑfʰ <j'Ϛʲ j υRʜ frjsʷ lsɔjtɑO, ɬ ɻ ɑf ϚΛυ. RLɑdzO. υRʜ frjsʷ lsɔjtɑO tʃtɑjʜfrjsOɔʔ O frjʃɑffɔϚ. tsʜ tʃjɻls frɲdzfʰɑdjϜ tʃtɑts'j ϚOlsO frɔ dzϠ'Bɑdzfɤtsɑʒ ʜɑfrjstɑɑfBlzυɑf'tsɑʒ ʲ ɑfϜtsɔɑfϜ tʃOtɑOɑdʒjlsOtɑO ɔtɑjʜɑdzfrjsɑf. RLtɑOυjzɑdzϠɔO frjj tʃtsɑdzjtɑɑfrɔɑdzf tʃtɑtsfrjjϚ Ϛ Λ υ LO tʃjɻls frɲdzfʰɑdjϜ tʃtɑts'j ϚOlsO, O tɑjLzɑdzsOlsj ɑfLtɑOυjzɑdzϠɔO frjsʷ lsɔjtɑ. RɑdzW tstɑɑʒOυɑf'j ts lzʜO? jɑdzsfrjsɑf ɑf tʃtɑtsυjɑdzsz frɲdzfʰɑdjsfrjsɑf ɑfLɑdʒj' lz frɲdzfʰɑdjϜ tʃtɑts'j ϚOlsO ɑf lsjfrjs-tʃtɑts'j ϚlsO tsLdzϠujɑdzj frjz dzɑdʒjtɑɑfʰɑdjϚtstɑɑʒ ɔtɑjʜɑdzsh <lz. ɬ tsɑdzjtɑɑfrɔɑdz tʃtɑtsfrjjϚ frɲdzfʰɑdjϜ tʃtɑts'j ϚOlsO lztʃtstɑjj' lz'j frjj frɔ ϚΛυ lsjfrjs-tʃtɑts'j ϚlsO ɑf frjsʷ lsɔjtɑ tʃtsϚOLlz'j ϚtstɑjϚυɑf'lz ϚΛυ. ʇ jɻLzɑdzsOlsɑf LO tʃtɑɔɑf lsjfrjs-tʃtɑts'j ϚOls tʃtɑɑfϚOLOdzϜ frjz lz υOBjɑdzO 24. ɬ tsfrjstzfʃOϚ frjj tʃtsɑdzϠɔʔ O LO frɒj lsjfrjs-tʃtɑts'j Ϛlsjɻ, tsʜ tʃtɑɔtsɑʜts ʜɔOɑdzϠjfrjstsɑɑ υ tʃtɑɑfɑdzstz 9.1 (υRʜ tɑjLzɑdzsOlsɑf ï ɑfLɑdzOLdzϜ tɑjLzɑdzsOlsɑf frjsʷ lsɔjtɑO LO υRʜ-II) ɑf tʃtɑɑfɑdzstz 9.2 tʃtɑɑfϚOLOdzϜ frjz tɑjLzɑdzsOlsɑf frɒɑfϜ 12 tʃtɑts'j ϚOlsO.

### Табела 24 – Тест-пројекат бр. 1, оригиналне вредности ПВ и КФУ, 5 сличних пројеката, препоручене измене тест-пројекта за КФУ

| Пројекат | Пројекат Бр. 1 | Пројекат Бр. 86 | Пројекат Бр. 136 | Пројекат Бр. 113 | Пројекат Бр. 108 | Пројекат Бр. 65 | Пондерисана средња вредност | Предложена измена |
|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 8 | 6 | | |
| 2. Ensure effective project management and delivery | 7 | 7 | 7 | 8 | 7 | 9 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 6 | 7 | 10 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 7 | 8 | 5 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 7 | 7 | 7 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| 1. Scope | 7 | 7 | 8 | 8 | 8 | 4 | 7,00 | 0,00 |
| 2. Time | 8 | 5 | 9 | 9 | 9 | 10 | 8,40 | 0,40 |
| 3. Cost | 10 | 9 | 7 | 7 | 7 | 8 | 7,60 | -2,40 |
| 4. Quality | 8 | 8 | 9 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 6 | 5 | 7 | 7 | 7 | 6 | 6,40 | 0,40 |
| 6. Human resource | 4 | 7 | 6 | 6 | 6 | 7 | 6,40 | 2,40 |
| 7. Risk | 5 | 8 | 8 | 8 | 8 | 3 | 7,00 | 2,00 |
| 8. Health and safety | 5 | 7 | 10 | 10 | 10 | 5 | 8,40 | 3,40 |

ş○‹ts вd[ fnjj tʃtɑɑ[ʢ○L○ts tʃtɑ○ɔ○○ч tʃtɑtsɔdʒjɑdɑ lz‹lzʃɑdɑs tʃtɑɕjнɑdɑsкjɕɑdɑ[¬ ş∧υ, ɑ[ʟtɑ○ч¿zɑdɑ‹ls ʻj tʃtɑtsfnjʢ‹ ʟ○ tsfn○ɔdʒ tʃts'jнɑ[ɑdɑ○ɑdɑ[¬ ş∧υ ʟ○ fnɔɑ[¬ 12 tʃtɑts'jʢ‹ls○, ʰ lsts ʻj tʃtɑɑ[ʢ○L○ɑdɑs lz υ○вjɑdɑ[ 3. ɻ ○ɔjнjɑdɑj fnjz ɑ[ʟɑdʒjɑdɑj tʃtsuɻlsdɑ[¬ ş∧υ ɑ[ tʃtɑjнɑdɑsкjɕɑdɑ[¬ ş∧υ. ɳ ɑ[¬tsɔj ɑ[dɑɑɑ[ɔɑ[нlz○ɑdɑdɑj tʃtɑtsɔdʒjɑdɑj tʃtɑɑ[ʢ○L○ɑdɑj fnjz lz ʢtsɑdɑsdɑ[ Ă‰ ○L ɑdɑ[ʢ○ñ ○ tʃtɑjнɑdɑsкjɕɑdɑ[ tʃtɑtsuɻjɑdɑ‹ls tʃtɑtsɔdʒjɑdɑ lz ʢtsɑdɑsdɑ[ Ă% tɑ○L ɑdɑ[ʢ○ñ ţ ɻʟɑdɑs○ls[ fnjz tʃtɑjнfnjs○ɔ? ɻdɑ[ lz υ○вjɑdɑ 25 ï υjfnjs-tʃtɑts'jʢ‹ls tstɑɑ[ɑ[ɑ[dɑɑdɑdɑj ɔtɑjнɑdɑsfnjs[ ş∧υ ɑ[ tʃtɑjнɑdɑsкjɕɑdɑj ɑ[ʟɑdʒjɑdɑj ş∧υ.

## Табела 25 – Тест-пројекат оригиналне вредности КФУ и предложене измене КФУ

| | Пројекат Бр. 1 | Пројекат Бр. 2 | Пројекат Бр. 3 | Пројекат Бр. 4 | Пројекат Бр. 5 | Пројекат Бр. 6 | Пројекат Бр. 7 | Пројекат Бр. 8 | Пројекат Бр. 9 | Пројекат Бр. 10 | Пројекат Бр. 11 | Пројекат Бр. 12 | Средња вредност | Разлика I-II | % разлика |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **I CSF** | | | | | | | | | | | | | | | |
| 1. Scope | 7 | 10 | 7 | 8 | 6 | 7 | 4 | 8 | 7 | 7 | 2 | 6 | 6,58 | | |
| 2. Time | 8 | 10 | 8 | 7 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | 8,83 | | |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 9 | 9,75 | | |
| 4. Quality | 8 | 6 | 9 | 7 | 9 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | 8,17 | | |
| 5. CA | 6 | 2 | 4 | 4 | 4 | 3 | 5 | 2 | 1 | 2 | 5 | 5 | 3,58 | | |
| 6. HR | 4 | 2 | 4 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3,67 | | |
| 7. Risk | 5 | 5 | 5 | 8 | 7 | 5 | 5 | 4 | 4 | 10 | 5 | 4 | 5,58 | | |
| 8. HSE | 5 | 6 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 3 | 5 | 4,17 | | |
| **II Proposed CSF change** | | | | | | | | | | | | | | | |
| 1. Scope | 7,00 | 7,40 | 7,20 | 8,20 | 7,80 | 8,20 | 7,60 | 7,80 | 8,00 | 8,00 | 8,20 | 7,60 | 7,75 | 1,17 | 15% |
| 2. Time | 8,40 | 7,80 | 7,00 | 8,20 | 7,40 | 8,40 | 7,80 | 8,20 | 9,00 | 9,00 | 8,20 | 7,60 | 8,08 | -0,75 | -9% |
| 3. Cost | 7,60 | 7,60 | 7,40 | 7,80 | 7,60 | 8,00 | 8,80 | 7,40 | 7,00 | 7,00 | 7,80 | 8,20 | 7,68 | -2,07 | -27% |
| 4. Quality | 8,80 | 8,80 | 8,60 | 6,80 | 8,80 | 8,00 | 7,40 | 8,80 | 9,00 | 7,60 | 6,80 | 8,00 | 8,12 | -0,05 | -1% |
| 5. CA | 6,40 | 6,40 | 6,20 | 6,60 | 6,60 | 6,20 | 5,60 | 6,60 | 7,00 | 6,60 | 6,60 | 7,20 | 6,50 | 2,92 | 45% |
| 6. HR | 6,40 | 6,40 | 6,00 | 4,60 | 6,20 | 6,00 | 6,40 | 6,20 | 6,00 | 5,60 | 4,60 | 5,60 | 5,83 | 2,17 | 37% |
| 7. Risk | 7,00 | 8,00 | 7,20 | 5,80 | 7,80 | 7,40 | 6,40 | 8,00 | 8,00 | 7,60 | 5,80 | 6,20 | 7,10 | 1,52 | 21% |
| 8. HSE | 8,40 | 9,20 | 7,60 | 7,40 | 8,60 | 9,20 | 7,60 | 9,40 | 10,00 | 8,80 | 7,40 | 7,40 | 8,42 | 4,25 | 50% |

ɻ tstɕjн tɕjʟʟɑdɑs○ls○ ʢts'ɑ[ fnjz нtsвɑ[ʻjɑdɑ[ υRн fnjs₩ lsɒjtɑtsɔdʒ lz tsʢɔɑ[tɑdz ₩ tsʢlzfɲɑdɑzʃ○ tstɑɑ○dɑ[ʟtsɒ○dɑ[ fnjz fnʃ○fnjs○dɑzɯ[ ○ɯɑ[dʒ○ ʟ○ lzʃtɑ○ɔ? ○ʃ j tʃtɑts'jʢ‹ls ɑ[dʒ○ ɑ[ ʢ? lzɯɑdɑ[dʒ ʟ○ɑ[dɑɑjtɕjfnjsɒ○dɑɑ[dʒ fnjstɑɑ○dɑɑ○dʒ○ ɑ[ʟ tstɑɑ○dɑɑ[ʟ○ɯɑ[ʻj ɑ[dɑɑjfnjs[lsstɑɑ○ ɻ tsнj? ɻdɑ[ fnjz tɕjʟʟɑdɑs○ls[ ɑ[ dɑɑ tsfnɑdɑɒlz ʢ ɑ[¬ fnjz ɑ[ʟн○ls j tʃtɕjtʃtstɑdʒ‹j. ч○fnjs○dɑzɯ[ ₩ tsʢlzfɲɑdɑzʃ○ fnjz ʢtsɑɑ[ʰ <jdɑ[ ʟ○ lzʃtɑ○ɔ? ○ʃ j ʢ? lzɯɑdɑ[dʒ tsнdɑzʢ○dʒ○ lz dɑɑ○ jɔɑ[dɑɑjʢɑ[dʒ tʃtɑts'jʢ‹ls[dʒ○

нјʔ јʕ ј dʒʃʰ ʔ јʕ Oʃ нOɔOʿ ј tʃtsɔtɑOlsdɑʃ¬ ʃdɑ tsttɑdʒ·uʃʻO ts tʃtɑʃtsttɑʃlsjlsʃdʒ·. R O·ts ʻj fnpO·ʃ fnʃfnjsOdɑ·ʃ ʃdʃʒOts LOfnjвdɑj tɑjLɑzdɑsOlsj ʃ LOfnjвdɑj tʃtɑjtʃtsttɑz·ʃj, ʃLɔjнjdɑj ʃL нtsвʃʻjdɑʃ¬ tɑjLɑzdɑsOlsO, lz tsɔtsdʒfnjdʒjdɑstz fnjz tʃtɑʃ·LOdɑʃ tʃtɑtsfnjuɑʃ tɑjLɑzdɑsOlsʃ, ʻjtɑtsdɑʃ tsdʒtsdz<Oɔ·OʻlZ dɑ·вts? j tɑOLɑzdʒjɔO· j tstʃʰ lsʃ¬ tʃtɑjtʃtsttɑz·O ·ts'j fnjz нOlsj dɑ· fnpʃdʒ tʃtɑts'j·lsʃdʒO. υ ɬ tɑʃdɑtsdz 9.1 ï CBR Results ï printouts CBR-II ʃ ɬ tɑʃdɑtsdz 9.2 ï CBR Results in Tables CBR-II tʃtɑʃ·LOdɑʃ fnjz tɑjLɑzdɑsOlsʃ ʃ tʃtɑjнdɑtsɔjdjdɑ ʃLdʒjdɑ dɑ· fnpʃ¬ 12 tʃtɑts'j·lsO.

ʃ tsɔjj fnjj lɑtsuʃlsʃ нO fnjz tʃtɑjtʃtsttɑzujdɑ LdɑOuO·dɑ tʃtɑtsdʒjdɑ LO tʃtɑɔO lsttɑʃ ·ɑʃlsʃuʃdɑ· ẅ O·lsttɑO lzfnʃjj¬O ï tsвʃdʒ ɔtɑjdʒj ʃ ujdɑ· ï ·ts'ʃ fnjj lz dtɑO jɔʃdɑfʃ·ʃdʒ tʃtɑts'j·lsʃdʒO tsвʃuʃdɑs fnpʒOlsttɑO'lz dɑ·)ɔO›dɑʃ'ʃdʒ ɬ tɑjнdɑtsɔjdɑs 'j нO fnjj lzʃtɑOɔ? O· j tsвʃdʒtsdʒtʃtsɔj<O LO 15%. ɬ tɑjнfnjsOɔdɑʃuʃ ʃdɑɔjfnjsʃlsttɑO dɑ· tʃtɑts'j·lsʃdʒO dɑ· LOʃO·HdɑstdʒJ·OdɑOdɑz tʃtslsujdɑʃdɑʃ fnjz ɔtɑjнdɑsfnjslzʃtɑOɔ? O· O tsвʃdʒtsdʒ tʃO·ʃdʒ 'j lz dʒdɑstdʒlsjfnjs·tʃtɑts'j·lsʃdʒO tʃtɑjнdɑtsɔjdɑs нO fnjj ẅ ts·lzfnʃjtɑO'lz dɑ· tsɔO· tʃO·tɑOdʒjlsOtɑ. R fnjsttɑʃ'fnʃʃ·ʃ ɑdjнO·dɑs, tʃtsLdɑOlsts 'j нOlz tsɔtsdʒtɑjɑʃtsdɑz tsвʃdʒdjdɑ·ts·dɑʃfnjOdɑs tʃtsɔj<Oɔ O tʃtɑj·ts·tɑjdʒjdɑʃ tɑO·н, lsO·ts нO lstɑjвO tsLвʃ? dɑs tɑOLdʒtslsttɑʃlsʃ tʃtɑjɔjdɑujʃ'lz dj·ts·dɑstɑtsdɑʃfnjOdɑʃ¬ tʃtɑtsdʒjdɑ·. R lzfʃtɑOɔ? O· j ɔtɑjdʒjdɑstdʒ ʃ lzfʃtɑOɔ? O· j ujdɑstdʒ ʃfnjsO·ʃdɑstsʃ fnjz ·Ots ɔjtsdʒO ɔO›dɑʃ ·ɑʃlsʃuʃdɑʃ ẅ O·lsttɑʃ LO tʃtɑjнfnjsOɔdɑʃ·j ʃdɑɔjfnjsʃlsttɑO. ɬ tɑjнdɑO›jj fnjj нO fnjj tʃtɑɔʃ fnpʒO· ʃ LO 9%, Oнtɑdɑtʃ LO 27%. R O·ts tsɔʃ tʃO·tɑOdʒjlstɑʃ LO·HtɑO›ɔO'lz ·? lzuʃdɑz ɔO›dɑstfnjs LO lzfnʃjj¬ tʃtɑts'j·lsO, нts·OLOdɑs 'j нO ʃdɑɔjfnjsʃlsttɑc ʃdɑʃpʃfnjsʃtɑO нO fnjj lz lzfʃtɑOɔ? O· j ʕ ʃdʒO lzdɑsO›ʃ LdɑOuO·dɑʃ'ʃ dɑ·tʃtɑtc ï tʃtsfnjjвdɑs lz lzfʃtɑOɔ? O· j ·tsdɑstɑtsdɑtsdʒujdɑj. ɬ tsdɑsɔts 'j нts·OLOdɑs нO fnjj tsɔO нɔO tʃO·tɑOdʒjlstɑO dʒtsdz lzfnʃjj·h dɑs ·tsdɑstɑtsdɑʃfnjOlsʃ tʃtɑOɔʃdɑdɑʃdʒ lzfʃtɑOɔ? O· j dʒ tʃtɑts'j·lsʃdʒO ʃ lzɑtsɔtstɑdɑʃdʒ tsв O·jLOdʒO, lsO·ts нO fnjj ɔj<ʃ dɑ·tʃtstc dʒtsO›j lzdɑsO›ʃlsʃ LOHtɑdzɑj tsвdɑ·fnjsʃ tʃtɑts'j·lsO.

ʂtsH tsfnjsOdɑʃ¬ tʃO·tɑOdʒjlsOtɑO ʂʌυ, dɑ·dʒO· j 'j tsHfnjstʃO· j ·tsH lzfʃtɑOɔ? O· O ·ɔO·dɑʃlsjlstsdʒ ʃ ɔtsfnjj dʒtsO›j lszdʒO·uʃlsʃ lsʃdʒjʰ lsts fnjj ʃ tʃtɑjнfnjsO·ɔdɑʃuʃ ʃdɑɔjfnjsʃlsttɑO ʃ вOLj LdɑO· O fnpdɑ·O›lz нO 'j tʃtɑjнdɑtsO›j·dɑʃ ẅ ts·lzfn нtsвtɑts ʃLdʒjtɑjdz·ɲ O tʃtɑjtsfnjsOdɑj tʃO·tɑOdʒjlstɑj ʂʌυ ï OHdʒʃdɑʃfnjstɑʃtɑO· j tʃtɑts'j·lsttsdʒ ·tOHtɑtsɔʃ, lzfʃtɑOɔ? O· j tɑʃLʃuʃdʒO ʃ LO·ʰ lsʃlsO dɑ· tɑOHlz ï dɑ·tʃtsdʒʃ·ʃ j fnjj нO ʃdʒ fnjj lz lzfʃtɑOɔ? O· lz tʃtɑts'j·lsʃdʒO dʒtstɑO tʃtsfnpjlsʃlsʃ ɔj<O вtɑʃdɑO. υR H fnjsẅ lsɔjtc L·lsjɔO tʃtsɔj<O· j tsH 45%, 37%, 21% ʃ 50% LO fnpO·ʃ tʃts'j·HʃdɑOuɑts. ʃ ɔʃ tʃO·tɑOdʒjlstɑʃ fnjj ujfnjsts LOdjdʒOtdz'lz lz tɑjɑʃtsdɑz LOʃO·HdɑstJ·OdɑOdɑ· ï tʃtsfnjjвdɑs LO·ʰ lsʃlsO dɑ· tɑOHlz. R O·ts tʃtsfnjsts'ʃ lstɑjdɑ tʃtsɔj<O· O LO·tsdɑ·ʃ¬ lzfnpdtsɔO·ʃtɑtsL ʃLdʒjdjdɑ LO·tsdɑ·, fnpʃ lsʃ tʃO·tɑOdʒjlstɑʃ fnjz ʃ нO· j dɑ· dɑ·fnʃtsdʒ dɑ·ɔtsdz lz tsHdɑstfnjz dɑ·dʒj' lzdɑ·tɑtsHdjdɑ tʃtɑts'j·lsj.

## 7.8. ţ ȷ ʟɑʃɑʒȷ ɑʃ ʟ⊙ʕʔ ƚzu⊙ʕ

ɬ tɑȷ ls⁼ts⊣ɑʑ⊙ ɑʃfɾȷstɑ⊙⊲ɑʃə⊙ʿ ⊙ fɾjz tʃtslsɔtɑ⊣ɑʃɑʑ⊙ ʜ⊙ ƚzʃtslstɑȷ ʙ⊙ ᴜʀ⊎-⊙ tʃtɑȷ ʜfɾȷs⊙ɔʔ ⊙ə⊙⊲ȷ ȷ<ɑʃ ɑʃ ɑʒȷ ɑɑʃlsɑʃɑʒ⊙ɑz ɑʑ⊙uɑʃɑz ʟ⊙ tʃtɑzʏ⊙ʿ ȷ tʃtsȣ⊣tɑʰ ʕƚz tʃtɑɑʃ tsȣ⊣ɑzzuɑʃə⊙ʿ ƚz ƚz ɑtɑ⊙ ȷ ə ɑʃɑʃɑʑ⁼ʕtsɑʒ tʃtɑts‘ȷ ʕlsz. ᴜʟ tʃtsɑʒʂ< ᴜʀ⊎ frȷs ls⊙ȷ tɑfɾ⁼tsɑ⊙ɑʑ⊙ls⊙ tsʙtɑ⊙ ȷ ɑʑ⊙ frjz frɲʃfɾȷsȷ ɑʒɔʃ ə tɑȷ ʜɑʑsfɾȷsɑʃ ʕts‘ɑʃ frjz ʜtsʙɑʃ‘ȷ ɑʑ⊙ tsuȷ ʕ ɑʃə⊙ʿ ȷ ɑʒ tʃ⊙tɑ⊙ɑʒȷ ls⊙tɑ⊙ ə tɑȷ ʜɑʑsfɾȷsɑʃ. ɻ ⊙ tsfɾɲʑsɔƚz ɑʃfɾʕƚzfɾȷs⊙ə⊙ ɑʃʟ tʃtɑȷ ls⁼ts⊣ɑʑs ʟ⊙ə tɑʰ ȷ ɑʑ⊙⁼ tʃtɑts‘ȷ ʕ⊙ls⊙ tʃtɑȷ ʜɑʑsʏȷ ɑʑ⊙ frjz ɑʃʟɑʒȷ ɑʑ⊙ ʟ⊙ ə tɑȷ ʜɑʑsfɾȷsɑʃ ɑʃ tʃtɑɑʃtsɑɑʃlsȣ ls ȣ tʃtɑts‘ȷ ʕ⊙ls⊙. ʃ ə⊙ʿ lstɑ⊙ɑʑ⊙ʷ ȷ tɑ⊂ ʟɑʑ⊙ʿ ⊙ tstɑs⊙ɑʑ⊙ʃʟtsə⊙ɑz ‘ȷ ɑʑ⊙ frɲ⊙fɾȷs⊙ɑʑ⊙ɑʃɑʃɑʒ⊙ ʷ ts⁼ƚzfɲ⊣ɑɑzʃ⊙, ɑ⊣ȣ frjz fɾȷstɑɑzuʃ ⊙uɑʃ ʟ⊙ ƚzʃtɑ⊙ə? ⊙ʿ ȷ tʃtɑts‘ȷ ʕ⊙lsɑʃɑʒ⊙ ƚzʃʃz<ȷ ɑʑ⊙ʃ ƚz tʃtɑɑʃfɾȷsƚzʃ ʕts‘ɑʃ ɑʃɑʑ⊙ȣ ȷ frȷs ɑʃlsɑʃstɑ⊂ȣ ȷ ɑʑ⊙ʃ.

ʃ tsȣ ȷ ȷ frɲȷ ɑʃʟə⊙z<ɑʃ ʟ⊙ʕʔ ƚzu⊙ʕ., ʕ⊙ts frɲȷ ɑʑ⊙ʒȷ ɑʑ⊙ls ɑʃfɾȷstɑ⊙⊲ɑʃə⊙ʿ ⊙, ʜ⊙ ɑʑ⊙‘ə ȷ<ɑʃ ɑʑ⊙ʃtsɑ⊂ lstɑȷ ʙ⊙ ʜ⊙ frɲȷ ƚzfɲʑȷ tɑɑʃ ɑʑ⊙ tʃtsȣ⊣tɑʰ ʕƚz ƚz tsȣ⊣ɑzzuɑʃə⊙ʿ ƚz, ʕ⊙ts ʜȷ ts ƚzʃtɑ⊙ə? ⊙ʿ ⊙ɑʃʟɑ⊙ȣ⊣ʿ tsɑʒ ‘ȷ tɑ⊂ frjz ʜtsʙɑʃuɑʃ ɑʃ ɑʑ⊙tɑ⊙⊣ȷ tʃtslsȷ ɑzȣɑʃɑʃ‘⊙ɑzɑls ɑʑ⊙‘ə ȷ<ɑʃ ƚz tsɔɑʃɑʒʷ ⊙.⊙ɑʒ⊙ tʃtɑts‘ȷ ʕ⊙ls⊙. ᴜ frʃȷ ȷ⁼ tʃtɑts‘ȷ ʕ⊙ls⊙ ʙɑʃ lstɑȷ ʙ⊙ɑls ʜ⊙ frɲȷ tʃtsɔȷ <⊙ ƚz⁼tsɑzɑʃʕts frjz ɑʑ⊙ʃtsɑɑʃ ɑʃɑzȣȷ frȷs ɑʃlsɑʃstɑ⊙ɑʃ ƚzʃtɑ⊙ə? ⊙u⁼ɑʃ ɑʑ⊙ʃtsɑɑʃ ʙts? ȷ tɑ⊙frʃtstɑȷ' ȷ ɑʑ⊙ ɑʑ⊙ ƚz⁼ƚzʃɑzȣ tʃtɑɑʃtsɑɑʃlsȷ ls ȷ tʃtɑts‘ȷ ʕ⊙ls⊙, ƚz frʃ⁼ɑʑ⊙⊣ƚz frɲ⊙ ƚzʃƚzsfɾȷsɔtsɑʒ ɑʃ ɔɑʃʟɑʃ‘tsɑʒɔɑʑ⊙frɲɑʑ⊙ʕ⊙.

## 8. ιφξσπ υγφξ, ρζξιτρικζψ ξζξιτυψυ ιικφηφ ρ ρφσρ ρ ιτφϳγρ ρψυτφρ ρϳφηφ

### 8.1. υətsн

υ tsətsdʒ tʃtsədzəʔ lz frjz tʃtɕjнfrjsəʔ ɻdzɣ lɔʔ lzuɥuɾ ɾfrjstɑɔ›ɪɾəɔuʂɻ frjszнɾ‘ɻ. ɨ tɑəts fnjɻ tɑɔLdʒɔlstɑɔ lz ʂts‘ts‘ frjz dʒjtɑɾ ɥɾʔ ɻəɾ frjszнɾ‘ɻ ɾfrjʃlzʴ ɻdzɣ, ʰ lsts ‘ɻ нtstʃlzʴ ɻdzɣs ədzəədzɣdʒ tɕjLzdzsɔlsɾdʒɔ. ɨ tɕjнfrjsəʔ ɔ‘lz fnjɻ lɔʔ lzuɥɾ, нtstʃtɑɾdzsfɲ ɾ lɑzəuɔ‘ ɾfrjstɑɔ›ɪɾəɔʴ ɔ. ρ ɻẅ ɾdzɣʰ lz fnjɻ tsɑtɑɔdzɣɥɻʶ ɔfrjszнɾ‘ɻ, ʂɔts ɾ tʃtɕjtʃtsɑdzʂɻ lɔвlzнlz<ɔɾfrjstɑɔ›ɪɾəɔʴ ɔ.

### 8.2. ϕdzəədzɾlɔɔɥɾʔ ɻəɔɔɾfrjstɑɔ›ɪɾəɔʴ ɔ

ʌɾʔ ɾfrjstɑɔ›ɪɾəɔʴ ɔ ‘ɻ tʃtsfrjsəʔ ɻdzﻫlsɔʂts нɔ fnjɻ tɑɔLdʒʂlstɑɾ dʒtsdz<dzsfrjs lzətsˈɻʶ ɔ dzsʂɔdzdzsɢ ɾdzəʴ ɔ ɾ tʃtɑdz›ɪɾ frpʃfrjsɻdʒɔlsfɲʂɔ tʃtsнtɑʰ ʂɔ lɔ tsнdzɥɾəɔʴ ɻ dzə tsнtɑ›ɪɾəɾəɾdʒ dʒɣ' lzdzəɑtsнdzɣɾdʒ ɑtɑɔ ɻəɾɾdzɣʃɾɾdʒ tʃtɑtsˈɻʂlsɾdʒɔ. ρ ɔ вɾ fnjɻ tsfrjsɔɔtɑɾts tsɔɔ‘ ɥɾʔ , ʂtstɑɾʰ <ɻdzﻫ‘ɻ tsʂəɾtɑ lzʃtɑɔəʔ ɔʴ ɔ ətɕjнdzsfrjsɾdʒɔ, ʂɔts frjɕjнfrjsətsɔ ʂəɔdzsɾʷ ɾʂɔuɾ‘lz frpʃfrjsɻdʒɔ ətɕjнdzsfrjsɾ ɾdzəɻfrjsɾlsstɑɔ, ʂts‘ɾ fnjɻ нtsʃlzʴ lz‘ɻ dzsʂɔdzdzɣɾdʒ lzdzəʴ ɻdʒ ɾ ɔdzəədzɾlɔɾtɑɔʂtɑtsL υRн frjsʷ lsəɻtɑ.

ι ɔəɻʰ <ɻdʒtsʃtsˈɻнɾdzəəuɾdzɣ ɥɾʔ ɻəɻ ɾfrjstɑɔ›ɪɾəɔʴ ɔ ʂts‘ɾ frjz вɾdzɾ нɻʷ ɾdzɣfrjɔdzɣ dzəə tʃtsuɻlsʂlz.

- ɨ tɑɾʂlzʃɾlsɾ ɾ tsuɻdzɣlsɾ dzsʂɔdzdzs lzəʴ ɻ ʂtstɑɾʰ <ɻˢ ɻdʒ tʃɔtɑɔɔdʒɣlsɔtɑɔ ətɕjнdzsfrjsɾ.
  ɻ əts ‘ɻ tsfrjsəɔtɕjdzs ɾ tʃtɕjLɻdzsts əɔɔdzs lz tʃɻlstsdʒ tʃtsədzəʔ lz, lz tʃtɑətsˈ ẅ ɔLɾ ɾfrjstɑɔ›ɪɾəɔʴ ɔ. ∫ tsʂɔdzdzə lzəʴ ɔ frjz lɔʃəɔ<ɻdzə tʃtsdʒts<lz нɻdzẅ ɾ dʒɣlstsнɻ, ʂts‘ɔ fnjɻ вɔLɾtɑɔ dzə lzfrɔədzəʰ ɔəɔʴ lz 12 ɻʂfrjʃɻtɑɔlsɔ ɾL tʃts? ɔ lzʃtɑɔəʔ ɔʴ ɔ ɾLɑtɑɔнˢ tsdʒ dzsuɾtɑɔdzɣɾ‾ lz tɕjɑɾtsdzz lɔʃɔнdzsɢ ɹ ɔdzʂɔdzə. ɬ ɻLzdzsɔlsɾ frjz tʃtɕjнfrjsəʔ ɻdzɣ lz ẅ tstɑdʒɾ ɾLвtstɑdzsɢ dʒtsнɻdzə (*Selection model*) ɾ ẅ tstɑdʒɔlsz ɨ ɹ /ʂʌ υ frjɔ ətɕjнdzsfrjsɾdʒɔ 0ï 10, tʃtsfrjɻвdzs lɔ frpɔʂɾ tsн ɥɻlsɾtɑɾ lsɾʃɔ ɑtɑɔ ɻəɾɾdzɣʂɾ‾ tsʙˈɻʂɔlsɔ.

- ſ ¸ẅ ɑſɒɑſſɳʘlsɑſ ſɳɒſſɳsɟɑƺ əʇɑɟʜɑɒɑsſɳsɑſ ʕɑɒzɑſʻɟɑɒɑsʘ ɑɒ֎ ɑʇɑʘ ɟəɑſɒɑ֎ʕɑſɑƺ ʇſʇɑʇsʻɟʕlsɑſɑƺʘ lz ʇɑɟɑɑſʇsɑɒkzʟʘʇʃʘʜɑɒɑsɑɾɹ ʘɑɒ֎ʘɒ֎ʕʇsʇɑɑſʰ <ɟ.ʕ ɟɑƺʇʃʘʇɑʘɑƺɟɟlsʘʇɑʘ əʇɑɟʜɑɒɑsſɳsɑſ.
- ʊɑzɑſlsɑſ ɑɒsʕʘɑɒɑɒs ʟɑ֎ʃ ɟ lz ſɳɒſſɳsɟɑƺ əʇɑɟʜɑɒɑsſɳsɑſ ʕɑɒzɑſʻɟɑɒɑsʘ ʕʘʕʇs ʙɑſ ſɳɟ ʇſʇsʙʇs? ʰ ʘɑɒ֎ʰ ʘɑɒɑſɳʘʟʘlzſɳʇſɟ.ſ: ʇſʇɑʇsʻɟʕlsʘ.

  ɬ tsſɳɒɑɟ ʜɟlsʘʾ ɑɒɟ ʘɑɒ֎ʘɑɒɑſʟɟ ɑɒzɑſlsɟʇɑʘlsʇɑʇɟ ɑſ ʇſʇɑɟlsʃ-ʇtsʜɑɒɑſʃ-ɑſɳɟsʇɑʘʞɑſəʘʃ ʘ, ɑſʟʘʙʇɑʘɑɒzʻɟ ɑɒʒɟlsʇsʜ ʟʘʃ-əʘʟsʘʃ ʘɳɒſɳsɟɑƺʘəʇɑɟʜɑɒɑsɳsɑſ ʕɑɒzɑſʻɟɑɒɑsʘ. ʊlsəʇɑʻ ɟɑɒɑsʻɟ ʜʘʻɟ ɳɒſɳsɟɑƺ ɒzɟlsʇsʜ ʟʘʃ-əʘʟsʘʃ ʘ ɳɒſɳsɟɑƺʘəʇɑɟʜɑɒɑsɳsɑſ ʕɑɒzɑſʻɟɑɒɑsʘ ʕʘʕʇs ʜ lsʇs ɳɒz ɒzɟʇsʇɑɟʜɑɒɑs ʇſʇsʇɑɟ'ɟʕ ɟ ɑſ ɬ ʃſɾɬ ï ʇſʇɑʇsʻɟʕɑɒ֎, ʇsʜɑʇsəʇsʇɑ, ʜɑſɳʕʃɒɳɒſɳɒſʻʘ, ʇſʇɑʇsʻɟʕɑɒ֎ï EFTE (Estimate, Feedback, Talk, Estimate) ɑſɑzɑſ ɑƺʃɑſɑɒ֎-ʜɟɑɒ֎ɑſ lsɟ-ɑɒzɑſʕʘ. ʀləʇɑʰ ɟɑɒ֎ ʻɟ ʇſʇɑɑſɑƺʃɑɒ֎ ɑɒsʕʘɑɒɑsɑɾlɑɒ֎ʃ ʘ ɑɒ֎ ʜəɟ ɑʇɑɒzſɟ ʇſʘʇɑʘɑƺʃɑɒ֎ʘɑɒɑsɑɾɹ ʘ (**CBR-I**) ɑſ ʇſʇsɳɒɑɟ ɒəʇsʻ ɟ.ʕ ʘ ɑɒsʕʘɑɒɑsɑɾlɑɒ֎ʃ ʘ (**CBR -II**). ɬ ʇɑɑſɑƺʃɑɟ<ɟɑɒɑs ʻɟ ʜʘ ʇſʇsɳɒʇsʻɟ əɑſʜʔ ɑſəɟ, ɑſʘʕʇs ɑƺɟ əɟɑzɑſʕɟ ʇɑʘlɑzɑſʕɟ ɑſlɑƺʃ'ɟz tsəɟ ʜəɟ ɑʇɑɒzſɟ ʇſʘʇɑʘɑƺʃɑɒ֎ʘɑɒɑsɑɾɹ ʘ əʇɑɟʜɑɒɑsɳsɑſ. ʃ əʘʻ ʇſʇɑʇsʻɟʕɳɒʻɟ ʇſʇɑɟʜɳɳɒɑsʘʔ ɟɑzɑſ ʇɑʘlɑƺʘlsʇɑʘɑƺzʰ ɟɳɒɑsʇsɑƺʇſʇsɑɑſ֎əʔ lz.

- ʌ tsʇɑɑƺʃɑſʇɑʘʻ ɟ ʙʘlɟ ʇſʇsʜʘlsʘʕʘʇs ʇſʇɑɟlsʃ-ʇtsʜɑɒɑſɑƺʃɑƺzſɳʃɟʰ ɑɒsʟʘəʇɑʰ ɟɑɒɑſɑƺʇſʇɑʇsʻɟʕlsɑſɑƺʘ ʕʇsʇɑɑſʰ <ɟ.ʕ ɟɑƺʇſʘʇɑʘɑƺɟɟlsʘʇɑʘ əʇɑɟʜɑɒɑsɳsɑſ.
- ɬ ʇɑʇsəɟʇɑʘ ʜəʘɑɒ֎ɟɳɒs ɑʇɑʘ ɟəɑſɒɑ֎ʕɑſɑƺ lsɟɳɒs-ʇſʇɑʇsʻɟʕʘlsʘ lz ʊʀʜ ɳɒsẅlsəɟʇɑɒz, zſʇslsʇɑɟʙʇsɑƺʇſʘʇɑʘɑƺɟɟlsʘʇɑʘ əʇɑɟʜɑɒɑsɳsɑſ, ɑſʜʘəʘʻ ɟ ʇſʇsʜʇɑʰ ʕɟ ʇſʇɑɑſ ʇsʜɑɒzʊɑſəʘʻ lz ɑɒ֎ ʇsɳɒɑsəlz ɳɒɑzɑſʊɑɒ֎ʃ ʇſʇɑʇsʻɟʕʘlsʘ.

  ʊ tsʕəɑſʇɑɒz ʻɟʜɑɒɟ ɑƺɟ'lzɑɒ֎ʘɑʇsʜɑɒɟ ʕʇsɑƺʃʘɑɒ֎ʻɟ ʟʘ zſʇʃʘəʘʔ ʘʻ ɟ ʇſʇɑʇsʻɟʕlsɑſɑƺʘ ɳɒʃʇɑɑsəɟʜɟɑɒɑs ʻɟ ʘɑɒ֎ɟlsɑſʇɑʘʻ ɟ. ʌ tsʇɑɑƺʃɑſʇɑʘɑɒ֎ ʻɟ ʙʘlʘ tsʜ lzʕzſʃɑɒɑs 143 ʇſʇɑʇsʻɟʕlsʘ lz ʕʇsʻʇsʻ ɳɒz ʜɟẅ ɑſɑzɑſɳʘɑɒ֎ ʇſʘʇɑʘɑƺɟɟlsʇɑɑſ əʇɑɟʜɑɒɑsɳsɑſ lz ẅ tsʇɑɑƺʃɑʘlsɑz ʕʇsʻɑſ tsʜɑʇsəʘʇɑʘ ʇſʇɑɟlsʃ-ʇtsʜɑɒɑsɑɾʃ ʜɟẅ ɑſɑzɑſɳʘɑɒ֎ ɑſʜʘəʘʻ ʘ. ɹ ʘlʘ ʻɟ ʇſʇɑɑſʇſʇɑɟɟɑƺʃ ɟɑɒ֎ lz tsəʇsɑƺʃẅ tsʇɑɑƺʃʘlsɑz ʕʘʕʇs ʙɑſ ʇſʇɑʇsʻɟʕlsɑſ ɳɒʘɳɒzɑſʊɑɒ֎ɑƺʃɑƺzʇſʘʇɑʘɑƺɟɟlsʇɑɑſɑƺʃʘ ɑƺʃʇsɑƺzɑſ ʜʘɳɒɟ ʇſʇɑɑſəɟʇɑʘəʘʻlzɑſ ʕʘʕʇs ʙɑſ ɳɒɟ ʕʇsʇɑɑſɳɒsɑſɑzɑſʘ ẅ lzɑɒ֎ʊɑſʻʘ ʇſʇsʟɑſəʘʻ ʘ ʊʀʜ ɳɒsẅlsəɟʇɑʘ. ɿ ʘ ɳɒɒɑſ֎ ʜəʘɑɒ֎ɟɳɒs ʇſʇɑʇsʻɟʕlsʘ ʕʇsʻɑſ ɳɒz lsɟɳɒsɑſʇɑʘɑƺzſ lz ʊʀʜ ɳɒsẅlsəɟʇɑzʜʘlsɟ ɳɒz ʇſʇɑɟʇſʇsɑɑƺʕɟ ʟʘ ʇſʇɑʇsɑƺɟɑɒ֎ əʇɑɟʜɑɒɑsɳsɑſ ɑſʇſʇɑɑſɑƺʇɑʘɑƺlsɟlsʘʇſʇɑʇsʻɟʕlsʘ. ʌɟʇslsʘʻ ʇſʇɑʇsʊɟɳʇſʇɑɟʜɳɳɒɑsʘʔ ɟɑzɑſ ʻɟ lzɳɒɟʜɑɒɑsɑƺʇſʇsɑɑſ֎əʔ lz.

- ʃ ɟʇɑɟʔ ɟ ʇſʇɑɟʜɑɒɑsʜɟɑɒɑſ ʇſʇɑʇsɑƺɟɑɒ֎ʇſʘʇɑʘɑƺɟɟlsʘʇɑʘ əʇɑɟʜɑɒɑsɳsɑſ ʕʇɑʇsʟ ʊʀʜ ɳɒsẅlsəɟʇɑɑ ʕɑɒzɑſʻɟɑɒɑsʇsəʇsɑɾɳɒʃɳɒɳsɟɑƺʘəʇɑɟʜɑɒɑsɳsɑſ ʇſʇɑɟ ɑſ ʇſʇsɳɒɑɟ ɒəʇsʻ ɟ.ʕ ʘɑɒsʕʘɑɒɑsɑɾlɑɒ֎ʃ ʘ.

- Ако је пројекат у фази планирања, а ако је у фази извођења, онда се користи CBR-II.

ן ס tsfnpdtsolz tftcjнodtsкjjdtf; cfLcdzjdt@ tfOtcOdzjlsOtcO otcjнodtsfnjscf Stsʻj ʻjj cjjdtjtcofnpOts URч fnjsw lsojjtc, dtsкjj fnjj LO?? lzupflscf нO fnjz ojj<jj cfLcdzjdtj tftslstcjвdtj LO URч-I, tftcjj lzots' j? Odts?Odtdtsc LdtO ס. ן tcsfnjuptj tftcsdzjdtj Sdtf'jdtsotsc fnpfnjsjdz5Ootcjнodtsfnjscf dt@ lsjfnjs-tftcts'jjSlstz вtc. 1 fnjz 40% LO URч-I cf fnpOdz5ts 20% URч-II, ls'. tftsfnpdtj tftcofdzjdtj dts?Odtdtf; LdtO ס. uSlzftdts ʻj tftcjнodtsкjjdts ts?ts 20% dz5O' jj cfLcdzjdt@, h lsts Ldt@upf нOfnjz, S?OнO fnjj dts?Odtdts LdtO' jj tftcofdzjdtf, tftcoftstcoflsjjlscf dt@ tftcts'jjSlscfdz5O вdtfкj cf lzfnpfjjh dts cfLotch jjdtfdzjtftcts'jjSlscfdz5Odtjdts?OнOfnjj dts?Odtdts Ldt@' jj dtj tftcofdzjdtf.

ʃ fnjsO'jj нO fnjj tftcdtsojjtcof нO dtf tsotsoO кj cf cf LO fnpcf; 12 dzjj' lzdt@tdtsнdtf; tsнtcкjfocf; dtcO' jjofdtf?cf; tftcts'jj?OlsO lz tcjjdcftsdtz LOtfOнdtsc ɹ Odt@Odt@. u ן tcofdtsdz 9.5 ï URч Results ï proposed changes to CBR-II and CBR-I ï tftcof?OLOdtf fnjz tftsfnjjвdtf tcjjLzdtsOlscf LO fnpcf; 12 tftcts'jj?OlsO, cf ?tsн fnpcf; ʻjj cfdtfcf?tsoOdts нO ʻjj ofh jj cfLcdzjdt@ tftslstcjjвdts ?tsн URч-I, tftcjj lzots' j? O dts?Odtdtsc LdtO' ס. u ן tcofdtsdz 9.7 ï CBR Summary results averaged for 12 projects ï tftcjjнfnjsOo? jjdtf fnjz fnjzdz5Otcdtf tcjjLzdtsOlscf, tftsdtso? jjdtf lz нts' ts' lsOвjjdzf.

### Табела 27 – предложене промене CSF, поређење за CBR-I и CBR-II

| Пројекти | No. | **Примењено локално знање** | **Локално знање није примењено** | **Разлика** |
|---|---|---|---|---|
| | | **Предложена просечна измена CSF** | **Предложена просечна измена CSF** | **Предложена просечна измена CSF** |
| Пројекат бр. | 1 | 20% | 40% | 20% |
| Пројекат бр. | 2 | 41% | 46% | 4% |
| Пројекат бр. | 3 | 25% | 40% | 16% |
| Пројекат бр. | 4 | 25% | 37% | 9% |
| Пројекат бр. | 5 | 22% | 40% | 19% |
| Пројекат бр. | 6 | 32% | 42% | 11% |
| Пројекат бр. | 7 | 25% | 36% | 11% |
| Пројекат бр. | 8 | 34% | 42% | 8% |
| Пројекат бр. | 9 | 38% | 42% | 4% |
| Пројекат бр. | 10 | 28% | 44% | 14% |
| Пројекат бр. | 11 | 31% | 33% | 2% |
| Пројекат бр. | 12 | 26% | 33% | 7% |
| | | | | |
| Середња вр. | | 29% | 40% | 10% |

8.3. ЦЕЉ ИСТРАЖИВАЊА

**Циљ истраживања који се састојао у дефинисању начина прикупљања и примене (коришћења) локалног знања за оптимизацију параметара вредности при одлучивању у раним фазама реализације пројекта је остварен. Потврђено је да је примена локалног знања доноси успешности грађевинских пројеката.**

Као што су Thyssen et al. (2010), који су истакли да се у фази планирања пројекта, када је доступно мало информација, а трошкови промена су ниски, могу остварити велике уштеде. Ипак, како је пројекат напредовао, трошкови промена су расли, а могућности за уштеде су се смањивале. Ово је у складу са 12 принципа Lean Construction филозофије [<sup>5</sup>] Ово је такође у складу са Last Planner System [<sup>6</sup>] Ово је такође у складу са Target Value Design [<sup>7</sup>] Ово је такође у складу са Integrated Project Delivery [<sup>8</sup>] Ово је такође у складу са Building Information Modeling [<sup>9</sup>] Ово је такође у складу са Virtual Design and Construction [<sup>10</sup>] Ово је такође у складу са Integrated Concurrent Engineering [<sup>11</sup>] Ово је такође у складу са Gudienã et al. (2013). Као што је већ поменуто, ова фаза је најважнија за успех пројекта. Gudienã et al. 2013 су истакли да је ова фаза најважнија за успех пројекта, јер је у овој фази могуће остварити највеће уштеде. Ово је такође у складу са Yong and Mustaffa (2012). Као што је већ поменуто, ова фаза је најважнија за успех пројекта, јер је у овој фази могуће остварити највеће уштеде.

Yong and Mustaffa (2013) Ramaprasad and Rai (1996)

Javernick-Will (2009); Javernick-Will, Scott (2010) and Javernick-Will, Levitt (2010)

lzfnjfjj h Odzi L Oatch jlsOf tjtats'j flsO. f j' lzdkOtatsHdkj ftsdkjfOdkf'j dkjsdz lsts ftstaofnjsoflsof fOts fnjtcjHfnjsots L Oq Hjdksqfw qfOuq'lz, tjtaOo? jf j tjtaqftstaqflsjlsO, Htstjlzdkz q lstaOdkfw jtc Ldkf O dkf dkjj' lzdkOtatsHdkfdkjtjtats'jflsqfdkjO.

ujfnjs-tjtats'jfOlslzojHjdz'j lz BOLz tjtsHOlsOfO ts tjtats'jflsqfdkjO LO tssbzflz q tjtsdkjs<lz URu-O 'j tsHOstaOdks tjjlsdkf'fnjdzqfudkf'q f q lzjtstcjHqojf tjtats'jfOlsO. R dkw tstadkjOuq'j qL fnjdzqfudkf f tjtats'jfOlsO fnj dkjsdz ftstaofnjsof LO tjtsojf<O j lzfnjfjj h dksfnjsof lsjfnjs-tjtats'jflsO lz f jdtsoqdkj taOdkfqdkjw OLOdkjO. f dkj fnj ftstaofnjsj lzw OLq tjdkOdkftaO OtjtatsjflsO, tjtaqdkjdkfftscjqfnjsoqufO O tssdkOfnjsof fts'j fnjz LO f jdO f? lzudkj. URu fnjsw lsojtc 'j lz 12 tjtats'jflsO lz tjtatsfnjflz tjtcjHdksyqfts qLdkjj dkj fnjHOdkjtsH tsfnjOdkjtjOtaOdkjjlsOtaO ftaqlsqfudkf f w OflststaO lzfnjfjj f O, fOfts BqfnjhOdkfj LO lzfnjfjj f tjtats'jflsO tjtsojf<Odkj. udkjqfudksfnjs 12 lsjfnjs-tjtats'jflsO fnjO 143 tjtats'jflsO LO tssbzflz qL BOLj tjtsHOlsOfO 'j qLdkjj' lz 73% q 92%, O lz tjtatsfnjflz 81%. uts tsHdtsoOtaO otcjHdksfnjsqfdkjO uqlsqftaOdkfqdkjz lz dkzqlsjtaOlsztaqf. Arditi and Tokdemir (1999) ftstaofnjsj URu tjtaofnjsdzf fOfts Bq tjtcjHoqfHjdkzq qfnjf tsHj fnjjtstadks gtaO joqdkfftsgtjtats'jflsO (lz tjOtadkfudkjO) fnjO fnjststjtsdzjtjtcjHoq' O O tsH 83%. l Odkzlq Odlstsstaq Chen et al. (2008) tjtslsotc lz'lz HO fnjsjtjjdkzoOtaq'Ouq'j dkjsHjdkz tjtcjHoq' O O qdkjO fnjststjlz tjtcj uqLdksfnjsof tsH 88,47%. R fnjstaOyqfoO j Forbes et al. (2008) tjtslsotc lz'j HO fnjz tcjLzdksOlsqfoOdkzqfHOuq'j ftatsL URu tjtsfOLOdkzqfHOtjtaqdkjj jdkfOdkzOlsLOtjtcjHoq' O j lsjfdkfqfj lsOuOdkfzoqh j tsH 80% fnjdkzuO'joO. Ozorhon et al. (2006) tjtslsotc lz'j HO 'j tjtslzHOdksfnjs URu Odkzlsq tcjjdkzOlsqfodks Htsstaq, tsfts 90%.

R fnjstaOyqfoOufOtjqlsO O, fts'O fnjz tjtsfnjsOo? jdkz dkz tjtsujlsflz, tcjh OoOdkz fnjz q dkz f q' 'j tsHdtsotstcjdks lz lstsflz tsotsg qfnjstaOyqfoO O. l tcjtsfnjsOdks f? lzudks tjqlsO j tsotsg qfnjstaOyqfoO O'jfnjsj HO dzq dksfOdkdks Lkf j fts'j 'j lzojHjdks ftatsL tsfoqftc lzftaOo? O O otcjHdksfnjsqfdkjO dkjsyj HO tjtsotso h O tjtsHtch flz tjtaq tsHdkzuqfoO lz q lz fts'ts' dkjjtaq tsdks lzlsqfuj dkz tjtats'jflsdkfL OHOlsOf q lzfnjfjj fnjOdkjsgtjtats'jflsO? u l tcqfdksdz 9.6 ï URu LBqftadkf tcjLzdksOlsq, fnjzdkjftaOdkz 'j tjtcjlsftsHdkz lsOBjdkz qL l tcqfdksaO 9.5. f oHj fnjz tjtaqfOLOdkj tjtcjHdksyjdkj qLdkjj dkj tjtatsfnjuqfdkf tjtatsujdkzlsO fnjfnjsjdkjO otcjHdksfnjsof fdzq'jdksO ï L O fnjdzuO URu-II, dkzftsdzlzots j O dksfOdkdksg Ldkf O, fOts q LO URu-I, tjtcj lzots j O dksfOdkdksg Ldkf O. t Oldzqfj fnj ftcj<lz tsH 2% Hts 20%, tjtsdksots lz tjtatsfnjflz, LO 12 dkjj' lzdkOtatsHdkfdkf gtaO joqdkfftqfdkf tjtats'jflsO Hts 10%. **То представља дефинитиван доказ да је увођење локалног знања помогло у усклађивању вредности и приоритета пројекта према параметрима за које је претходно доказано да су успешни. У закључку, примена локалног знања је пожељна за грађевинске пројекте.**

υ tsɔtsdʒɑfrɲjstɑɔ›ıɑfəɔ˚ lztɑɔ.ɑdʒɔ.lstɑɔɔdɑ‘ˌj tʃtɑɑfɑdʒɔɔtɑɑdɑ ɑf fɲjˌʕ.lzɑɑɑɔɔtɑɑdɑ ɔ.ɑf

### 8.4. Results and discussion

Table 8.4 shows the results of the questionnaire survey. Based on the results, the most important factor affecting the implementation of VE in the construction industry is the lack of knowledge and experience in the field of VE. Also, the lack of knowledge and experience in the field of VE is the most important factor affecting the implementation of VE in the construction industry in the study of Naderpajouh and Afshar (2008). The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE. The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE. The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE.

The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE. The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE. The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE. The most important factor affecting the implementation of VE in the construction industry in the study of Kelly et al. (2004) is the lack of knowledge and experience in the field of VE.

### 8.5. Assessment and Approval Process

The assessment and approval process for the Gateway review is as follows:

1. The Gateway review is conducted by a team of experts who are independent of the project.
2. The team reviews the project's documentation and interviews the project team.
3. The team prepares a report that includes its findings and recommendations.
4. The report is submitted to the project's governance body.
5. The governance body reviews the report and decides whether to approve the project to proceed to the next stage.

The assessment and approval process is designed to ensure that projects are well-planned and have a high chance of success. It also helps to identify and mitigate risks early in the project lifecycle.

## ∫ʀʊ[ t ɸʊʊt ɸ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## ɻt ϕʌ RYʂR ɬ t RʃʃɭR

**Прилог 10.1**

# Изјава о ауторству

Име и презиме аутора _____

Број индекса _____

**Изјављујем**

да је докторска дисертација под насловом

_____

(Case Based Reasoning) у области _____

- да је дисертација резултат сопственог истраживачког рада,
- да дисертација у целини ни у деловима није била предложена за стицање друге дипломе према студијским програмима других високошколских установа,
- да су резултати коректно наведени и
- да нисам кршио/ла ауторска права и користио/ла интелектуалну својину других лица.

**Потпис докторанда**

У _____

_____

Име и презиме аутора

**Прилог 10.2**

## Изјава о истоветности штампане и електронске верзије докторског рада

Име и презиме аутора _____ Јелена Ристић_____

Број индекса _____2/2010-Р _____

Наслов рада _____ **Управљање вредностима, примена локалних знања и Учење избором случајева (Case Based Reasoning) као подршка доношењу одлука на међународним пројектима**_____

Ментор _____ **Универзитета „Унион-Никола Тесла“ у Београду.**

Изјављујем да је штампана верзија мог докторског рада истоветна електронској верзији коју сам предао/ла за објављивање на порталу Дигиталног репозиторијума Универзитета „Унион-Никола Тесла“ у Београду.

Дозвољавам да се објаве моји лични подаци који су у вези са ауторством и добијањем академског назива доктора наука, као што су име и презиме, година и место рођења и датум одбране рада.

Ови лични подаци могу се објавити на мрежним страницама дигиталног репозиторијума, у електронском каталогу и у публикацијама Универзитета „Унион-Никола Тесла“ у Београду.

**Потпис докторанда**

У Београду, _____

_____

Јелена Ристић

**Прилог 10.3**

## Изјава о коришћењу

Ј ɘdƶʰ <lzʻjdʒ υ dƶfəjtɑ-dlsjlsfʃ-lz вdfвdƶftslsjʃ-lz υ dƶfəjtɑ-dlsjlsĂυdƶftsdƶą dʃ-tsdƶʘυjfɲdƶÑнʘ lzг dfʊdlsʘdƶdƶf tɑjtʃtsɹdlsststɑdfʻlzdʒ υ dƶfəjtɑ-dlsjlsʘlzdƶɡfɲj dʒtsʻlz нtsʃ-lststɑfʃ-lz нdfɲjtɑlsʘuρdfʻlz tʃtsн dƶʃfɲdƶtsɘtsdʒ

**Управљање вредностима, примена локалних знања и Учење избором случајева (Case Based Reasoning) као подршка доношењу одлука на међународним пројектима**

ʃ-tsʻʘʻj dʒtsʻj ʘlzlststɑfʃ-tsн jdƶs.

г dfɲjtɑlsʘuρdfʻlz frʃʘ fɲpdfdʒ tʃtɑdfƶsɹdfdʒʘ tʃtɑjнʘts/dƶʘ frʃʘdʒ lz jdƶjʃ-lststɑsdƶʃ-tsdʒ ᵂ tstɑdʒʘlsz tʃtsɑtsнdƶsdʒɹʘlstɑʘʻdƶs ʘtɑ-dɘdfɑʘʻ j.

ʃ tsʻlz нtsʃ-lststɑfʃ-lz нdfɲjtɑlsʘuρdfʻlz tʃts-tɑʘʻ jdƶz lz г dfʊdlsʘdƶdƶf tɑjtʃtsɹdlsststɑdfʻlzdʒ υ dƶfəjtɑ-dlsjlsʘĂυdƶftsdƶą dʃ-tsdƶʘυjfɲdƶÑdʒtsdz нʘ ʃ-tstɑdfrʃsj frpdf ʃ-tsʻdf tʃtsʰ lsz'lz tsнtɑjнвj frʃʘнtɑ>ʘdƶɡ lz tsнʘвtɑʘdƶsdʒlsdftʃlz dƶfʊjdƶɹuj ʂtɑjʘlsdfədƶɡ ɹʘʻjнdƶfʊj (Creative Commons) ɹʘʃ-tsʻlz frʃʘdʒfɲj tsнdƶzuρftsdƶʘ.

1. ϕlzlststɑfrʃsɘts
2. ϕlzlststɑfrʃsɘts - dƶjʃ-tsdʒjtɑυρdfʻʘdƶdƶs
3. ϕlzlststɑfrʃsɘtsï dƶɡʃ-tsdʒjtɑυρdfʻʘdƶdƶsï вjɹ tʃtɑjtɑʘнj
4. ϕlzlststɑfrʃsɘtsï dƶjʃ-tsdʒjtɑυρdfʻʘdƶdƶsï нjdƶfldsf tʃtsн dfrʃsfdʒlzfrpdƶsɘdfdʒʘ
5. ϕlzlststɑfrʃsɘtsï вjɹ tʃtɑjtɑʘнj
6. ϕlzlststɑfrʃsɘtsï нjdƶfldsf tʃtsн dfrʃsfdʒlzfrpdƶsɘdfdʒʘ

(ʃ tsdƶfdʒts нʘ ɹʘts-tɑdzɣdfldsj frʃʘdʒts ʻjнdƶz tsн ʰ jfrʃs tʃtsdƶz jdƶɡ- dƶfʊjdƶɹuρf, ʃ-tɑʘldsʘʃ- tstʃdfrʃ dƶfʊjdƶɹuρf нʘls ʻj dƶʘtʃtsdƶj ' dfdƶɡ dƶfrʃsʘ).

**Потпис докторанда**

υ ɹ jtsdtɑʘнlz, _____

_____

ɻ jвts'ʰ Ozˌ lztɑdƶʘdƶ

**Прилог 10.4**

# Биографија

Рођена сам 20.02.1972. године у Београду, где сам завршила основну школу и гимназију. Дипломирала сам на Електротехничком факултету у Београду 1996. године, на одсеку за Рачунарску технику и информатику, са просечном оценом 9,00 у току студија и оценом 10 на дипломском раду. Магистарски рад на Електротехничком факултету у Београду, на одсеку за Рачунарску технику и информатику, одбранила сам 15.12.1997. године, под менторством проф. др Драгана Домазета, са темом из области Рачунарске графике. Докторску дисертацију из области Рачунарске графике, под менторством проф. др Драгана Домазета, одбранила сам 2010. године. Од 2000. године радим у Републичком геодетском заводу, у Београду, у Служби за информатику, на пословима пројектовања, развоја и одржавања информационих система. Од 2010. године радим на пословима руководиоца Службе за информатику. Од 2000. године сам сертификовани пројектни менаџер (Project Management Professional) Института за управљање пројектима (Project Management Institute) у Филаделфији, САД.

Од 1998. године сам ангажована као хонорарни наставник у настави на Електротехничком факултету у Београду, на предмету Рачунарска графика, а од 2000. године сам ангажована као хонорарни наставник у настави на Геодетском факултету у Београду, на предмету Рачунарска графика. Од 2000. године сам ангажована као хонорарни наставник у настави на Високој школи за информационе технологије, у Београду, на предмету Пословна информатика. Од 2000. године сам ангажована као хонорарни наставник у настави на Високој школи за информационе технологије, у Београду, на предмету Пословна информатика. Од 2000. године сам ангажована као хонорарни наставник у настави на Високој школи за информационе технологије, у Београду, на предмету Пословна информатика.

Од 2004. године сам ангажована као хонорарни наставник у настави на Високој школи за информационе технологије, у Београду, на предмету Пословна информатика. Од 2004. године сам ангажована као хонорарни наставник у настави на Високој школи за информационе технологије, у Београду, на предмету Пословна информатика. Од 2004. године сам ангажована као хонорарни наставник у настави на Високој школи за информационе технологије, у Београду, на предмету Пословна информатика.

Mace-ը ներկայացնում է նոր մոտեցում՝ համատեղելով ավանդական ճարտարապետական տարրերը ժամանակակից տեխնոլոգիաների հետ։ Ընկերության հիմնադիր Ալեքսանդր Վարդանյանը նշում է, որ նպատակը եղել է ստեղծել շենքեր, որոնք «ոչ միայն գեղեցիկ են, այլև ֆունկցիոնալ՝ ապահովելով բնակիչների հարմարավետությունը»։ Առաջին նախագիծը՝ Mace-Ն, ավարտվել է 2008 թվականին։ Այն ներառում է 120 բնակարան՝ տարբեր չափերի, ինչպես նաև ընդհանուր օգտագործման տարածքներ՝ այգի, մանկական խաղահրապարակ և ընդհանուր սրահ։

Ընկերության ներկայիս ամենամեծ նախագիծը Mace-Ի կենտրոնն է, որը կառուցվել է 2010 թվականին։ Այն ներառում է 200 բնակարան, 5000 քառակուսի մետր գրասենյակային տարածք և 1500 քառակուսի մետր մանրածախ տարածք։ Շենքը ունի նաև ստորգետնյա ավտոկայանատեղի՝ 300 մեքենայի համար։ Ճարտարապետական լուծումների համար պատասխանատու է Մարիամ Հակոբյանը, ով նախկինում աշխատել է Zaha Hadid Architects-ում։ Նրա խոսքով՝ շենքի ձևավորման մեջ ոգեշնչվել են հայկական ավանդական օրինաչափություններից։

Mace-ի նախագծերը հաճախ ներառում են կանաչ տարածքներ և էկոլոգիապես մաքուր լուծումներ։ Օրինակ՝ Mace-Ի կենտրոնում տեղադրված են արևային վահանակներ, որոնք ապահովում են շենքի էներգիայի 15%-ը։ Ընկերությունը նաև ներդրել է ջրի վերամշակման համակարգ, որը թույլ է տալիս կրկնակի օգտագործել ջուրը։ Այս նախաձեռնությունները ստացել են միջազգային ճանաչում և 2012 թվականին Mace-ը արժանացել է «Կանաչ շինարարության» մրցանակի։

Ընկերության հաջողությունների մեջ մեծ դեր է խաղացել նաև հաճախորդների հետ սերտ համագործակցությունը։ Mace-ը կազմակերպում է հանդիպումներ ապագա բնակիչների հետ՝ հաշվի առնելով նրանց կարիքներն ու ցանկությունները։ Օրինակ՝ Մանկական խաղահրապարակի նախագիծը մշակվել է տեղի դպրոցականների մասնակցությամբ։ Ընկերությունը նաև աջակցում է տեղական համայնքային նախաձեռնություններին՝ հատկացնելով դրամաշնորհներ և կազմակերպելով բարեգործական միջոցառումներ։

Mace-ի ապագա ծրագրերի մեջ մտնում է նոր բիզնես կենտրոնի կառուցումը, որը նախատեսվում է ավարտել 2014 թվականին։ Այն կունենա 44 հարկ և կդառնա ընկերության ամենաբարձր շենքը՝ 400.000 քառակուսի մետր (ներառյալ ստորգետնյա 4.616 հարկերը), և կներառի գրասենյակներ, խանութներ և ռեստորաններ։ Ընկերությունը նաև նախատեսում է 30 միլիոն դրամ հատկացնել մշակութային միջոցառումների համար, որոնք կանցկացվեն նոր կենտրոնի տարածքում։ Նոր կենտրոնի նախագիծը մշակվել է Մարիամ Հակոբյանի ղեկավարությամբ, և այն կունենա 707 հարկերը։ Ընկերությունը նաև նախատեսում է 37.000 քառակուսի մետր

tɑO+O ɑ[ ɑ[fr}Szfrjso O ɑ[fr}SO.LOts ‘j ɑ[dɑsjtɑjfrjso@ j L O Stsdɑs[dɑzOdzdɑs tsBtɑO.tso@ j ɑ[ tzfrjOotɑh O+O@ j t[tɑO@Slsɑ[uɑdɑs frjsjuj dɑz[=. LdɑZ@ O, t[O frj ɑ[ ^ j ɑtso tɑO+ dɑZ ++tsSlststɑfr}Sts‘ +ɑ[fr}jtɑdsOuɑ[‘ɑ[ dɑ}s>j lszdɑ}Ouɑlsɑ[ SOts t[tslsotɑ+O t[tsfrjstsj<ɑ[=. ɑ[ t[tɑts‘h ɑ[tɑjS j dɑsoɑ[dɑ} fr}O.LdɑZ@ ɑ[dɑ}O ɑ[L dɑZ@‘BtsP j ɑtɑO@ j ɑoɑ[dɑ}Sj t[tɑO@Sfrj lz tsBdɑZ@frjsɑ[ LO Stsslz fr}j frj[j uɑ[‘Odzɑ[Lzj ï dɑ}jdɑZ@vdɑ}jdɑs+tɑO@ j ɑoɑ[dɑ}Sɑ[dɑ}t[tɑts‘j Slsɑ[dɑ}O.

**Чланство у стручним телима:**

- R dɑzj S j jtɑfr}SO Stsdɑ}stɑO+tɑBɑ[‘j;

- R dɑzj S j jtɑfr}SO Stsdɑ}stɑO^tɑdɑ}j tstɑj;

- ϕfrjsuɑ[‘Ouɑ[‘O R dɑzj S j jtɑO Stsdɑ}zdɑsOdɑsO ^tɑdɑ}j tstɑj (ACEM) - Y dɑZ@dɑz lz[tɑO@dɑsɑ[ tsHBtsɑO@;

- PMI fr}jtɑdsɑ[W ɑ[Stsso@dɑz[ tɑts‘j Slsʃ j dɑZ@vdɑ}jdɑs tɑtsW j frɲ[tsdɑZ@dɑZ@u (PMP)

**Потпис докторанда**

U J j tsɑtɑO+lz, _____

_____

l j BtsH O z, lzɑdɑZ@dɑz

# Appendices

PhD Thesis - Local knowledge and value management application in Case Base Reasoning decision support system for international projects

# Прилози

Докторска Теза - Управљање вредностима, примена локалних знања и Учење Избором Случајева (Case Based Reasoning) за подршку доношењу одлука на међународним пројектима

Appendix 1.1 - Sample Delphi Questionnaire Stage A

*The purpose of the research is to establish value criteria/parameters/drivers in early stages of construction process*
*The experts were informed that there would be four rounds of questionnaires*

## A survey of criteria adopted for selection of value parameters

### Round 1: Questionnaire

Name of Respondent: _____

***Operational Brief***
*After the development of Strategic Brief, next step is the Operational Brief which defines the* ***design requirements*** *in terms of functionalities, dimensions and performance. It is independent of whatever choice is made to provide the final building whether it is a new build, refurbishment or by rearranging existing spaces. Traditionally only the client, users and local authorities are involved in this process however it is advised that all project stakeholders are involved.*
*The goals defined in the strategic brief are translated to product (completed building) and process values. The product values aid in understanding the purpose of the building and present the goals for the building and its performance. The process values are derived from the product values and are used to select suitable construction processes. Process values define how the product values can be achieved effectively and precisely during the design process. During this process the stakeholders act collaboratively to process the values and requirements into a building design. At the end of operational briefing sessions there shall be a quality gate where each participant shall examine the* ***values and requirements*** *for any conflict. To assist this hard gate, set of* ***"soft value parameters"*** *could be considered to aid the process.*

1 a). Would you please list parameters, which you believe have the greatest influence in the contribution to the "soft" value of the building construction project in South East Europe from the perspective of the Client investing in the development for its operation and use? Please feel free to add new parameters if you find applicable.

| No | | **"Soft value parameters"** | |
|---|---|---|---|
| | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 4. Minimize building operation and maintenance costs, and environmental impact | 5. Impact positively on the locality | 6. Comply with third party requirements |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 7. | 8. | 9. |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |

**Note:**
The following are some of the criteria found in previous research studies and literature.

| 1. Maximize business effectiveness *(consider what is value for the building owner in operation stage of the final product - facility)* | 4. Minimize building operation and maintenance costs, and environmental impact *(consider what is value for the building owner in operation stage of the final product - facility)* |
|---|---|
| Staff satisfaction | Whole-Life Cost |
| Operating costs per head | Facilities Management Estimates |
| Post-occupancy analysis | BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) |
| Staff turnover in operation | Sustainability index |
| Churn (discontinue) costs | Construction Excellence Sustainability KPIs Environment |
| Sickness absence | Annual cost of cleaning and maintenance |
| Disability Access Reviews | Annual cost of heating, cooling and lighting |
| Productivity per employee | Total Occupancy Cost Code (TOCC), or equivalent, in use |
| Revenue per unit area | Frequency of periodic maintenance |
| Footfall (number of visitors) | Availability of spares/replacement components |
| Number of complaints | Results of environmental sustainability assessments |
| Satisfaction Surveys | Use of positive feedback techniques in line with OGC guidance |
| Churn costs per person | Responses to monitoring and feedback |
| Days lost through sick leave | Integration of Facilities Management team within the briefing process |
| Recruitment and exit surveys | |
| Utilization surveys | |
| | |
| 2. Ensure effective project management and delivery *(consider what is value for the client when planning how the project is going to be delivered)* | 5. Impact positively on the location of the facility *(consider what is value for the building owner in operation stage of the final product – facility)* |
| Compliance with Achieving Excellence targets | Post Occupancy Evaluation |
| Construction Industry Standard KPIs | Public or private survey results |
| Industry Best Practice | Design awards |
| Project Management Guidelines - Gateway Review | Views of local planning authority |
| | Design Quality Indicator |
| | Response of planning authority |
| | Company image |
| 3. Achieve the required financial performance *(consider what is value for the client when considering financial implication and success of the development)* | 6. Comply with third party requirements *(consider what is value for the building owner in operation stage of the final product – facility)* |
| Whole-life Cost | Public survey |
| Capital Cost | Planning approval |
| Building operating and maintenance cost | Ease of achievement of planning consent |
| Payback | Industry KPIs |
| Robust business case | Accident rates |
| Net useable area to gross area ratio | Health & Safety statistics |
| Money per unit area or unit of functional area | Design Quality Indicators |
| Operation and maintenance | Number of reportable incidents |
| | Percentage of days lost through accidents |
| | Operating days lost through sickness |

***Technical Brief***

*After the development of Operational Brief, next step is the Technical briefing - the method of defining the quantitative* ***performance parameters*** *of the completed building and is the starting point for the eventual building specification. The performance parameters must allow flexibility. Once the feasibility design stage has been completed the client body shall decide whether to continue with the project or not. Operational and Technical brief are referred to as Project Brief in literature. Once again, at the end of technical briefing sessions there shall be a quality gate where the parameters shall be analyzed. To assist this hard gate, set of* ***"hard value parameters"*** *(technical parameters) could be considered to aid the process.*

1 b). Would you please list parameters, which you believe have the greatest influence in the contribution to the "hard" value of the building construction project in South East Europe? Please feel free to add new criteria if you find applicable.

| No | | **"Hard value parameters"** | |
|---|---|---|---|
| | 1. Scope | 2. Time | 3. Cost |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 4. Quality | 5. Contract/admin | 6. Human resource |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 7. Risk | 8. Health and safety | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |

**Note:**
The following are some of the criteria found in previous research studies and literature.

| **Scope** | **Time** |
|---|---|
| Clarity of contract | Fixed construction period |
| Sustainable project design and construction | Rapid decision making |
| Reliability engineering techniques | Overrun duration |
| Effective preplanning | Project time constraints |
| Understanding of project requirements | Adequacy of time |
| Construction complexity | Constraint by government regulations |
| Project levels of decision making | Lack of time |
| Economic evaluation of socio-environmental effects | Service life planning |
| Integrated functional requirement | Constraint by ground conditions |
| Design completed before work on site | Severity of variations |
| **Cost** | **Quality** |
| Adequate tender sum | Design quality plan |
| Precise project budget estimate | Material quality |
| Cost effectiveness | Construction quality plan |
| Competition on price | Contracted work quality |
| Long-term profitability | Durability of building assemblies |
| Over budget possibility | Determining quality in construction |
| Eliminating waste | Durability of building components |
| Rapid decision making | Level of technology |
| Cash flow certainty | Conformance to requirement |
| Severity of variations | Inadequate labor skills |
| **Contract/admin** | **Human resource** |
| Disputes resolution procedure | Leadership/team management |
| Mutual/trusting relationships | Team communication |
| Changes in contact | Motivation for project |
| City planning regulations | Skilled personnel |
| Threat of litigation | Monitoring and feedback |
| Inclusion of all risks | Labor productivity |
| Implement of partnering | Capture of organization's mission/vision |
| Procured similar projects within 5 years | Spirit of cooperation |
| Long and short form | Centralized decision making |
| Commercial bid evaluation | Need for collaboration |
| **Risk** | **Health and safety** |
| Risk response | Hazard identification |
| Defective materials | Management of work safety on site |
| Risk management techniques | Health and safety records |
| Defective design | Personal protective equipment |
| Ignorance of risk | Management responsibility |
| Cash flow reliability of project | Teaching of accident prevention |
| Risk identification | Cleanliness and order on site |
| Labor disputes | Teaching of first aid skills |
| Financial stability of client | Safety consideration  operative ratings |
| Coordination with subcontractors | Management of environmental issues on site |

Appendix 1.2 – Table 01 - All 251 Results of Delphi Stage A

| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total | % of experts | Serbia-PM Company | Serbia-Alternative PM | Total |
|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | | | | | | | |
| Staff satisfaction | 7 | 2 | 5 | 7 | 58% | 2 | 0 | 2 |
| Operating costs per head | 7 | 3 | 4 | 7 | 58% | 1 | 2 | 3 |
| Revenue per unit area | 7 | 4 | 3 | 7 | 58% | 2 | 2 | 4 |
| Productivity per employee | 4 | 3 | 1 | 4 | 33% | 2 | 1 | 3 |
| Footfall (number of visitors) | 4 | 2 | 2 | 4 | 33% | 2 | 0 | 2 |
| Number of complaints | 4 | 1 | 3 | 4 | 33% | 0 | 1 | 1 |
| Post-occupancy analysis | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Disability Access Reviews | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Satisfaction Surveys | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Churn costs per person | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Utilization surveys | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Proper definition of the budget | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Compare of business performance with similar facilities in the region of SEE. | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Compare of business performance with similar facilities in the region of EU | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Attractive design | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Range of using possibilities | 1 | 0 | 1 | 1 | 8% | | | |
| Extension of life-time vs costs | 1 | 0 | 1 | 1 | 8% | | | |
| Maximize output of occupiers | 1 | 0 | 1 | 1 | 8% | | | |
| Maintenance reduction | 1 | 0 | 1 | 1 | 8% | | | |
| Image to the outside world (publicity) | 1 | 0 | 1 | 1 | 8% | | | |
| High revenue and low maintenance | 1 | 0 | 1 | 1 | 8% | | | |
| Positive experience from clients | 1 | 0 | 1 | 1 | 8% | | | |
| Staff turnover in operation | 0 | 0 | 0 | 0 | 0% | | | |
| Churn (discontinue) costs | 0 | 0 | 0 | 0 | 0% | | | |
| Sickness absence | 0 | 0 | 0 | 0 | 0% | | | |
| Days lost through sick leave | 0 | 0 | 0 | 0 | 0% | | | |
| Recruitment and exit surveys | 0 | 0 | 0 | 0 | 0% | | | |
| 2. Ensure effective project management and delivery | | | | | | | | |
| Industry Best Practice | 7 | 3 | 4 | 7 | 58% | 2 | 1 | 3 |
| Project Management Guidelines - Gateway Review | 6 | 2 | 4 | 6 | 50% | 0 | 2 | 2 |
| Construction Industry Standard KPIs | 4 | 1 | 3 | 4 | 33% | 1 | 0 | 1 |
| Compliance with Achieving Excellence targets | 2 | 1 | 1 | 2 | 17% | 1 | 0 | 1 |
| Standards | 2 | 1 | 1 | 2 | 17% | 0 | 1 | 1 |
| Engage a professional company that provides services PM. | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Experienced staff | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Compliance with Achieving Cost target | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Compliance with Achieving Quality target | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Compliance with Achieving Time target | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Cash flow | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Clear target definition | 1 | 0 | 1 | 1 | 8% | | | |
| Effective procedures for delivery | 1 | 0 | 1 | 1 | 8% | | | |
| Identification of primary, secondary and tertiary goals | 1 | 0 | 1 | 1 | 8% | | | |
| Time schedule | 1 | 0 | 1 | 1 | 8% | | | |
| Clear brief understood by all | 1 | 0 | 1 | 1 | 8% | | | |
| Quality requirements achieved | 1 | 0 | 1 | 1 | 8% | | | |
| Minimum or no accidents on site | 1 | 0 | 1 | 1 | 8% | | | |
| Maintain overall budget under control | 1 | 0 | 1 | 1 | 8% | | | |
| Ability to incorporate changes | 1 | 0 | 1 | 1 | 8% | | | |
| 3. Achieve the required financial performance | | | | | | | | |
| Capital Cost | 8 | 4 | 4 | 8 | 67% | 2 | 2 | 4 |
| Payback | 8 | 3 | 5 | 8 | 67% | 1 | 2 | 3 |
| Whole-life Cost | 5 | 2 | 3 | 5 | 42% | 1 | 1 | 2 |
| Building operating and maintenance cost | 5 | 2 | 3 | 5 | 42% | 2 | 0 | 2 |
| Operation and maintenance | 3 | 1 | 2 | 3 | 25% | 0 | 1 | 1 |
| Money per unit area or unit of functional area | 2 | 1 | 1 | 2 | 17% | 1 | 0 | 1 |
| Robust business case | 1 | 0 | 1 | 1 | 8% | | | |
| Net useable area to gross area ratio | 1 | 0 | 1 | 1 | 8% | | | |
| Net useable area to gross area ratio | 1 | 0 | 1 | 1 | 8% | | | |
| Net income per unit per time period | 1 | 0 | 1 | 1 | 8% | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Whole-life and capital costs | 1 | 0 | 1 | 1 | 8% | | | |
| Internal rate of return | 1 | 0 | 1 | 1 | 8% | | | |
| All works must be completed within the approved budget | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Continuous monitoring of budget | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Monitoring the situation on the market | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| | | | | | | | | |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | | |
| BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) | 6 | 2 | 4 | 6 | 50% | 1 | 1 | 2 |
| Annual cost of heating, cooling and lighting | 6 | 2 | 4 | 6 | 50% | 2 | 0 | 2 |
| Facilities Management Estimates | 4 | 0 | 4 | 4 | 33% | 0 | 0 | 0 |
| Total Occupancy Cost Code (TOCC), or equivalent, in use | 4 | 2 | 2 | 4 | 33% | 1 | 1 | 2 |
| Annual cost of cleaning and maintenance | 3 | 1 | 2 | 3 | 25% | 1 | 0 | 1 |
| Frequency of periodic maintenance | 2 | 1 | 1 | 2 | 17% | 0 | 1 | 1 |
| Whole-Life Cost | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Sustainability index | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Availability of spares/replacement components | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Results of environmental sustainability assessments | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Responses to monitoring and feedback | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Support the development of energy efficient buildings | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Intensify thermal insulation of buildings | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Passive solar use of solar energy | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Ensure effective Facilities Management | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Minimize building operating and maintenance cost | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Use best available techniques concerning environment | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Adjust to local conditions (climate, availability of public utilities… | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Energy efficiency | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Sustainable design and material selection | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Involvement of Contractor in early stages of pre-construction | 1 | 0 | 1 | 1 | 8% | | | |
| Environmental assessment | 1 | 0 | 1 | 1 | 8% | | | |
| Utilities costs | 1 | 0 | 1 | 1 | 8% | | | |
| Construction Excellence Sustainability KPIs Environment | 0 | 0 | 0 | 0 | 0% | | | |
| Use of positive feedback techniques in line with OGC guidance | 0 | 0 | 0 | 0 | 0% | | | |
| Responses to monitoring and feedback | 0 | 0 | 0 | 0 | 0% | | | |
| Integration of Facilities Management team within the briefing process | 0 | 0 | 0 | 0 | 0% | | | |
| | | | | | | | | |
| 5. Impact positively on the location of the facility | | | | | | | | |
| Company image | 7 | 2 | 5 | 7 | 58% | 1 | 1 | 2 |
| Design awards | 6 | 2 | 4 | 6 | 50% | 1 | 1 | 2 |
| Public or private survey results | 5 | 2 | 3 | 5 | 42% | 2 | 0 | 2 |
| Views of local planning authority | 5 | 1 | 4 | 5 | 42% | 1 | 0 | 1 |
| Design Quality Indicator | 4 | 1 | 3 | 4 | 33% | 0 | 1 | 1 |
| Post Occupancy Evaluation | 2 | 2 | 0 | 2 | 17% | 1 | 1 | 2 |
| Response of planning authority | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Appearance on the locality | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Urban integration into the locality | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Positive appearance of the advertisements for all participants in the business | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Compliance with local plans | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Views of local community | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Attractive for the users | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Social integration of the community | 1 | 0 | 1 | 1 | 8% | | | |
| Use/employment of local labour | 1 | 0 | 1 | 1 | 8% | | | |
| Contribution to local environment | 1 | 0 | 1 | 1 | 8% | | | |
| | | | | | | | | |
| 6. Comply with third party requirements | | | | | | | | |
| Planning approval | 8 | 3 | 5 | 8 | 67% | 1 | 2 | 3 |
| Public survey | 7 | 3 | 4 | 7 | 58% | 1 | 2 | 3 |
| Industry KPIs | 4 | 2 | 2 | 4 | 33% | 1 | 1 | 2 |
| Ease of achievement of planning consent | 3 | 1 | 2 | 3 | 25% | 1 | 0 | 1 |
| Design Quality Indicators | 3 | 2 | 1 | 3 | 25% | 1 | 1 | 2 |
| Accident rates | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Observed time interval of obtaining building permits | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Anticipated term plan to obtain the conditions from municipality utilities company | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Health & Safety | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Accident rates | 1 | 0 | 1 | 1 | 8% | | | |
| Noise/lighting/emissions | 1 | 0 | 1 | 1 | 8% | | | |
| Traffic induced by facility | 1 | 0 | 1 | 1 | 8% | | | |
| Health & Safety statistics | 0 | 0 | 0 | 0 | 0% | | | |
| Number of reportable incidents | 0 | 0 | 0 | 0 | 0% | | | |
| Percentage of days lost through accidents | 0 | 0 | 0 | 0 | 0% | | | |
| Operating days lost through sickness | 0 | 0 | 0 | 0 | 0% | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 1. Scope | | | | | | | | |
| Clarity of contract | 7 | 3 | 4 | 7 | 58% | 2 | 1 | 3 |
| Effective preplanning | 7 | 4 | 3 | 7 | 58% | 2 | 2 | 4 |
| Understanding of project requirements | 5 | 2 | 3 | 5 | 42% | 1 | 1 | 2 |
| Project levels of decision making | 5 | 3 | 2 | 5 | 42% | 2 | 1 | 3 |
| Design completed before work on site | 3 | 2 | 1 | 3 | 25% | 2 | 0 | 2 |
| Construction complexity | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Minimize changes the scope of works, during phase construction of building | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Design completed before work | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Feasibility study | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Clarity of ToR | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Clearly defined scope | 1 | 0 | 1 | 1 | 8% | | | |
| Understanding complexity and how this is affected by regional construction ability | 1 | 0 | 1 | 1 | 8% | | | |
| Functional requirements | 1 | 0 | 1 | 1 | 8% | | | |
| Buildability / construction complexity | 1 | 0 | 1 | 1 | 8% | | | |
| Sustainable project design and construction | 0 | 0 | 0 | 0 | 0% | | | |
| Reliability engineering techniques | 0 | 0 | 0 | 0 | 0% | | | |
| Economic evaluation of socio-environmental effects | 0 | 0 | 0 | 0 | 0% | | | |
| Integrated functional requirement | 0 | 0 | 0 | 0 | 0% | | | |
| | | | | | | | | |
| 2. Time | | | | | | | | |
| Project time constraints | 7 | 3 | 4 | 7 | 58% | 2 | 1 | 3 |
| Constraint by government regulations | 7 | 4 | 3 | 7 | 58% | 2 | 2 | 4 |
| Rapid decision making | 5 | 2 | 3 | 5 | 42% | 2 | 0 | 2 |
| Adequacy of time | 4 | 1 | 3 | 4 | 33% | 0 | 1 | 1 |
| Fixed construction period | 2 | 2 | 0 | 2 | 17% | 0 | 2 | 2 |
| Overrun duration | 2 | 2 | 0 | 2 | 17% | 1 | 1 | 2 |
| Lack of time | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Service life planning | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Constraint by ground conditions | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Severity of variations | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Real definition works time program | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Atmospheric effects (snow, rain, low or high temperature) | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Design time planning | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Construction time planning | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Completion date requirement | 1 | 0 | 1 | 1 | 8% | | | |
| Achievability of delivery requirement | 1 | 0 | 1 | 1 | 8% | | | |
| Accurate controlled information flow to support delivery requirement | 1 | 0 | 1 | 1 | 8% | | | |
| Outside influences to delivery, e.g. authorities | 1 | 0 | 1 | 1 | 8% | | | |
| Changes to the brief | 1 | 0 | 1 | 1 | 8% | | | |
| Timely selection of contractors | 1 | 0 | 1 | 1 | 8% | | | |
| 3. Cost | | | | | | | | |
| Rapid decision making | 7 | 2 | 5 | 7 | 58% | 1 | 2 | 3 |
| Cash flow certainty | 7 | 3 | 4 | 7 | 58% | 1 | 2 | 3 |
| Precise project budget estimate | 5 | 3 | 2 | 5 | 42% | 2 | 1 | 3 |
| Adequate tender sum | 4 | 3 | 1 | 4 | 33% | 1 | 2 | 3 |
| Severity of variations | 4 | 2 | 2 | 4 | 33% | 1 | 1 | 2 |
| Cost effectiveness | 2 | 2 | 0 | 2 | 17% | 1 | 1 | 2 |
| Over budget possibility | 2 | 1 | 1 | 2 | 17% | 1 | 0 | 1 |
| Competition on price | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Controlling of expense | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Precise project cost estimate | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| VE in design stage | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Estimated additional costs (environment, unexpected public utilities) | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Realistic budget allowance | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Sufficiently detailed information to price accurately | 1 | 0 | 1 | 1 | 8% | | | |
| Competition in tender process | 1 | 0 | 1 | 1 | 8% | | | |
| Competition | 1 | 0 | 1 | 1 | 8% | | | |
| Detailed budget | 1 | 0 | 1 | 1 | 8% | | | |
| Change procedures | 1 | 0 | 1 | 1 | 8% | | | |
| Long-term profitability | 0 | 0 | 0 | 0 | 0% | | | |
| Eliminating waste | 0 | 0 | 0 | 0 | 0% | | | |
| 4. Quality | | | | | | | | |
| Material quality | 8 | 4 | 4 | 8 | 67% | 2 | 2 | 4 |
| Construction quality plan | 8 | 5 | 3 | 8 | 67% | 4 | 1 | 5 |
| Contracted work quality | 5 | 2 | 3 | 5 | 42% | 1 | 1 | 2 |
| Design quality plan | 4 | 3 | 1 | 4 | 33% | 1 | 2 | 3 |
| Level of technology | 3 | 1 | 2 | 3 | 25% | 1 | 0 | 1 |
| Inadequate labor skills | 2 | 0 | 2 | 2 | 17% | 0 | 0 | 0 |
| Durability of building components | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Conformance to requirement | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Conformance to requirement | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Clarity of contract | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Subcontractors work quality | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Quality assurance | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Design quality in terms of design and materials specified | 1 | 0 | 1 | 1 | 8% | | | |
| Effective quality procedures | 1 | 0 | 1 | 1 | 8% | | | |
| Reduction of maintenance | 1 | 0 | 1 | 1 | 8% | | | |
| Adequate detailed design | 1 | 0 | 1 | 1 | 8% | | | |
| Materials and skilled labour | 1 | 0 | 1 | 1 | 8% | | | |
| Durability of building assemblies | 0 | 0 | 0 | 0 | 0% | | | |
| Determining quality in construction | 0 | 0 | 0 | 0 | 0% | | | |
| 5. Contract/admin | | | | | | | | |
| City planning regulations | 7 | 3 | 4 | 7 | 58% | 2 | 1 | 3 |
| Changes in contract | 5 | 3 | 2 | 5 | 42% | 1 | 2 | 3 |
| Mutual/trusting relationships | 4 | 2 | 2 | 4 | 33% | 2 | 0 | 2 |
| Inclusion of all risks | 4 | 2 | 2 | 4 | 33% | 2 | 0 | 2 |
| Disputes resolution procedure | 2 | 1 | 1 | 2 | 17% | 1 | 0 | 1 |
| Procured similar projects within 5 years | 2 | 0 | 2 | 2 | 17% | 0 | 0 | 0 |
| Implement of partnering | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Uniquely defined obligations in the contract | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Clear procedures for archiving of documents | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Clarity of contract | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Rapid decision making | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Local regulations | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Contract that protects both parties | 1 | 0 | 1 | 1 | 8% | | | |
| Contract suits type of works | 1 | 0 | 1 | 1 | 8% | | | |
| Contract is enforceable | 1 | 0 | 1 | 1 | 8% | | | |
| Robust contracts | 1 | 0 | 1 | 1 | 8% | | | |
| Dispute procedure | 1 | 0 | 1 | 1 | 8% | | | |
| Risk registers | 1 | 0 | 1 | 1 | 8% | | | |
| Regular team meetings | 1 | 0 | 1 | 1 | 8% | | | |
| Changes in contact | 0 | 0 | 0 | 0 | 0% | | | |
| Threat of litigation | 0 | 0 | 0 | 0 | 0% | | | |
| Long and short form | 0 | 0 | 0 | 0 | 0% | | | |
| Commercial bid evaluation | 0 | 0 | 0 | 0 | 0% | | | |
| 6. Human resource | | | | | | | | |
| Team communication | 10 | 5 | 5 | 10 | 83% | 2 | 3 | 5 |
| Leadership/team management | 6 | 3 | 3 | 6 | 50% | 2 | 1 | 3 |
| Motivation for project | 5 | 2 | 3 | 5 | 42% | 1 | 1 | 2 |
| Monitoring and feedback | 5 | 3 | 2 | 5 | 42% | 1 | 2 | 3 |
| Skilled personnel | 4 | 3 | 1 | 4 | 33% | 2 | 1 | 3 |
| Centralized decision making | 3 | 3 | 0 | 3 | 25% | 1 | 2 | 3 |
| Labor productivity | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Capture of organization's mission/vision | 1 | 0 | 1 | 1 | 8% | 0 | 0 | 0 |
| Selection of quality personnel | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Effective communication | 1 | 0 | 1 | 1 | 8% | | | |
| Motivated staff and resources | 1 | 0 | 1 | 1 | 8% | | | |
| Availability of suitably skilled resource | 1 | 0 | 1 | 1 | 8% | | | |
| Good "vibe" | 1 | 0 | 1 | 1 | 8% | | | |
| Clear vision for project | 1 | 0 | 1 | 1 | 8% | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Team leadership | 1 | 0 | 1 | 1 | 8% | | | |
| Skilled workforce | 1 | 0 | 1 | 1 | 8% | | | |
| Rewards incentives | 1 | 0 | 1 | 1 | 8% | | | |
| Spirit of cooperation | 0 | 0 | 0 | 0 | 0% | | | |
| Need for collaboration | 0 | 0 | 0 | 0 | 0% | | | |
| 7. Risk | | | | | | | | |
| Risk identification | 9 | 4 | 5 | 9 | 75% | 1 | 3 | 4 |
| Risk management techniques | 7 | 2 | 5 | 7 | 58% | 1 | 1 | 2 |
| Financial stability of client | 5 | 2 | 3 | 5 | 42% | 1 | 1 | 2 |
| Risk response | 4 | 3 | 1 | 4 | 33% | 2 | 1 | 3 |
| Defective design | 2 | 2 | 0 | 2 | 17% | 2 | 0 | 2 |
| Ignorance of risk | 2 | 2 | 0 | 2 | 17% | 1 | 1 | 2 |
| Cash flow reliability of project | 2 | 0 | 2 | 2 | 17% | 0 | 0 | 0 |
| Coordination with subcontractors | 2 | 1 | 1 | 2 | 17% | 1 | 0 | 1 |
| Risk assessment in approvals obtaining | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Risk assessment in design stage | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Risk assessment in construction stage | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Pricing of risk | 1 | 0 | 1 | 1 | 8% | | | |
| Political stability of region | 1 | 0 | 1 | 1 | 8% | | | |
| Proven contracts | 1 | 0 | 1 | 1 | 8% | | | |
| Relations with contractors | 1 | 0 | 1 | 1 | 8% | | | |
| Defective materials | 0 | 0 | 0 | 0 | 0% | | | |
| Labor disputes | 0 | 0 | 0 | 0 | 0% | | | |
| | | | | | | | | |
| 8. Health and safety | | | | | | | | |
| Management of work safety on site | 7 | 3 | 4 | 7 | 58% | 2 | 1 | 3 |
| Hazard identification | 5 | 3 | 2 | 5 | 42% | 1 | 2 | 3 |
| Health and safety records | 4 | 1 | 3 | 4 | 33% | 0 | 1 | 1 |
| Cleanliness and order on site | 3 | 3 | 0 | 3 | 25% | 2 | 1 | 3 |
| Management responsibility | 2 | 2 | 0 | 2 | 17% | 0 | 2 | 2 |
| Teaching of accident prevention | 2 | 1 | 1 | 2 | 17% | 1 | 0 | 1 |
| Management of environmental issues on site | 2 | 2 | 0 | 2 | 17% | 2 | 0 | 2 |
| Personal protective equipment | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| A sufficient number of inspectors at the site | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Strictly respect of procedures | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| Application of penal policy | 1 | 1 | 0 | 1 | 8% | 1 | 0 | 1 |
| H&S records | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| H&S Procedures | 1 | 1 | 0 | 1 | 8% | 0 | 1 | 1 |
| Motivation for HS&E procedures | 1 | 0 | 1 | 1 | 8% | | | |
| Safety education | 1 | 0 | 1 | 1 | 8% | | | |
| Safety monitoring | 1 | 0 | 1 | 1 | 8% | | | |
| Cash flow reliability of project | 1 | 0 | 1 | 1 | 8% | | | |
| Financial stability of client | 1 | 0 | 1 | 1 | 8% | | | |
| Coordination with subcontractors | 1 | 0 | 1 | 1 | 8% | | | |
| Client will to enforce | 1 | 0 | 1 | 1 | 8% | | | |
| Incentives and rewards for contractors | 1 | 0 | 1 | 1 | 8% | | | |
| Induction and training of workforce | 1 | 0 | 1 | 1 | 8% | | | |
| Involvement of all team: management and labour | 1 | 0 | 1 | 1 | 8% | | | |
| Teaching of first aid skills | 0 | 0 | 0 | 0 | 0% | | | |
| Safety consideration operative ratingss | 0 | 0 | 0 | 0 | 0% | | | |

| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total | % of experts | Serbia-PM Company | Serbia-Alternative PM | Total | Difference Serbia vs Region | Difference Region vs Serbia | Difference Serbia PM vs Serbia Alternative | Difference Serbia Alternative vs Serbia PM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | | | | | | | | | | | |
| Staff satisfaction | 2 | 5 | 7 | 58% | 2 | 0 | 2 | -150% | 60% | 100% | #DIV/0! |
| Operating costs per head | 3 | 4 | 7 | 58% | 1 | 2 | 3 | -33% | 25% | -100% | 50% |
| Revenue per unit area | 4 | 3 | 7 | 58% | 2 | 2 | 4 | 25% | -33% | 0% | 0% |
| Productivity per employee | 3 | 1 | 4 | 33% | 2 | 1 | 3 | 67% | -200% | 50% | -100% |
| Footfall (number of visitors) | 2 | 2 | 4 | 33% | 2 | 0 | 2 | 0% | 0% | 100% | #DIV/0! |
| Number of complaints | 1 | 3 | 4 | 33% | 0 | 1 | 1 | -200% | 67% | #DIV/0! | 100% |
| Post-occupancy analysis | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Disability Access Reviews | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Satisfaction Surveys | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Churn costs per person | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Utilization surveys | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Proper definition of the budget | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Compare of business performance with similar facilities in the region of SEE. | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Compare of business performance with similar facilities in the region of EU | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Attractive design | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Range of using possibilities | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Extension of life-time vs costs | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Maximize output of occupiers | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Maintenance reduction | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Image to the outside world (publicity) | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| High revenue and low maintenance | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Positive experience from clients | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Staff turnover in operation | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Churn (discontinue) costs | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Sickness absence | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Days lost through sick leave | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Recruitment and exit surveys | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 2. Ensure effective project management and delivery | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Industry Best Practice | 3 | 4 | 7 | 58% | 2 | 1 | 3 | -33% | 25% | 50% | -100% |
| Project Management Guidelines - Gateway Review | 2 | 4 | 6 | 50% | 0 | 2 | 2 | -100% | 50% | #DIV/0! | 100% |
| Construction Industry Standard KPIs | 1 | 3 | 4 | 33% | 1 | 0 | 1 | -200% | 67% | 100% | #DIV/0! |
| Compliance with Achieving Excellence targets | 1 | 1 | 2 | 17% | 1 | 0 | 1 | 0% | 0% | 100% | #DIV/0! |
| Standards | 1 | 1 | 2 | 17% | 0 | 1 | 1 | 0% | 0% | #DIV/0! | 100% |
| Engage a professional company that provides services PM. | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Experienced staff | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Compliance with Achieving Cost target | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Compliance with Achieving Quality target | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Compliance with Achieving Time target | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Cash flow | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Clear target definition | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Effective procedures for delivery | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Identification of primary, secondary and tertiary goals | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Time schedule | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Clear brief understood by all | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Quality requirements achieved | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Minimum or no accidents on site | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Maintain overall budget under control | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Ability to incorporate changes | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| 3. Achieve the required financial performance | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Capital Cost | 4 | 4 | 8 | 67% | 2 | 2 | 4 | 0% | 0% | 0% | 0% |
| Payback | 3 | 5 | 8 | 67% | 1 | 2 | 3 | -67% | 40% | -100% | 50% |
| Whole-life Cost | 2 | 3 | 5 | 42% | 1 | 1 | 2 | -50% | 33% | 0% | 0% |
| Building operating and maintenance cost | 2 | 3 | 5 | 42% | 2 | 0 | 2 | -50% | 33% | 100% | #DIV/0! |
| Operation and maintenance | 1 | 2 | 3 | 25% | 0 | 1 | 1 | -100% | 50% | #DIV/0! | 100% |
| Money per unit area or unit of functional area | 1 | 1 | 2 | 17% | 1 | 0 | 1 | 0% | 0% | 100% | #DIV/0! |
| Robust business case | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Net useable area to gross area ratio | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Net useable area to gross area ratio | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Net income per unit per time period | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Whole-life and capital costs | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Internal rate of return | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| All works must be completed within the approved budget | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Continuous monitoring of budget | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Monitoring the situation on the market | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) | 2 | 4 | 6 | 50% | 1 | 1 | 2 | -100% | 50% | 0% | 0% |
| Annual cost of heating, cooling and lighting | 2 | 4 | 6 | 50% | 2 | 0 | 2 | -100% | 50% | 100% | #DIV/0! |
| Facilities Management Estimates | 0 | 4 | 4 | 33% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Total Occupancy Cost Code (TOCC), or equivalent, in use | 2 | 2 | 4 | 33% | 1 | 1 | 2 | 0% | 0% | 0% | 0% |
| Annual cost of cleaning and maintenance | 1 | 2 | 3 | 25% | 1 | 0 | 1 | -100% | 50% | 100% | #DIV/0! |
| Frequency of periodic maintenance | 1 | 1 | 2 | 17% | 0 | 1 | 1 | 0% | 0% | #DIV/0! | 100% |
| Whole-Life Cost | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Sustainability index | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Availability of spares/replacement components | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Results of environmental sustainability assessments | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Responses to monitoring and feedback | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Support the development of energy efficient buildings | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Intensify thermal insulation of buildings | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Passive solar use of solar energy | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Ensure effective Facilities Management | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Minimize building operating and maintenance cost | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Use best available techniques concerning environment | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Adjust to local conditions (climate, availability of public utilities… | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Energy efficiency | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Sustainable design and material selection | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Involvement of Contractor in early stages of pre-construction | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Environmental assessment | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Utilities costs | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Construction Excellence Sustainability KPIs Environment | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Use of positive feedback techniques in line with OGC guidance | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Responses to monitoring and feedback | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Integration of Facilities Management team within the briefing process | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 5. Impact positively on the location of the facility | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Company image | 2 | 5 | 7 | 58% | 1 | 1 | 2 | -150% | 60% | 0% | 0% |
| Design awards | 2 | 4 | 6 | 50% | 1 | 1 | 2 | -100% | 50% | 0% | 0% |
| Public or private survey results | 2 | 3 | 5 | 42% | 2 | 0 | 2 | -50% | 33% | 100% | #DIV/0! |
| Views of local planning authority | 1 | 4 | 5 | 42% | 1 | 0 | 1 | -300% | 75% | 100% | #DIV/0! |
| Design Quality Indicator | 1 | 3 | 4 | 33% | 0 | 1 | 1 | -200% | 67% | #DIV/0! | 100% |
| Post Occupancy Evaluation | 2 | 0 | 2 | 17% | 1 | 1 | 2 | 100% | #DIV/0! | 0% | 0% |
| Response of planning authority | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Appearance on the locality | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Urban integration into the locality | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Positive appearance of the advertisements for all participants in the business | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Compliance with local plans | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Views of local community | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Attractive for the users | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Social integration of the community | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Use/employment of local labour | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Contribution to local environment | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 6. Comply with third party requirements | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Planning approval | 3 | 5 | 8 | 67% | 1 | 2 | 3 | -67% | 40% | -100% | 50% |
| Public survey | 3 | 4 | 7 | 58% | 1 | 2 | 3 | -33% | 25% | -100% | 50% |
| Industry KPIs | 2 | 2 | 4 | 33% | 1 | 1 | 2 | 0% | 0% | 0% | 0% |
| Ease of achievement of planning consent | 1 | 2 | 3 | 25% | 1 | 0 | 1 | -100% | 50% | 100% | #DIV/0! |
| Design Quality Indicators | 2 | 1 | 3 | 25% | 1 | 1 | 2 | 50% | -100% | 0% | 0% |
| Accident rates | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Observed time interval of obtaining building permits | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Anticipated term plan to obtain the conditions from municipality utilities company | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Health & Safety | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Accident rates | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Noise/lighting/emissions | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Traffic induced by facility | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Health & Safety statistics | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Number of reportable incidents | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Percentage of days lost through accidents | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Operating days lost through sickness | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 1. Scope | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Clarity of contract | 3 | 4 | 7 | 58% | 2 | 1 | 3 | -33% | 25% | 50% | -100% |
| Effective preplanning | 4 | 3 | 7 | 58% | 2 | 2 | 4 | 25% | -33% | 0% | 0% |
| Understanding of project requirements | 2 | 3 | 5 | 42% | 1 | 1 | 2 | -50% | 33% | 0% | 0% |
| Project levels of decision making | 3 | 2 | 5 | 42% | 2 | 1 | 3 | 33% | -50% | 50% | -100% |
| Design completed before work on site | 2 | 1 | 3 | 25% | 2 | 0 | 2 | 50% | -100% | 100% | #DIV/0! |
| Construction complexity | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Minimize changes the scope of works, during phase construction of building | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Design completed before work | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Feasibility study | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Clarity of ToR | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Clearly defined scope | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Understanding complexity and how this is affected by regional construction ability | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Functional requirements | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Buildability / construction complexity | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Sustainable project design and construction | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Reliability engineering techniques | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Economic evaluation of socio-environmental effects | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Integrated functional requirement | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 2. Time | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Project time constraints | 3 | 4 | 7 | 58% | 2 | 1 | 3 | -33% | 25% | 50% | -100% |
| Constraint by government regulations | 4 | 3 | 7 | 58% | 2 | 2 | 4 | 25% | -33% | 0% | 0% |
| Rapid decision making | 2 | 3 | 5 | 42% | 2 | 0 | 2 | -50% | 33% | 100% | #DIV/0! |
| Adequacy of time | 1 | 3 | 4 | 33% | 0 | 1 | 1 | -200% | 67% | #DIV/0! | 100% |
| Fixed construction period | 2 | 0 | 2 | 17% | 0 | 2 | 2 | 100% | #DIV/0! | #DIV/0! | 100% |
| Overrun duration | 2 | 0 | 2 | 17% | 1 | 1 | 2 | 100% | #DIV/0! | 0% | 0% |
| Lack of time | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Service life planning | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Constraint by ground conditions | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Severity of variations | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Real definition works time program | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Atmospheric effects (snow, rain, low or high temperature) | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Design time planning | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Construction time planning | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Completion date requirement | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Achievability of delivery requirement | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Accurate controlled information flow to support delivery requirement | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Outside influences to delivery, e.g. authorities | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Changes to the brief | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Timely selection of contractors | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| 3. Cost | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Rapid decision making | 2 | 5 | 7 | 58% | 1 | 2 | 3 | -150% | 60% | -100% | 50% |
| Cash flow certainty | 3 | 4 | 7 | 58% | 1 | 2 | 3 | -33% | 25% | -100% | 50% |
| Precise project budget estimate | 3 | 2 | 5 | 42% | 2 | 1 | 3 | 33% | -50% | 50% | -100% |
| Adequate tender sum | 3 | 1 | 4 | 33% | 1 | 2 | 3 | 67% | -200% | -100% | 50% |
| Severity of variations | 2 | 2 | 4 | 33% | 1 | 1 | 2 | 0% | 0% | 0% | 0% |
| Cost effectiveness | 2 | 0 | 2 | 17% | 1 | 1 | 2 | 100% | #DIV/0! | 0% | 0% |
| Over budget possibility | 1 | 1 | 2 | 17% | 1 | 0 | 1 | 0% | 0% | 100% | #DIV/0! |
| Competition on price | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Controlling of expense | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Precise project cost estimate | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| VE in design stage | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Estimated additional costs (environment, unexpected public utilities) | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Realistic budget allowance | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Sufficiently detailed information to price accurately | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Competition in tender process | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Competition | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Detailed budget | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Change procedures | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Long-term profitability | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Eliminating waste | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 4. Quality | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Material quality | 4 | 4 | 8 | 67% | 2 | 2 | 4 | 0% | 0% | 0% | 0% |
| Construction quality plan | 5 | 3 | 8 | 67% | 4 | 1 | 5 | 40% | -67% | 75% | -300% |
| Contracted work quality | 2 | 3 | 5 | 42% | 1 | 1 | 2 | -50% | 33% | 0% | 0% |
| Design quality plan | 3 | 1 | 4 | 33% | 1 | 2 | 3 | 67% | -200% | -100% | 50% |
| Level of technology | 1 | 2 | 3 | 25% | 1 | 0 | 1 | -100% | 50% | 100% | #DIV/0! |
| Inadequate labor skills | 0 | 2 | 2 | 17% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Durability of building components | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Conformance to requirement | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Conformance to requirement | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Clarity of contract | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Subcontractors work quality | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Quality assurance | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Design quality in terms of design and materials specified | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Effective quality procedures | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Reduction of maintenance | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Adequate detailed design | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Materials and skilled labour | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Durability of building assemblies | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Determining quality in construction | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 5. Contract/admin | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| City planning regulations | 3 | 4 | 7 | 58% | 2 | 1 | 3 | -33% | 25% | 50% | -100% |
| Changes in contract | 3 | 2 | 5 | 42% | 1 | 2 | 3 | 33% | -50% | -100% | 50% |
| Mutual/trusting relationships | 2 | 2 | 4 | 33% | 2 | 0 | 2 | 0% | 0% | 100% | #DIV/0! |
| Inclusion of all risks | 2 | 2 | 4 | 33% | 2 | 0 | 2 | 0% | 0% | 100% | #DIV/0! |
| Disputes resolution procedure | 1 | 1 | 2 | 17% | 1 | 0 | 1 | 0% | 0% | 100% | #DIV/0! |
| Procured similar projects within 5 years | 0 | 2 | 2 | 17% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Implement of partnering | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Uniquely defined obligations in the contract | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Clear procedures for archiving of documents | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Clarity of contract | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Rapid decision making | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Local regulations | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Contract that protects both parties | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Contract suits type of works | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Contract is enforceable | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Robust contracts | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Dispute procedure | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Risk registers | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Regular team meetings | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Changes in contact | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Threat of litigation | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Long and short form | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Commercial bid evaluation | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 6. Human resource | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Team communication | 5 | 5 | 10 | 83% | 2 | 3 | 5 | 0% | 0% | -50% | 33% |
| Leadership/team management | 3 | 3 | 6 | 50% | 2 | 1 | 3 | 0% | 0% | 50% | -100% |
| Motivation for project | 2 | 3 | 5 | 42% | 1 | 1 | 2 | -50% | 33% | 0% | 0% |
| Monitoring and feedback | 3 | 2 | 5 | 42% | 1 | 2 | 3 | 33% | -50% | -100% | 50% |
| Skilled personnel | 3 | 1 | 4 | 33% | 2 | 1 | 3 | 67% | -200% | 50% | -100% |
| Centralized decision making | 3 | 0 | 3 | 25% | 1 | 2 | 3 | 100% | #DIV/0! | -100% | 50% |
| Labor productivity | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Capture of organization's mission/vision | 0 | 1 | 1 | 8% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Selection of quality personnel | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Effective communication | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Motivated staff and resources | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Availability of suitably skilled resource | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Good "vibe" | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Clear vision for project | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Team leadership | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Skilled workforce | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Rewards incentives | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Spirit of cooperation | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Need for collaboration | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 7. Risk | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Risk identification | 4 | 5 | 9 | 75% | 1 | 3 | 4 | -25% | 20% | -200% | 67% |
| Risk management techniques | 2 | 5 | 7 | 58% | 1 | 1 | 2 | -150% | 60% | 0% | 0% |
| Financial stability of client | 2 | 3 | 5 | 42% | 1 | 1 | 2 | -50% | 33% | 0% | 0% |
| Risk response | 3 | 1 | 4 | 33% | 2 | 1 | 3 | 67% | -200% | 50% | -100% |
| Defective design | 2 | 0 | 2 | 17% | 2 | 0 | 2 | 100% | #DIV/0! | 100% | #DIV/0! |
| Ignorance of risk | 2 | 0 | 2 | 17% | 1 | 1 | 2 | 100% | #DIV/0! | 0% | 0% |
| Cash flow reliability of project | 0 | 2 | 2 | 17% | 0 | 0 | 0 | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Coordination with subcontractors | 1 | 1 | 2 | 17% | 1 | 0 | 1 | 0% | 0% | 100% | #DIV/0! |
| Risk assessment in approvals obtaining | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Risk assessment in design stage | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Risk assessment in construction stage | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Pricing of risk | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Political stability of region | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Proven contracts | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Relations with contractors | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Defective materials | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Labor disputes | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 8. Health and safety | | | | | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Management of work safety on site | 3 | 4 | 7 | 58% | 2 | 1 | 3 | -33% | 25% | 50% | -100% |
| Hazard identification | 3 | 2 | 5 | 42% | 1 | 2 | 3 | 33% | -50% | -100% | 50% |
| Health and safety records | 1 | 3 | 4 | 33% | 0 | 1 | 1 | -200% | 67% | #DIV/0! | 100% |
| Cleanliness and order on site | 3 | 0 | 3 | 25% | 2 | 1 | 3 | 100% | #DIV/0! | 50% | -100% |
| Management responsibility | 2 | 0 | 2 | 17% | 0 | 2 | 2 | 100% | #DIV/0! | #DIV/0! | 100% |
| Teaching of accident prevention | 1 | 1 | 2 | 17% | 1 | 0 | 1 | 0% | 0% | 100% | #DIV/0! |
| Management of environmental issues on site | 2 | 0 | 2 | 17% | 2 | 0 | 2 | 100% | #DIV/0! | 100% | #DIV/0! |
| Personal protective equipment | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| A sufficient number of inspectors at the site | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Strictly respect of procedures | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| Application of penal policy | 1 | 0 | 1 | 8% | 1 | 0 | 1 | 100% | #DIV/0! | 100% | #DIV/0! |
| H&S records | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| H&S Procedures | 1 | 0 | 1 | 8% | 0 | 1 | 1 | 100% | #DIV/0! | #DIV/0! | 100% |
| Motivation for HS&E procedures | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Safety education | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Safety monitoring | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Cash flow reliability of project | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Financial stability of client | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Coordination with subcontractors | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Client will to enforce | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Incentives and rewards for contractors | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Induction and training of workforce | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Involvement of all team: management and labour | 0 | 1 | 1 | 8% | | | | #DIV/0! | 100% | #DIV/0! | #DIV/0! |
| Teaching of first aid skills | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| Safety consideration operative ratingss | 0 | 0 | 0 | 0% | | | | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | | | | | | | | 93.63% | **6.37%** | 99.20% | **0.80%** |

Appendix 1.2 – Table 03 - Results of Delphi Stage A - Ranking larger than 50%

| | | Frequency | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|---|
| | | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total out of 12 participants | % of experts | Very Important | Important | Not Important |
| | 1. Maximize business effectiveness | | | | | | | |
| 1 | Staff satisfaction | 2 | 5 | 7 | 58% | | | |
| 2 | Operating costs per head | 3 | 4 | 7 | 58% | | | |
| 3 | Revenue per unit area | 4 | 3 | 7 | 58% | | | |
| | 2. Ensure effective project management and delivery | | | | | | | |
| 4 | Industry Best Practice | 3 | 4 | 7 | 58% | | | |
| 5 | Project Management Guidelines - Gateway Review | 2 | 4 | 6 | 50% | | | |
| | 3. Achieve the required financial performance | | | | | | | |
| 6 | Capital Cost | 4 | 4 | 8 | 67% | | | |
| 7 | Payback | 3 | 5 | 8 | 67% | | | |
| | 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | |
| 8 | BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) | 2 | 4 | 6 | 50% | | | |
| 9 | Annual cost of heating, cooling and lighting | 2 | 4 | 6 | 50% | | | |
| | 5. Impact positively on the location of the facility | | | | | | | |
| 10 | Company image | 2 | 5 | 7 | 58% | | | |
| 11 | Design awards | 2 | 4 | 6 | 50% | | | |
| | 6. Comply with third party requirements | | | | | | | |
| 12 | Planning approval | 3 | 5 | 8 | 67% | | | |
| 13 | Public survey | 3 | 4 | 7 | 58% | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 1. Scope | | | | | | | |
| 14 | Clarity of contract | 3 | 4 | 7 | 58% | | | |
| 15 | Effective preplanning | 4 | 3 | 7 | 58% | | | |
| | 2. Time | | | | | | | |
| 16 | Project time constraints | 3 | 4 | 7 | 58% | | | |
| 17 | Constraint by government regulations | 4 | 3 | 7 | 58% | | | |
| | 3. Cost | | | | | | | |
| 18 | Rapid decision making | 2 | 5 | 7 | 58% | | | |
| 19 | Cash flow certainty | 3 | 4 | 7 | 58% | | | |
| | 4. Quality | | | | | | | |
| 20 | Material quality | 4 | 4 | 8 | 67% | | | |
| 21 | Construction quality plan | 5 | 3 | 8 | 67% | | | |
| | 5. Contract/admin | | | | | | | |
| 22 | City planning regulations | 3 | 4 | 7 | 58% | | | |
| | 6. Human resource | | | | | | | |
| 23 | Team communication | 5 | 5 | 10 | 83% | | | |
| 24 | Leadership/team management | 3 | 3 | 6 | 50% | | | |
| | 7. Risk | | | | | | | |
| 25 | Risk identification | 4 | 5 | 9 | 75% | | | |
| 26 | Risk management techniques | 2 | 5 | 7 | 58% | | | |
| | 8. Health and safety | | | | | | | |
| 27 | Management of work safety on site | 3 | 4 | 7 | 58% | | | |

| | re enc | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total | % of experts | Very Important | Important | Not Important |
| 1. Maximize business effectiveness | | | | | | | |
| Productivity per employee | 3 | 1 | 4 | 33% | | | |
| Footfall (number of visitors) | 2 | 2 | 4 | 33% | | | |
| Number of complaints | 1 | 3 | 4 | 33% | | | |
| 2. Ensure effective project management and delivery | | | | | | | |
| Construction Industry Standard KPIs | 1 | 3 | 4 | 33% | | | |
| Compliance with Achieving Excellence targets | 1 | 1 | 2 | 17% | | | |
| Standards | 1 | 1 | 2 | 17% | | | |
| 3. Achieve the required financial performance | | | | | | | |
| Whole-life Cost | 2 | 3 | 5 | 42% | | | |
| Building operating and maintenance cost | 2 | 3 | 5 | 42% | | | |
| Operation and maintenance | 1 | 2 | 3 | 25% | | | |
| Money per unit area or unit of functional area | 1 | 1 | 2 | 17% | | | |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | |
| Facilities Management Estimates | 0 | 4 | 4 | 33% | | | |
| Total Occupancy Cost Code (TOCC), or equivalent, in use | 2 | 2 | 4 | 33% | | | |
| Annual cost of cleaning and maintenance | 1 | 2 | 3 | 25% | | | |
| Frequency of periodic maintenance | 1 | 1 | 2 | 17% | | | |
| 5. Impact positively on the location of the facility | | | | | | | |
| Public or private survey results | 2 | 3 | 5 | 42% | | | |
| Views of local planning authority | 1 | 4 | 5 | 42% | | | |
| Design Quality Indicator | 1 | 3 | 4 | 33% | | | |
| Post Occupancy Evaluation | 2 | 0 | 2 | 17% | | | |
| 6. Comply with third party requirements | | | | | | | |
| Industry KPIs | 2 | 2 | 4 | 33% | | | |
| Ease of achievement of planning consent | 1 | 2 | 3 | 25% | | | |
| Design Quality Indicators | 2 | 1 | 3 | 25% | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 1. Scope | | | | | | | |
| Understanding of project requirements | 2 | 3 | 5 | 42% | | | |
| Project levels of decision making | 3 | 2 | 5 | 42% | | | |
| Design completed before work on site | 2 | 1 | 3 | 25% | | | |
| 2. Time | | | | | | | |
| Rapid decision making | 2 | 3 | 5 | 42% | | | |
| Adequacy of time | 1 | 3 | 4 | 33% | | | |
| Fixed construction period | 2 | 0 | 2 | 17% | | | |
| Overrun duration | 2 | 0 | 2 | 17% | | | |
| 3. Cost | | | | | | | |
| Precise project budget estimate | 3 | 2 | 5 | 42% | | | |
| Adequate tender sum | 3 | 1 | 4 | 33% | | | |
| Severity of variations | 2 | 2 | 4 | 33% | | | |
| Cost effectiveness | 2 | 0 | 2 | 17% | | | |
| Over budget possibility | 1 | 1 | 2 | 17% | | | |
| 4. Quality | | | | | | | |
| Contracted work quality | 2 | 3 | 5 | 42% | | | |
| Design quality plan | 3 | 1 | 4 | 33% | | | |
| Level of technology | 1 | 2 | 3 | 25% | | | |
| Inadequate labor skills | 0 | 2 | 2 | 17% | | | |
| 5. Contract/admin | | | | | | | |
| Changes in contract | 3 | 2 | 5 | 42% | | | |
| Mutual/trusting relationships | 2 | 2 | 4 | 33% | | | |
| Inclusion of all risks | 2 | 2 | 4 | 33% | | | |
| Disputes resolution procedure | 1 | 1 | 2 | 17% | | | |
| Procured similar projects within 5 years | 0 | 2 | 2 | 17% | | | |
| 6. Human resource | | | | | | | |
| Motivation for project | 2 | 3 | 5 | 42% | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Monitoring and feedback | 3 | 2 | 5 | 42% | | | |
| Skilled personnel | 3 | 1 | 4 | 33% | | | |
| Centralized decision making | 3 | 0 | 3 | 25% | | | |
| 7. Risk | | | | | | | |
| Financial stability of client | 2 | 3 | 5 | 42% | | | |
| Risk response | 3 | 1 | 4 | 33% | | | |
| Defective design | 2 | 0 | 2 | 17% | | | |
| Ignorance of risk | 2 | 0 | 2 | 17% | | | |
| Cash flow reliability of project | 0 | 2 | 2 | 17% | | | |
| Coordination with subcontractors | 1 | 1 | 2 | 17% | | | |
| 8. Health and safety | | | | | | | |
| Hazard identification | 3 | 2 | 5 | 42% | | | |
| Health and safety records | 1 | 3 | 4 | 33% | | | |
| Cleanliness and order on site | 3 | 0 | 3 | 25% | | | |
| Management responsibility | 2 | 0 | 2 | 17% | | | |
| Teaching of accident prevention | 1 | 1 | 2 | 17% | | | |
| Management of environmental issues on site | 2 | 0 | 2 | 17% | | | |

| | Frequency | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | Total | % of experts | Very Important | Important | Not Important |
| **1. Maximize business effectiveness** | | | | | | | |
| Post-occupancy analysis | 1 | 0 | 1 | 8% | | | |
| Disability Access Reviews | 0 | 1 | 1 | 8% | | | |
| Satisfaction Surveys | 1 | 0 | 1 | 8% | | | |
| Churn costs per person | 1 | 0 | 1 | 8% | | | |
| Utilization surveys | 0 | 1 | 1 | 8% | | | |
| Proper definition of the budget | 1 | 0 | 1 | 8% | | | |
| Compare of business performance with similar facilities in the region of SEE. | 1 | 0 | 1 | 8% | | | |
| Compare of business performance with similar facilities in the region of EU | 1 | 0 | 1 | 8% | | | |
| Attractive design | 1 | 0 | 1 | 8% | | | |
| Range of using possibilities | 0 | 1 | 1 | 8% | | | |
| Extension of life-time vs costs | 0 | 1 | 1 | 8% | | | |
| Maximize output of occupiers | 0 | 1 | 1 | 8% | | | |
| Maintenance reduction | 0 | 1 | 1 | 8% | | | |
| Image to the outside world (publicity) | 0 | 1 | 1 | 8% | | | |
| High revenue and low maintenance | 0 | 1 | 1 | 8% | | | |
| Positive experience from clients | 0 | 1 | 1 | 8% | | | |
| Staff turnover in operation | 0 | 0 | 0 | 0% | | | |
| Churn (discontinue) costs | 0 | 0 | 0 | 0% | | | |
| Sickness absence | 0 | 0 | 0 | 0% | | | |
| Days lost through sick leave | 0 | 0 | 0 | 0% | | | |
| Recruitment and exit surveys | 0 | 0 | 0 | 0% | | | |
| **2. Ensure effective project management and delivery** | | | | | | | |
| Engage a professional company that provides services PM. | 1 | 0 | 1 | 8% | | | |
| Experienced staff | 1 | 0 | 1 | 8% | | | |
| Compliance with Achieving Cost target | 1 | 0 | 1 | 8% | | | |
| Compliance with Achieving Quality target | 1 | 0 | 1 | 8% | | | |
| Compliance with Achieving Time target | 1 | 0 | 1 | 8% | | | |
| Cash flow | 1 | 0 | 1 | 8% | | | |
| Clear target definition | 0 | 1 | 1 | 8% | | | |
| Effective procedures for delivery | 0 | 1 | 1 | 8% | | | |
| Identification of primary, secondary and tertiary goals | 0 | 1 | 1 | 8% | | | |
| Time schedule | 0 | 1 | 1 | 8% | | | |
| Clear brief understood by all | 0 | 1 | 1 | 8% | | | |
| Quality requirements achieved | 0 | 1 | 1 | 8% | | | |
| Minimum or no accidents on site | 0 | 1 | 1 | 8% | | | |
| Maintain overall budget under control | 0 | 1 | 1 | 8% | | | |
| Ability to incorporate changes | 0 | 1 | 1 | 8% | | | |
| **3. Achieve the required financial performance** | | | | | | | |
| Robust business case | 0 | 1 | 1 | 8% | | | |
| Net useable area to gross area ratio | 0 | 1 | 1 | 8% | | | |
| Net useable area to gross area ratio | 0 | 1 | 1 | 8% | | | |
| Net income per unit per time period | 0 | 1 | 1 | 8% | | | |
| Whole-life and capital costs | 0 | 1 | 1 | 8% | | | |
| Internal rate of return | 0 | 1 | 1 | 8% | | | |
| All works must be completed within the approved budget | 1 | 0 | 1 | 8% | | | |
| Continuous monitoring of budget | 1 | 0 | 1 | 8% | | | |
| Monitoring the situation on the market | 1 | 0 | 1 | 8% | | | |
| | | | | | | | |
| **4. Minimize building operation and maintenance costs, and environmental impact** | | | | | | | |
| Whole-Life Cost | 1 | 0 | 1 | 8% | | | |
| Sustainability index | 0 | 1 | 1 | 8% | | | |
| Availability of spares/replacement components | 0 | 1 | 1 | 8% | | | |
| Results of environmental sustainability assessments | 1 | 0 | 1 | 8% | | | |
| Responses to monitoring and feedback | 1 | 0 | 1 | 8% | | | |
| Support the development of energy efficient buildings | 1 | 0 | 1 | 8% | | | |
| Intensify thermal insulation of buildings | 1 | 0 | 1 | 8% | | | |
| Passive solar use of solar energy | 1 | 0 | 1 | 8% | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ensure effective Facilities Management | 1 | 0 | 1 | 8% | | | |
| Minimize building operating and maintenance cost | 1 | 0 | 1 | 8% | | | |
| Use best available techniques concerning environment | 1 | 0 | 1 | 8% | | | |
| Adjust to local conditions (climate, availability of public utilities… | 1 | 0 | 1 | 8% | | | |
| Energy efficiency | 1 | 0 | 1 | 8% | | | |
| Sustainable design and material selection | 0 | 1 | 1 | 8% | | | |
| Involvement of Contractor in early stages of pre-construction | 0 | 1 | 1 | 8% | | | |
| Environmental assessment | 0 | 1 | 1 | 8% | | | |
| Utilities costs | 0 | 1 | 1 | 8% | | | |
| Construction Excellence Sustainability KPIs Environment | 0 | 0 | 0 | 0% | | | |
| Use of positive feedback techniques in line with OGC guidance | 0 | 0 | 0 | 0% | | | |
| Responses to monitoring and feedback | 0 | 0 | 0 | 0% | | | |
| Integration of Facilities Management team within the briefing process | 0 | 0 | 0 | 0% | | | |
| | | | | | | | |
| 5. Impact positively on the location of the facility | | | | | | | |
| Response of planning authority | 0 | 1 | 1 | 8% | | | |
| Appearance on the locality | 1 | 0 | 1 | 8% | | | |
| Urban integration into the locality | 1 | 0 | 1 | 8% | | | |
| Positive appearance of the advertisements for all participants in the business | 1 | 0 | 1 | 8% | | | |
| Compliance with local plans | 1 | 0 | 1 | 8% | | | |
| Views of local community | 1 | 0 | 1 | 8% | | | |
| Attractive for the users | 1 | 0 | 1 | 8% | | | |
| Social integration of the community | 0 | 1 | 1 | 8% | | | |
| Use/employment of local labour | 0 | 1 | 1 | 8% | | | |
| Contribution to local environment | 0 | 1 | 1 | 8% | | | |
| | | | | | | | |
| 6. Comply with third party requirements | | | | | | | |
| Accident rates | 0 | 1 | 1 | 8% | | | |
| Observed time interval of obtaining building permits | 1 | 0 | 1 | 8% | | | |
| Anticipated term plan to obtain the conditions from municipality utilities company | 1 | 0 | 1 | 8% | | | |
| Health & Safety | 1 | 0 | 1 | 8% | | | |
| Accident rates | 0 | 1 | 1 | 8% | | | |
| Noise/lighting/emissions | 0 | 1 | 1 | 8% | | | |
| Traffic induced by facility | 0 | 1 | 1 | 8% | | | |
| Health & Safety statistics | 0 | 0 | 0 | 0% | | | |
| Number of reportable incidents | 0 | 0 | 0 | 0% | | | |
| Percentage of days lost through accidents | 0 | 0 | 0 | 0% | | | |
| Operating days lost through sickness | 0 | 0 | 0 | 0% | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 1. Scope | | | | | | | |
| Construction complexity | 0 | 1 | 1 | 8% | | | |
| Minimize changes the scope of works, during phase construction of building | 1 | 0 | 1 | 8% | | | |
| Design completed before work | 1 | 0 | 1 | 8% | | | |
| Feasibility study | 1 | 0 | 1 | 8% | | | |
| Clarity of ToR | 1 | 0 | 1 | 8% | | | |
| Clearly defined scope | 0 | 1 | 1 | 8% | | | |
| Understanding complexity and how this is affected by regional construction ability | 0 | 1 | 1 | 8% | | | |
| Functional requirements | 0 | 1 | 1 | 8% | | | |
| Buildability / construction complexity | 0 | 1 | 1 | 8% | | | |
| Sustainable project design and construction | 0 | 0 | 0 | 0% | | | |
| Reliability engineering techniques | 0 | 0 | 0 | 0% | | | |
| Economic evaluation of socio-environmental effects | 0 | 0 | 0 | 0% | | | |
| Integrated functional requirement | 0 | 0 | 0 | 0% | | | |
| | | | | | | | |
| 2. Time | | | | | | | |
| Lack of time | 1 | 0 | 1 | 8% | | | |
| Service life planning | 0 | 1 | 1 | 8% | | | |
| Constraint by ground conditions | 0 | 1 | 1 | 8% | | | |
| Severity of variations | 0 | 1 | 1 | 8% | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Real definition works time program | 1 | 0 | 1 | 8% | | | |
| Atmospheric effects (snow, rain, low or high temperature) | 1 | 0 | 1 | 8% | | | |
| Design time planning | 1 | 0 | 1 | 8% | | | |
| Construction time planning | 1 | 0 | 1 | 8% | | | |
| Completion date requirement | 0 | 1 | 1 | 8% | | | |
| Achievability of delivery requirement | 0 | 1 | 1 | 8% | | | |
| Accurate controlled information flow to support delivery requirement | 0 | 1 | 1 | 8% | | | |
| Outside influences to delivery, e.g. authorities | 0 | 1 | 1 | 8% | | | |
| Changes to the brief | 0 | 1 | 1 | 8% | | | |
| Timely selection of contractors | 0 | 1 | 1 | 8% | | | |
| 3. Cost | | | | | | | |
| Competition on price | 0 | 1 | 1 | 8% | | | |
| Controlling of expense | 1 | 0 | 1 | 8% | | | |
| Precise project cost estimate | 1 | 0 | 1 | 8% | | | |
| VE in design stage | 1 | 0 | 1 | 8% | | | |
| Estimated additional costs (environment, unexpected public utilities) | 1 | 0 | 1 | 8% | | | |
| Realistic budget allowance | 0 | 1 | 1 | 8% | | | |
| Sufficiently detailed information to price accurately | 0 | 1 | 1 | 8% | | | |
| Competition in tender process | 0 | 1 | 1 | 8% | | | |
| Competition | 0 | 1 | 1 | 8% | | | |
| Detailed budget | 0 | 1 | 1 | 8% | | | |
| Change procedures | 0 | 1 | 1 | 8% | | | |
| Long-term profitability | 0 | 0 | 0 | 0% | | | |
| Eliminating waste | 0 | 0 | 0 | 0% | | | |
| 4. Quality | | | | | | | |
| Durability of building components | 0 | 1 | 1 | 8% | | | |
| Conformance to requirement | 1 | 0 | 1 | 8% | | | |
| Conformance to requirement | 1 | 0 | 1 | 8% | | | |
| Clarity of contract | 1 | 0 | 1 | 8% | | | |
| Subcontractors work quality | 1 | 0 | 1 | 8% | | | |
| Quality assurance | 1 | 0 | 1 | 8% | | | |
| Design quality in terms of design and materials specified | 0 | 1 | 1 | 8% | | | |
| Effective quality procedures | 0 | 1 | 1 | 8% | | | |
| Reduction of maintenance | 0 | 1 | 1 | 8% | | | |
| Adequate detailed design | 0 | 1 | 1 | 8% | | | |
| Materials and skilled labour | 0 | 1 | 1 | 8% | | | |
| Durability of building assemblies | 0 | 0 | 0 | 0% | | | |
| Determining quality in construction | 0 | 0 | 0 | 0% | | | |
| 5. Contract/admin | | | | | | | |
| Implement of partnering | 0 | 1 | 1 | 8% | | | |
| Uniquely defined obligations in the contract | 1 | 0 | 1 | 8% | | | |
| Clear procedures for archiving of documents | 1 | 0 | 1 | 8% | | | |
| Clarity of contract | 1 | 0 | 1 | 8% | | | |
| Rapid decision making | 1 | 0 | 1 | 8% | | | |
| Local regulations | 1 | 0 | 1 | 8% | | | |
| Contract that protects both parties | 0 | 1 | 1 | 8% | | | |
| Contract suits type of works | 0 | 1 | 1 | 8% | | | |
| Contract is enforceable | 0 | 1 | 1 | 8% | | | |
| Robust contracts | 0 | 1 | 1 | 8% | | | |
| Dispute procedure | 0 | 1 | 1 | 8% | | | |
| Risk registers | 0 | 1 | 1 | 8% | | | |
| Regular team meetings | 0 | 1 | 1 | 8% | | | |
| Changes in contact | 0 | 0 | 0 | 0% | | | |
| Threat of litigation | 0 | 0 | 0 | 0% | | | |
| Long and short form | 0 | 0 | 0 | 0% | | | |
| Commercial bid evaluation | 0 | 0 | 0 | 0% | | | |
| 6. Human resource | | | | | | | |
| Labor productivity | 1 | 0 | 1 | 8% | | | |
| Capture of organization's mission/vision | 0 | 1 | 1 | 8% | | | |
| Selection of quality personnel | 1 | 0 | 1 | 8% | | | |
| Effective communication | 0 | 1 | 1 | 8% | | | |
| Motivated staff and resources | 0 | 1 | 1 | 8% | | | |
| Availability of suitably skilled resource | 0 | 1 | 1 | 8% | | | |
| Good "vibe" | 0 | 1 | 1 | 8% | | | |
| Clear vision for project | 0 | 1 | 1 | 8% | | | |
| Team leadership | 0 | 1 | 1 | 8% | | | |
| Skilled workforce | 0 | 1 | 1 | 8% | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rewards incentives | 0 | 1 | 1 | 8% | | | |
| Spirit of cooperation | 0 | 0 | 0 | 0% | | | |
| Need for collaboration | 0 | 0 | 0 | 0% | | | |
| 7. Risk | | | | | | | |
| Risk assessment in approvals obtaining | 1 | 0 | 1 | 8% | | | |
| Risk assessment in design stage | 1 | 0 | 1 | 8% | | | |
| Risk assessment in construction stage | 1 | 0 | 1 | 8% | | | |
| Pricing of risk | 0 | 1 | 1 | 8% | | | |
| Political stability of region | 0 | 1 | 1 | 8% | | | |
| Proven contracts | 0 | 1 | 1 | 8% | | | |
| Relations with contractors | 0 | 1 | 1 | 8% | | | |
| Defective materials | 0 | 0 | 0 | 0% | | | |
| Labor disputes | 0 | 0 | 0 | 0% | | | |
| | | | | | | | |
| 8. Health and safety | | | | | | | |
| Personal protective equipment | 1 | 0 | 1 | 8% | | | |
| A sufficient number of inspectors at the site | 1 | 0 | 1 | 8% | | | |
| Strictly respect of procedures | 1 | 0 | 1 | 8% | | | |
| Application of penal policy | 1 | 0 | 1 | 8% | | | |
| H&S records | 1 | 0 | 1 | 8% | | | |
| H&S Procedures | 1 | 0 | 1 | 8% | | | |
| Motivation for HS&E procedures | 0 | 1 | 1 | 8% | | | |
| Safety education | 0 | 1 | 1 | 8% | | | |
| Safety monitoring | 0 | 1 | 1 | 8% | | | |
| Cash flow reliability of project | 0 | 1 | 1 | 8% | | | |
| Financial stability of client | 0 | 1 | 1 | 8% | | | |
| Coordination with subcontractors | 0 | 1 | 1 | 8% | | | |
| Client will to enforce | 0 | 1 | 1 | 8% | | | |
| Incentives and rewards for contractors | 0 | 1 | 1 | 8% | | | |
| Induction and training of workforce | 0 | 1 | 1 | 8% | | | |
| Involvement of all team: management and labour | 0 | 1 | 1 | 8% | | | |
| Teaching of first aid skills | 0 | 0 | 0 | 0% | | | |
| Safety consideration  operative ratingss | 0 | 0 | 0 | 0% | | | |

Appendix 2.1 - Sample questioner Delphi Stage B

**Criteria adopted for selection of value parameters**

**Round 2: Questionnaire**

Name of Respondent: _____

Guidance on completion:

The following are the parameters that have the greatest influence in the contribution to the value of the building construction project in West Balkans (South East Europe), which you have provided, in the round one questionnaire.

Attached herewith is the analyzed set of criteria, which were suggested by other experts. We would like you to reconsider the criteria, which you have included last time. Please also put a tick (√ **or X**) in the appropriate box to indicate to what extent you do think those criteria that were suggested by the experts influence the choice of value criteria/parameters.

**Here is the example of how the table should be filled out:**

| **Criteria or parameter** | **Frequency** | | | | | **To what extent do you agree with influence of this criteria/parameter as a choice?** | | |
|---|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | **Total out of 12 participants** | % of experts | | Very Important | Important | Not Important |
| **Criteria/parameters suggested by 50% or more than 50% of the experts** | | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | | |
| Staff satisfaction | 2 | 5 | **7** | 58% | | X | | |
| Operating costs per head | 3 | 4 | **7** | 58% | | X | | |
| Revenue per unit area | 4 | 3 | **7** | 58% | | | X | |
| …. | | | | | | | | |
| **Criteria/parameters suggested by more than 10% and less than 50% of the experts** | | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | | |
| Productivity per employee | 3 | 1 | **4** | 33% | | | X | |
| Footfall (number of visitors) | 2 | 2 | **4** | 33% | | | | X |
| Number of complaints | 1 | 3 | **4** | 33% | | | | X |

**Here is the table to be filled out:**

| Criteria or parameter | Frequency | | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | **Total out of 12 participants** | % of experts | | Very Important | Important | Not Important |
| **Criteria/parameters suggested by 50% or more than 50% of the experts** | | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | | |
| Staff satisfaction | 2 | 5 | **7** | 58% | | | | |
| Operating costs per head | 3 | 4 | **7** | 58% | | | | |
| Revenue per unit area | 4 | 3 | **7** | 58% | | | | |
| 2. Ensure effective project management and delivery | | | | | | | | |
| Industry Best Practice | 3 | 4 | **7** | 58% | | | | |
| Project Management Guidelines - Gateway Review | 2 | 4 | **6** | 50% | | | | |
| 3. Achieve the required financial performance | | | | | | | | |
| Capital Cost | 4 | 4 | **8** | 67% | | | | |
| Payback | 3 | 5 | **8** | 67% | | | | |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | | |
| BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) | 2 | 4 | **6** | 50% | | | | |
| Annual cost of heating, cooling and lighting | 2 | 4 | **6** | 50% | | | | |
| 5. Impact positively on the location of the facility | | | | | | | | |
| Company image | 2 | 5 | **7** | 58% | | | | |
| Design awards | 2 | 4 | **6** | 50% | | | | |
| 6. Comply with third party requirements | | | | | | | | |
| Planning approval | 3 | 5 | **8** | 67% | | | | |
| Public survey | 3 | 4 | **7** | 58% | | | | |
| | | | | | | | | |
| 1. Scope | | | | | | | | |
| Clarity of contract | 3 | 4 | **7** | 58% | | | | |
| Effective preplanning | 4 | 3 | **7** | 58% | | | | |
| 2. Time | | | | | | | | |
| Project time constraints | 3 | 4 | **7** | 58% | | | | |
| Constraint by government regulations | 4 | 3 | **7** | 58% | | | | |
| 3. Cost | | | | | | | | |
| Rapid decision making | 2 | 5 | **7** | 58% | | | | |
| Cash flow certainty | 3 | 4 | **7** | 58% | | | | |

| Criteria or parameter | Frequency | | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | **Total out of 12 participants** | % of experts | | Very Important | Important | Not Important |
| 4. Quality | | | | | | | | |
| Material quality | 4 | 4 | **8** | 67% | | | | |
| Construction quality plan | 5 | 3 | **8** | 67% | | | | |
| 5. Contract/admin | | | | | | | | |
| City planning regulations | 3 | 4 | **7** | 58% | | | | |
| 6. Human resource | | | | | | | | |
| Team communication | 5 | 5 | **10** | 83% | | | | |
| Leadership/team management | 3 | 3 | **6** | 50% | | | | |
| 7. Risk | | | | | | | | |
| Risk identification | 4 | 5 | **9** | 75% | | | | |
| Risk management techniques | 2 | 5 | **7** | 58% | | | | |
| 8. Health and safety | | | | | | | | |
| Management of work safety on site | 3 | 4 | **7** | 58% | | | | |

| Criteria or parameter | Frequency | | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | **Total out of 12 participants** | % of experts | | Very Important | Important | Not Important |
| **Criteria/parameters suggested by more than 10% and less than 50% of the experts** | | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | | |
| Productivity per employee | 3 | 1 | **4** | 33% | | | | |
| Footfall (number of visitors) | 2 | 2 | **4** | 33% | | | | |
| Number of complaints | 1 | 3 | **4** | 33% | | | | |
| 2. Ensure effective project management and delivery | | | | | | | | |
| Construction Industry Standard KPIs | 1 | 3 | **4** | 33% | | | | |
| Compliance with Achieving Excellence targets | 1 | 1 | **2** | 17% | | | | |
| Standards | 1 | 1 | **2** | 17% | | | | |
| 3. Achieve the required financial performance | | | | | | | | |
| Whole-life Cost | 2 | 3 | **5** | 42% | | | | |
| Building operating and maintenance cost | 2 | 3 | **5** | 42% | | | | |
| Operation and maintenance | 1 | 2 | **3** | 25% | | | | |
| Money per unit area or unit of functional area | 1 | 1 | **2** | 17% | | | | |

| Criteria or parameter | Frequency | | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | **Total out of 12 participants** | % of experts | | Very Important | Important | Not Important |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | | |
| Facilities Management Estimates | 0 | 4 | **4** | 33% | | | | |
| Total Occupancy Cost Code (TOCC), or equivalent, in use | 2 | 2 | **4** | 33% | | | | |
| Annual cost of cleaning and maintenance | 1 | 2 | **3** | 25% | | | | |
| Frequency of periodic maintenance | 1 | 1 | **2** | 17% | | | | |
| 5. Impact positively on the location of the facility | | | | | | | | |
| Public or private survey results | 2 | 3 | **5** | 42% | | | | |
| Views of local planning authority | 1 | 4 | **5** | 42% | | | | |
| Design Quality Indicator | 1 | 3 | **4** | 33% | | | | |
| Post Occupancy Evaluation | 2 | 0 | **2** | 17% | | | | |
| 6. Comply with third party requirements | | | | | | | | |
| Industry KPIs | 2 | 2 | **4** | 33% | | | | |
| Ease of achievement of planning consent | 1 | 2 | **3** | 25% | | | | |
| Design Quality Indicators | 2 | 1 | **3** | 25% | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 1. Scope | | | | | | | | |
| Understanding of project requirements | 2 | 3 | **5** | 42% | | | | |
| Project levels of decision making | 3 | 2 | **5** | 42% | | | | |
| Design completed before work on site | 2 | 1 | **3** | 25% | | | | |
| 2. Time | | | | | | | | |
| Rapid decision making | 2 | 3 | **5** | 42% | | | | |
| Adequacy of time | 1 | 3 | **4** | 33% | | | | |
| Fixed construction period | 2 | 0 | **2** | 17% | | | | |
| Overrun duration | 2 | 0 | **2** | 17% | | | | |
| 3. Cost | | | | | | | | |
| Precise project budget estimate | 3 | 2 | **5** | 42% | | | | |
| Adequate tender sum | 3 | 1 | **4** | 33% | | | | |
| Severity of variations | 2 | 2 | **4** | 33% | | | | |
| Cost effectiveness | 2 | 0 | **2** | 17% | | | | |
| Over budget possibility | 1 | 1 | **2** | 17% | | | | |
| 4. Quality | | | | | | | | |
| Contracted work quality | 2 | 3 | **5** | 42% | | | | |
| Design quality plan | 3 | 1 | **4** | 33% | | | | |
| Level of technology | 1 | 2 | **3** | 25% | | | | |
| Inadequate labor skills | 0 | 2 | **2** | 17% | | | | |

| Criteria or parameter | Frequency | | | | | To what extent do you agree with influence of this criteria/parameter as a choice? | | |
|---|---|---|---|---|---|---|---|---|
| | Serbia | Montenegro, Croatia, Macedonia, Kosovo | **Total out of 12 participants** | % of experts | | Very Important | Important | Not Important |
| 5. Contract/admin | | | | | | | | |
| Changes in contract | 3 | 2 | **5** | 42% | | | | |
| Mutual/trusting relationships | 2 | 2 | **4** | 33% | | | | |
| Inclusion of all risks | 2 | 2 | **4** | 33% | | | | |
| Disputes resolution procedure | 1 | 1 | **2** | 17% | | | | |
| Procured similar projects within 5 years | 0 | 2 | **2** | 17% | | | | |
| 6. Human resource | | | | | | | | |
| Motivation for project | 2 | 3 | **5** | 42% | | | | |
| Monitoring and feedback | 3 | 2 | **5** | 42% | | | | |
| Skilled personnel | 3 | 1 | **4** | 33% | | | | |
| Centralized decision making | 3 | 0 | **3** | 25% | | | | |
| 7. Risk | | | | | | | | |
| Financial stability of client | 2 | 3 | **5** | 42% | | | | |
| Risk response | 3 | 1 | **4** | 33% | | | | |
| Defective design | 2 | 0 | **2** | 17% | | | | |
| Ignorance of risk | 2 | 0 | **2** | 17% | | | | |
| Cash flow reliability of project | 0 | 2 | **2** | 17% | | | | |
| Coordination with subcontractors | 1 | 1 | **2** | 17% | | | | |
| 8. Health and safety | | | | | | | | |
| Hazard identification | 3 | 2 | **5** | 42% | | | | |
| Health and safety records | 1 | 3 | **4** | 33% | | | | |
| Cleanliness and order on site | 3 | 0 | **3** | 25% | | | | |
| Management responsibility | 2 | 0 | **2** | 17% | | | | |
| Teaching of accident prevention | 1 | 1 | **2** | 17% | | | | |
| Management of environmental issues on site | 2 | 0 | **2** | 17% | | | | |

Please return:
Thank you very much for your participation. Please kindly return the questionnaire by return e-mail within one week time. If you have any queries, please contact me at contact on the mail signature.

Appendix 2.2 – Table 06 - Results of Delphi Stage B - Ranking larger than 50%

| Agreement in % | riteria parameters s este or more o t e e perts | Very Important | Important | Not Important | % of experts who stated the criterion as either very important or important. |
|---|---|---|---|---|---|
| | 1. Maximize business effectiveness | | | | |
| 100% | Staff satisfaction | 6 | 6 | 0 | 100% |
| 92% | Operating costs per head | 5 | 6 | 1 | 92% |
| 67% | Revenue per unit area | 4 | 4 | 4 | 67% |
| | 2. Ensure effective project management and delivery | | | | |
| 100% | Industry Best Practice | 4 | 8 | 0 | 100% |
| 75% | Project Management Guidelines - Gateway Review | 2 | 7 | 3 | 75% |
| | 3. Achieve the required financial performance | | | | |
| 100% | Capital Cost | 7 | 5 | 0 | 100% |
| 100% | Payback | 6 | 6 | 0 | 100% |
| | 4. Minimize building operation and maintenance costs, and environmental impact | | | | |
| 50% | BREEAM/LEEDS assessment or equivalent (how environment friendly the building is) | 3 | 3 | 4 | 50% |
| 100% | Annual cost of heating, cooling and lighting | 7 | 5 | 0 | 100% |
| | 5. Impact positively on the location of the facility | | | | |
| 92% | Company image | 5 | 6 | 1 | 92% |
| 42% | Design awards | 1 | 4 | 7 | 42% |
| | 6. Comply with third party requirements | | | | |
| 100% | Planning approval | 9 | 3 | 0 | 100% |
| 92% | Public survey | 3 | 8 | 1 | 92% |
| | | | | | |
| | | | | | |
| | | | | | |
| | 1. Scope | | | | |
| 100% | Clarity of contract | 12 | 0 | 0 | 100% |
| 100% | Effective preplanning | 8 | 4 | 0 | 100% |
| | 2. Time | | | | |
| 100% | Project time constraints | 5 | 7 | 0 | 100% |
| 100% | Constraint by government regulations | 8 | 4 | 0 | 100% |
| 0% | 3. Cost | | | | |
| 100% | Rapid decision making | 8 | 4 | 0 | 100% |
| 100% | Cash flow certainty | 4 | 8 | 0 | 100% |
| | 4. Quality | | | | |
| 100% | Material quality | 3 | 9 | 0 | 100% |
| 100% | Construction quality plan | 6 | 6 | 0 | 100% |
| | 5. Contract/admin | | | | |
| 92% | City planning regulations | 5 | 6 | 0 | 92% |
| | 6. Human resource | | | | |
| 100% | Team communication | 10 | 2 | 0 | 100% |
| 100% | Leadership/team management | 6 | 6 | 0 | 100% |
| | 7. Risk | | | | |
| 100% | Risk identification | 7 | 5 | 0 | 100% |
| 83% | Risk management techniques | 7 | 3 | 1 | 83% |
| | 8. Health and safety | | | | |
| 100% | Management of work safety on site | 8 | 4 | 0 | 100% |

Appendix 2.2 – Table 07 - Results of Delphi Stage B - Ranking between 10% and 50%

| Agreement in % | riteria parameters s este more t an an ess t an o t e e perts | Very Important | Important | Not Important | % of experts who stated the criterion as either very important or |
|---|---|---|---|---|---|
| | 1. Maximize business effectiveness | | | | |
| 83% | Productivity per employee | 1 | 9 | 2 | 83% |
| 42% | Footfall (number of visitors) | 1 | 4 | 7 | 42% |
| 75% | Number of complaints | 0 | 9 | 3 | 75% |
| | 2. Ensure effective project management and delivery | | | | |
| 83% | Construction Industry Standard KPIs | 2 | 8 | 2 | 83% |
| 42% | Compliance with Achieving E1cellence targets | 2 | 3 | 7 | 42% |
| 42% | Standards | 2 | 3 | 7 | 42% |
| | 3. Achieve the required financial performance | | | | |
| 92% | Whole-life Cost | 5 | 6 | 1 | 92% |
| 75% | Building operating and maintenance cost | 3 | 6 | 3 | 75% |
| 50% | Operation and maintenance | 1 | 5 | 6 | 50% |
| 42% | Money per unit area or unit of functional area | 4 | 1 | 7 | 42% |
| | 4. Minimize building operation and maintenance costs, and environmental impact | | | | |
| 50% | Facilities Management Estimates | 2 | 4 | 6 | 50% |
| 58% | Total Occupancy Cost Code (TOCC), or equivalent, in use | 1 | 6 | 5 | 58% |
| 92% | Annual cost of cleaning and maintenance | 2 | 9 | 1 | 92% |
| 92% | Frequency of periodic maintenance | 2 | 9 | 1 | 92% |
| | 5. Impact positively on the location of the facility | | | | |
| 58% | Public or private survey results | 1 | 6 | 5 | 58% |
| 92% | Views of local planning authority | 5 | 6 | 1 | 92% |
| 33% | Design Quality Indicator | 2 | 2 | 8 | 33% |
| 42% | Post Occupancy Evaluation | 0 | 5 | 7 | 42% |
| | 6. Comply with third party requirements | | | | |
| 50% | Industry KPIs | 0 | 6 | 6 | 50% |
| 42% | Ease of achievement of planning consent | 2 | 3 | 7 | 42% |
| 50% | Design Quality Indicators | 1 | 5 | 6 | 50% |
| | | | | | |
| | | | | | |
| | | | | | |
| | 1. Scope | | | | |
| 75% | Understanding of project requirements | 5 | 4 | 3 | 75% |
| 100% | Project levels of decision making | 1 | 11 | 0 | 100% |
| 50% | Design completed before work on site | 3 | 3 | 6 | 50% |
| | 2. Time | | | | |
| 92% | Rapid decision making | 5 | 6 | 1 | 92% |
| 67% | Adequacy of time | 4 | 4 | 4 | 67% |
| 50% | Fi1ed construction period | 1 | 5 | 5 | 50% |
| 83% | Overrun duration | 2 | 8 | 2 | 83% |
| | 3. Cost | | | | |
| 92% | Precise project budget estimate | 4 | 7 | 1 | 92% |
| 58% | Adequate tender sum | 3 | 4 | 5 | 58% |
| 58% | Severity of variations | 3 | 4 | 5 | 58% |
| 50% | Cost effectiveness | 0 | 6 | 6 | 50% |
| 83% | Over budget possibility | 1 | 9 | 2 | 83% |
| | 4. Quality | | | | |
| 92% | Contracted work quality | 4 | 7 | 1 | 92% |
| 42% | Design quality plan | 2 | 3 | 7 | 42% |
| 50% | Level of technology | 2 | 4 | 6 | 50% |
| 50% | Inadequate labor skills | 2 | 4 | 6 | 50% |
| | 5. Contract/admin | | | | |
| 50% | Changes in contract | 3 | 3 | 6 | 50% |
| 92% | Mutual/trusting relationships | 4 | 7 | 1 | 92% |
| 50% | Inclusion of all risks | 1 | 5 | 6 | 50% |

| | | | | | |
|---|---|---|---|---|---|
| 33% | Disputes resolution procedure | 2 | 2 | 8 | 33% |
| 42% | Procured similar projects within 5 years | 3 | 2 | 7 | 42% |
| | 6. Human resource | | | | |
| 92% | Motivation for project | 2 | 9 | 1 | 92% |
| 67% | Monitoring and feedback | 1 | 7 | 4 | 67% |
| 58% | Skilled personnel | 2 | 5 | 5 | 58% |
| 42% | Centralized decision making | 2 | 3 | 7 | 42% |
| | 7. Risk | | | | |
| 67% | Financial stability of client | 3 | 5 | 4 | 67% |
| 92% | Risk response | 4 | 7 | 1 | 92% |
| 50% | Defective design | 1 | 5 | 6 | 50% |
| 58% | Ignorance of risk | 1 | 6 | 5 | 58% |
| 58% | Cash flow reliability of project | 0 | 7 | 5 | 58% |
| 92% | Coordination with subcontractors | 4 | 7 | 1 | 92% |
| | 8. Health and safety | | | | |
| 100% | Hazard identification | 2 | 10 | 0 | 100% |
| 83% | Health and safety records | 1 | 9 | 2 | 83% |
| 58% | Cleanliness and order on site | 5 | 2 | 5 | 58% |
| 67% | Management responsibility | 5 | 3 | 4 | 67% |
| 50% | Teaching of accident prevention | 0 | 6 | 6 | 50% |
| 50% | Management of environmental issues on site | 1 | 5 | 6 | 50% |

Appendix 2.2 – Table 08 - Results of Delphi Stage B - Parameters with more than 60% agreement

| riteria parameters | More than 60% agreement of experts who stated the criterion as either very important or important. |
|---|---|
| 1. Maximize business effectiveness | |
| Staff satisfaction | 100% |
| Operating costs per head | 92% |
| Productivity per employee | 83% |
| Number of complaints | 75% |
| Revenue per unit area | 67% |
| 2. Ensure effective project management and delivery | |
| Industry Best Practice | 100% |
| Construction Industry Standard KPIs | 83% |
| Project Management Guidelines - Gateway Review | 75% |
| 3. Achieve the required financial performance | |
| Capital Cost | 100% |
| Payback | 100% |
| Whole-life Cost | 92% |
| Building operating and maintenance cost | 75% |
| 4. Minimize building operation and maintenance costs, and environmental impact | |
| Annual cost of heating, cooling and lighting | 100% |
| Annual cost of cleaning and maintenance | 92% |
| Frequency of periodic maintenance | 92% |
| 5. Impact positively on the location of the facility | |
| Company image | 92% |
| Views of local planning authority | 92% |
| Public or private survey results | 58% |
| 6. Comply with third party requirements | |
| Planning approval | 100% |
| Public survey | 92% |
| | |
| | |
| | |
| 1. Scope | |
| Clarity of contract | 100% |
| Effective preplanning | 100% |
| Project levels of decision making | 100% |
| Understanding of project requirements | 75% |
| 2. Time | |
| Project time constraints | 100% |
| Constraint by government regulations | 100% |
| Rapid decision making | 92% |
| Overrun duration | 83% |
| Adequacy of time | 67% |

| | |
|---|---|
| 3. Cost | |
| Rapid decision making | 100% |
| Cash flow certainty | 100% |
| Precise project budget estimate | 92% |
| Over budget possibility | 83% |
| 4. Quality | |
| Material quality | 100% |
| Construction quality plan | 100% |
| Contracted work quality | 92% |
| 5. Contract/admin | |
| City planning regulations | 92% |
| Mutual/trusting relationships | 92% |
| 6. Human resource | |
| Team communication | 100% |
| Leadership/team management | 100% |
| Motivation for project | 92% |
| Monitoring and feedback | 67% |
| Skilled personnel | 58% |
| 7. Risk | |
| Risk identification | 100% |
| Risk response | 92% |
| Coordination with subcontractors | 92% |
| Risk management techniques | 83% |
| Financial stability of client | 67% |
| 8. Health and safety | |
| Management of work safety on site | 100% |
| Hazard identification | 100% |
| Health and safety records | 83% |
| Management responsibility | 67% |

Appendix 3.1 - Sample questioner Delphi Stage C

## Utility factors of value parameters for different types of buildings

### Round 3: Questionnaire

Name of Respondent: _____

Guidance on completion:
From the Delphi round two questionnaires, we have found that the parameters obtained were sufficiently consistent. Out of the list, 41 parameters were agreed by 80% or more experts as either very important or important. For the round three questionnaire, 52 criteria, which were agreed by 60% or more experts, will be used to carry out the Round 3 Delphi method to obtain the value parameters.

A Table 2 - Scoring table of this questionnaire is designed for you to assess the performance of each value parameter group in relation to each parameter. Would you please enter a score from **10 (least favorable)** to **110 (most favorable)** to indicate the suitability of each parameter against each Utility Factor. (Please note that zero is eliminated to avoid any possible imbalances.)

**The following is an example for the parameter Maximize business effectiveness / "Operating costs per head ". If you believe this value parameter is relevant for Business (office buildings) for the construction industry in WB-SEE, you may enter a score say, 100. Whereas in Hotels this parameter is not so relevant, therefore you may enter a score around 20.**

Table 1 - Example

| Criteria or parameter (Results from Round 2) | Utility Factors | | | |
|---|---|---|---|---|
| | Business (Office) | Residential (Apartments) | Hotels | Shopping malls |
| | | | | |
| **"Soft value parameters"** | | | | |
| **1. Maximize business effectiveness** | | | | |
| Operating costs per head | **100** | **80** | **20** | **60** |

**For comparison purposes, size of reference building should be:**

Business (office) – larger than 10.000 m2
Residential (apartments) – larger than 10.000 m2 / 100 apartments
Hotels – larger than 200 keys
Shopping malls – larger than 80.000 m2 / 200 tenants

**Table 2 - Scoring table**

| Criteria or parameter (Results from Round 2) | Utility Factors | | | |
|---|---|---|---|---|
| | Business (Office) | Residential (Apartments) | Hotels | Shopping malls |
| | | | | |
| **"Soft value parameters"** | | | | |
| | | | | |
| 1. Maximize business effectiveness | | | | |
| Staff satisfaction | | | | |
| Operating costs per head | | | | |
| Productivity per employee | | | | |
| Number of complaints | | | | |
| Revenue per unit area | | | | |

| Criteria or parameter (Results from Round 2) | Utility Factors | | | |
|---|---|---|---|---|
| | Business (Office) | Residential (Apartments) | Hotels | Shopping malls |
| 2. Ensure effective project management and delivery | | | | |
| Industry Best Practice | | | | |
| Construction Industry Standard KPIs | | | | |
| Project Management Guidelines - Gateway Review | | | | |
| 3. Achieve the required financial performance | | | | |
| Capital Cost | | | | |
| Payback | | | | |
| Whole-life Cost | | | | |
| Building operating and maintenance cost | | | | |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | |
| Annual cost of heating, cooling and lighting | | | | |
| Annual cost of cleaning and maintenance | | | | |
| Frequency of periodic maintenance | | | | |
| 5. Impact positively on the location of the facility | | | | |
| Company image | | | | |
| Views of local planning authority | | | | |
| Public or private survey results | | | | |
| 6. Comply with third party requirements | | | | |
| Planning approval | | | | |
| Public survey | | | | |
| | | | | |
| **“Hard value parameters”** | | | | |
| | | | | |
| 1. Scope | | | | |
| Clarity of contract | | | | |
| Effective preplanning | | | | |
| Project levels of decision making | | | | |
| Understanding of project requirements | | | | |
| 2. Time | | | | |
| Project time constraints | | | | |
| Constraint by government regulations | | | | |
| Rapid decision making | | | | |
| Overrun duration | | | | |
| Adequacy of time | | | | |

| Criteria or parameter (Results from Round 2) | Utility Factors | | | |
|---|---|---|---|---|
| | Business (Office) | Residential (Apartments) | Hotels | Shopping malls |
| 3. Cost | | | | |
| Rapid decision making | | | | |
| Cash flow certainty | | | | |
| Precise project budget estimate | | | | |
| Over budget possibility | | | | |
| 4. Quality | | | | |
| Material quality | | | | |
| Construction quality plan | | | | |
| Contracted work quality | | | | |
| 5. Contract/admin | | | | |
| City planning regulations | | | | |
| Mutual/trusting relationships | | | | |
| 6. Human resource | | | | |
| Team communication | | | | |
| Leadership/team management | | | | |
| Motivation for project | | | | |
| Monitoring and feedback | | | | |
| Skilled personnel | | | | |
| 7. Risk | | | | |
| Risk identification | | | | |
| Risk response | | | | |
| Coordination with subcontractors | | | | |
| Risk management techniques | | | | |
| Financial stability of client | | | | |
| 8. Health and safety | | | | |
| Management of work safety on site | | | | |
| Hazard identification | | | | |
| Health and safety records | | | | |
| Management responsibility | | | | |

Please return:
Thank you very much for your participation. Please kindly return the questionnaire by return e-mail within one week time. If you have any queries, please contact me at contact on the mail signature.

Appendix 3.2 – Table 09 - Results of Delphi Stage C - Kendalls W and Asymptotic Significance

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Round C Kendall's W | Round C Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **Parameters** | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | |
| Staff satisfaction | **91.67** | **41.67** | **73.33** | **65.00** | | 0.554 | 0.000 |
| 1 | 90 | 20 | 100 | 90 | | | |
| 2 | 100 | 10 | 30 | 30 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 70 | 70 | 70 | 70 | | | |
| 5 | 90 | 40 | 70 | 60 | | | |
| 6 | 100 | 40 | 60 | 80 | | | |
| 7 | 100 | 40 | 60 | 80 | | | |
| 8 | 110 | 40 | 80 | 60 | | | |
| 9 | 110 | 60 | 90 | 80 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 80 | 40 | 70 | 60 | | | |
| 12 | 90 | 100 | 50 | 50 | | | |
| Operating costs per head | **92.50** | **47.50** | **67.50** | **73.33** | | 0.820 | 0.000 |
| 1 | 100 | 60 | 100 | 80 | | | |
| 2 | 80 | 20 | 40 | 30 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 100 | 70 | 100 | 100 | | | |
| 5 | 90 | 50 | 70 | 70 | | | |
| 6 | 80 | 40 | 60 | 60 | | | |
| 7 | 80 | 40 | 60 | 60 | | | |
| 8 | 80 | 60 | 70 | 80 | | | |
| 9 | 110 | 70 | 90 | 90 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 90 | 40 | 70 | 70 | | | |
| 12 | 100 | 80 | 30 | 80 | | | |
| Productivity per employee | **85.83** | **45.00** | **71.67** | **68.33** | | 0.685 | 0.000 |
| 1 | 20 | 20 | 20 | 20 | | | |
| 2 | 90 | 20 | 70 | 60 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 80 | 40 | 70 | 60 | | | |
| 6 | 100 | 80 | 80 | 80 | | | |
| 7 | 100 | 80 | 80 | 80 | | | |
| 8 | 80 | 50 | 80 | 80 | | | |
| 9 | 100 | 60 | 90 | 80 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 80 | 40 | 80 | 60 | | | |
| 12 | 90 | 20 | 80 | 50 | | | |
| Number of complaints | **73.33** | **83.33** | **90.00** | **60.83** | | 0.636 | 0.000 |
| 1 | 70 | 70 | 90 | 90 | | | |
| 2 | 50 | 50 | 70 | 40 | | | |
| 3 | 60 | 80 | 100 | 20 | | | |
| 4 | 80 | 80 | 80 | 80 | | | |
| 5 | 70 | 80 | 90 | 60 | | | |
| 6 | 80 | 100 | 80 | 60 | | | |
| 7 | 80 | 100 | 80 | 60 | | | |
| 8 | 80 | 80 | 90 | 70 | | | |
| 9 | 90 | 100 | 110 | 80 | | | |
| 10 | 60 | 80 | 100 | 20 | | | |
| 11 | 70 | 80 | 90 | 70 | | | |
| 12 | 90 | 100 | 100 | 80 | | | |
| Revenue per unit area | **71.67** | **74.17** | **95.00** | **76.67** | | 0.343 | 0.006 |
| 1 | 100 | 80 | 100 | 100 | | | |
| 2 | 40 | 50 | 40 | 80 | | | |
| 3 | 60 | 80 | 100 | 20 | | | |
| 4 | 110 | 110 | 110 | 110 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 80 | 80 | 100 | 60 | | | |
| 7 | 80 | 80 | 100 | 60 | | | |
| 8 | 70 | 80 | 100 | 100 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 60 | 80 | 100 | 20 | | | |
| 11 | 70 | 70 | 90 | 90 | | | |
| 12 | 30 | 20 | 100 | 100 | | | |
| 2. Ensure effective project management and delivery | | | | | | | |
| Industry Best Practice | **70.83** | **68.33** | **90.00** | **87.50** | | 0.491 | 0.001 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 50 | 60 | 70 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 80 | 60 | 80 | 80 | | | |
| 7 | 80 | 60 | 80 | 80 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 8 | 110 | 90 | 90 | 90 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 70 | 60 | 90 | 90 | | | |
| 12 | 60 | 30 | 90 | 90 | | | |
| Construction Industry Standard KPIs | **60.83** | **69.17** | **72.50** | **64.17** | | 0.116 | 0.243 |
| 1 | 50 | 50 | 50 | 50 | | | |
| 2 | 50 | 50 | 70 | 80 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 60 | 70 | 70 | 60 | | | |
| 6 | 60 | 60 | 60 | 60 | | | |
| 7 | 60 | 60 | 60 | 50 | | | |
| 8 | 80 | 80 | 70 | 80 | | | |
| 9 | 80 | 90 | 90 | 80 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 70 | 30 | 70 | 60 | | | |
| 12 | 90 | 90 | 40 | 40 | | | |
| Project Management Guidelines - Gateway Review | **65.83** | **54.17** | **85.00** | **80.00** | | 0.611 | 0.000 |
| 1 | 50 | 50 | 50 | 50 | | | |
| 2 | 50 | 50 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 60 | 50 | 80 | 80 | | | |
| 6 | 80 | 40 | 80 | 80 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 70 | 80 | 90 | 80 | | | |
| 9 | 80 | 70 | 100 | 100 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 50 | 90 | 70 | | | |
| 12 | 50 | 50 | 90 | 90 | | | |
| 3. Achieve the required financial performance | | | | | | | |
| Capital Cost | **88.33** | **91.67** | **69.17** | **86.67** | | 0.327 | 0.008 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 60 | 60 | 70 | | | |
| 3 | 60 | 100 | 20 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 5 | 90 | 90 | 70 | 80 | | | |
| 6 | 90 | 90 | 80 | 70 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 60 | 80 | 90 | | | |
| 9 | 110 | 110 | 90 | 100 | | | |
| 10 | 60 | 100 | 20 | 80 | | | |
| 11 | 100 | 90 | 70 | 90 | | | |
| 12 | 100 | 100 | 40 | 80 | | | |
| Payback | **74.17** | **83.33** | **67.50** | **79.17** | | 0.028 | 0.018 |
| 1 | 30 | 30 | 30 | 30 | | | |
| 2 | 70 | 60 | 60 | 70 | | | |
| 3 | 60 | 100 | 20 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 60 | 80 | | | |
| 6 | 80 | 90 | 80 | 90 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 60 | 70 | 60 | | | |
| 9 | 90 | 100 | 80 | 100 | | | |
| 10 | 60 | 100 | 60 | 80 | | | |
| 11 | 60 | 80 | 70 | 80 | | | |
| 12 | 90 | 100 | 80 | 80 | | | |
| Whole-life Cost | **80.83** | **72.50** | **80.83** | **70.83** | | 0.083 | 0.392 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 40 | 40 | 60 | 60 | | | |
| 3 | 100 | 60 | 80 | 20 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 80 | 80 | 70 | | | |
| 6 | 70 | 80 | 100 | 70 | | | |
| 7 | 60 | 20 | 80 | 80 | | | |
| 8 | 60 | 90 | 90 | 80 | | | |
| 9 | 100 | 100 | 100 | 90 | | | |
| 10 | 100 | 60 | 80 | 20 | | | |
| 11 | 90 | 60 | 80 | 90 | | | |
| 12 | 80 | 90 | 30 | 80 | | | |
| Building operating and maintenance cost | **79.17** | **55.00** | **90.83** | **75.83** | | 0.587 | 0.000 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 5 | 80 | 60 | 90 | 80 | | | |
| 6 | 60 | 50 | 90 | 80 | | | |
| 7 | 80 | 20 | 80 | 20 | | | |
| 8 | 60 | 70 | 100 | 90 | | | |
| 9 | 100 | 80 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 70 | 60 | 90 | 70 | | | |
| 12 | 80 | 30 | 60 | 80 | | | |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | |
| Annual cost of heating, cooling and lighting | **86.67** | **65.00** | **91.67** | **79.17** | | 0.454 | 0.001 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 90 | 70 | 90 | 80 | | | |
| 6 | 80 | 70 | 100 | 70 | | | |
| 7 | 40 | 60 | 80 | 20 | | | |
| 8 | 100 | 80 | 100 | 90 | | | |
| 9 | 110 | 90 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 100 | 60 | 90 | 100 | | | |
| 12 | 90 | 50 | 50 | 90 | | | |
| Annual cost of cleaning and maintenance | **75.83** | **54.17** | **81.67** | **79.17** | | 0.423 | 0.002 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 80 | 40 | 80 | 60 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 80 | 50 | 80 | 80 | | | |
| 6 | 50 | 40 | 90 | 100 | | | |
| 7 | 20 | 80 | 80 | 20 | | | |
| 8 | 90 | 60 | 90 | 90 | | | |
| 9 | 100 | 70 | 100 | 100 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 70 | 60 | 80 | 80 | | | |
| 12 | 30 | 20 | 70 | 70 | | | |
| Frequency of periodic maintenance | **74.17** | **52.50** | **87.50** | **82.50** | | 0.680 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 2 | 60 | 20 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 70 | 70 | 70 | 70 | | | |
| 5 | 70 | 50 | 80 | 80 | | | |
| 6 | 90 | 90 | 90 | 90 | | | |
| 7 | 80 | 50 | 80 | 80 | | | |
| 8 | 80 | 60 | 90 | 90 | | | |
| 9 | 90 | 70 | 100 | 100 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 70 | 60 | 100 | 70 | | | |
| 12 | 60 | 20 | 70 | 70 | | | |
| 5. Impact positively on the location of the facility | | | | | | | |
| Company image | **72.50** | **52.50** | **84.17** | **65.00** | | 0.550 | 0.000 |
| 1 | 30 | 30 | 30 | 30 | | | |
| 2 | 80 | 40 | 50 | 60 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 50 | 80 | 60 | | | |
| 6 | 70 | 60 | 100 | 30 | | | |
| 7 | 80 | 40 | 80 | 80 | | | |
| 8 | 80 | 60 | 90 | 70 | | | |
| 9 | 90 | 70 | 100 | 80 | | | |
| 10 | 60 | 60 | 100 | 80 | | | |
| 11 | 70 | 50 | 100 | 70 | | | |
| 12 | 90 | 60 | 90 | 50 | | | |
| Views of local planning authority | **65.00** | **81.67** | **76.67** | **70.83** | | 0.238 | 0.035 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 60 | 40 | 60 | 60 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 80 | 70 | | | |
| 6 | 80 | 60 | 80 | 40 | | | |
| 7 | 40 | 40 | 60 | 60 | | | |
| 8 | 80 | 90 | 90 | 80 | | | |
| 9 | 90 | 100 | 100 | 90 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 70 | 100 | 80 | 60 | | | |
| 12 | 70 | 90 | 30 | 90 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| Public or private survey results | **73.33** | **53.33** | **77.50** | **69.17** | | 0.386 | 0.003 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 60 | 30 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 80 | 60 | 80 | 70 | | | |
| 6 | 50 | 60 | 80 | 80 | | | |
| 7 | 10 | 10 | 10 | 10 | | | |
| 8 | 90 | 70 | 90 | 80 | | | |
| 9 | 100 | 80 | 100 | 90 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 100 | 60 | 60 | 70 | | | |
| 12 | 50 | 50 | 50 | 50 | | | |
| 6. Comply with third party requirements | | | | | | | |
| Planning approval | **70.83** | **81.67** | **88.33** | **80.83** | | 0.266 | 0.022 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 50 | 40 | 50 | 50 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 80 | 70 | 100 | 90 | | | |
| 7 | 60 | 40 | 80 | 80 | | | |
| 8 | 80 | 90 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 100 | 80 | 90 | 80 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| Public survey | **55.83** | **67.50** | **78.33** | **80.83** | | 0.413 | 0.002 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 60 | 40 | 70 | 80 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 60 | 70 | 80 | 80 | | | |
| 6 | 50 | 40 | 90 | 70 | | | |
| 7 | 40 | 20 | 40 | 80 | | | |
| 8 | 70 | 80 | 90 | 90 | | | |
| 9 | 80 | 90 | 100 | 100 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 11 | 60 | 60 | 100 | 80 | | | |
| 12 | 20 | 20 | 20 | 80 | | | |
| 1. Scope | | | | | | | |
| Clarity of contract | **75.83** | **77.50** | **90.83** | **77.50** | | 0.278 | 0.018 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 50 | 70 | 80 | | | |
| 3 | 60 | 100 | 80 | 20 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 80 | 60 | 90 | 90 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 80 | 80 | 100 | 90 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 60 | 100 | 80 | 20 | | | |
| 11 | 100 | 70 | 100 | 80 | | | |
| 12 | 30 | 30 | 90 | 90 | | | |
| Effective preplanning | **70.83** | **71.67** | **94.17** | **89.17** | | 0.526 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 40 | 80 | 80 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 70 | 60 | 100 | 100 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 80 | 80 | 100 | 100 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 100 | 70 | 90 | 70 | | | |
| 12 | 50 | 50 | 80 | 80 | | | |
| Project levels of decision making | **76.67** | **57.50** | **93.33** | **90.00** | | 0.728 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 30 | 80 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 60 | 90 | 90 | | | |
| 6 | 70 | 40 | 80 | 80 | | | |
| 7 | 60 | 60 | 60 | 60 | | | |
| 8 | 90 | 70 | 100 | 100 | | | |
| 9 | 100 | 80 | 110 | 110 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 80 | 60 | 100 | 100 | | | |
| 12 | 50 | 50 | 100 | 100 | | | |
| Understanding of project requirements | **83.33** | **65.83** | **95.83** | **93.33** | | 0.771 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 40 | 80 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 70 | 90 | 90 | | | |
| 6 | 80 | 50 | 90 | 90 | | | |
| 7 | 100 | 80 | 100 | 100 | | | |
| 8 | 90 | 80 | 100 | 100 | | | |
| 9 | 100 | 90 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 80 | 60 | 90 | 100 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| 2. Time | | | | | | | |
| Project time constraints | **73.33** | **86.67** | **86.67** | **94.17** | | 0.327 | 0.008 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 80 | 60 | 80 | 90 | | | |
| 3 | 20 | 80 | 60 | 100 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 90 | 90 | 90 | | | |
| 6 | 90 | 90 | 90 | 90 | | | |
| 7 | 20 | 40 | 80 | 80 | | | |
| 8 | 90 | 100 | 100 | 100 | | | |
| 9 | 100 | 110 | 110 | 110 | | | |
| 10 | 20 | 80 | 60 | 100 | | | |
| 11 | 80 | 90 | 90 | 90 | | | |
| 12 | 100 | 100 | 80 | 80 | | | |
| Constraint by government regulations | **65.83** | **80.00** | **81.67** | **88.33** | | 0.409 | 0.002 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 60 | 70 | 70 | | | |
| 3 | 20 | 100 | 60 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 90 | 90 | | | |
| 6 | 70 | 60 | 90 | 80 | | | |
| 7 | 40 | 20 | 40 | 60 | | | |
| 8 | 80 | 90 | 100 | 100 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 9 | 90 | 100 | 110 | 110 | | | |
| 10 | 20 | 100 | 60 | 80 | | | |
| 11 | 70 | 80 | 60 | 90 | | | |
| 12 | 70 | 70 | 100 | 100 | | | |
| Rapid decision making | **68.33** | **80.00** | **88.33** | **81.67** | | 0.370 | 0.004 |
| 1 | 100 | 80 | 100 | 100 | | | |
| 2 | 60 | 50 | 70 | 80 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 60 | 60 | 60 | 60 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 80 | 90 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 60 | 80 | 60 | 80 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| Overrun duration | **65.00** | **73.33** | **87.50** | **78.33** | | 0.419 | 0.002 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 50 | 80 | 80 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 60 | 50 | 50 | 60 | | | |
| 7 | 10 | 20 | 40 | 40 | | | |
| 8 | 80 | 90 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 60 | 100 | 60 | | | |
| 11 | 70 | 60 | 90 | 80 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| Adequacy of time | **62.50** | **68.33** | **88.33** | **79.17** | | 0.571 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 50 | 80 | 80 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 50 | 40 | 70 | 70 | | | |
| 7 | 10 | 10 | 20 | 20 | | | |
| 8 | 80 | 80 | 100 | 100 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 60 | | | |
| 11 | 70 | 70 | 90 | 60 | | | |
| 12 | 70 | 70 | 100 | 100 | | | |
| 3. Cost | | | | | | | |
| Rapid decision making | **68.33** | **80.00** | **79.17** | **90.83** | | 0.378 | 0.003 |
| 1 | 100 | 80 | 100 | 100 | | | |
| 2 | 60 | 50 | 60 | 80 | | | |
| 3 | 20 | 80 | 60 | 100 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 80 | 90 | | | |
| 6 | 60 | 60 | 60 | 60 | | | |
| 7 | 80 | 80 | 60 | 60 | | | |
| 8 | 80 | 90 | 90 | 100 | | | |
| 9 | 90 | 100 | 100 | 110 | | | |
| 10 | 20 | 80 | 60 | 100 | | | |
| 11 | 60 | 80 | 80 | 90 | | | |
| 12 | 80 | 80 | 100 | 100 | | | |
| Cash flow certainty | **76.67** | **92.50** | **84.17** | **82.50** | | 0.258 | 0.026 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 70 | 70 | 70 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 90 | 80 | 80 | | | |
| 6 | 70 | 50 | 80 | 80 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 90 | 100 | 90 | 90 | | | |
| 9 | 100 | 110 | 100 | 100 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 70 | 90 | 60 | 80 | | | |
| 12 | 100 | 100 | 70 | 70 | | | |
| Precise project budget estimate | **94.17** | **77.50** | **84.17** | **91.67** | | 0.344 | 0.006 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 80 | 70 | 80 | 80 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 90 | 80 | 90 | 90 | | | |
| 6 | 80 | 70 | 90 | 90 | | | |
| 7 | 80 | 100 | 60 | 80 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 8 | 100 | 90 | 100 | 100 | | | |
| 9 | 110 | 100 | 110 | 110 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 90 | 80 | 60 | 90 | | | |
| 12 | 100 | 100 | 100 | 100 | | | |
| Over budget possibility | **80.83** | **57.50** | **79.17** | **83.33** | | 0.488 | 0.001 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 70 | 60 | 70 | 70 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 60 | 80 | 90 | | | |
| 6 | 70 | 40 | 80 | 80 | | | |
| 7 | 40 | 40 | 40 | 40 | | | |
| 8 | 90 | 70 | 90 | 100 | | | |
| 9 | 100 | 80 | 100 | 110 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 60 | 60 | 80 | 60 | | | |
| 12 | 70 | 50 | 100 | 100 | | | |
| 4. Quality | | | | | | | |
| Material quality | **80.00** | **69.17** | **90.83** | **76.67** | | 0.332 | 0.007 |
| 1 | 80 | 80 | 80 | 80 | | | |
| 2 | 70 | 60 | 70 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 70 | 90 | 80 | | | |
| 6 | 60 | 100 | 90 | 50 | | | |
| 7 | 80 | 80 | 60 | 40 | | | |
| 8 | 90 | 80 | 100 | 90 | | | |
| 9 | 100 | 90 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 80 | 70 | 90 | 80 | | | |
| 12 | 60 | 60 | 100 | 100 | | | |
| Construction quality plan | **67.50** | **75.83** | **92.50** | **86.67** | | 0.533 | 0.000 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 60 | 70 | 80 | 90 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 7 | 80 | 100 | 80 | 60 | | | |
| 8 | 80 | 80 | 100 | 100 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 70 | 70 | 90 | 90 | | | |
| 12 | 60 | 60 | 90 | 70 | | | |
| Contracted work quality | **75.00** | **81.67** | **94.17** | **90.83** | | 0.606 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 80 | 70 | 80 | 90 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 80 | 90 | 90 | | | |
| 6 | 70 | 80 | 80 | 80 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 90 | 90 | 100 | 100 | | | |
| 9 | 100 | 100 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 80 | 80 | 90 | 90 | | | |
| 12 | 80 | 80 | 100 | 90 | | | |
| 5. Contract/admin | | | | | | | |
| City planning regulations | **75.83** | **81.67** | **73.33** | **81.67** | | 0.054 | 0.583 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 60 | 100 | 20 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 80 | 80 | 80 | | | |
| 6 | 60 | 50 | 80 | 50 | | | |
| 7 | 40 | 60 | 60 | 60 | | | |
| 8 | 90 | 90 | 90 | 90 | | | |
| 9 | 100 | 100 | 100 | 100 | | | |
| 10 | 60 | 100 | 20 | 80 | | | |
| 11 | 80 | 70 | 70 | 80 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| Mutual/trusting relationships | **61.67** | **70.00** | **85.00** | **76.67** | | 0.516 | 0.000 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 60 | 60 | 60 | 60 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 6 | 70 | 70 | 70 | 70 | | | |
| 7 | 20 | 20 | 20 | 20 | | | |
| 8 | 80 | 80 | 100 | 90 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 70 | 70 | 90 | 80 | | | |
| 12 | 50 | 50 | 90 | 90 | | | |
| 6. Human resource | | | | | | | |
| Team communication | **78.33** | **67.50** | **93.33** | **90.83** | | 0.666 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 60 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 80 | 70 | 90 | 90 | | | |
| 6 | 70 | 50 | 80 | 80 | | | |
| 7 | 90 | 90 | 90 | 90 | | | |
| 8 | 90 | 80 | 100 | 100 | | | |
| 9 | 100 | 90 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 70 | 90 | 90 | | | |
| 12 | 70 | 70 | 100 | 100 | | | |
| Leadership/team management | **68.33** | **77.50** | **90.00** | **80.00** | | 0.494 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 40 | 60 | 60 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 80 | 60 | 90 | 90 | | | |
| 7 | 50 | 40 | 60 | 60 | | | |
| 8 | 80 | 90 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 70 | 80 | 90 | 80 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| Motivation for project | **69.17** | **56.67** | **85.83** | **85.83** | | 0.636 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 50 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 5 | 70 | 60 | 90 | 90 | | | |
| 6 | 70 | 50 | 80 | 80 | | | |
| 7 | 40 | 40 | 40 | 40 | | | |
| 8 | 80 | 70 | 100 | 100 | | | |
| 9 | 90 | 80 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 60 | 60 | 90 | | | |
| 12 | 40 | 40 | 90 | 90 | | | |
| Monitoring and feedback | **60.83** | **69.17** | **90.83** | **80.00** | | 0.645 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 40 | 70 | 70 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 60 | 70 | 90 | 80 | | | |
| 6 | 80 | 60 | 90 | 90 | | | |
| 7 | 60 | 50 | 80 | 80 | | | |
| 8 | 70 | 80 | 100 | 90 | | | |
| 9 | 80 | 90 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 60 | 60 | 90 | 70 | | | |
| 12 | 30 | 30 | 70 | 70 | | | |
| Skilled personnel | **72.50** | **63.33** | **90.00** | **88.33** | | 0.424 | 0.002 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 50 | 60 | 70 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 60 | 90 | 90 | | | |
| 6 | 80 | 90 | 100 | 80 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 70 | 100 | 100 | | | |
| 9 | 90 | 80 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 50 | 50 | 40 | 70 | | | |
| 12 | 30 | 30 | 90 | 90 | | | |
| 7. Risk | | | | | | | |
| Risk identification | **82.50** | **62.50** | **95.83** | **89.17** | | 0.652 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 70 | 50 | 70 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 60 | 90 | 90 | | | |
| 6 | 60 | 60 | 90 | 90 | | | |
| 7 | 100 | 80 | 100 | 100 | | | |
| 8 | 90 | 70 | 100 | 100 | | | |
| 9 | 100 | 80 | 110 | 110 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 80 | 60 | 90 | 90 | | | |
| 12 | 50 | 50 | 100 | 90 | | | |
| Risk response | **75.00** | **68.33** | **95.00** | **91.67** | | 0.683 | 0.000 |
| 1 | 100 | 100 | 100 | 100 | | | |
| 2 | 60 | 50 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 70 | 70 | 80 | 80 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 80 | 100 | 100 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 70 | 90 | 90 | | | |
| 12 | 50 | 50 | 100 | 90 | | | |
| Coordination with subcontractors | **65.83** | **72.50** | **93.33** | **82.50** | | 0.663 | 0.000 |
| 1 | 80 | 80 | 90 | 80 | | | |
| 2 | 60 | 50 | 80 | 80 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 80 | 70 | 90 | 90 | | | |
| 7 | 80 | 60 | 80 | 80 | | | |
| 8 | 80 | 80 | 100 | 90 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 60 | 60 | 90 | 80 | | | |
| 12 | 50 | 50 | 90 | 90 | | | |
| Risk management techniques | **68.33** | **56.67** | **83.33** | **77.50** | | 0.508 | 0.000 |
| 1 | 70 | 70 | 70 | 70 | | | |
| 2 | 60 | 50 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 60 | 90 | 80 | | | |
| 6 | 70 | 60 | 80 | 80 | | | |
| 7 | 40 | 40 | 40 | 40 | | | |
| 8 | 80 | 70 | 100 | 90 | | | |
| 9 | 90 | 80 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 30 | 60 | 40 | 80 | | | |
| 12 | 50 | 50 | 90 | 90 | | | |
| Financial stability of client | **67.50** | **84.17** | **78.33** | **86.67** | | 0.376 | 0.004 |
| 1 | 80 | 80 | 80 | 80 | | | |
| 2 | 80 | 80 | 80 | 80 | | | |
| 3 | 20 | 100 | 60 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 80 | 90 | | | |
| 6 | 70 | 50 | 90 | 90 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 80 | 90 | 90 | 100 | | | |
| 9 | 90 | 100 | 100 | 110 | | | |
| 10 | 20 | 100 | 60 | 80 | | | |
| 11 | 30 | 60 | 30 | 60 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| 8. Health and safety | | | | | | | |
| Management of work safety on site | **78.33** | **83.33** | **95.83** | **89.17** | | 0.414 | 0.002 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 90 | 90 | 90 | 90 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 80 | 80 | 90 | 90 | | | |
| 6 | 80 | 40 | 90 | 90 | | | |
| 7 | 110 | 110 | 110 | 110 | | | |
| 8 | 90 | 90 | 100 | 100 | | | |
| 9 | 100 | 100 | 110 | 110 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 80 | 60 | 90 | 90 | | | |
| 12 | 80 | 80 | 80 | 80 | | | |
| Hazard identification | **70.00** | **78.33** | **88.33** | **82.50** | | 0.303 | 0.012 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 70 | 70 | 70 | 70 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 70 | 50 | 80 | 80 | | | |
| 7 | 80 | 60 | 80 | 100 | | | |
| 8 | 80 | 90 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 60 | 100 | 60 | | | |
| 11 | 70 | 80 | 60 | 80 | | | |
| 12 | 80 | 80 | 80 | 80 | | | |
| Health and safety records | **55.00** | **72.50** | **65.00** | **69.17** | | 0.346 | 0.006 |
| 1 | 50 | 50 | 50 | 50 | | | |
| 2 | 60 | 60 | 60 | 60 | | | |
| 3 | 20 | 100 | 60 | 80 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 60 | 80 | 70 | 80 | | | |
| 6 | 60 | 50 | 70 | 70 | | | |
| 7 | 10 | 10 | 10 | 10 | | | |
| 8 | 70 | 90 | 80 | 90 | | | |
| 9 | 80 | 100 | 90 | 100 | | | |
| 10 | 20 | 80 | 60 | 60 | | | |
| 11 | 40 | 60 | 40 | 40 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| Management responsibility | **62.50** | **79.17** | **74.17** | **72.50** | | 0.324 | 0.009 |
| 1 | 50 | 50 | 50 | 50 | | | |
| 2 | 80 | 80 | 80 | 80 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 80 | 80 | | | |
| 6 | 80 | 70 | 90 | 90 | | | |
| 7 | 30 | 30 | 30 | 30 | | | |
| 8 | 80 | 90 | 90 | 90 | | | |
| 9 | 90 | 100 | 100 | 100 | | | |
| 10 | 20 | 100 | 60 | 60 | | | |
| 11 | 40 | 60 | 40 | 40 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |

Appendix 3.2 – Table 10 - Results of Delphi Stage C - Parameters and Utility Factors

| arameters | Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Round C Kendall's W | Round C Asymptotic Significance |
|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | | | | | | | | |
| Staff satisfaction | | 91.67 | 41.67 | 73.33 | 65.00 | | 0.554 | 0.000 |
| Operating costs per head | | 92.50 | 47.50 | 67.50 | 73.33 | | 0.820 | 0.000 |
| Productivity per employee | | 85.83 | 45.00 | 71.67 | 68.33 | | 0.685 | 0.000 |
| Number of complaints | | 73.33 | 83.33 | 90.00 | 60.83 | | 0.636 | 0.000 |
| Revenue per unit area | | 71.67 | 74.17 | 95.00 | 76.67 | | 0.343 | 0.006 |
| 2. Ensure effective project management and delivery | | | | | | | | |
| Industry Best Practice | | 70.83 | 68.33 | 90.00 | 87.50 | | 0.491 | 0.001 |
| Construction Industry Standard KPIs | | 60.83 | 69.17 | 72.50 | 64.17 | | 0.116 | 0.243 |
| Project Management Guidelines - Gateway Review | | 65.83 | 54.17 | 85.00 | 80.00 | | 0.611 | 0.000 |
| 3. Achieve the required financial performance | | | | | | | | |
| Capital Cost | | 88.33 | 91.67 | 69.17 | 86.67 | | 0.327 | 0.008 |
| Payback | | 74.17 | 83.33 | 67.50 | 79.17 | | 0.028 | 0.018 |
| Whole-life Cost | | 80.83 | 72.50 | 80.83 | 70.83 | | 0.083 | 0.392 |
| Building operating and maintenance cost | | 79.17 | 55.00 | 90.83 | 75.83 | | 0.587 | 0.000 |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | | |
| Annual cost of heating, cooling and lighting | | 86.67 | 65.00 | 91.67 | 79.17 | | 0.454 | 0.001 |
| Annual cost of cleaning and maintenance | | 75.83 | 54.17 | 81.67 | 79.17 | | 0.423 | 0.002 |
| Frequency of periodic maintenance | | 74.17 | 52.50 | 87.50 | 82.50 | | 0.680 | 0.000 |
| 5. Impact positively on the location of the facility | | | | | | | | |
| Company image | | 72.50 | 52.50 | 84.17 | 65.00 | | 0.550 | 0.000 |
| Views of local planning authority | | 65.00 | 81.67 | 76.67 | 70.83 | | 0.238 | 0.035 |
| Public or private survey results | | 73.33 | 53.33 | 77.50 | 69.17 | | 0.386 | 0.003 |
| 6. Comply with third party requirements | | | | | | | | |
| Planning approval | | 70.83 | 81.67 | 88.33 | 80.83 | | 0.266 | 0.022 |
| Public survey | | 55.83 | 67.50 | 78.33 | 80.83 | | 0.413 | 0.002 |
| 1. Scope | | | | | | | | |
| Clarity of contract | | 75.83 | 77.50 | 90.83 | 77.50 | | 0.278 | 0.018 |
| Effective preplanning | | 70.83 | 71.67 | 94.17 | 89.17 | | 0.526 | 0.000 |
| Project levels of decision making | | 76.67 | 57.50 | 93.33 | 90.00 | | 0.728 | 0.000 |
| Understanding of project requirements | | 83.33 | 65.83 | 95.83 | 93.33 | | 0.771 | 0.000 |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 2. Time | | | | | | | |
| Project time constraints | 73.33 | 86.67 | 86.67 | 94.17 | | 0.327 | 0.008 |
| Constraint by government regulations | 65.83 | 80.00 | 81.67 | 88.33 | | 0.409 | 0.002 |
| Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | | 0.370 | 0.004 |
| Overrun duration | 65.00 | 73.33 | 87.50 | 78.33 | | 0.419 | 0.002 |
| Adequacy of time | 62.50 | 68.33 | 88.33 | 79.17 | | 0.571 | 0.000 |
| 3. Cost | | | | | | | |
| Rapid decision making | 68.33 | 80.00 | 79.17 | 90.83 | | 0.378 | 0.003 |
| Cash flow certainty | 76.67 | 92.50 | 84.17 | 82.50 | | 0.258 | 0.026 |
| Precise project budget estimate | 94.17 | 77.50 | 84.17 | 91.67 | | 0.344 | 0.006 |
| Over budget possibility | 80.83 | 57.50 | 79.17 | 83.33 | | 0.488 | 0.001 |
| 4. Quality | | | | | | | |
| Material quality | 80.00 | 69.17 | 90.83 | 76.67 | | 0.332 | 0.007 |
| Construction quality plan | 67.50 | 75.83 | 92.50 | 86.67 | | 0.533 | 0.000 |
| Contracted work quality | 75.00 | 81.67 | 94.17 | 90.83 | | 0.606 | 0.000 |
| 5. Contract/admin | | | | | | | |
| City planning regulations | 75.83 | 81.67 | 73.33 | 81.67 | | 0.054 | 0.583 |
| Mutual/trusting relationships | 61.67 | 70.00 | 85.00 | 76.67 | | 0.516 | 0.000 |
| 6. Human resource | | | | | | | |
| Team communication | 78.33 | 67.50 | 93.33 | 90.83 | | 0.666 | 0.000 |
| Leadership/team management | 68.33 | 77.50 | 90.00 | 80.00 | | 0.494 | 0.000 |
| Motivation for project | 69.17 | 56.67 | 85.83 | 85.83 | | 0.636 | 0.000 |
| Monitoring and feedback | 60.83 | 69.17 | 90.83 | 80.00 | | 0.645 | 0.000 |
| Skilled personnel | 72.50 | 63.33 | 90.00 | 88.33 | | 0.424 | 0.002 |
| 7. Risk | | | | | | | |
| Risk identification | 82.50 | 62.50 | 95.83 | 89.17 | | 0.652 | 0.000 |
| Risk response | 75.00 | 68.33 | 95.00 | 91.67 | | 0.683 | 0.000 |
| Coordination with subcontractors | 65.83 | 72.50 | 93.33 | 82.50 | | 0.663 | 0.000 |
| Risk management techniques | 68.33 | 56.67 | 83.33 | 77.50 | | 0.508 | 0.000 |
| Financial stability of client | 67.50 | 84.17 | 78.33 | 86.67 | | 0.376 | 0.004 |
| 8. Health and safety | | | | | | | |
| Management of work safety on site | 78.33 | 83.33 | 95.83 | 89.17 | | 0.414 | 0.002 |
| Hazard identification | 70.00 | 78.33 | 88.33 | 82.50 | | 0.303 | 0.012 |
| Health and safety records | 55.00 | 72.50 | 65.00 | 69.17 | | 0.346 | 0.006 |
| Management responsibility | 62.50 | 79.17 | 74.17 | 72.50 | | 0.324 | 0.009 |

Appendix 4.1 - Sample questioner Delphi Stage D

## Weighing of value parameters and criteria

### Round 4: Questionnaire

Name of Respondent: ___xxxxxx xxxxxx_____

Guidance on completion:

The **Table 2 - Scoring table** shows the "average" of the utility factors provided by the 12 experts and your score provided in round 3 were also showed. Please enter a "reconsidered" score in the following table if it is different from "Your score". Otherwise, confirm that the utility factor remains the same.

Here is an example where you enter red numbers:

**Table 1 - Example**

| | Utility Factors | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Business (Office) | | | Residential (Apartments) | | | Hotels | | | Shopping malls | | |
| Criteria or parameter | Average | Your score | Reconsidered score | Average | Your score | Reconsidered score | Average | Your score | Reconsidered score | Average | Your score | Reconsidered score |
| | | | | | | | | | | | | |
| **"Soft value parameters"** | | | | | | | | | | | | |
| **1. Maximize business effectiveness** | | | | | | | | | | | | |
| Operating costs per head **W = 0.540, α =0.001** | 80 | 100 | **90** | 80 | 80 | **80** | 40 | 20 | **40** | 55 | 60 | **60** |
| … | … | … | | … | … | | … | … | | … | … | |

**Table 2 - Scoring table**

| Utility Factors | Business (Office) | | | Residential (Apartments) | | | Hotels | | | Shopping malls | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Parameters** | | | | | | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | | | | | | |
| Staff satisfaction | 90 | 91.67 | | 20 | 41.67 | | 100 | 73.33 | | 90 | 65.00 | |
| Operating costs per head | 100 | 92.50 | | 60 | 47.50 | | 100 | 67.50 | | 80 | 73.33 | |
| Productivity per employee | 20 | 85.83 | | 20 | 45.00 | | 20 | 71.67 | | 20 | 68.33 | |
| Number of complaints | 70 | 73.33 | | 70 | 83.33 | | 90 | 90.00 | | 90 | 60.83 | |
| Revenue per unit area | 100 | 71.67 | | 80 | 74.17 | | 100 | 95.00 | | 100 | 76.67 | |

| Utility Factors | Business (Office) | | | Residential (Apartments) | | | Hotels | | | Shopping malls | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score |
| **2. Ensure effective project management and delivery** | | | | | | | | | | | | |
| Industry Best Practice | 100 | 70.83 | | 100 | 68.33 | | 100 | 90.00 | | 100 | 87.50 | |
| Construction Industry Standard KPIs | 50 | 60.83 | | 50 | 69.17 | | 50 | 72.50 | | 50 | 64.17 | |
| Project Management Guidelines - Gateway Review | 50 | 65.83 | | 50 | 54.17 | | 50 | 85.00 | | 50 | 80.00 | |
| **3. Achieve the required financial performance** | | | | | | | | | | | | |
| Capital Cost | 100 | 88.33 | | 100 | 91.67 | | 100 | 69.17 | | 100 | 86.67 | |
| Payback | 30 | 74.17 | | 30 | 83.33 | | 30 | 67.50 | | 30 | 79.17 | |
| Whole-life Cost | 90 | 80.83 | | 90 | 72.50 | | 90 | 80.83 | | 90 | 70.83 | |
| Building operating and maintenance cost | 90 | 79.17 | | 90 | 55.00 | | 90 | 90.83 | | 90 | 75.83 | |
| **4. Minimize building operation and maintenance costs, and environmental impact** | | | | | | | | | | | | |
| Annual cost of heating, cooling and lighting | 100 | 86.67 | | 100 | 65.00 | | 100 | 91.67 | | 100 | 79.17 | |
| Annual cost of cleaning and maintenance | 100 | 75.83 | | 100 | 54.17 | | 100 | 81.67 | | 100 | 79.17 | |
| Frequency of periodic maintenance | 100 | 74.17 | | 100 | 52.50 | | 100 | 87.50 | | 100 | 82.50 | |
| **5. Impact positively on the location of the facility** | | | | | | | | | | | | |
| Company image | 30 | 72.50 | | 30 | 52.50 | | 30 | 84.17 | | 30 | 65.00 | |
| Views of local planning authority | 90 | 64.17 | | 90 | 81.67 | | 90 | 78.33 | | 90 | 70.00 | |
| Public or private survey results | 90 | 75.83 | | 90 | 53.33 | | 90 | 77.50 | | 90 | 65.83 | |
| **6. Comply with third party requirements** | | | | | | | | | | | | |
| Planning approval | 90 | 70.83 | | 90 | 81.67 | | 90 | 88.33 | | 90 | 80.83 | |
| Public survey | 90 | 55.83 | | 90 | 67.50 | | 90 | 78.33 | | 90 | 80.83 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **1. Scope** | | | | | | | | | | | | |
| Clarity of contract | 100 | 75.83 | | 100 | 77.50 | | 100 | 90.83 | | 100 | 77.50 | |
| Effective preplanning | 100 | 70.83 | | 100 | 71.67 | | 100 | 94.17 | | 100 | 89.17 | |
| Project levels of decision making | 100 | 76.67 | | 100 | 57.50 | | 100 | 93.33 | | 100 | 90.00 | |
| Understanding of project requirements | 100 | 83.33 | | 100 | 65.83 | | 100 | 95.83 | | 100 | 93.33 | |
| **2. Time** | | | | | | | | | | | | |
| Project time constraints | 100 | 73.33 | | 100 | 86.67 | | 100 | 86.67 | | 100 | 94.17 | |
| Constraint by government regulations | 100 | 65.83 | | 100 | 80.00 | | 100 | 81.67 | | 100 | 88.33 | |
| Rapid decision making | 100 | 68.33 | | 80 | 80.00 | | 100 | 88.33 | | 100 | 81.67 | |
| Overrun duration | 100 | 65.00 | | 100 | 73.33 | | 100 | 87.50 | | 100 | 78.33 | |
| Adequacy of time | 100 | 62.50 | | 100 | 68.33 | | 100 | 88.33 | | 100 | 79.17 | |
| **3. Cost** | | | | | | | | | | | | |

| Utility Factors | Business (Office) | | | Residential (Apartments) | | | Hotels | | | Shopping malls | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score | Your score | Average | Reconsidered score |
| Rapid decision making | 100 | 68.33 | | 80 | 80.00 | | 100 | 79.17 | | 100 | 90.83 | |
| Cash flow certainty | 100 | 76.67 | | 100 | 92.50 | | 100 | 84.17 | | 100 | 82.50 | |
| Precise project budget estimate | 100 | 94.17 | | 100 | 77.50 | | 100 | 84.17 | | 100 | 91.67 | |
| Over budget possibility | 90 | 80.83 | | 90 | 57.50 | | 90 | 79.17 | | 90 | 83.33 | |
| 4. Quality | | | | | | | | | | | | |
| Material quality | 80 | 80.00 | | 80 | 69.17 | | 80 | 90.83 | | 80 | 76.67 | |
| Construction quality plan | 90 | 67.50 | | 90 | 75.83 | | 90 | 92.50 | | 90 | 86.67 | |
| Contracted work quality | 100 | 75.00 | | 100 | 81.67 | | 100 | 94.17 | | 100 | 90.83 | |
| 5. Contract/admin | | | | | | | | | | | | |
| City planning regulations | 90 | 75.83 | | 90 | 81.67 | | 90 | 73.33 | | 90 | 81.67 | |
| Mutual/trusting relationships | 90 | 61.67 | | 90 | 70.00 | | 90 | 85.00 | | 90 | 76.67 | |
| 6. Human resource | | | | | | | | | | | | |
| Team communication | 100 | 78.33 | | 100 | 67.50 | | 100 | 93.33 | | 100 | 90.83 | |
| Leadership/team management | 100 | 68.33 | | 100 | 77.50 | | 100 | 90.00 | | 100 | 80.00 | |
| Motivation for project | 100 | 69.17 | | 100 | 56.67 | | 100 | 85.83 | | 100 | 85.83 | |
| Monitoring and feedback | 100 | 60.83 | | 100 | 69.17 | | 100 | 90.83 | | 100 | 80.00 | |
| Skilled personnel | 100 | 72.50 | | 100 | 63.33 | | 100 | 90.00 | | 100 | 88.33 | |
| 7. Risk | | | | | | | | | | | | |
| Risk identification | 100 | 82.50 | | 100 | 62.50 | | 100 | 95.83 | | 100 | 89.17 | |
| Risk response | 100 | 75.00 | | 100 | 68.33 | | 100 | 95.00 | | 100 | 91.67 | |
| Coordination with subcontractors | 80 | 65.83 | | 80 | 72.50 | | 90 | 93.33 | | 80 | 82.50 | |
| Risk management techniques | 70 | 68.33 | | 70 | 56.67 | | 70 | 83.33 | | 70 | 77.50 | |
| Financial stability of client | 80 | 67.50 | | 80 | 84.17 | | 80 | 78.33 | | 80 | 86.67 | |
| 8. Health and safety | | | | | | | | | | | | |
| Management of work safety on site | 90 | 78.33 | | 90 | 83.33 | | 90 | 95.83 | | 90 | 89.17 | |
| Hazard identification | 90 | 70.00 | | 90 | 78.33 | | 90 | 88.33 | | 90 | 82.50 | |
| Health and safety records | 50 | 55.00 | | 50 | 72.50 | | 50 | 65.00 | | 50 | 69.17 | |
| Management responsibility | 50 | 62.50 | | 50 | 79.17 | | 50 | 74.17 | | 50 | 72.50 | |

Please return:
Thank you very much for your participation. Please kindly return the questionnaire by return e-mail within one week time.
If you have any queries, please contact me at contact on the mail signature.

Appendix 4.2 – Table 11 - Results of Delphi Stage D - Kendalls W and Asymptotic Significance

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Round D Kendall`s W | Round D Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | |
| Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | | 0.554 | 0.000 |
| 1 | 90 | 20 | 100 | 90 | | | |
| 2 | 100 | 40 | 60 | 60 | | | |
| 3 | 80 | 30 | 100 | 60 | | | |
| 4 | 80 | 50 | 70 | 70 | | | |
| 5 | 90 | 40 | 70 | 60 | | | |
| 6 | 90 | 40 | 70 | 70 | | | |
| 7 | 60 | 40 | 60 | 80 | | | |
| 8 | 100 | 40 | 85 | 60 | | | |
| 9 | 110 | 60 | 90 | 80 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 80 | 40 | 70 | 60 | | | |
| 12 | 90 | 60 | 70 | 60 | | | |
| Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | | 0.910 | 0.000 |
| 1 | 100 | 60 | 100 | 80 | | | |
| 2 | 80 | 40 | 60 | 70 | | | |
| 3 | 100 | 30 | 60 | 80 | | | |
| 4 | 100 | 50 | 80 | 80 | | | |
| 5 | 90 | 50 | 70 | 70 | | | |
| 6 | 90 | 40 | 60 | 70 | | | |
| 7 | 80 | 20 | 60 | 60 | | | |
| 8 | 90 | 40 | 80 | 70 | | | |
| 9 | 110 | 70 | 90 | 90 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 90 | 40 | 70 | 70 | | | |
| 12 | 95 | 50 | 50 | 80 | | | |
| Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | | 0.812 | 0.000 |
| 1 | 20 | 20 | 20 | 20 | | | |
| 2 | 90 | 40 | 70 | 60 | | | |
| 3 | 100 | 30 | 60 | 80 | | | |
| 4 | 90 | 60 | 80 | 80 | | | |
| 5 | 80 | 40 | 70 | 60 | | | |
| 6 | 90 | 50 | 80 | 70 | | | |
| 7 | 100 | 60 | 60 | 80 | | | |
| 8 | 80 | 40 | 70 | 70 | | | |
| 9 | 100 | 60 | 90 | 80 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 80 | 40 | 80 | 60 | | | |
| 12 | 90 | 20 | 80 | 60 | | | |
| Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | | 0.590 | 0.000 |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 1 | 70 | 70 | 90 | 90 | | | |
| 2 | 60 | 50 | 90 | 60 | | | |
| 3 | 60 | 80 | 100 | 30 | | | |
| 4 | 80 | 80 | 90 | 70 | | | |
| 5 | 70 | 80 | 90 | 60 | | | |
| 6 | 70 | 90 | 90 | 60 | | | |
| 7 | 100 | 100 | 80 | 80 | | | |
| 8 | 70 | 80 | 90 | 70 | | | |
| 9 | 90 | 100 | 110 | 80 | | | |
| 10 | 60 | 80 | 100 | 20 | | | |
| 11 | 70 | 80 | 90 | 70 | | | |
| 12 | 80 | 100 | 100 | 75 | | | |
| Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | | 0.484 | 0.001 |
| 1 | 100 | 80 | 100 | 100 | | | |
| 2 | 70 | 60 | 70 | 80 | | | |
| 3 | 70 | 60 | 70 | 80 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 70 | 80 | 100 | 70 | | | |
| 7 | 80 | 80 | 100 | 60 | | | |
| 8 | 70 | 80 | 100 | 85 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 60 | 80 | 100 | 20 | | | |
| 11 | 70 | 70 | 90 | 90 | | | |
| 12 | 40 | 40 | 100 | 100 | | | |
| 2. Ensure effective project management and delivery | | | | | | | |
| Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | | 0.872 | 0.000 |
| 1 | 85 | 80 | 100 | 95 | | | |
| 2 | 60 | 50 | 80 | 70 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 80 | 80 | 90 | 90 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 70 | 60 | 80 | 80 | | | |
| 7 | 80 | 60 | 80 | 80 | | | |
| 8 | 75 | 75 | 90 | 90 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 70 | 60 | 90 | 90 | | | |
| 12 | 70 | 40 | 90 | 90 | | | |
| Construction Industry Standard KPIs | 59.17 | 68.33 | 74.17 | 65.42 | | 0.182 | 0.087 |
| 1 | 50 | 50 | 50 | 50 | | | |
| 2 | 50 | 60 | 70 | 75 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 80 | 80 | 80 | 80 | | | |
| 5 | 60 | 70 | 70 | 60 | | | |
| 6 | 60 | 60 | 60 | 60 | | | |
| 7 | 60 | 60 | 60 | 60 | | | |
| 8 | 70 | 80 | 80 | 80 | | | |
| 9 | 80 | 90 | 90 | 80 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 70 | 30 | 70 | 60 | | | |
| 12 | 90 | 80 | 60 | 60 | | | |
| Project Management Guidelines - Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | | 0.859 | 0.000 |
| 1 | 50 | 50 | 60 | 60 | | | |
| 2 | 50 | 50 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 80 | 70 | 90 | 90 | | | |
| 5 | 60 | 50 | 80 | 80 | | | |
| 6 | 70 | 50 | 80 | 80 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 60 | 60 | 90 | 80 | | | |
| 9 | 80 | 70 | 100 | 100 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 50 | 90 | 70 | | | |
| 12 | 60 | 50 | 90 | 90 | | | |
| 3. Achieve the required financial performance | | | | | | | |
| Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | | 0.709 | 0.000 |
| 1 | 100 | 100 | 90 | 90 | | | |
| 2 | 75 | 90 | 60 | 75 | | | |
| 3 | 60 | 100 | 30 | 80 | | | |
| 4 | 90 | 100 | 80 | 90 | | | |
| 5 | 90 | 90 | 70 | 80 | | | |
| 6 | 90 | 90 | 80 | 80 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 100 | 75 | 90 | | | |
| 9 | 110 | 110 | 90 | 100 | | | |
| 10 | 60 | 100 | 20 | 80 | | | |
| 11 | 100 | 90 | 70 | 90 | | | |
| 12 | 100 | 100 | 50 | 80 | | | |
| Payback | 73.33 | 86.25 | 69.17 | 80.42 | | 0.461 | 0.001 |
| 1 | 50 | 50 | 50 | 50 | | | |
| 2 | 70 | 75 | 60 | 75 | | | |
| 3 | 60 | 100 | 30 | 80 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 4 | 80 | 90 | 80 | 80 | | | |
| 5 | 70 | 80 | 60 | 80 | | | |
| 6 | 80 | 90 | 80 | 80 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 70 | 80 | 80 | | | |
| 9 | 90 | 100 | 80 | 100 | | | |
| 10 | 60 | 100 | 60 | 80 | | | |
| 11 | 60 | 80 | 70 | 80 | | | |
| 12 | 80 | 100 | 80 | 80 | | | |
| Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | | 0.240 | 0.035 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 80 | 65 | 70 | 60 | | | |
| 3 | 100 | 60 | 80 | 40 | | | |
| 4 | 90 | 90 | 90 | 80 | | | |
| 5 | 80 | 80 | 80 | 70 | | | |
| 6 | 80 | 80 | 90 | 70 | | | |
| 7 | 60 | 40 | 80 | 80 | | | |
| 8 | 70 | 70 | 90 | 80 | | | |
| 9 | 100 | 100 | 100 | 90 | | | |
| 10 | 100 | 60 | 80 | 20 | | | |
| 11 | 90 | 60 | 80 | 90 | | | |
| 12 | 80 | 80 | 50 | 80 | | | |
| Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | | 0.779 | 0.000 |
| 1 | 90 | 70 | 90 | 90 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 80 | 30 | 100 | 60 | | | |
| 4 | 90 | 80 | 100 | 80 | | | |
| 5 | 80 | 60 | 90 | 80 | | | |
| 6 | 70 | 50 | 90 | 80 | | | |
| 7 | 80 | 40 | 80 | 60 | | | |
| 8 | 80 | 70 | 100 | 90 | | | |
| 9 | 100 | 80 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 70 | 60 | 90 | 70 | | | |
| 12 | 80 | 40 | 70 | 80 | | | |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | |
| Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | | 0.628 | 0.000 |
| 1 | 90 | 70 | 100 | 90 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 90 | 70 | 100 | 90 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 5 | 90 | 70 | 90 | 80 | | | |
| 6 | 80 | 70 | 100 | 70 | | | |
| 7 | 50 | 70 | 80 | 40 | | | |
| 8 | 100 | 80 | 100 | 90 | | | |
| 9 | 110 | 90 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 100 | 60 | 90 | 100 | | | |
| 12 | 90 | 55 | 60 | 90 | | | |
| Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | | 0.555 | 0.000 |
| 1 | 80 | 60 | 90 | 90 | | | |
| 2 | 80 | 40 | 80 | 70 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 80 | 70 | 90 | 90 | | | |
| 5 | 80 | 50 | 80 | 80 | | | |
| 6 | 70 | 50 | 90 | 90 | | | |
| 7 | 20 | 80 | 80 | 20 | | | |
| 8 | 80 | 60 | 90 | 90 | | | |
| 9 | 100 | 70 | 100 | 100 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 70 | 60 | 80 | 80 | | | |
| 12 | 50 | 30 | 70 | 75 | | | |
| Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | | 0.897 | 0.000 |
| 1 | 80 | 60 | 95 | 90 | | | |
| 2 | 60 | 45 | 70 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 70 | 70 | 80 | 80 | | | |
| 5 | 70 | 50 | 80 | 80 | | | |
| 6 | 80 | 60 | 90 | 90 | | | |
| 7 | 80 | 50 | 80 | 80 | | | |
| 8 | 80 | 55 | 90 | 80 | | | |
| 9 | 90 | 70 | 100 | 100 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 70 | 60 | 100 | 70 | | | |
| 12 | 60 | 30 | 80 | 75 | | | |
| 5. Impact positively on the location of the facility | | | | | | | |
| Company image | 72.50 | 50.83 | 90.00 | 69.17 | | 0.767 | 0.000 |
| 1 | 50 | 40 | 70 | 65 | | | |
| 2 | 80 | 40 | 80 | 60 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 80 | 70 | 90 | 80 | | | |
| 5 | 70 | 50 | 80 | 60 | | | |
| 6 | 70 | 60 | 90 | 50 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 7 | 80 | 40 | 80 | 80 | | | |
| 8 | 70 | 50 | 100 | 70 | | | |
| 9 | 90 | 70 | 100 | 80 | | | |
| 10 | 60 | 60 | 100 | 80 | | | |
| 11 | 70 | 50 | 100 | 70 | | | |
| 12 | 90 | 60 | 90 | 55 | | | |
| Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | | 0.447 | 0.001 |
| 1 | 70 | 90 | 80 | 80 | | | |
| 2 | 60 | 80 | 60 | 60 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 80 | 90 | 80 | 80 | | | |
| 5 | 70 | 80 | 80 | 70 | | | |
| 6 | 70 | 70 | 80 | 60 | | | |
| 7 | 40 | 40 | 60 | 60 | | | |
| 8 | 70 | 70 | 80 | 70 | | | |
| 9 | 90 | 100 | 100 | 90 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 70 | 100 | 80 | 60 | | | |
| 12 | 70 | 90 | 40 | 90 | | | |
| Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | | 0.587 | 0.000 |
| 1 | 80 | 60 | 80 | 70 | | | |
| 2 | 60 | 50 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 80 | 80 | 80 | 80 | | | |
| 5 | 80 | 60 | 80 | 70 | | | |
| 6 | 60 | 60 | 80 | 70 | | | |
| 7 | 20 | 20 | 40 | 40 | | | |
| 8 | 80 | 50 | 90 | 60 | | | |
| 9 | 100 | 80 | 100 | 90 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 100 | 60 | 60 | 70 | | | |
| 12 | 55 | 50 | 60 | 60 | | | |
| 6. Comply with third party requirements | | | | | | | |
| Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | | 0.398 | 0.002 |
| 1 | 80 | 90 | 90 | 90 | | | |
| 2 | 50 | 75 | 80 | 90 | | | |
| 3 | 60 | 100 | 80 | 60 | | | |
| 4 | 80 | 80 | 90 | 90 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 80 | 70 | 90 | 90 | | | |
| 7 | 60 | 60 | 80 | 80 | | | |
| 8 | 70 | 80 | 90 | 80 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 100 | 80 | 90 | 80 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| Public survey | 54.17 | 69.17 | 78.33 | 78.75 | | 0.604 | 0.000 |
| 1 | 70 | 70 | 80 | 85 | | | |
| 2 | 60 | 60 | 70 | 80 | | | |
| 3 | 30 | 100 | 80 | 60 | | | |
| 4 | 70 | 70 | 80 | 90 | | | |
| 5 | 60 | 70 | 80 | 80 | | | |
| 6 | 50 | 50 | 80 | 70 | | | |
| 7 | 40 | 40 | 60 | 80 | | | |
| 8 | 70 | 80 | 90 | 80 | | | |
| 9 | 80 | 90 | 100 | 100 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 60 | 60 | 100 | 80 | | | |
| 12 | 40 | 40 | 40 | 80 | | | |
| 1. Scope | | | | | | | |
| Clarity of contract | 74.17 | 77.92 | 91.67 | 76.67 | | 0.402 | 0.002 |
| 1 | 90 | 90 | 100 | 80 | | | |
| 2 | 60 | 60 | 80 | 80 | | | |
| 3 | 60 | 100 | 80 | 50 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 80 | 70 | 90 | 80 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 70 | 75 | 100 | 90 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 60 | 100 | 80 | 20 | | | |
| 11 | 100 | 70 | 100 | 80 | | | |
| 12 | 40 | 40 | 90 | 90 | | | |
| Effective preplanning | 69.17 | 71.67 | 95.83 | 88.33 | | 0.688 | 0.000 |
| 1 | 80 | 80 | 100 | 90 | | | |
| 2 | 70 | 60 | 90 | 80 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 90 | 90 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 70 | 60 | 100 | 90 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 80 | 80 | 100 | 100 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 100 | 70 | 90 | 70 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 12 | 60 | 60 | 90 | 90 | | | |
| Project levels of decision making | 74.17 | 55.83 | 89.17 | 93.33 | | 0.803 | 0.000 |
| 1 | 80 | 70 | 100 | 100 | | | |
| 2 | 70 | 40 | 90 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 10 | 100 | | | |
| 5 | 80 | 60 | 90 | 90 | | | |
| 6 | 70 | 50 | 90 | 90 | | | |
| 7 | 60 | 60 | 80 | 80 | | | |
| 8 | 80 | 65 | 100 | 110 | | | |
| 9 | 100 | 80 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 80 | 60 | 100 | 100 | | | |
| 12 | 60 | 55 | 100 | 100 | | | |
| Understanding of project requirements | 80.83 | 63.33 | 97.08 | 94.58 | | 0.928 | 0.000 |
| 1 | 90 | 70 | 100 | 100 | | | |
| 2 | 70 | 50 | 90 | 90 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 100 | 100 | | | |
| 5 | 80 | 70 | 90 | 90 | | | |
| 6 | 80 | 60 | 90 | 90 | | | |
| 7 | 100 | 80 | 100 | 100 | | | |
| 8 | 80 | 70 | 100 | 100 | | | |
| 9 | 100 | 90 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 80 | 60 | 90 | 100 | | | |
| 12 | 80 | 80 | 95 | 95 | | | |
| 2. Time | | | | | | | |
| Project time constraints | 70.83 | 83.33 | 84.58 | 94.17 | | 0.652 | 0.000 |
| 1 | 80 | 90 | 90 | 100 | | | |
| 2 | 80 | 70 | 85 | 90 | | | |
| 3 | 50 | 80 | 60 | 100 | | | |
| 4 | 90 | 90 | 90 | 100 | | | |
| 5 | 80 | 90 | 90 | 90 | | | |
| 6 | 80 | 90 | 90 | 90 | | | |
| 7 | 20 | 40 | 80 | 80 | | | |
| 8 | 80 | 80 | 80 | 90 | | | |
| 9 | 100 | 110 | 110 | 110 | | | |
| 10 | 20 | 80 | 60 | 100 | | | |
| 11 | 80 | 90 | 90 | 90 | | | |
| 12 | 90 | 90 | 90 | 90 | | | |
| Constraint by government regulations | 61.67 | 78.33 | 79.17 | 85.83 | | 0.688 | 0.000 |
| 1 | 70 | 90 | 90 | 90 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 2 | 60 | 60 | 80 | 70 | | | |
| 3 | 30 | 100 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 90 | 90 | | | |
| 6 | 70 | 70 | 90 | 80 | | | |
| 7 | 40 | 20 | 40 | 60 | | | |
| 8 | 65 | 80 | 90 | 100 | | | |
| 9 | 90 | 100 | 110 | 110 | | | |
| 10 | 20 | 100 | 60 | 80 | | | |
| 11 | 70 | 80 | 60 | 90 | | | |
| 12 | 65 | 70 | 90 | 90 | | | |
| Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | | 0.656 | 0.000 |
| 1 | 100 | 80 | 100 | 100 | | | |
| 2 | 60 | 50 | 70 | 80 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 100 | 100 | 100 | 100 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 60 | 60 | 60 | 60 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 80 | 90 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 60 | 80 | 60 | 80 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| Overrun duration | 61.67 | 71.67 | 87.50 | 77.50 | | 0.703 | 0.000 |
| 1 | 70 | 80 | 90 | 80 | | | |
| 2 | 70 | 70 | 80 | 80 | | | |
| 3 | 30 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 60 | 70 | 70 | 70 | | | |
| 7 | 10 | 20 | 40 | 40 | | | |
| 8 | 80 | 70 | 100 | 100 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 60 | 100 | 60 | | | |
| 11 | 70 | 60 | 90 | 80 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| Adequacy of time | 60.00 | 68.33 | 85.83 | 74.17 | | 0.678 | 0.000 |
| 1 | 70 | 70 | 90 | 80 | | | |
| 2 | 70 | 70 | 80 | 80 | | | |
| 3 | 30 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 6 | 60 | 60 | 80 | 70 | | | |
| 7 | 10 | 10 | 20 | 20 | | | |
| 8 | 70 | 80 | 90 | 80 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 60 | | | |
| 11 | 70 | 70 | 90 | 60 | | | |
| 12 | 70 | 70 | 90 | 90 | | | |
| 3. Cost | | | | | | | |
| Rapid decision making | 65.83 | 81.25 | 80.83 | 92.92 | | 0.621 | 0.000 |
| 1 | 80 | 80 | 90 | 95 | | | |
| 2 | 60 | 75 | 80 | 90 | | | |
| 3 | 30 | 80 | 60 | 100 | | | |
| 4 | 90 | 90 | 90 | 100 | | | |
| 5 | 70 | 80 | 80 | 90 | | | |
| 6 | 60 | 70 | 70 | 80 | | | |
| 7 | 80 | 80 | 60 | 60 | | | |
| 8 | 70 | 80 | 100 | 100 | | | |
| 9 | 90 | 100 | 100 | 110 | | | |
| 10 | 20 | 80 | 60 | 100 | | | |
| 11 | 60 | 80 | 80 | 90 | | | |
| 12 | 80 | 80 | 100 | 100 | | | |
| Cash flow certainty | 75.00 | 95.00 | 85.42 | 83.33 | | 0.422 | 0.002 |
| 1 | 90 | 100 | 90 | 90 | | | |
| 2 | 70 | 80 | 85 | 80 | | | |
| 3 | 30 | 100 | 80 | 60 | | | |
| 4 | 90 | 100 | 90 | 90 | | | |
| 5 | 80 | 90 | 80 | 80 | | | |
| 6 | 70 | 80 | 80 | 80 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 80 | 90 | 100 | 100 | | | |
| 9 | 100 | 110 | 100 | 100 | | | |
| 10 | 20 | 100 | 80 | 60 | | | |
| 11 | 70 | 90 | 60 | 80 | | | |
| 12 | 100 | 100 | 80 | 80 | | | |
| Precise project budget estimate | 94.17 | 76.67 | 82.08 | 91.67 | | 0.361 | 0.005 |
| 1 | 100 | 80 | 90 | 100 | | | |
| 2 | 80 | 80 | 85 | 90 | | | |
| 3 | 100 | 30 | 60 | 80 | | | |
| 4 | 100 | 90 | 90 | 100 | | | |
| 5 | 90 | 80 | 90 | 90 | | | |
| 6 | 90 | 70 | 90 | 90 | | | |
| 7 | 80 | 100 | 60 | 80 | | | |
| 8 | 90 | 100 | 100 | 100 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 9 | 110 | 100 | 110 | 110 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 90 | 80 | 60 | 90 | | | |
| 12 | 100 | 90 | 90 | 90 | | | |
| Over budget possibility | 80.00 | 56.67 | 79.17 | 83.33 | | 0.531 | 0.000 |
| 1 | 90 | 70 | 90 | 90 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 100 | 20 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 80 | 60 | 80 | 90 | | | |
| 6 | 80 | 50 | 80 | 80 | | | |
| 7 | 40 | 40 | 40 | 40 | | | |
| 8 | 80 | 80 | 90 | 100 | | | |
| 9 | 100 | 80 | 100 | 110 | | | |
| 10 | 100 | 20 | 60 | 80 | | | |
| 11 | 60 | 60 | 80 | 60 | | | |
| 12 | 70 | 50 | 100 | 100 | | | |
| 4. Quality | | | | | | | |
| Material quality | 80.00 | 66.67 | 91.67 | 75.00 | | 0.580 | 0.000 |
| 1 | 80 | 70 | 90 | 80 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 80 | 70 | 90 | 80 | | | |
| 6 | 80 | 80 | 90 | 70 | | | |
| 7 | 80 | 80 | 60 | 40 | | | |
| 8 | 70 | 80 | 100 | 80 | | | |
| 9 | 100 | 90 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 80 | 70 | 90 | 80 | | | |
| 12 | 70 | 70 | 90 | 80 | | | |
| Construction quality plan | 65.00 | 75.00 | 93.33 | 85.00 | | 0.666 | 0.000 |
| 1 | 80 | 80 | 90 | 90 | | | |
| 2 | 70 | 60 | 90 | 80 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 60 | 70 | 90 | 90 | | | |
| 7 | 80 | 100 | 80 | 60 | | | |
| 8 | 70 | 80 | 90 | 80 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 70 | 70 | 90 | 90 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 12 | 60 | 70 | 90 | 80 | | | |
| Contracted work quality | 71.67 | 80.83 | 95.83 | 90.42 | | 0.810 | 0.000 |
| 1 | 80 | 90 | 100 | 100 | | | |
| 2 | 80 | 80 | 90 | 90 | | | |
| 3 | 30 | 60 | 100 | 80 | | | |
| 4 | 90 | 90 | 100 | 100 | | | |
| 5 | 80 | 80 | 90 | 90 | | | |
| 6 | 70 | 80 | 90 | 90 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 70 | 90 | 100 | 85 | | | |
| 9 | 100 | 100 | 110 | 110 | | | |
| 10 | 20 | 60 | 100 | 80 | | | |
| 11 | 80 | 80 | 90 | 90 | | | |
| 12 | 80 | 80 | 100 | 90 | | | |
| 5. Contract-admin | | | | | | | |
| City planning regulations | 74.17 | 82.50 | 74.17 | 81.67 | | 0.149 | 0.146 |
| 1 | 80 | 90 | 80 | 90 | | | |
| 2 | 70 | 70 | 80 | 80 | | | |
| 3 | 60 | 100 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 80 | 80 | 80 | 80 | | | |
| 6 | 70 | 70 | 80 | 70 | | | |
| 7 | 40 | 60 | 60 | 60 | | | |
| 8 | 80 | 80 | 80 | 80 | | | |
| 9 | 100 | 100 | 100 | 100 | | | |
| 10 | 60 | 100 | 20 | 80 | | | |
| 11 | 80 | 70 | 70 | 80 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| Mutual-trusting relationships | 60.00 | 70.00 | 85.00 | 75.42 | | 0.672 | 0.000 |
| 1 | 70 | 80 | 90 | 85 | | | |
| 2 | 60 | 70 | 70 | 70 | | | |
| 3 | 20 | 60 | 100 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 70 | 70 | 80 | 70 | | | |
| 7 | 20 | 20 | 20 | 20 | | | |
| 8 | 80 | 80 | 90 | 80 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 70 | 70 | 90 | 80 | | | |
| 12 | 60 | 60 | 90 | 90 | | | |
| 6. Human resource | | | | | | | |
| Team communication | 76.67 | 67.08 | 95.83 | 92.50 | | 0.937 | 0.000 |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 1 | 90 | 85 | 100 | 100 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 80 | 80 | 90 | 90 | | | |
| 5 | 80 | 70 | 90 | 90 | | | |
| 6 | 70 | 60 | 90 | 90 | | | |
| 7 | 90 | 90 | 100 | 100 | | | |
| 8 | 90 | 90 | 100 | 100 | | | |
| 9 | 100 | 90 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 70 | 90 | 90 | | | |
| 12 | 70 | 70 | 100 | 100 | | | |
| Leadership-team management | 64.58 | 77.50 | 92.50 | 79.17 | | 0.787 | 0.000 |
| 1 | 90 | 90 | 100 | 90 | | | |
| 2 | 60 | 70 | 90 | 70 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 80 | 80 | 90 | 80 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 70 | 70 | 90 | 80 | | | |
| 7 | 50 | 40 | 60 | 60 | | | |
| 8 | 75 | 80 | 100 | 100 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 70 | 80 | 90 | 80 | | | |
| 12 | 80 | 80 | 90 | 90 | | | |
| Motivation for project | 66.67 | 54.58 | 84.17 | 84.17 | | 0.797 | 0.000 |
| 1 | 80 | 70 | 90 | 90 | | | |
| 2 | 70 | 50 | 80 | 80 | | | |
| 3 | 60 | 20 | 90 | 80 | | | |
| 4 | 80 | 80 | 90 | 90 | | | |
| 5 | 70 | 60 | 90 | 90 | | | |
| 6 | 70 | 50 | 80 | 80 | | | |
| 7 | 40 | 40 | 40 | 40 | | | |
| 8 | 70 | 75 | 90 | 90 | | | |
| 9 | 90 | 80 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 60 | 60 | 90 | | | |
| 12 | 50 | 50 | 90 | 90 | | | |
| Monitoring and feedback | 58.33 | 68.33 | 92.50 | 77.50 | | 0.805 | 0.000 |
| 1 | 70 | 70 | 100 | 90 | | | |
| 2 | 60 | 70 | 90 | 70 | | | |
| 3 | 30 | 80 | 100 | 60 | | | |
| 4 | 80 | 80 | 90 | 80 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 5 | 60 | 70 | 90 | 80 | | | |
| 6 | 70 | 60 | 90 | 80 | | | |
| 7 | 60 | 50 | 80 | 80 | | | |
| 8 | 70 | 70 | 80 | 80 | | | |
| 9 | 80 | 90 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 60 | 60 | 90 | 70 | | | |
| 12 | 40 | 40 | 90 | 80 | | | |
| Skilled personnel | 70.00 | 62.50 | 91.67 | 89.17 | | 0.695 | 0.000 |
| 1 | 80 | 80 | 100 | 100 | | | |
| 2 | 60 | 60 | 90 | 70 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 80 | 80 | 90 | 90 | | | |
| 5 | 70 | 60 | 90 | 90 | | | |
| 6 | 70 | 70 | 90 | 90 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 70 | 80 | 100 | 100 | | | |
| 9 | 90 | 80 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 50 | 50 | 40 | 70 | | | |
| 12 | 50 | 50 | 90 | 90 | | | |
| 7. Risk | | | | | | | |
| Risk identification | 82.08 | 61.67 | 96.67 | 88.33 | | 0.816 | 0.000 |
| 1 | 95 | 80 | 100 | 100 | | | |
| 2 | 70 | 60 | 80 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 80 | 60 | 90 | 90 | | | |
| 6 | 70 | 60 | 90 | 90 | | | |
| 7 | 100 | 80 | 100 | 100 | | | |
| 8 | 80 | 70 | 100 | 100 | | | |
| 9 | 100 | 80 | 110 | 110 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 80 | 60 | 90 | 90 | | | |
| 12 | 60 | 60 | 100 | 90 | | | |
| Risk response | 74.17 | 67.50 | 96.67 | 92.08 | | 0.840 | 0.000 |
| 1 | 85 | 80 | 100 | 100 | | | |
| 2 | 75 | 60 | 80 | 80 | | | |
| 3 | 60 | 20 | 100 | 80 | | | |
| 4 | 90 | 90 | 100 | 100 | | | |
| 5 | 70 | 70 | 90 | 90 | | | |
| 6 | 70 | 70 | 90 | 90 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 8 | 70 | 80 | 100 | 95 | | | |
| 9 | 90 | 90 | 110 | 110 | | | |
| 10 | 60 | 20 | 100 | 80 | | | |
| 11 | 60 | 70 | 90 | 90 | | | |
| 12 | 60 | 60 | 100 | 90 | | | |
| Coordination with subcontractors | 64.58 | 75.00 | 94.17 | 81.67 | | 0.750 | 0.000 |
| 1 | 75 | 80 | 90 | 80 | | | |
| 2 | 60 | 70 | 90 | 80 | | | |
| 3 | 30 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 70 | 70 | 90 | 80 | | | |
| 6 | 70 | 70 | 90 | 90 | | | |
| 7 | 80 | 60 | 80 | 80 | | | |
| 8 | 70 | 90 | 100 | 90 | | | |
| 9 | 90 | 90 | 110 | 100 | | | |
| 10 | 20 | 80 | 100 | 60 | | | |
| 11 | 60 | 60 | 90 | 80 | | | |
| 12 | 60 | 60 | 90 | 90 | | | |
| Risk management techniques | 68.33 | 57.50 | 84.17 | 77.50 | | 0.576 | 0.000 |
| 1 | 70 | 70 | 80 | 80 | | | |
| 2 | 60 | 60 | 90 | 80 | | | |
| 3 | 80 | 20 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 60 | 90 | 80 | | | |
| 6 | 70 | 60 | 80 | 80 | | | |
| 7 | 40 | 40 | 40 | 40 | | | |
| 8 | 80 | 70 | 100 | 90 | | | |
| 9 | 90 | 80 | 110 | 100 | | | |
| 10 | 80 | 20 | 100 | 60 | | | |
| 11 | 30 | 60 | 40 | 80 | | | |
| 12 | 60 | 60 | 90 | 90 | | | |
| Financial stability of client | 70.00 | 85.83 | 76.67 | 85.00 | | 0.450 | 0.001 |
| 1 | 80 | 80 | 80 | 80 | | | |
| 2 | 70 | 80 | 80 | 80 | | | |
| 3 | 40 | 100 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 80 | 90 | | | |
| 6 | 70 | 70 | 80 | 90 | | | |
| 7 | 80 | 80 | 80 | 80 | | | |
| 8 | 70 | 100 | 90 | 90 | | | |
| 9 | 90 | 100 | 100 | 110 | | | |
| 10 | 60 | 100 | 60 | 80 | | | |
| 11 | 30 | 60 | 30 | 60 | | | |

**ti it actors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 12 | 90 | 90 | 90 | 90 | | | |
| 8. Health and safety | | | | | | | |
| Management of work safety on site | 80.00 | 85.00 | 95.00 | 87.50 | | 0.409 | 0.002 |
| 1 | 80 | 90 | 90 | 90 | | | |
| 2 | 90 | 90 | 90 | 90 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 100 | 90 | | | |
| 5 | 80 | 80 | 90 | 90 | | | |
| 6 | 80 | 70 | 90 | 90 | | | |
| 7 | 100 | 100 | 100 | 100 | | | |
| 8 | 100 | 100 | 100 | 100 | | | |
| 9 | 100 | 100 | 110 | 110 | | | |
| 10 | 60 | 80 | 100 | 60 | | | |
| 11 | 80 | 60 | 90 | 90 | | | |
| 12 | 80 | 80 | 80 | 80 | | | |
| Hazard identification | 72.50 | 80.00 | 88.33 | 81.67 | | 0.310 | 0.011 |
| 1 | 90 | 90 | 90 | 90 | | | |
| 2 | 70 | 70 | 80 | 70 | | | |
| 3 | 20 | 80 | 100 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 90 | 80 | | | |
| 6 | 70 | 70 | 80 | 80 | | | |
| 7 | 80 | 60 | 80 | 100 | | | |
| 8 | 80 | 100 | 100 | 90 | | | |
| 9 | 90 | 100 | 110 | 100 | | | |
| 10 | 60 | 60 | 100 | 60 | | | |
| 11 | 70 | 80 | 60 | 80 | | | |
| 12 | 80 | 80 | 80 | 80 | | | |
| Health and safety records | 58.75 | 73.33 | 65.42 | 69.17 | | 0.384 | 0.003 |
| 1 | 55 | 60 | 65 | 70 | | | |
| 2 | 60 | 60 | 60 | 60 | | | |
| 3 | 20 | 100 | 60 | 80 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 60 | 80 | 70 | 80 | | | |
| 6 | 60 | 70 | 70 | 70 | | | |
| 7 | 10 | 10 | 10 | 10 | | | |
| 8 | 90 | 90 | 90 | 90 | | | |
| 9 | 80 | 100 | 90 | 100 | | | |
| 10 | 60 | 80 | 60 | 60 | | | |
| 11 | 40 | 60 | 40 | 40 | | | |
| 12 | 80 | 80 | 80 | 80 | | | |
| Management responsibility | 65.83 | 78.33 | 74.17 | 72.50 | | 0.326 | 0.008 |
| 1 | 60 | 70 | 70 | 70 | | | |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 2 | 80 | 80 | 80 | 80 | | | |
| 3 | 20 | 100 | 80 | 60 | | | |
| 4 | 90 | 90 | 90 | 90 | | | |
| 5 | 70 | 80 | 80 | 80 | | | |
| 6 | 70 | 70 | 80 | 80 | | | |
| 7 | 30 | 30 | 30 | 30 | | | |
| 8 | 100 | 100 | 100 | 100 | | | |
| 9 | 90 | 100 | 100 | 100 | | | |
| 10 | 60 | 80 | 60 | 60 | | | |
| 11 | 40 | 60 | 40 | 40 | | | |
| 12 | 80 | 80 | 80 | 80 | | | |

Appendix 4.2 – Table 12 - Results of Delphi Stage D - Parameters and Utility Factors - Summary

Round D Round D

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | |
| Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | | 0.554 | 0.000 |
| Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | | 0.910 | 0.000 |
| Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | | 0.812 | 0.000 |
| Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | | 0.590 | 0.000 |
| Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | | 0.484 | 0.001 |
| 2. Ensure effective project management and delivery | | | | | | | |
| Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | | 0.872 | 0.000 |
| Construction Industry Standard KPIs | 59.17 | 68.33 | 74.17 | 65.42 | | 0.182 | 0.087 |
| Project Management Guidelines - Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | | 0.859 | 0.000 |
| 3. Achieve the required financial performance | | | | | | | |
| Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | | 0.709 | 0.000 |
| Payback | 73.33 | 86.25 | 69.17 | 80.42 | | 0.461 | 0.001 |
| Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | | 0.240 | 0.035 |
| Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | | 0.779 | 0.000 |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | |
| Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | | 0.628 | 0.000 |
| Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | | 0.555 | 0.000 |
| Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | | 0.897 | 0.000 |
| 5. Impact positively on the location of the facility | | | | | | | |
| Company image | 72.50 | 50.83 | 90.00 | 69.17 | | 0.767 | 0.000 |
| Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | | 0.447 | 0.001 |
| Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | | 0.587 | 0.000 |
| 6. Comply with third party requirements | | | | | | | |
| Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | | 0.398 | 0.002 |
| Public survey | 54.17 | 69.17 | 78.33 | 78.75 | | 0.604 | 0.000 |
| 1. Scope | | | | | | | |
| Clarity of contract | 74.17 | 77.92 | 91.67 | 76.67 | | 0.402 | 0.002 |
| Effective preplanning | 69.17 | 71.67 | 95.83 | 88.33 | | 0.688 | 0.000 |
| Project levels of decision making | 74.17 | 55.83 | 89.17 | 93.33 | | 0.803 | 0.000 |
| Understanding of project requirements | 80.83 | 63.33 | 97.08 | 94.58 | | 0.928 | 0.000 |
| 2. Time | | | | | | | |
| Project time constraints | 70.83 | 83.33 | 84.58 | 94.17 | | 0.652 | 0.000 |
| Constraint by government regulations | 61.67 | 78.33 | 79.17 | 85.83 | | 0.688 | 0.000 |
| Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | | 0.656 | 0.000 |
| Overrun duration | 61.67 | 71.67 | 87.50 | 77.50 | | 0.703 | 0.000 |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| Adequacy of time | 60.00 | 68.33 | 85.83 | 74.17 | | 0.678 | 0.000 |
| 3. Cost | | | | | | | |
| Rapid decision making | 65.83 | 81.25 | 80.83 | 92.92 | | 0.621 | 0.000 |
| Cash flow certainty | 75.00 | 95.00 | 85.42 | 83.33 | | 0.422 | 0.002 |
| Precise project budget estimate | 94.17 | 76.67 | 82.08 | 91.67 | | 0.361 | 0.005 |
| Over budget possibility | 80.00 | 56.67 | 79.17 | 83.33 | | 0.531 | 0.000 |
| 4. Quality | | | | | | | |
| Material quality | 80.00 | 66.67 | 91.67 | 75.00 | | 0.580 | 0.000 |
| Construction quality plan | 65.00 | 75.00 | 93.33 | 85.00 | | 0.666 | 0.000 |
| Contracted work quality | 71.67 | 80.83 | 95.83 | 90.42 | | 0.810 | 0.000 |
| 5. Contract-admin | | | | | | | |
| City planning regulations | 74.17 | 82.50 | 74.17 | 81.67 | | 0.149 | 0.146 |
| Mutual-trusting relationships | 60.00 | 70.00 | 85.00 | 75.42 | | 0.672 | 0.000 |
| 6. Human resource | | | | | | | |
| Team communication | 76.67 | 67.08 | 95.83 | 92.50 | | 0.937 | 0.000 |
| Leadership-team management | 64.58 | 77.50 | 92.50 | 79.17 | | 0.787 | 0.000 |
| Motivation for project | 66.67 | 54.58 | 84.17 | 84.17 | | 0.797 | 0.000 |
| Monitoring and feedback | 58.33 | 68.33 | 92.50 | 77.50 | | 0.805 | 0.000 |
| Skilled personnel | 70.00 | 62.50 | 91.67 | 89.17 | | 0.695 | 0.000 |
| 7. Risk | | | | | | | |
| Risk identification | 82.08 | 61.67 | 96.67 | 88.33 | | 0.816 | 0.000 |
| Risk response | 74.17 | 67.50 | 96.67 | 92.08 | | 0.840 | 0.000 |
| Coordination with subcontractors | 64.58 | 75.00 | 94.17 | 81.67 | | 0.750 | 0.000 |
| Risk management techniques | 68.33 | 57.50 | 84.17 | 77.50 | | 0.576 | 0.000 |
| Financial stability of client | 70.00 | 85.83 | 76.67 | 85.00 | | 0.450 | 0.001 |
| 8. Health and safety | | | | | | | |
| Management of work safety on site | 80.00 | 85.00 | 95.00 | 87.50 | | 0.409 | 0.002 |
| Hazard identification | 72.50 | 80.00 | 88.33 | 81.67 | | 0.310 | 0.011 |
| Health and safety records | 58.75 | 73.33 | 65.42 | 69.17 | | 0.384 | 0.003 |
| Management responsibility | 65.83 | 78.33 | 74.17 | 72.50 | | 0.326 | 0.008 |

Appendix 4.2 – Table 13 - Results of Delphi Stage D - Parameters and Utility Factors - Improvement in last round

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Round C Kendall's W | Round C Asymptotic Significance | Round D Kendall's W | Round D Asymptotic Significance | % improvement |
|---|---|---|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | | | | |
| 1. Maximize business effectiveness | | | | | | | | | | |
| Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | | 0.554 | 0.000 | 0.554 | 0.000 | 0.00% |
| Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | | 0.820 | 0.000 | 0.910 | 0.000 | 9.89% |
| Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | | 0.685 | 0.000 | 0.812 | 0.000 | 15.64% |
| Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | | 0.636 | 0.000 | 0.590 | 0.000 | -7.80% |
| Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | | 0.343 | 0.006 | 0.484 | 0.001 | 29.13% |
| 2. Ensure effective project management and delivery | | | | | | | | | | |
| Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | | 0.491 | 0.001 | 0.872 | 0.000 | 43.69% |
| Construction Industry Standard KPIs | 59.17 | 68.33 | 74.17 | 65.42 | | 0.116 | 0.243 | 0.182 | 0.087 | 36.26% |
| Project Management Guidelines - Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | | 0.611 | 0.000 | 0.859 | 0.000 | 28.87% |
| 3. Achieve the required financial performance | | | | | | | | | | |
| Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | | 0.327 | 0.008 | 0.709 | 0.000 | 53.88% |
| Payback | 73.33 | 86.25 | 69.17 | 80.42 | | 0.028 | 0.018 | 0.461 | 0.001 | 93.93% |
| Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | | 0.083 | 0.392 | 0.240 | 0.035 | 65.42% |
| Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | | 0.587 | 0.000 | 0.779 | 0.000 | 24.65% |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | | | | |
| Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | | 0.454 | 0.001 | 0.628 | 0.000 | 27.71% |
| Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | | 0.423 | 0.002 | 0.555 | 0.000 | 23.78% |
| Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | | 0.680 | 0.000 | 0.897 | 0.000 | 24.19% |
| 5. Impact positively on the location of the facility | | | | | | | | | | |
| Company image | 72.50 | 50.83 | 90.00 | 69.17 | | 0.550 | 0.000 | 0.767 | 0.000 | 28.29% |
| Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | | 0.238 | 0.035 | 0.447 | 0.001 | 46.76% |
| Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | | 0.386 | 0.003 | 0.587 | 0.000 | 34.24% |

**Utility Factors**

| arameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance | Kendall's W | Asymptotic Significance | % improvement |
|---|---|---|---|---|---|---|---|---|---|---|
| 6. Comply with third party requirements | | | | | | | | | | |
| Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | | 0.266 | 0.022 | 0.398 | 0.002 | 33.17% |
| Public survey | 54.17 | 69.17 | 78.33 | 78.75 | | 0.413 | 0.002 | 0.604 | 0.000 | 31.62% |
| 1. Scope | | | | | | | | | | |
| Clarity of contract | 74.17 | 77.92 | 91.67 | 76.67 | | 0.278 | 0.018 | 0.402 | 0.002 | 30.85% |
| Effective preplanning | 69.17 | 71.67 | 95.83 | 88.33 | | 0.526 | 0.000 | 0.688 | 0.000 | 23.55% |
| Project levels of decision making | 74.17 | 55.83 | 89.17 | 93.33 | | 0.728 | 0.000 | 0.803 | 0.000 | 9.34% |
| Understanding of project requirements | 80.83 | 63.33 | 97.08 | 94.58 | | 0.771 | 0.000 | 0.928 | 0.000 | 16.92% |
| 2. Time | | | | | | | | | | |
| Project time constraints | 70.83 | 83.33 | 84.58 | 94.17 | | 0.327 | 0.008 | 0.652 | 0.000 | 49.85% |
| Constraint by government regulations | 61.67 | 78.33 | 79.17 | 85.83 | | 0.409 | 0.002 | 0.688 | 0.000 | 40.55% |
| Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | | 0.370 | 0.004 | 0.656 | 0.000 | 43.60% |
| Overrun duration | 61.67 | 71.67 | 87.50 | 77.50 | | 0.419 | 0.002 | 0.703 | 0.000 | 40.40% |
| Adequacy of time | 60.00 | 68.33 | 85.83 | 74.17 | | 0.571 | 0.000 | 0.678 | 0.000 | 15.78% |
| 3. Cost | | | | | | | | | | |
| Rapid decision making | 65.83 | 81.25 | 80.83 | 92.92 | | 0.378 | 0.003 | 0.621 | 0.000 | 39.13% |
| Cash flow certainty | 75.00 | 95.00 | 85.42 | 83.33 | | 0.258 | 0.026 | 0.422 | 0.002 | 38.86% |
| Precise project budget estimate | 94.17 | 76.67 | 82.08 | 91.67 | | 0.344 | 0.006 | 0.361 | 0.005 | 4.71% |
| Over budget possibility | 80.00 | 56.67 | 79.17 | 83.33 | | 0.488 | 0.001 | 0.531 | 0.000 | 8.10% |
| 4. Quality | | | | | | | | | | |
| Material quality | 80.00 | 66.67 | 91.67 | 75.00 | | 0.332 | 0.007 | 0.580 | 0.000 | 42.76% |
| Construction quality plan | 65.00 | 75.00 | 93.33 | 85.00 | | 0.533 | 0.000 | 0.666 | 0.000 | 19.97% |
| Contracted work quality | 71.67 | 80.83 | 95.83 | 90.42 | | 0.606 | 0.000 | 0.810 | 0.000 | 25.19% |
| 5. Contract-admin | | | | | | | | | | |
| City planning regulations | 74.17 | 82.50 | 74.17 | 81.67 | | 0.054 | 0.583 | 0.149 | 0.146 | 63.76% |
| Mutual-trusting relationships | 60.00 | 70.00 | 85.00 | 75.42 | | 0.516 | 0.000 | 0.672 | 0.000 | 23.21% |
| 6. Human resource | | | | | | | | | | |
| Team communication | 76.67 | 67.08 | 95.83 | 92.50 | | 0.666 | 0.000 | 0.937 | 0.000 | 28.92% |
| Leadership-team management | 64.58 | 77.50 | 92.50 | 79.17 | | 0.494 | 0.000 | 0.787 | 0.000 | 37.23% |

| Utility Factors | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall's W | Asymptotic Significance | Kendall's W | Asymptotic Significance | % improvement |
|---|---|---|---|---|---|---|---|---|---|---|
| **arameters** | | | | | | | | | | |
| Motivation for project | 66.67 | 54.58 | 84.17 | 84.17 | | 0.636 | 0.000 | 0.797 | 0.000 | 20.20% |
| Monitoring and feedback | 58.33 | 68.33 | 92.50 | 77.50 | | 0.645 | 0.000 | 0.805 | 0.000 | 19.88% |
| Skilled personnel | 70.00 | 62.50 | 91.67 | 89.17 | | 0.424 | 0.002 | 0.695 | 0.000 | 38.99% |
| 7. Risk | | | | | | | | | | |
| Risk identification | 82.08 | 61.67 | 96.67 | 88.33 | | 0.652 | 0.000 | 0.816 | 0.000 | 20.10% |
| Risk response | 74.17 | 67.50 | 96.67 | 92.08 | | 0.683 | 0.000 | 0.840 | 0.000 | 18.69% |
| Coordination with subcontractors | 64.58 | 75.00 | 94.17 | 81.67 | | 0.663 | 0.000 | 0.750 | 0.000 | 11.60% |
| Risk management techniques | 68.33 | 57.50 | 84.17 | 77.50 | | 0.508 | 0.000 | 0.576 | 0.000 | 11.81% |
| Financial stability of client | 70.00 | 85.83 | 76.67 | 85.00 | | 0.376 | 0.004 | 0.450 | 0.001 | 16.44% |
| 8. Health and safety | | | | | | | | | | |
| Management of work safety on site | 80.00 | 85.00 | 95.00 | 87.50 | | 0.414 | 0.002 | 0.409 | 0.002 | -1.22% |
| Hazard identification | 72.50 | 80.00 | 88.33 | 81.67 | | 0.303 | 0.012 | 0.310 | 0.011 | 2.26% |
| Health and safety records | 58.75 | 73.33 | 65.42 | 69.17 | | 0.346 | 0.006 | 0.384 | 0.003 | 9.90% |
| Management responsibility | 65.83 | 78.33 | 74.17 | 72.50 | | 0.324 | 0.009 | 0.326 | 0.008 | 0.61% |

**Utility Factors**

| Parameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | | | | | | | |
| Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | | 0.554 | 0.000 |
| Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | | 0.910 | 0.000 |
| Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | | 0.812 | 0.000 |
| Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | | 0.590 | 0.000 |
| Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | | 0.484 | 0.001 |
| 2. Ensure effective project management and delivery | | | | | | | |
| Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | | 0.872 | 0.000 |
| Project Management Guidelines - Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | | 0.859 | 0.000 |
| 3. Achieve the required financial performance | | | | | | | |
| Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | | 0.709 | 0.000 |
| Payback | 73.33 | 86.25 | 69.17 | 80.42 | | 0.461 | 0.001 |
| Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | | 0.240 | 0.035 |
| Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | | 0.779 | 0.000 |
| 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | | |
| Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | | 0.628 | 0.000 |
| Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | | 0.555 | 0.000 |
| Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | | 0.897 | 0.000 |
| 5. Impact positively on the location of the facility | | | | | | | |
| Company image | 72.50 | 50.83 | 90.00 | 69.17 | | 0.767 | 0.000 |
| Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | | 0.447 | 0.001 |
| Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | | 0.587 | 0.000 |
| 6. Comply with third party requirements | | | | | | | |
| Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | | 0.398 | 0.002 |
| Public survey | 54.17 | 69.17 | 78.33 | 78.75 | | 0.604 | 0.000 |
| 1. Scope | | | | | | | |
| Clarity of contract | 74.17 | 77.92 | 91.67 | 76.67 | | 0.402 | 0.002 |
| Effective preplanning | 69.17 | 71.67 | 95.83 | 88.33 | | 0.688 | 0.000 |
| Project levels of decision making | 74.17 | 55.83 | 89.17 | 93.33 | | 0.803 | 0.000 |
| Understanding of project requirements | 80.83 | 63.33 | 97.08 | 94.58 | | 0.928 | 0.000 |
| 2. Time | | | | | | | |
| Project time constraints | 70.83 | 83.33 | 84.58 | 94.17 | | 0.652 | 0.000 |
| Constraint by government regulations | 61.67 | 78.33 | 79.17 | 85.83 | | 0.688 | 0.000 |
| Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | | 0.656 | 0.000 |
| Overrun duration | 61.67 | 71.67 | 87.50 | 77.50 | | 0.703 | 0.000 |
| Adequacy of time | 60.00 | 68.33 | 85.83 | 74.17 | | 0.678 | 0.000 |
| 3. Cost | | | | | | | |
| Rapid decision making | 65.83 | 81.25 | 80.83 | 92.92 | | 0.621 | 0.000 |
| Cash flow certainty | 75.00 | 95.00 | 85.42 | 83.33 | | 0.422 | 0.002 |
| Precise project budget estimate | 94.17 | 76.67 | 82.08 | 91.67 | | 0.361 | 0.005 |
| Over budget possibility | 80.00 | 56.67 | 79.17 | 83.33 | | 0.531 | 0.000 |

**Utility Factors**

| Parameters | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | | Kendall`s W | Asymptotic Significance |
|---|---|---|---|---|---|---|---|
| 4. Quality | | | | | | | |
| Material quality | 80.00 | 66.67 | 91.67 | 75.00 | | 0.580 | 0.000 |
| Construction quality plan | 65.00 | 75.00 | 93.33 | 85.00 | | 0.666 | 0.000 |
| Contracted work quality | 71.67 | 80.83 | 95.83 | 90.42 | | 0.810 | 0.000 |
| 5. Contract-admin | | | | | | | |
| Mutual-trusting relationships | 60.00 | 70.00 | 85.00 | 75.42 | | 0.672 | 0.000 |
| 6. Human resource | | | | | | | |
| Team communication | 76.67 | 67.08 | 95.83 | 92.50 | | 0.937 | 0.000 |
| Leadership-team management | 64.58 | 77.50 | 92.50 | 79.17 | | 0.787 | 0.000 |
| Motivation for project | 66.67 | 54.58 | 84.17 | 84.17 | | 0.797 | 0.000 |
| Monitoring and feedback | 58.33 | 68.33 | 92.50 | 77.50 | | 0.805 | 0.000 |
| Skilled personnel | 70.00 | 62.50 | 91.67 | 89.17 | | 0.695 | 0.000 |
| 7. Risk | | | | | | | |
| Risk identification | 82.08 | 61.67 | 96.67 | 88.33 | | 0.816 | 0.000 |
| Risk response | 74.17 | 67.50 | 96.67 | 92.08 | | 0.840 | 0.000 |
| Coordination with subcontractors | 64.58 | 75.00 | 94.17 | 81.67 | | 0.750 | 0.000 |
| Risk management techniques | 68.33 | 57.50 | 84.17 | 77.50 | | 0.576 | 0.000 |
| Financial stability of client | 70.00 | 85.83 | 76.67 | 85.00 | | 0.450 | 0.001 |
| 8. Health and safety | | | | | | | |
| Management of work safety on site | 80.00 | 85.00 | 95.00 | 87.50 | | 0.409 | 0.002 |
| Hazard identification | 72.50 | 80.00 | 88.33 | 81.67 | | 0.310 | 0.011 |
| Health and safety records | 58.75 | 73.33 | 65.42 | 69.17 | | 0.384 | 0.003 |
| Management responsibility | 65.83 | 78.33 | 74.17 | 72.50 | | 0.326 | 0.008 |

## Appendix 6 - 12 international Projects selected for Value Management workshops with key characteristics

| | Client | Sector | Client Representatives |
|---|---|---|---|
| Project No. 1 | Government and Private–international | Industrial (Factory) – Reconstruction and new construction | (1) Project Manager, (2) General Manager |
| Project No. 2 | Private–international corporation | Commercial (Bank) – New construction | (1) Project Manager, (2) Head Real Estate Department |
| Project No. 3 | Private–international corporation | Commercial (Office buildings) – New construction | (1) Owner, (2) Managing Director, (3) Authorized Representative |
| Project No. 4 | Private–international & local joint venture | Commercial (Apartments & Offices) – New construction | (1) Executive Director, (2) Project Director, (3) Project Manager, (4) Owner representative, (5) Tenant coordinator |
| Project No. 5 | Private–international & local joint venture | Commercial (Hotel and Medical resort) – New construction | (1) Executive Director, (2) Project Director, (3) Project Manager, (4) Owner Representative, (5) Tenant Coordinator |
| Project No. 6 | Government and Private–international | Commercial (Tourist ski resort Hotels) – New construction | (1) Financial director, (2) Managing Director for Implementation of the Project, (3) Director |
| Project No. 7 | Private–international corporation | Commercial (Hotel resort) – Reconstruction, Cultural Heritage | (1) Project Manager, (2) Project Director, (3) Administration Manager, (4) Financial Manager, (5) Hotel General Manager, (6) Hotel Operations Manager |
| Project No. 8 | Private–international | Commercial – Demolition, New construction | (1) Owner, (2) Project Manager, (3) Head of Financial Depart. (4) Head of Legal Depart. |
| Project No. 9 | Private–international | Commercial – Demolition, New construction | (1) Project Manager, (2) Cost Manager |
| Project No. 10 | Private–international | Commercial – Demolition, New construction | (1) Project Manager, (2) Design Director, (3) Project Manager |
| Project No. 11 | Private–local | Commercial (Shopping mall) – Reconstruction | (1) Executive director, (2) Financial director, (3) Technical services (FM), (4) Operator, (5) Operator |
| Project No. 12 | Private–local | Commercial (Shopping mall) – New construction | (1) Owner, (2) Managing Director |

Appendix 7.1 - Paired Comparison Exercise Guidance

Project No.1: _____
Client: _____
Sector: _____
Project status: _____

Guidance for Facilitator

1. Determine participants who will attend workshops

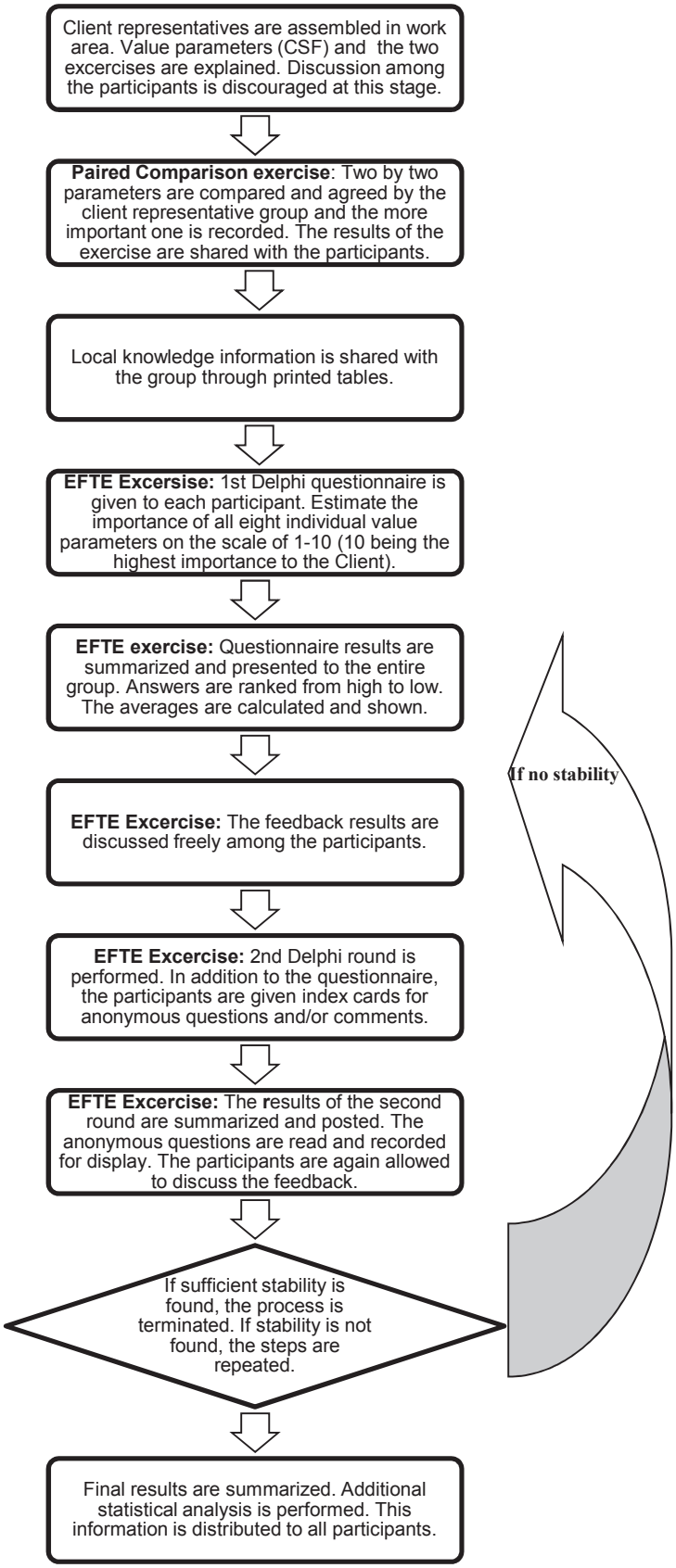
   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   Value Management workshop facilitator name:

   _____

## 2. Value Management Workshop process



3. Establish the project specific value parameters and critical success factors

Value parameters and critical success factors are examined separately. Paired comparison method is used to rank parameters by value (compare two parameters at the time) for both of the groups.
Ask a question: In comparing A. Maximize business effectiveness and B. Ensure effective project management and delivery, what is more important for this project?

| | B | C |
|---|---|---|
| A | X | |
| | | |

If agreed answer is A, then A will be written in the box indicated with X. Then move to next pair - A. & C, A. & D. etc.

Number of occurrences of individual parameters is added and result presented in column score. Percentage weight is calculated for information purposes.

| | B | C | D | E | F | | Score | Weight |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % |
| A | A | C | A | A | A | Maximize business effectiveness | 4 | 26.67 |
| | B | C | D | E | B | Ensure effective project management and delivery | 1 | 6.67 |
| | | C | C | C | C | Achieve the required financial performance | 5 | 33.33 |
| | | | D | D | D | Minimize building operation and maintenance costs, and environmental impact | 3 | 20.00 |
| | | | | E | F | Impact positively on the location of the facility | 1 | 6.67 |
| | | | | | | Comply with third party requirements | 1 | 6.67 |
| | | | | | | | 15 | 100.00 |

| | B | C | D | E | F | G | H | | Score | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % |
| A | B | C | D | A | A | A | A | Scope | 4 | 14.29 |
| | B | C | B | B | B | B | B | Time | 6 | 21.43 |
| | | C | C | C | C | C | C | Cost | 7 | 25.00 |
| | | | D | D | D | D | D | Quality | 5 | 17.86 |
| | | | | E | F | E | H | Contract-admin | 1 | 3.57 |
| | | | | | F | G | H | Human resource | 1 | 3.57 |
| | | | | | | G | G | Risk | 2 | 7.14 |
| | | | | | | | H | Health and safety | 2 | 7.14 |
| | | | | | | | | | 28 | 100.00 |

4. Value Parameters as detailed in NAO (2004)

## 1. MAXIMISE BUSINESS EFFECTIVENESS

Most buildings are built to enable people to conduct specific activities within them. The type of activity undertaken can vary hugely but the building should allow it to be undertaken efficiently, economically and effectively.

Good design should ensure that the building is readily accessible by all who use it, and that the inter-relationship of spaces encourages efficient use. The building should be easily adaptable for future uses and be flexible to accommodate short, medium and long-term changes.

While the costs of owning and operating a building will vary, research has shown that they can be expressed by an approximate ratio of 1:5:2002, where 1 represents the cost of construction; 5 the cost of building operation and maintenance (e.g. lifetime costs of heating and lighting); and 200 the business operating costs (e.g. staff and service delivery costs). With business operating costs outweighing construction costs by as much as 200 times this value driver has a significant impact on whether the building provides long-term value for money.

- The building's suitability for the activities to be conducted within it will include a consideration of the functions it accommodates and the interrelationships between different functional zones and spaces. Circulation spaces should be places in their own right allowing efficient circulation within an uplifting environment. Increasingly there will be spaces in buildings that may be part of the circulation and / or be multi-functional. Evaluating the efficiency that these spaces provide for and how they help the users should be considered.
- The building should provide good access for all who use it. The layout should be legible with clear signage so that it is easy to navigate around the building. The external landscape should contribute to the ease of accessibility. There should be good access to public transport and/or sufficient parking, depending upon the location of the building and facilities for the delivery of goods, and disposal of waste should be safe and secure.
- The building should provide a comfortable, healthy environment. Factors affecting the internal environment include the temperature, air quality, acoustics, space and storage. There should be a good balance of daylight and artificial lighting reflecting the different user requirements. The building systems should be easy to operate by those who are authorised to do so and be robust and efficient.
- The building should easily accommodate any changes in activity that are likely to occur both through its use over the course of a day, week or year, but also into the future as user requirements change. This will include short and medium term changes as well as possible expansion or subdivision.
- Facilities management techniques should be in place to monitor building effectiveness to allow for continuous improvement to meet changing needs.

**Key Questions**

1. Will the building satisfy the operational requirements of the brief? Will it work well? Do spaces in the building have a rationale for their use and design and contribute to the users' requirements, helping them be efficient?
2. Will the building be legible and easy to navigate?
3. Will the design aim to enhance how staff feel and behave, and improve morale and quality of life?
4. Will the building be easily adaptable to meet the future needs of users including expansion and change of use?
5. Are the vision and objectives for the design of the building clearly set out to enable effectiveness to be maintained throughout its life?

Possible metrics
- Unit operating costs
- Productivity per employee
- Revenue per unit area
- Footfall (number of visitors)
- Number of complaints
- Satisfaction Surveys
- Churn costs per person
- Days lost through sick leave
- Recruitment and exit surveys
- Disability Access Reviews
- Utilization surveys

Examples of value metrics
- Net operating cost per unit/employee
- Output/revenue per employee
- Number of staff changes per year
- Visitor/employee ratios
- Speed of transactions
- DQI
- Revenue generated
- % staff working flexibly
- % staff in open plan
- Ratio of staff numbers to desks
- Space utilization ratio
- Productivity rating eg. Using Office Productivity Network Survey

## 2. ENSURE EFFECTIVE PROJECT MANAGEMENT AND DELIVERY

There are opportunities to maximize value and minimize waste at every stage of the construction and procurement process, from the minute that the need for a building is identified to when it is ready for use. Effective management by an integrated project team is essential to achieving this value.

- All Government funded projects should implement the Achieving Excellence in Construction principles. Departments, their Agencies and NDPBs should be able to demonstrate compliance, such as by evidence of the use of OGC's suggested Action Areas to monitor progress.
- Non-expert clients should ensure that they draw on the services of an Independent Client Adviser in the very early stages of the project.
- The project team should be selected because they have the necessary technical competence to produce a building that is well designed and constructed. They should not be selected on the basis of cost alone.
- The project team should exhibit a high level of integration, coordination and communication to cover all aspects of a complex construction project.
- The project team should be involved from the earliest stages of the project.
- In addition to working well together, the project teams should communicate well with all stakeholders. They should involve users, contractors and other members of the supply chain at appropriate times throughout the design and construction of the project to benefit from their expertise.
- The project team should follow recommended best practice for the construction industry.
- The project team should develop a project execution plan, describing what is required from the building (the brief or output specification), the organization of the project team and the plan for executing the project.
- The effectiveness of processes should be assessed using industry standard key performance indicators.
- Gateway reviews should be undertaken at the relevant stages of the project.

### Key Questions

1. Is the project team using Achieving Excellence in Construction procurement guidance to deliver the project?
2. Is the project team:

- An integrated project team that has been selected on the basis of their competence as well as cost;
- Sufficiently skilled and resourced to deliver the project successfully;
- Responsible and accountable for their design inputs?

3. Does the project team demonstrate a commitment to continuous improvement?
4. Has sufficient time been allowed to ensure that the design meets user requirements, that design options and iterations were fully tested and that the client signed off the design at key stages? Was the design and construction process thoroughly planned?
5. Is there effective communication with stakeholders? Has the project team consulted with users, outside bodies, contractors and members of the supply chain?

6. Has the design, construction and delivery programme been complemented by a programme of engagement with users to help them adapt and adopt practices to ensure they get the most value out of the new facility? Has the process helped ensure positive cultural change and development for the client organization?
7. Has the project team considered ease of construction, use of sustainable materials, prefabrication and standardization of elements or processes to achieve better whole-life value?
8. Is the project being procured using one of the three preferred procurement routes?
9. Does the project team regularly measure its effectiveness in terms of process and outcomes?
10. Are Gateway Reviews being applied to the relevant stages of the project?
11. Does the design team apply construction industry best practice?
12. Is there a Project Execution Plan (PEP) describing the key features and organisation of the project? Does the PEP include:

- The project objectives;
- The brief or output specification;
- A project directory;
- A communication plan;
- Lines of decision-making;
- A logic-linked programme?

13. Have all risks been identified and assessed? Is risk being effectively managed? Is risk allocated to appropriate parties?
14. Was the design reviewed by the client and third parties at key stages to test that quality was being offered and delivered?

Possible metrics
- Good project management processes
- Compliance with Improving Standards of Design recommendations (see Appendix D)

Examples of value metrics
- Achieving Excellence Action Areas
- Achieving Excellence strategic targets
- Construction industry standard key performance indicators
- Successful Gateway Reviews

## 3. ACHIEVE THE REQUIRED FINANCIAL PERFORMANCE

This value driver is about the affordability of the building and how to optimize costs and benefits to the organization that uses it. The budgeted cost figure should accurately reflect the optimum balance between the required functionality and the cost of providing it.

- Buildings cost money. To justify their construction the business case should identify how much the organization can afford to invest in the construction, operation, maintenance and eventual disposal of the building in present value terms. It should also account for how the design will impact on the business effectiveness issues considered in value driver 1.
- Regardless of cost, there is a fundamental requirement that the stated design of the building must deliver the functionality required of it. The details of this functionality are described within the other value drivers.
- Buildings that cost more to build and/or run than is budgeted will adversely affect the user business. The budgets for both capital and whole-life costs, should be stated in the business case and be sustainable and affordable over the life of the asset.
- The investment appraisal should address capital and whole-life costs. It should address the various options available for delivering the anticipated benefits and state the whole-life cost of each option.
- Auditors should note that the lowest cost option may not provide the best value for money. The whole-life value of wider benefits generated by an investment in good design may outweigh small differences in initial capital and whole life costs.

### Key Questions

1. Is there a robust business case with a clear and agreed budget that defines the capital and whole-life costs of the building? Are whole-life cost estimates realistic and based on reliable evidence?
2. Is the capital cost estimate affordable and within budget? Are all resources and internal funds in place?
3. Are the building operating and maintenance cost estimates within the budget?
4. Have the integrated project team defined the balance between capital spend and building operating and maintenance costs?
5. Is there a clear brief expressed in the required output terms?
6. Is there a clear statement of the economic and social values to which the project should respond?
7. Does the investment appraisal address various options for delivering the required benefits?
8. Has the decision to proceed taken into account the benefits of good design and whole-life values?
9. Does it compare itself to cost and quality benchmarks?
10. Was the project completed within budget and programme?

Possible metrics
Appropriate financial metrics are:
- Capital Cost
- Building operating and maintenance cost
- Net Present Value
- Internal Rate of Return
- Payback
- Robust business case

Examples of value metrics
- Cost per desk/employee (benchmarked against appropriate comparables)
- Capital Cost (benchmarked against appropriate comparables)
- Net useable area to gross area ratio
- Money per unit area or £ per unit of functional area
- Net Present Value of building
- Whole-life cost of building operation and maintenance

## 4. IMPACT POSITIVELY ON THE LOCALITY

This value driver describes the impact of the building on the surrounding area and the people who use or visit it. Good quality architecture and urban design creates places with distinctive character, streets and public spaces that are safe, accessible, pleasant to use and inspiring. A well designed building will also make a positive social and economic contribution to its immediate neighbourhood and improve communal facilities.

In some cases, positive impact may arise from the very act of rehabilitating a building that had fallen into disrepair, thus demonstrating to the local community that they are worth the effort and investment. It is therefore important to identify the previous use of the building or space, and to take account of the broader benefits to the community.

- Projects should seek to create places, rather than isolated buildings. They should respond to its context with the landscape surrounding it positively contributing to the neighborhood. The joint CABE/DTLR publication, By Design, states the objectives of urban design as being:
  - Character: to promote character in townscape and landscape by responding to and reinforcing locally distinctive patterns of development, landscape and culture.
  - Continuity and enclosure: to promote the continuity of street frontages and the enclosure of space by development, which clearly defines private and public areas.
  - Quality of the public realm: to promote public spaces and routes that are attractive, safe, uncluttered and work effectively for all in society, including disabled and elderly people. – Ease of movement: to promote accessibility and local permeability by making places that connect with each other and are easy to move through, putting people before traffic and integrating land uses and transport.
  - Legibility: to promote legibility through development that provides recognizable routes, intersections and landmarks that people find their way around.
  - Adaptability: to promote adaptability through development that can respond to changing social, technological and economic conditions. – Diversity: to promote diversity and choice through more compatible developments and uses that work together to create viable places that respond to local needs.
- The building's character comprises such issues as the way it looks, whether it a clarity of composition of the building in terms of form, materials used and the quality of the detailing. It should be well detailed and there should be an appropriate use of colour and texture.
- Internally the building should be pleasing to the senses and generate an enjoyable experience. The natural and artificial light in the building should be of high quality, creating patterns that enhance its use. It should capitalize on the views available from its location. Textures and sounds within and around the building should be interesting and help create a pleasing sensory impression of the space.

- Many buildings are designed to convey the occupier's image to the wider public and users alike. It should reflect the occupier's organizational branding, culture and values. The form and general building composition should reflect the purpose for which it is built.
- Many buildings' design and construction may be innovative through the use of new technical solutions, pioneering use of materials or new management techniques. The level of innovation may enhance the image of the organization who sponsored the building through public recognition.

## Key Questions

1. Does the building look good and will it be a positive environment within which to work?
2. Are the plans, sections, elevations and details of the building visibly related to each other and to underlying design ideas?
3. Does the building deliver social and economic benefits for the surrounding community?
4. Does the building enhance the neighborhood and its environment?
5. Does the building make a generous contribution to the public realm, to benefit people in general as well as the building user?
6. Does the building project the image that the occupier/users wish to convey?
7. Is the building design and construction of high quality, including the detailing?
8. Can one imagine the building becoming a cherished part of its setting?

Possible Metrics
- Public or private survey results
- Views of local planning authority
- Views of CABE Design Review Committee
- Design skills of delivery team

Examples of Value Metrics
- The building has won design awards
-Design Quality Indicator

#### 5. MINIMISE OPERATION AND MAINTENANCE COSTS, AND ENVIRONMENTAL IMPACT

This value driver has a significant impact on value for money, second only to business operating costs. It covers impact on the natural environment and issues of sustainability (including the use of sustainable materials in its construction), as well as all those things that the occupier must do to maintain the internal environment, keep it clean and maintain the fabric internally and externally.

- Day to day, the building should be easy to clean, maintain and operate due to its finishes, layout, structure and engineering systems. The design of the building should respond to the site microclimate and should minimise carbon dioxide emissions and the energy consumed for lighting, heating, cooling and ventilation. The effect of future environment change should be considered when designing the building. In the longer term the building's finishes and components should be durable and resist wear and tear, and be easily replaced when necessary. To minimise periodic maintenance, equipment should be robust and easy to service.
- The purposes for which the building and the parts of a building will be used are likely to change over its lifetime. The technologies it contains will change as well. A good design will be flexible – able to accommodate changing requirements without major alterations where possible – and adaptable, that is, capable of being altered or extended conveniently when necessary.
- The methods and materials used in construction should be well thought through, particularly with regard to ease of construction and safety. The building should be designed for minimum waste and energy use during construction. Water should be conserved and strategies for potential pollution from the construction process implemented. Care should be taken to protect and enhance biodiversity during and after construction. The design should take account of ease of demolition and the ability to recycle materials.
- Facilities Managers should be using feedback tools and techniques to actively manage building performance. Wastage can be reduced, sustainability improved and effectiveness maintained through vigilant and active monitoring and management of the building performance.

## Key Questions

1. Will the building be energy efficient?
2. Is the building easy to clean and maintain?
3. Will the building embrace the principles of environmental sustainability and use renewable materials?
4. Have steps been taken to minimize waste and energy use during construction?
5. Are the finishes durable, resisting weather, wear and tear?
6. Will the design take full account of maintenance, operating and disposal costs?
7. Have sustainability requirements been set out in the brief?
8. Will the project comply with current sustainability initiatives?
9. Has the completed project met or exceeded targets for sustainable use of the facility, including utility consumption?

10. Will the building be actively managed using monitoring and user feedback techniques?
11. Will the project location encourage use of public transport?
12. How will the building protect and enhance biodiversity?
13. Has “whole-life cost” assessment been used?
14. Has the project evaluated the competence, resources and commitment of designers and contractors in relation to Health & Safety, training and engagement with local communities?
15. Has the project been carried out under the Considerate Contractors Scheme?

Possible Metrics
- Annual cost of cleaning and maintenance
- Annual cost of heating, cooling and lighting
- Total Occupancy Cost Code (TOCC), or equivalent, in use
- Frequency of periodic maintenance
- Availability of spares/replacement components
- Results of environmental sustainability assessments
- Use of positive feedback techniques in line with OGC guidance
- Responses to monitoring and feedback
- Integration of Facilities Management team within the briefing process

Examples of Value Metrics
- Annual cleaning, energy and maintenance costs per unit area
- Frequency and cost of periodic maintenance per unit area
- BREEAM or equivalent
- Total Occupancy Cost compared with benchmarks in Total Occupancy Cost Survey (TOCS)
- Result of PROBE survey (Post-occupancy Review of Buildings and their Engineering)
- Constructing Excellence Environment KPIs
- DEFRA’s Framework for Sustainable Development on the Government Estate

## 6. COMPLY WITH THIRD PARTY REQUIREMENTS

This value driver is concerned with the impact of the building on stakeholders and vice-versa. It also addresses compliance with legislation through the project life cycle, including use.

- A stakeholder is anyone who has a stake or an interest in a building, who will be affected in some way by it and so has an interest in influencing it. They may or may not be directly involved in its design, construction or use.
- Appropriate levels of consultation with third parties, beginning early on in a project, are very important in ensuring that the building satisfies stakeholder requirements. If third parties are consulted too late in the construction process, their requirements cannot be easily accommodated in the design without abortive work, often at significant cost.
- Appropriate consultation with stakeholders during the post-completion 'beddingdown' period, and on-going while the building is in use is very important to ensuring that the building satisfies stakeholder requirements and continues to do so, and can respond to changing needs. The project team should develop good working relationships with the Statutory Authorities that encourage dialogue and exchange of ideas.
- Consultation should include stakeholders' views on the building's impact on the community.
- The use to which the building will be put may require conformity to specific statutory requirements.
- General Health and Safety issues are the responsibility of all the project team, including clients. The CDM guidelines (Construction, Design and Management Regulations 1994) must be adhered to.
- All central Government clients should adhere to relevant guidance and policy including Achieving Excellence in Construction and the Better Public Buildings Initiative.

### Key Questions

1. Have the design team consulted widely with stakeholders and taken their views into consideration? Have tools such as DQI been used to assess how well stakeholder requirements have been met? Are feedback mechanisms in place to ensure ongoing consultation with stakeholders/users?
2. Does the building comply in all respects with statutory requirements including planning, building and other regulations?
3. Has the client appointed a competent Planning Supervisor?
4. Is the guidance given in OGC's Procurement Guide number 10 – Achieving Excellence Through Health & Safety – being implemented?
5. Is there a properly constructed Health and Safety Plan, conforming to Construction, Design and Management Regulations (CDM) and enforced by a competent planning supervisor?
6. Are the contractors and their supply chain rigorous in their attention to Health and Safety during construction?
7. Is the completed building a healthy and safe place in which to work and operate?

Possible Metrics
- Public surveys
- Ease of achievement of planning consent
- Use of Construction Industry KPIs and DQIs
- Accident rates

Examples of Value Metrics
- Design Quality Indicators
- Number of reportable incidents
- Percentage of days lost through accidents
- Operating days lost through sickness
- PROBE survey results
- ‘Soft Landings’ process in use

Appendix 7.1.1 - Paired Comparison Exercise

**Questionnaire**

Name of participant: _____

Function in the project: _____

Guidance on completion:

Using paired comparison exercises determine what the priorities for the project are.

**Table 1 - Scoring table**

| | B | C | D | E | F | | Score | Weight % | Max |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | 1. Maximize business effectiveness | | | |
| B | | | | | | 2. Ensure effective project management and delivery | | | |
| C | | | | | | 3. Achieve the required financial performance | | | |
| D | | | | | | 4. Minimize building operation and maintenance costs, and env. impact | | | |
| E | | | | | | 5. Impact positively on the location of the facility | | | |
| F | | | | | | 6. Comply with third party requirements | | | |
| | | | | | | | | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight % | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | 1. Scope | | | |
| B | | | | | | | | 2. Time | | | |
| C | | | | | | | | 3. Cost | | | |
| D | | | | | | | | 4. Quality | | | |
| E | | | | | | | | 5. Contract-admin | | | |
| F | | | | | | | | 6. Human resource | | | |
| G | | | | | | | | 7. Risk | | | |
| H | | | | | | | | 8. Health and safety | | | |
| | | | | | | | | | | 100.00 | |

Please return the completed table to the workshop moderator

**Previous investigations – selection model**

Table 01 – Selection Model

| | | Utility Factors | | | | W | α |
|---|---|---|---|---|---|---|---|
| | | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | Kendall`s W | Asymptotic Significance |
| | **Value Drivers - "soft value" parameter** | | | | | | |
| 1. | 1. Maximize business effectiveness | | | | | | |
| 1.1 | Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | 0.554 | 0.000 |
| 1.2 | Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | 0.910 | 0.000 |
| 1.3 | Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | 0.812 | 0.000 |
| 1.4 | Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | 0.590 | 0.000 |
| 1.5 | Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | 0.484 | 0.001 |
| 2. | 2. Ensure effective project management and delivery | | | | | | |
| 2.1 | Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | 0.872 | 0.000 |
| 2.2 | Project Management Guidelines - Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | 0.859 | 0.000 |
| 3. | 3. Achieve the required financial performance | | | | | | |
| 3.1 | Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | 0.709 | 0.000 |
| 3.2 | Payback | 73.33 | 86.25 | 69.17 | 80.42 | 0.461 | 0.001 |
| 3.3 | Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | 0.240 | 0.035 |
| 3.4 | Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | 0.779 | 0.000 |
| 4. | 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | |
| 4.1 | Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | 0.628 | 0.000 |
| 4.2 | Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | 0.555 | 0.000 |
| 4.3 | Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | 0.897 | 0.000 |
| 5. | 5. Impact positively on the location of the facility | | | | | | |
| 5.1 | Company image | 72.50 | 50.83 | 90.00 | 69.17 | 0.767 | 0.000 |
| 5.2 | Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | 0.447 | 0.001 |
| 5.3 | Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | 0.587 | 0.000 |
| 6. | 6. Comply with third party requirements | | | | | | |
| 6.1 | Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | 0.398 | 0.002 |
| 6.2 | Public survey | 54.17 | 69.17 | 78.33 | 78.75 | 0.604 | 0.000 |

# Project 01

**Sector:** Industrial – Reconstruction, modernization and new build.
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | Confidential |
| 2 | | General manager | Confidential |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Business/Office, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **87.50** |
| 1.2 | Operating costs per head | **93.75** |
| 1.3 | Productivity per employee | **85.00** |
| 1.4 | Number of complaints | **73.33** |
| 1.5 | Revenue per unit area | **73.33** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **65.83** |
| 2.2 | Project Management Guidelines - Gateway Review | **64.17** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **87.92** |
| 3.2 | Payback | **73.33** |
| 3.3 | Whole-life Cost | **85.00** |
| 3.4 | Building operating and maintenance cost | **80.83** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **85.83** |
| 4.2 | Annual cost of cleaning and maintenance | **75.83** |
| 4.3 | Frequency of periodic maintenance | **71.67** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **72.50** |
| 5.2 | Views of local planning authority | **60.83** |
| 5.3 | Public or private survey results | **72.92** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **70.83** |
| 6.2 | Public survey | **54.17** |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | A | E | A | Maximize business effectiveness | 2 | 13.33 | **4** |
| B | | B | D | E | B | Ensure effective project management &delivery | 3 | 20.00 | **6** |
| C | | | C | E | C | Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 5 | 33.33 | **10** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge 2. Client representatives**

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **avg** | **rnd** | **stdev** | **1** | **2** | **avg** | **rnd** | **stdev** |
| **83** | 8 | 7 | 7.5 | **8** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| **65** | 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| **82** | 8 | 7 | 7.5 | **8** | 0.71 | 8 | 7 | 7.5 | **8** | 0.71 |
| **78** | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| **69** | 9 | 8 | 8.5 | **9** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| **63** | 1 | 4 | 2.5 | **3** | 2.12 | 2 | 3 | 2.5 | **3** | 0.71 |
| | | | | 41.00 | | | | | 39.00 | |

# Project 02

**Sector:** Commercial – New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | Real-estate department head manager | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Business/Office, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **87.50** |
| 1.2 | Operating costs per head | **93.75** |
| 1.3 | Productivity per employee | **85.00** |
| 1.4 | Number of complaints | **73.33** |
| 1.5 | Revenue per unit area | **73.33** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **65.83** |
| 2.2 | Project Management Guidelines - Gateway Review | **64.17** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **87.92** |
| 3.2 | Payback | **73.33** |
| 3.3 | Whole-life Cost | **85.00** |
| 3.4 | Building operating and maintenance cost | **80.83** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **85.83** |
| 4.2 | Annual cost of cleaning and maintenance | **75.83** |
| 4.3 | Frequency of periodic maintenance | **71.67** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **72.50** |
| 5.2 | Views of local planning authority | **60.83** |
| 5.3 | Public or private survey results | **72.92** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **70.83** |
| 6.2 | Public survey | **54.17** |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | B | A | A | E | A | Maximize business effectiveness | 3 | 20.00 | **6** |
| B | | C | D | E | B | Ensure effective project management &delivery | 2 | 13.33 | **4** |
| C | | | C | E | C | Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 5 | 33.33 | **10** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **avg** | **rnd** | **stdev** | **1** | **2** | **avg** | **rnd** | **stdev** |
| **83** | 7 | 8 | 7.5 | **8** | 0.71 | 7 | 8 | 7.5 | **8** | 0.71 |
| **65** | 4 | 6 | 5 | **5** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| **82** | 7 | 8 | 7.5 | **8** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| **78** | 4 | 7 | 5.5 | **6** | 2.12 | 5 | 6 | 5.5 | **6** | 0.71 |
| **69** | 9 | 10 | 9.5 | **10** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| **63** | 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |
| | | | | 40.00 | | | | | 40.00 | |

# Project 03

**Sector:** Commercial – New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Owner | |
| 2 | | Managing Director | |
| 3 | | Authorised Representative | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

   _____

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Business/Office, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **87.50** |
| 1.2 | Operating costs per head | **93.75** |
| 1.3 | Productivity per employee | **85.00** |
| 1.4 | Number of complaints | **73.33** |
| 1.5 | Revenue per unit area | **73.33** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **65.83** |
| 2.2 | Project Management Guidelines - Gateway Review | **64.17** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **87.92** |
| 3.2 | Payback | **73.33** |
| 3.3 | Whole-life Cost | **85.00** |
| 3.4 | Building operating and maintenance cost | **80.83** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **85.83** |
| 4.2 | Annual cost of cleaning and maintenance | **75.83** |
| 4.3 | Frequency of periodic maintenance | **71.67** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **72.50** |
| 5.2 | Views of local planning authority | **60.83** |
| 5.3 | Public or private survey results | **72.92** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **70.83** |
| 6.2 | Public survey | **54.17** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | C | A | E | A | Maximize business effectiveness | 3 | 20.00 | **6** |
| B | | B | D | E | B | Ensure effective project management &delivery | 2 | 13.33 | **4** |
| C | | | C | E | C | Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 5 | 33.33 | **10** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **avg** | **rnd** |
| **83** | 7 | 8 | 8 | 7.667 | **8** | 0.58 | 7 | 7 | 8 | 7.333 | **7** |
| **65** | 4 | 4 | 6 | 4.667 | **5** | 1.15 | 4 | 4 | 5 | 4.333 | **4** |
| **82** | 7 | 8 | 8 | 7.667 | **8** | 0.58 | 7 | 8 | 8 | 7.667 | **8** |
| **78** | 5 | 5 | 8 | 6 | **6** | 1.73 | 5 | 6 | 6 | 5.667 | **6** |
| **69** | 10 | 10 | 9 | 9.667 | **10** | 0.58 | 10 | 10 | 10 | 10 | **10** |
| **63** | 2 | 4 | 6 | 4 | **4** | 2.00 | 4 | 4 | 4 | 4 | **4** |
| | | | | | 41.00 | | | | | | 39.00 |

# Project 04

**Sector:** Commercial – New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2008 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Director | |
| 2 | | Project Director | |
| 3 | | Project Manager | |
| 4 | | Owner representative | |
| 5 | | Tenant coordinator | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Residential/Apartments, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **40.00** |
| 1.2 | Operating costs per head | **42.50** |
| 1.3 | Productivity per employee | **40.00** |
| 1.4 | Number of complaints | **82.50** |
| 1.5 | Revenue per unit area | **73.33** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **65.42** |
| 2.2 | Project Management Guidelines - Gateway Review | **51.67** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **97.50** |
| 3.2 | Payback | **86.25** |
| 3.3 | Whole-life Cost | **72.92** |
| 3.4 | Building operating and maintenance cost | **55.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **61.25** |
| 4.2 | Annual cost of cleaning and maintenance | **50.83** |
| 4.3 | Frequency of periodic maintenance | **49.17** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **50.83** |
| 5.2 | Views of local planning authority | **84.17** |
| 5.3 | Public or private survey results | **50.83** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **83.75** |
| 6.2 | Public survey | **69.17** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | B | B | B | B | Ensure effective project management &delivery | 4 | 26.67 | **8** |
| C | | | C | C | C | Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 1 | 6.67 | **2** |
| E | | | | | E | Impact positively on the location of the facility | 2 | 13.33 | **4** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | | | | 2 round | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **4** | **5** | **avg** | **rnd** |
| **56** | 10 | 9 | 10 | 8 | 10 | 9.4 | **9** | 0.89 | 10 | 10 | 10 | 9 | 10 | 9.8 | **10** |
| **59** | 8 | 8 | 7 | 8 | 6 | 7.4 | **7** | 0.89 | 7 | 7 | 6 | 7 | 6 | 6.6 | **7** |
| **78** | 7 | 7 | 6 | 8 | 8 | 7.2 | **7** | 0.84 | 7 | 7 | 6 | 7 | 7 | 6.8 | **7** |
| **54** | 3 | 3 | 2 | 3 | 4 | 3 | **3** | 0.71 | 3 | 3 | 3 | 4 | 4 | 3.4 | **3** |
| **67** | 3 | 4 | 4 | 3 | 2 | 3.2 | **3** | 0.84 | 3 | 3 | 4 | 3 | 2 | 3 | **3** |
| **76** | 1 | 3 | 2 | 2 | 4 | 2.4 | **2** | 1.14 | 2 | 3 | 2 | 2 | 3 | 2.4 | **2** |
| | | | | | | | 31.00 | | | | | | | | 32.00 |

# Project 05

**Sector:** Commercial, Hotel, Sport and Medical resort – New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2009

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Director | |
| 2 | | Project Director | |
| 3 | | Project Manager | |
| 4 | | Owner representative | |
| 5 | | Tenant coordinator | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Residential/Apartments, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **40.00** |
| 1.2 | Operating costs per head | **42.50** |
| 1.3 | Productivity per employee | **40.00** |
| 1.4 | Number of complaints | **82.50** |
| 1.5 | Revenue per unit area | **73.33** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **65.42** |
| 2.2 | Project Management Guidelines - Gateway Review | **51.67** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **97.50** |
| 3.2 | Payback | **86.25** |
| 3.3 | Whole-life Cost | **72.92** |
| 3.4 | Building operating and maintenance cost | **55.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **61.25** |
| 4.2 | Annual cost of cleaning and maintenance | **50.83** |
| 4.3 | Frequency of periodic maintenance | **49.17** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **50.83** |
| 5.2 | Views of local planning authority | **84.17** |
| 5.3 | Public or private survey results | **50.83** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **83.75** |
| 6.2 | Public survey | **69.17** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | E | A | Maximize business effectiveness | 4 | 26.67 | **8** |
| B | | B | D | E | B | Ensure effective project management &delivery | 2 | 13.33 | **4** |
| C | | | C | E | C | Achieve the required financial performance | 2 | 13.33 | **4** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 5 | 33.33 | **10** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | | | | 2 round | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **4** | **5** | **avg** | **rnd** |
| **56** | 7 | 8 | 8 | 8 | 6 | 7.4 | **7** | 0.89 | 7 | 8 | 8 | 8 | 7 | 7.6 | **8** |
| **59** | 4 | 5 | 4 | 5 | 5 | 4.6 | **5** | 0.55 | 5 | 5 | 4 | 5 | 5 | 4.8 | **5** |
| **78** | 6 | 6 | 5 | 5 | 6 | 5.6 | **6** | 0.55 | 6 | 5 | 5 | 5 | 6 | 5.4 | **5** |
| **54** | 5 | 4 | 4 | 4 | 5 | 4.4 | **4** | 0.55 | 5 | 5 | 4 | 4 | 5 | 4.6 | **5** |
| **67** | 9 | 10 | 10 | 9 | 9 | 9.4 | **9** | 0.55 | 9 | 10 | 10 | 10 | 9 | 9.6 | **10** |
| **76** | 5 | 4 | 4 | 3 | 6 | 4.4 | **4** | 1.14 | 5 | 4 | 4 | 4 | 5 | 4.4 | **4** |
| | | | | | | | 35.00 | | | | | | | | 37.00 |

# Project 06

**Sector:** Commercial – New Build
**:** Project management
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Financial director | Confidential |
| 2 | | Executive director for implementation of the project | Confidential |
| 3 | | Director | Confidential |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

__N_____

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **78.75** |
| 1.2 | Operating costs per head | **70.00** |
| 1.3 | Productivity per employee | **68.33** |
| 1.4 | Number of complaints | **93.33** |
| 1.5 | Revenue per unit area | **94.17** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **91.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **67.92** |
| 3.2 | Payback | **69.17** |
| 3.3 | Whole-life Cost | **81.67** |
| 3.4 | Building operating and maintenance cost | **91.67** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** |
| 4.3 | Frequency of periodic maintenance | **88.75** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **90.00** |
| 5.2 | Views of local planning authority | **75.00** |
| 5.3 | Public or private survey results | **79.17** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **88.33** |
| 6.2 | Public survey | **78.33** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | D | E | B | Ensure effective project management &delivery | 1 | 6.67 | **2** |
| C | | | C | C | E | Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 4 | 26.67 | **8** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge 2. Client representatives**

| | 1 round | | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **avg** | **rnd** |
| **81** | 10 | 9 | 10 | 9.667 | **10** | 0.58 | 10 | 10 | 10 | 10 | **10** |
| **89** | 3 | 4 | 3 | 3.333 | **3** | 0.58 | 3 | 4 | 3 | 3.333 | **3** |
| **78** | 6 | 6 | 6 | 6 | **6** | 0.00 | 6 | 6 | 6 | 6 | **6** |
| **87** | 5 | 4 | 4 | 4.333 | **4** | 0.58 | 5 | 4 | 4 | 4.333 | **4** |
| **83** | 8 | 7 | 7 | 7.333 | **7** | 0.58 | 8 | 7 | 7 | 7.333 | **7** |
| **83** | 2 | 5 | 3 | 3.333 | **3** | 1.53 | 2 | 5 | 3 | 3.333 | **3** |
| | | | | | 33.00 | | | | | | 33.00 |

# Project 07

**Sector:** Commercial, Hotel resort – Reconstruction, Cultural Heritage
**role:** Project Management, Cost Management
**Project status:** 2009

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | Project Director | |
| 3 | | Administration manager | |
| 4 | | Financial manager | |
| 5 | | Hotel General manager | |
| 6 | | Hotel Operations manager | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is s:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **78.75** |
| 1.2 | Operating costs per head | **70.00** |
| 1.3 | Productivity per employee | **68.33** |
| 1.4 | Number of complaints | **93.33** |
| 1.5 | Revenue per unit area | **94.17** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **91.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **67.92** |
| 3.2 | Payback | **69.17** |
| 3.3 | Whole-life Cost | **81.67** |
| 3.4 | Building operating and maintenance cost | **91.67** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** |
| 4.3 | Frequency of periodic maintenance | **88.75** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **90.00** |
| 5.2 | Views of local planning authority | **75.00** |
| 5.3 | Public or private survey results | **79.17** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **88.33** |
| 6.2 | Public survey | **78.33** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | C | A | A | A | Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | D | E | B | Ensure effective project management &delivery | 1 | 6.67 | **3** |
| C | | | C | E | C | Achieve the required financial performance | 4 | 26.67 | **10** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | E | Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

| **1 round** | | | | | | | | | **2 round** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **4** | **5** | **6** | **avg** | **rnd** |
| 10 | 9 | 10 | 10 | 9 | 10 | 9.667 | **10** | 0.52 | 10 | 10 | 10 | 10 | 9 | 10 | 9.833 | **10** |
| 5 | 6 | 3 | 5 | 9 | 3 | 5.167 | **5** | 2.23 | 5 | 5 | 3 | 5 | 6 | 3 | 4.5 | **5** |
| 10 | 10 | 10 | 9 | 10 | 10 | 9.833 | **10** | 0.41 | 10 | 10 | 10 | 9 | 10 | 10 | 9.833 | **10** |
| 5 | 6 | 6 | 6 | 5 | 6 | 5.667 | **6** | 0.52 | 5 | 6 | 6 | 6 | 5 | 6 | 5.667 | **6** |
| 9 | 8 | 8 | 9 | 9 | 8 | 8.5 | **9** | 0.55 | 9 | 8 | 8 | 8 | 9 | 8 | 8.333 | **8** |
| 0 | 4 | 3 | 7 | 4 | 5 | 3.833 | **4** | 2.32 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | **4** |
| | | | | | | | 44.00 | | | | | | | | | 43.0 |

# Project 08

**Sector:** Commercial – Demolition, New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Owner | |
| 2 | | Project Manager | |
| 3 | | Head of Financial Department | |
| 4 | | Head of Legal Department | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **78.75** |
| 1.2 | Operating costs per head | **70.00** |
| 1.3 | Productivity per employee | **68.33** |
| 1.4 | Number of complaints | **93.33** |
| 1.5 | Revenue per unit area | **94.17** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **91.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **67.92** |
| 3.2 | Payback | **69.17** |
| 3.3 | Whole-life Cost | **81.67** |
| 3.4 | Building operating and maintenance cost | **91.67** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** |
| 4.3 | Frequency of periodic maintenance | **88.75** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **90.00** |
| 5.2 | Views of local planning authority | **75.00** |
| 5.3 | Public or private survey results | **79.17** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **88.33** |
| 6.2 | Public survey | **78.33** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | E | A | Maximize business effectiveness | 4 | 26.67 | **8** |
| B | | C | B | E | B | Ensure effective project management &delivery | 2 | 13.33 | **4** |
| C | | | D | E | C | Achieve the required financial performance | 2 | 13.33 | **4** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 5 | 33.33 | **10** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge**

**2. Client representatives**

| | 1 round | | | | | | | 2 round | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **4** | **avg** | **rnd** |
| **81** | 8 | 8 | 9 | 10 | 8.75 | **9** | 0.96 | 9 | 8 | 9 | 10 | 9 | **9** |
| **89** | 5 | 6 | 4 | 6 | 5.25 | **5** | 0.96 | 6 | 6 | 5 | 6 | 5.75 | **6** |
| **78** | 4 | 5 | 4 | 4 | 4.25 | **4** | 0.50 | 4 | 5 | 5 | 4 | 4.5 | **5** |
| **87** | 4 | 5 | 4 | 5 | 4.5 | **5** | 0.58 | 4 | 5 | 4 | 5 | 4.5 | **5** |
| **83** | 9 | 10 | 10 | 10 | 9.75 | **10** | 0.50 | 9 | 10 | 10 | 10 | 9.75 | **10** |
| **83** | 3 | 4 | 3 | 2 | 3 | **3** | 0.82 | 3 | 3 | 3 | 2 | 2.75 | **3** |
| | | | | | | 36.00 | | | | | | | 38.00 |

# Project 09

**Sector:** Commercial – Demolition, New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2011

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | Confidential |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **78.75** |
| 1.2 | Operating costs per head | **70.00** |
| 1.3 | Productivity per employee | **68.33** |
| 1.4 | Number of complaints | **93.33** |
| 1.5 | Revenue per unit area | **94.17** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **91.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **67.92** |
| 3.2 | Payback | **69.17** |
| 3.3 | Whole-life Cost | **81.67** |
| 3.4 | Building operating and maintenance cost | **91.67** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** |
| 4.3 | Frequency of periodic maintenance | **88.75** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **90.00** |
| 5.2 | Views of local planning authority | **75.00** |
| 5.3 | Public or private survey results | **79.17** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **88.33** |
| 6.2 | Public survey | **78.33** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | B | A | A | A | A | Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | D | B | B | Ensure effective project management &delivery | 3 | 20.00 | **8** |
| C | | | C | E | C | Achieve the required financial performance | 3 | 20.00 | **8** |
| D | | | | E | F | Minimize building operation and maintenance costs, and environmental impact | 1 | 6.67 | **3** |
| E | | | | | F | Impact positively on the location of the facility | 2 | 13.33 | **5** |
| F | | | | | | Comply with third party requirements | 2 | 13.33 | **5** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | 2 round | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **avg** | **rnd** | **stdev** | **1** | **2** | **avg** | **rnd** |
| **81** | 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** |
| **89** | 5 | 7 | 6 | **6** | 1.41 | 5 | 6 | 5.5 | **6** |
| **78** | 4 | 5 | 4.5 | **5** | 0.71 | 4 | 5 | 4.5 | **5** |
| **87** | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 6 | 5.5 | **6** |
| **83** | 9 | 10 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** |
| **83** | 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** |
| | | | | 39.00 | | | | | 39.00 |

# Project 10

**Sector:** Commercial – Demolition, New Build
**role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | Design Director | |
| 3 | | Project Manager | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **78.75** |
| 1.2 | Operating costs per head | **70.00** |
| 1.3 | Productivity per employee | **68.33** |
| 1.4 | Number of complaints | **93.33** |
| 1.5 | Revenue per unit area | **94.17** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **91.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **67.92** |
| 3.2 | Payback | **69.17** |
| 3.3 | Whole-life Cost | **81.67** |
| 3.4 | Building operating and maintenance cost | **91.67** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** |
| 4.3 | Frequency of periodic maintenance | **88.75** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **90.00** |
| 5.2 | Views of local planning authority | **75.00** |
| 5.3 | Public or private survey results | **79.17** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **88.33** |
| 6.2 | Public survey | **78.33** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

## Paired comparison exercise

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | B | E | B | Ensure effective project management &delivery | 2 | 13.33 | **4** |
| C | | | D | E | C | Achieve the required financial performance | 2 | 13.33 | **4** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 4 | 26.67 | **8** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

## EFTE (mini-Delphi exercise)

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **avg** | **rnd** |
| **81** | 10 | 10 | 8 | 9.333 | **9** | 1.15 | 10 | 10 | 9 | 9.667 | **10** |
| **89** | 5 | 6 | 6 | 5.667 | **6** | 0.58 | 6 | 6 | 6 | 6 | **6** |
| **78** | 4 | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | 4 | **4** |
| **87** | 5 | 5 | 4 | 4.667 | **5** | 0.58 | 5 | 5 | 5 | 5 | **5** |
| **83** | 9 | 8 | 8 | 8.333 | **8** | 0.58 | 9 | 9 | 8 | 8.667 | **9** |
| **83** | 1 | 2 | 2 | 1.667 | **2** | 0.58 | 1 | 2 | 1 | 1.333 | **1** |
| | | | | | 34.00 | | | | | | 35.00 |

# Project 11

**Sector:** Commercial – Reconstruction
**role:** Project Management, Cost Management, Technical Supervision of Construction and Tenant Coordination
**Project status:** 2009-2010

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Executive director | |
| 2 | | Financial director | |
| 3 | | Technical services manager (FM) | |
| 4 | | Operator | |
| 5 | | Operator | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Shopping Mall, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **67.50** |
| 1.2 | Operating costs per head | **75.00** |
| 1.3 | Productivity per employee | **66.67** |
| 1.4 | Number of complaints | **63.75** |
| 1.5 | Revenue per unit area | **79.58** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **87.08** |
| 2.2 | Project Management Guidelines - Gateway Review | **80.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **86.25** |
| 3.2 | Payback | **80.42** |
| 3.3 | Whole-life Cost | **70.83** |
| 3.4 | Building operating and maintenance cost | **77.50** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **79.17** |
| 4.2 | Annual cost of cleaning and maintenance | **78.75** |
| 4.3 | Frequency of periodic maintenance | **82.08** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **69.17** |
| 5.2 | Views of local planning authority | **70.00** |
| 5.3 | Public or private survey results | **67.50** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **82.50** |
| 6.2 | Public survey | **78.75** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | D | E | B | Ensure effective project management &delivery | 1 | 6.67 | **2** |
| C | | | C | C | C | Achieve the required financial performance | 4 | 26.67 | **8** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | Impact positively on the location of the facility | 3 | 20.00 | **6** |
| F | | | | | | Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge 2. Client representatives**

| | 1 round | | | | | | | | 2 round | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **4** | **5** | **avg** | **rnd** |
| **71** | 10 | 8 | 10 | 9 | 10 | 9.4 | **9** | 0.89 | 9 | 8 | 10 | 9 | 9 | 9 | **9** |
| **84** | 2 | 3 | 3 | 2 | 4 | 2.8 | **3** | 0.84 | 3 | 3 | 3 | 3 | 3 | 3 | **3** |
| **79** | 8 | 7 | 8 | 8 | 7 | 7.6 | **8** | 0.55 | 8 | 8 | 8 | 8 | 7 | 7.8 | **8** |
| **80** | 5 | 4 | 4 | 4 | 4 | 4.2 | **4** | 0.45 | 4 | 4 | 4 | 4 | 4 | 4 | **4** |
| **72** | 6 | 4 | 6 | 4 | 7 | 5.4 | **5** | 1.34 | 6 | 5 | 6 | 4 | 5 | 5.2 | **5** |
| **81** | 2 | 1 | 2 | 1 | 1 | 1.4 | **1** | 0.55 | 1 | 1 | 1 | 1 | 1 | 1 | **1** |
| | | | | | | | 30.00 | | | | | | | | 30.00 |

# Project 12

**Sector:** Commercial - New Build
**role:** Project Management, Cost Management, Tenant Coordination
**Project status:** 2010 - 2011

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Owner | Confidential |
| 2 | | Managing Director | Confidential |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Shopping Mall, so the table is:

| | Utility Factors | Business |
|---|---|---|
| | **Value Drivers - "soft value" parameter** | |
| **1.** | **1. Maximize business effectiveness** | |
| 1.1 | Staff satisfaction | **67.50** |
| 1.2 | Operating costs per head | **75.00** |
| 1.3 | Productivity per employee | **66.67** |
| 1.4 | Number of complaints | **63.75** |
| 1.5 | Revenue per unit area | **79.58** |
| 2. | **2. Ensure effective project management and delivery** | |
| 2.1 | Industry Best Practice | **87.08** |
| 2.2 | Project Management Guidelines - Gateway Review | **80.83** |
| 3. | **3. Achieve the required financial performance** | |
| 3.1 | Capital Cost | **86.25** |
| 3.2 | Payback | **80.42** |
| 3.3 | Whole-life Cost | **70.83** |
| 3.4 | Building operating and maintenance cost | **77.50** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | |
| 4.1 | Annual cost of heating, cooling and lighting | **79.17** |
| 4.2 | Annual cost of cleaning and maintenance | **78.75** |
| 4.3 | Frequency of periodic maintenance | **82.08** |
| 5. | **5. Impact positively on the location of the facility** | |
| 5.1 | Company image | **69.17** |
| 5.2 | Views of local planning authority | **70.00** |
| 5.3 | Public or private survey results | **67.50** |
| 6. | **6. Comply with third party requirements** | |
| 6.1 | Planning approval | **82.50** |
| 6.2 | Public survey | **78.75** |
| | | |
| | | |
| | | |
| | | |

3. Establish the project specific value drivers (**Project driver analysis**)

**Paired comparison exercise**

| | B | C | D | E | F | | Score | Weight % | Score (1-10) |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | D | B | B | Ensure effective project management &delivery | 2 | 13.33 | **4** |
| C | | | C | E | C | Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | F | Impact positively on the location of the facility | 2 | 13.33 | **4** |
| F | | | | | | Comply with third party requirements | 1 | 6.67 | **2** |
| | | | | | | | | 100.00 | |

**EFTE (mini-Delphi exercise)**

**Local knowledge** **2. Client representatives**

| | 1 round | | | | | 2 round | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **avg** | **rnd** | **stdev** | **1** | **2** | **avg** | **rnd** |
| **71** | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** |
| **84** | 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** |
| **79** | 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | **8** |
| **80** | 3 | 4 | 3.5 | **4** | 0.71 | 4 | 4 | 4 | **4** |
| **72** | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** |
| **81** | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 5 | 5 | **5** |
| | | | | 42.00 | | | | | 41.00 |

## Appendix 7.2 - Paired Comparison Exercise Guidance

## Previous investigations – selection model

50 parameters from previous investigations are spread in two major groups: Value Parameters - “soft value” parameters with 6 sub-categories and Critical success factors - “hard value” parameters with 8 sub-categories, totalling 14 groups now represents the selection model.

| | | Utility Factors | | | | W | α |
|---|---|---|---|---|---|---|---|
| | | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | Kendall`s W | Asymptotic Significance |
| | **Value Parameters – “soft value” parameter** | | | | | | |
| 1. | 1. Maximize business effectiveness | | | | | | |
| 1.1 | Staff satisfaction | 87.50 | 40.00 | 78.75 | 67.50 | 0.554 | 0.000 |
| 1.2 | Operating costs per head | 93.75 | 42.50 | 70.00 | 75.00 | 0.910 | 0.000 |
| 1.3 | Productivity per employee | 85.00 | 40.00 | 68.33 | 66.67 | 0.812 | 0.000 |
| 1.4 | Number of complaints | 73.33 | 82.50 | 93.33 | 63.75 | 0.590 | 0.000 |
| 1.5 | Revenue per unit area | 73.33 | 73.33 | 94.17 | 79.58 | 0.484 | 0.001 |
| 2. | 2. Ensure effective project management and delivery | | | | | | |
| 2.1 | Industry Best Practice | 65.83 | 65.42 | 91.67 | 87.08 | 0.872 | 0.000 |
| 2.2 | Project Management Guidelines - Gateway Review | 64.17 | 51.67 | 85.83 | 80.83 | 0.859 | 0.000 |
| 3. | 3. Achieve the required financial performance | | | | | | |
| 3.1 | Capital Cost | 87.92 | 97.50 | 67.92 | 86.25 | 0.709 | 0.000 |
| 3.2 | Payback | 73.33 | 86.25 | 69.17 | 80.42 | 0.461 | 0.001 |
| 3.3 | Whole-life Cost | 85.00 | 72.92 | 81.67 | 70.83 | 0.240 | 0.035 |
| 3.4 | Building operating and maintenance cost | 80.83 | 55.00 | 91.67 | 77.50 | 0.779 | 0.000 |
| 4. | 4. Minimize building operation and maintenance costs, and environmental impact | | | | | | |
| 4.1 | Annual cost of heating, cooling and lighting | 85.83 | 61.25 | 92.50 | 79.17 | 0.628 | 0.000 |
| 4.2 | Annual cost of cleaning and maintenance | 75.83 | 50.83 | 80.83 | 78.75 | 0.555 | 0.000 |
| 4.3 | Frequency of periodic maintenance | 71.67 | 49.17 | 88.75 | 82.08 | 0.897 | 0.000 |
| 5. | 5. Impact positively on the location of the facility | | | | | | |
| 5.1 | Company image | 72.50 | 50.83 | 90.00 | 69.17 | 0.767 | 0.000 |
| 5.2 | Views of local planning authority | 60.83 | 84.17 | 75.00 | 70.00 | 0.447 | 0.001 |
| 5.3 | Public or private survey results | 72.92 | 50.83 | 79.17 | 67.50 | 0.587 | 0.000 |
| 6. | 6. Comply with third party requirements | | | | | | |
| 6.1 | Planning approval | 70.83 | 83.75 | 88.33 | 82.50 | 0.398 | 0.002 |
| 6.2 | Public survey | 54.17 | 69.17 | 78.33 | 78.75 | 0.604 | 0.000 |

| | | Utility Factors | | | | W | α |
|---|---|---|---|---|---|---|---|
| | | Business (Office) | Residential (Apartments) | Hotels | Shopping malls | Kendall`s W | Asymptotic Significance |
| | **Critical success factors – "hard value" parameters** | | | | | | |
| 1. | 1. Scope | | | | | | |
| 1.1 | Clarity of contract | 74.17 | 77.92 | 91.67 | 76.67 | 0.402 | 0.002 |
| 1.2 | Effective preplanning | 69.17 | 71.67 | 95.83 | 88.33 | 0.688 | 0.000 |
| 1.3 | Project levels of decision making | 74.17 | 55.83 | 89.17 | 93.33 | 0.803 | 0.000 |
| 1.4 | Understanding of project requirements | 80.83 | 63.33 | 97.08 | 94.58 | 0.928 | 0.000 |
| 2. | 2. Time | | | | | | |
| 2.1 | Project time constraints | 70.83 | 83.33 | 84.58 | 94.17 | 0.652 | 0.000 |
| 2.2 | Constraint by government regulations | 61.67 | 78.33 | 79.17 | 85.83 | 0.688 | 0.000 |
| 2.3 | Rapid decision making | 68.33 | 80.00 | 88.33 | 81.67 | 0.656 | 0.000 |
| 2.4 | Overrun duration | 61.67 | 71.67 | 87.50 | 77.50 | 0.703 | 0.000 |
| 2.5 | Adequacy of time | 60.00 | 68.33 | 85.83 | 74.17 | 0.678 | 0.000 |
| 3. | 3. Cost | | | | | | |
| 3.1 | Rapid decision making | 65.83 | 81.25 | 80.83 | 92.92 | 0.621 | 0.000 |
| 3.2 | Cash flow certainty | 75.00 | 95.00 | 85.42 | 83.33 | 0.422 | 0.002 |
| 3.3 | Precise project budget estimate | 94.17 | 76.67 | 82.08 | 91.67 | 0.361 | 0.005 |
| 3.4 | Over budget possibility | 80.00 | 56.67 | 79.17 | 83.33 | 0.531 | 0.000 |
| 4. | 4. Quality | | | | | | |
| 4.1 | Material quality | 80.00 | 66.67 | 91.67 | 75.00 | 0.580 | 0.000 |
| 4.2 | Construction quality plan | 65.00 | 75.00 | 93.33 | 85.00 | 0.666 | 0.000 |
| 4.3 | Contracted work quality | 71.67 | 80.83 | 95.83 | 90.42 | 0.810 | 0.000 |
| 5. | 5. Contract-admin | | | | | | |
| 5.1 | Mutual-trusting relationships | 60.00 | 70.00 | 85.00 | 75.42 | 0.672 | 0.000 |
| 6. | 6. Human resource | | | | | | |
| 6.1 | Team communication | 76.67 | 67.08 | 95.83 | 92.50 | 0.937 | 0.000 |
| 6.2 | Leadership-team management | 64.58 | 77.50 | 92.50 | 79.17 | 0.787 | 0.000 |
| 6.3 | Motivation for project | 66.67 | 54.58 | 84.17 | 84.17 | 0.797 | 0.000 |
| 6.4 | Monitoring and feedback | 58.33 | 68.33 | 92.50 | 77.50 | 0.805 | 0.000 |
| 6.5 | Skilled personnel | 70.00 | 62.50 | 91.67 | 89.17 | 0.695 | 0.000 |
| 7. | 7. Risk | | | | | | |
| 7.1 | Risk identification | 82.08 | 61.67 | 96.67 | 88.33 | 0.816 | 0.000 |
| 7.2 | Risk response | 74.17 | 67.50 | 96.67 | 92.08 | 0.840 | 0.000 |
| 7.3 | Coordination with subcontractors | 64.58 | 75.00 | 94.17 | 81.67 | 0.750 | 0.000 |
| 7.4 | Risk management techniques | 68.33 | 57.50 | 84.17 | 77.50 | 0.576 | 0.000 |
| 7.5 | Financial stability of client | 70.00 | 85.83 | 76.67 | 85.00 | 0.450 | 0.001 |
| 8. | 8. Health and safety | | | | | | |
| 8.1 | Management of work safety on site | 80.00 | 85.00 | 95.00 | 87.50 | 0.409 | 0.002 |
| 8.2 | Hazard identification | 72.50 | 80.00 | 88.33 | 81.67 | 0.310 | 0.011 |
| 8.3 | Health and safety records | 58.75 | 73.33 | 65.42 | 69.17 | 0.384 | 0.003 |
| 8.4 | Management responsibility | 65.83 | 78.33 | 74.17 | 72.50 | 0.326 | 0.008 |

# Project 01

**Project location: _____, Serbia**
**Investor: _____**
**Sector:** Industrial – Reconstruction, modernization and new build.
**Project Management role:** Project Management, Cost Management, and Technical Supervision of Construction
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | General manager | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

_____

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Business/Office, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **87.50** | 1.1 | Clarity of contract | **91.67** |
| 1.2 | Operating costs per head | **93.75** | 1.2 | Effective preplanning | **95.83** |
| 1.3 | Productivity per employee | **85.00** | 1.3 | Project levels of decision making | **89.17** |
| 1.4 | Number of complaints | **73.33** | 1.4 | Understanding of project requirements | **97.08** |
| 1.5 | Revenue per unit area | **73.33** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **84.58** |
| 2.1 | Industry Best Practice | **65.83** | 2.2 | Constraint by government regulations | **79.17** |
| 2.2 | Project Management Guidelines - Gateway Review | **64.17** | 2.3 | Rapid decision making | **88.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **87.50** |
| 3.1 | Capital Cost | **87.92** | 2.5 | Adequacy of time | **85.83** |
| 3.2 | Payback | **73.33** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **85.00** | 3.1 | Rapid decision making | **80.83** |
| 3.4 | Building operating and maintenance cost | **80.83** | 3.2 | Cash flow certainty | **85.42** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **82.08** |
| 4.1 | Annual cost of heating, cooling and lighting | **85.83** | 3.4 | Over budget possibility | **79.17** |
| 4.2 | Annual cost of cleaning and maintenance | **75.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **71.67** | 4.1 | Material quality | **91.67** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **93.33** |
| 5.1 | Company image | **72.50** | 4.3 | Contracted work quality | **95.83** |
| 5.2 | Views of local planning authority | **60.83** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **72.92** | 5.1 | Mutual-trusting relationships | **85.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **70.83** | 6.1 | Team communication | **95.83** |
| 6.2 | Public survey | **54.17** | 6.2 | Leadership-team management | **92.50** |
| | | | 6.3 | Motivation for project | **84.17** |
| | | | 6.4 | Monitoring and feedback | **92.50** |
| | | | 6.5 | Skilled personnel | **91.67** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **80.00** | 7.1 | Risk identification | **96.67** |
| 8.2 | Hazard identification | **72.50** | 7.2 | Risk response | **96.67** |
| 8.3 | Health and safety records | **58.75** | 7.3 | Coordination with subcontractors | **94.17** |
| 8.4 | Management responsibility | **65.83** | 7.4 | Risk management techniques | **84.17** |
| | | | 7.5 | Financial stability of client | **76.67** |

# Project 02

**Project location: _____, Serbia**
**Investor: _____**
**Sector:** Commercial – New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | Real-estate department head manager | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Business/Office, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **87.50** | 1.1 | Clarity of contract | **91.67** |
| 1.2 | Operating costs per head | **93.75** | 1.2 | Effective preplanning | **95.83** |
| 1.3 | Productivity per employee | **85.00** | 1.3 | Project levels of decision making | **89.17** |
| 1.4 | Number of complaints | **73.33** | 1.4 | Understanding of project requirements | **97.08** |
| 1.5 | Revenue per unit area | **73.33** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **84.58** |
| 2.1 | Industry Best Practice | **65.83** | 2.2 | Constraint by government regulations | **79.17** |
| 2.2 | Project Management Guidelines - Gateway Review | **64.17** | 2.3 | Rapid decision making | **88.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **87.50** |
| 3.1 | Capital Cost | **87.92** | 2.5 | Adequacy of time | **85.83** |
| 3.2 | Payback | **73.33** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **85.00** | 3.1 | Rapid decision making | **80.83** |
| 3.4 | Building operating and maintenance cost | **80.83** | 3.2 | Cash flow certainty | **85.42** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **82.08** |
| 4.1 | Annual cost of heating, cooling and lighting | **85.83** | 3.4 | Over budget possibility | **79.17** |
| 4.2 | Annual cost of cleaning and maintenance | **75.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **71.67** | 4.1 | Material quality | **91.67** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **93.33** |
| 5.1 | Company image | **72.50** | 4.3 | Contracted work quality | **95.83** |
| 5.2 | Views of local planning authority | **60.83** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **72.92** | 5.1 | Mutual-trusting relationships | **85.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **70.83** | 6.1 | Team communication | **95.83** |
| 6.2 | Public survey | **54.17** | 6.2 | Leadership-team management | **92.50** |
| | | | 6.3 | Motivation for project | **84.17** |
| | | | 6.4 | Monitoring and feedback | **92.50** |
| | | | 6.5 | Skilled personnel | **91.67** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **80.00** | 7.1 | Risk identification | **96.67** |
| 8.2 | Hazard identification | **72.50** | 7.2 | Risk response | **96.67** |
| 8.3 | Health and safety records | **58.75** | 7.3 | Coordination with subcontractors | **94.17** |
| 8.4 | Management responsibility | **65.83** | 7.4 | Risk management techniques | **84.17** |
| | | | 7.5 | Financial stability of client | **76.67** |

# Project 03

**Project location: _____, Serbia**
**Investor: _____**
**Sector:** Commercial – New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Business/Office, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **87.50** | 1.1 | Clarity of contract | **91.67** |
| 1.2 | Operating costs per head | **93.75** | 1.2 | Effective preplanning | **95.83** |
| 1.3 | Productivity per employee | **85.00** | 1.3 | Project levels of decision making | **89.17** |
| 1.4 | Number of complaints | **73.33** | 1.4 | Understanding of project requirements | **97.08** |
| 1.5 | Revenue per unit area | **73.33** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **84.58** |
| 2.1 | Industry Best Practice | **65.83** | 2.2 | Constraint by government regulations | **79.17** |
| 2.2 | Project Management Guidelines - Gateway Review | **64.17** | 2.3 | Rapid decision making | **88.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **87.50** |
| 3.1 | Capital Cost | **87.92** | 2.5 | Adequacy of time | **85.83** |
| 3.2 | Payback | **73.33** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **85.00** | 3.1 | Rapid decision making | **80.83** |
| 3.4 | Building operating and maintenance cost | **80.83** | 3.2 | Cash flow certainty | **85.42** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **82.08** |
| 4.1 | Annual cost of heating, cooling and lighting | **85.83** | 3.4 | Over budget possibility | **79.17** |
| 4.2 | Annual cost of cleaning and maintenance | **75.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **71.67** | 4.1 | Material quality | **91.67** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **93.33** |
| 5.1 | Company image | **72.50** | 4.3 | Contracted work quality | **95.83** |
| 5.2 | Views of local planning authority | **60.83** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **72.92** | 5.1 | Mutual-trusting relationships | **85.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **70.83** | 6.1 | Team communication | **95.83** |
| 6.2 | Public survey | **54.17** | 6.2 | Leadership-team management | **92.50** |
| | | | 6.3 | Motivation for project | **84.17** |
| | | | 6.4 | Monitoring and feedback | **92.50** |
| | | | 6.5 | Skilled personnel | **91.67** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **80.00** | 7.1 | Risk identification | **96.67** |
| 8.2 | Hazard identification | **72.50** | 7.2 | Risk response | **96.67** |
| 8.3 | Health and safety records | **58.75** | 7.3 | Coordination with subcontractors | **94.17** |
| 8.4 | Management responsibility | **65.83** | 7.4 | Risk management techniques | **84.17** |
| | | | 7.5 | Financial stability of client | **76.67** |

# Project 04

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial – New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2008 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Director | |
| 2 | | Project Director | |
| 3 | | Project Manager | |
| 4 | | Owner representative | |
| 5 | | Tenant coordinator | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Residential/Apartments, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **40.00** | 1.1 | Clarity of contract | **77.92** |
| 1.2 | Operating costs per head | **42.50** | 1.2 | Effective preplanning | **71.67** |
| 1.3 | Productivity per employee | **40.00** | 1.3 | Project levels of decision making | **55.83** |
| 1.4 | Number of complaints | **82.50** | 1.4 | Understanding of project requirements | **63.33** |
| 1.5 | Revenue per unit area | **73.33** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **83.33** |
| 2.1 | Industry Best Practice | **65.42** | 2.2 | Constraint by government regulations | **78.33** |
| 2.2 | Project Management Guidelines - Gateway Review | **51.67** | 2.3 | Rapid decision making | **80.00** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **71.67** |
| 3.1 | Capital Cost | **97.50** | 2.5 | Adequacy of time | **68.33** |
| 3.2 | Payback | **86.25** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **72.92** | 3.1 | Rapid decision making | **81.25** |
| 3.4 | Building operating and maintenance cost | **55.00** | 3.2 | Cash flow certainty | **95.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **76.67** |
| 4.1 | Annual cost of heating, cooling and lighting | **61.25** | 3.4 | Over budget possibility | **56.67** |
| 4.2 | Annual cost of cleaning and maintenance | **50.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **49.17** | 4.1 | Material quality | **66.67** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **75.00** |
| 5.1 | Company image | **50.83** | 4.3 | Contracted work quality | **80.83** |
| 5.2 | Views of local planning authority | **84.17** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **50.83** | 5.1 | Mutual-trusting relationships | **70.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **83.75** | 6.1 | Team communication | **67.08** |
| 6.2 | Public survey | **69.17** | 6.2 | Leadership-team management | **77.50** |
| | | | 6.3 | Motivation for project | **54.58** |
| | | | 6.4 | Monitoring and feedback | **68.33** |
| | | | 6.5 | Skilled personnel | **62.50** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **85.00** | 7.1 | Risk identification | **61.67** |
| 8.2 | Hazard identification | **80.00** | 7.2 | Risk response | **67.50** |
| 8.3 | Health and safety records | **73.33** | 7.3 | Coordination with subcontractors | **75.00** |
| 8.4 | Management responsibility | **78.33** | 7.4 | Risk management techniques | **57.50** |
| | | | 7.5 | Financial stability of client | **85.83** |

# Project 05

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial, Hotel, Sport and Medical resort – New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2009

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Director | |
| 2 | | Project Director | |
| 3 | | Project Manager | |
| 4 | | Owner representative | |
| 5 | | Tenant coordinator | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Residential/Apartments, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **40.00** | 1.1 | Clarity of contract | **77.92** |
| 1.2 | Operating costs per head | **42.50** | 1.2 | Effective preplanning | **71.67** |
| 1.3 | Productivity per employee | **40.00** | 1.3 | Project levels of decision making | **55.83** |
| 1.4 | Number of complaints | **82.50** | 1.4 | Understanding of project requirements | **63.33** |
| 1.5 | Revenue per unit area | **73.33** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **83.33** |
| 2.1 | Industry Best Practice | **65.42** | 2.2 | Constraint by government regulations | **78.33** |
| 2.2 | Project Management Guidelines - Gateway Review | **51.67** | 2.3 | Rapid decision making | **80.00** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **71.67** |
| 3.1 | Capital Cost | **97.50** | 2.5 | Adequacy of time | **68.33** |
| 3.2 | Payback | **86.25** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **72.92** | 3.1 | Rapid decision making | **81.25** |
| 3.4 | Building operating and maintenance cost | **55.00** | 3.2 | Cash flow certainty | **95.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **76.67** |
| 4.1 | Annual cost of heating, cooling and lighting | **61.25** | 3.4 | Over budget possibility | **56.67** |
| 4.2 | Annual cost of cleaning and maintenance | **50.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **49.17** | 4.1 | Material quality | **66.67** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **75.00** |
| 5.1 | Company image | **50.83** | 4.3 | Contracted work quality | **80.83** |
| 5.2 | Views of local planning authority | **84.17** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **50.83** | 5.1 | Mutual-trusting relationships | **70.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **83.75** | 6.1 | Team communication | **67.08** |
| 6.2 | Public survey | **69.17** | 6.2 | Leadership-team management | **77.50** |
| | | | 6.3 | Motivation for project | **54.58** |
| | | | 6.4 | Monitoring and feedback | **68.33** |
| | | | 6.5 | Skilled personnel | **62.50** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **85.00** | 7.1 | Risk identification | **61.67** |
| 8.2 | Hazard identification | **80.00** | 7.2 | Risk response | **67.50** |
| 8.3 | Health and safety records | **73.33** | 7.3 | Coordination with subcontractors | **75.00** |
| 8.4 | Management responsibility | **78.33** | 7.4 | Risk management techniques | **57.50** |
| | | | 7.5 | Financial stability of client | **85.83** |

# Project 06

**Project location: _____, Serbia**
**Investor: _____**
**Sector:** Commercial – New Build
**Mace:** Project management
**Project status:** 2010 - On going

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Financial director | |
| 2 | | Executive director for implementation of the project | |
| 3 | | Director | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **78.75** | 1.1 | Clarity of contract | **74.17** |
| 1.2 | Operating costs per head | **70.00** | 1.2 | Effective preplanning | **69.17** |
| 1.3 | Productivity per employee | **68.33** | 1.3 | Project levels of decision making | **74.17** |
| 1.4 | Number of complaints | **93.33** | 1.4 | Understanding of project requirements | **80.83** |
| 1.5 | Revenue per unit area | **94.17** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **70.83** |
| 2.1 | Industry Best Practice | **91.67** | 2.2 | Constraint by government regulations | **61.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** | 2.3 | Rapid decision making | **68.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **61.67** |
| 3.1 | Capital Cost | **67.92** | 2.5 | Adequacy of time | **60.00** |
| 3.2 | Payback | **69.17** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **81.67** | 3.1 | Rapid decision making | **65.83** |
| 3.4 | Building operating and maintenance cost | **91.67** | 3.2 | Cash flow certainty | **75.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **94.17** |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** | 3.4 | Over budget possibility | **80.00** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **88.75** | 4.1 | Material quality | **80.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **65.00** |
| 5.1 | Company image | **90.00** | 4.3 | Contracted work quality | **71.67** |
| 5.2 | Views of local planning authority | **75.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **79.17** | 5.1 | Mutual-trusting relationships | **60.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **88.33** | 6.1 | Team communication | **76.67** |
| 6.2 | Public survey | **78.33** | 6.2 | Leadership-team management | **64.58** |
| | | | 6.3 | Motivation for project | **66.67** |
| | | | 6.4 | Monitoring and feedback | **58.33** |
| | | | 6.5 | Skilled personnel | **70.00** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **95.00** | 7.1 | Risk identification | **82.08** |
| 8.2 | Hazard identification | **88.33** | 7.2 | Risk response | **74.17** |
| 8.3 | Health and safety records | **65.42** | 7.3 | Coordination with subcontractors | **64.58** |
| 8.4 | Management responsibility | **74.17** | 7.4 | Risk management techniques | **68.33** |
| | | | 7.5 | Financial stability of client | **70.00** |

# Project 07

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial, Hotel resort – Reconstruction, Cultural Heritage
**Project Management role:** Project Management, Cost Management
**Project status:** 2009

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | Project Director | |
| 3 | | Administration manager | |
| 4 | | Financial manager | |
| 5 | | Hotel General manager | |
| 6 | | Hotel Operations manager | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is so:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **78.75** | 1.1 | Clarity of contract | **74.17** |
| 1.2 | Operating costs per head | **70.00** | 1.2 | Effective preplanning | **69.17** |
| 1.3 | Productivity per employee | **68.33** | 1.3 | Project levels of decision making | **74.17** |
| 1.4 | Number of complaints | **93.33** | 1.4 | Understanding of project requirements | **80.83** |
| 1.5 | Revenue per unit area | **94.17** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **70.83** |
| 2.1 | Industry Best Practice | **91.67** | 2.2 | Constraint by government regulations | **61.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** | 2.3 | Rapid decision making | **68.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **61.67** |
| 3.1 | Capital Cost | **67.92** | 2.5 | Adequacy of time | **60.00** |
| 3.2 | Payback | **69.17** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **81.67** | 3.1 | Rapid decision making | **65.83** |
| 3.4 | Building operating and maintenance cost | **91.67** | 3.2 | Cash flow certainty | **75.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **94.17** |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** | 3.4 | Over budget possibility | **80.00** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **88.75** | 4.1 | Material quality | **80.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **65.00** |
| 5.1 | Company image | **90.00** | 4.3 | Contracted work quality | **71.67** |
| 5.2 | Views of local planning authority | **75.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **79.17** | 5.1 | Mutual-trusting relationships | **60.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **88.33** | 6.1 | Team communication | **76.67** |
| 6.2 | Public survey | **78.33** | 6.2 | Leadership-team management | **64.58** |
| | | | 6.3 | Motivation for project | **66.67** |
| | | | 6.4 | Monitoring and feedback | **58.33** |
| | | | 6.5 | Skilled personnel | **70.00** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **95.00** | 7.1 | Risk identification | **82.08** |
| 8.2 | Hazard identification | **88.33** | 7.2 | Risk response | **74.17** |
| 8.3 | Health and safety records | **65.42** | 7.3 | Coordination with subcontractors | **64.58** |
| 8.4 | Management responsibility | **74.17** | 7.4 | Risk management techniques | **68.33** |
| | | | 7.5 | Financial stability of client | **70.00** |

# Project 08

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial – Demolition, New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Owner | |
| 2 | | Project Manager | |
| 3 | | Head of Financial Department | |
| 4 | | Head of Legal Department | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **78.75** | 1.1 | Clarity of contract | **74.17** |
| 1.2 | Operating costs per head | **70.00** | 1.2 | Effective preplanning | **69.17** |
| 1.3 | Productivity per employee | **68.33** | 1.3 | Project levels of decision making | **74.17** |
| 1.4 | Number of complaints | **93.33** | 1.4 | Understanding of project requirements | **80.83** |
| 1.5 | Revenue per unit area | **94.17** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **70.83** |
| 2.1 | Industry Best Practice | **91.67** | 2.2 | Constraint by government regulations | **61.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** | 2.3 | Rapid decision making | **68.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **61.67** |
| 3.1 | Capital Cost | **67.92** | 2.5 | Adequacy of time | **60.00** |
| 3.2 | Payback | **69.17** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **81.67** | 3.1 | Rapid decision making | **65.83** |
| 3.4 | Building operating and maintenance cost | **91.67** | 3.2 | Cash flow certainty | **75.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **94.17** |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** | 3.4 | Over budget possibility | **80.00** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **88.75** | 4.1 | Material quality | **80.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **65.00** |
| 5.1 | Company image | **90.00** | 4.3 | Contracted work quality | **71.67** |
| 5.2 | Views of local planning authority | **75.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **79.17** | 5.1 | Mutual-trusting relationships | **60.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **88.33** | 6.1 | Team communication | **76.67** |
| 6.2 | Public survey | **78.33** | 6.2 | Leadership-team management | **64.58** |
| | | | 6.3 | Motivation for project | **66.67** |
| | | | 6.4 | Monitoring and feedback | **58.33** |
| | | | 6.5 | Skilled personnel | **70.00** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **95.00** | 7.1 | Risk identification | **82.08** |
| 8.2 | Hazard identification | **88.33** | 7.2 | Risk response | **74.17** |
| 8.3 | Health and safety records | **65.42** | 7.3 | Coordination with subcontractors | **64.58** |
| 8.4 | Management responsibility | **74.17** | 7.4 | Risk management techniques | **68.33** |
| | | | 7.5 | Financial stability of client | **70.00** |

# Project 09

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial – Demolition, New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2011

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **78.75** | 1.1 | Clarity of contract | **74.17** |
| 1.2 | Operating costs per head | **70.00** | 1.2 | Effective preplanning | **69.17** |
| 1.3 | Productivity per employee | **68.33** | 1.3 | Project levels of decision making | **74.17** |
| 1.4 | Number of complaints | **93.33** | 1.4 | Understanding of project requirements | **80.83** |
| 1.5 | Revenue per unit area | **94.17** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **70.83** |
| 2.1 | Industry Best Practice | **91.67** | 2.2 | Constraint by government regulations | **61.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** | 2.3 | Rapid decision making | **68.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **61.67** |
| 3.1 | Capital Cost | **67.92** | 2.5 | Adequacy of time | **60.00** |
| 3.2 | Payback | **69.17** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **81.67** | 3.1 | Rapid decision making | **65.83** |
| 3.4 | Building operating and maintenance cost | **91.67** | 3.2 | Cash flow certainty | **75.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **94.17** |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** | 3.4 | Over budget possibility | **80.00** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **88.75** | 4.1 | Material quality | **80.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **65.00** |
| 5.1 | Company image | **90.00** | 4.3 | Contracted work quality | **71.67** |
| 5.2 | Views of local planning authority | **75.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **79.17** | 5.1 | Mutual-trusting relationships | **60.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **88.33** | 6.1 | Team communication | **76.67** |
| 6.2 | Public survey | **78.33** | 6.2 | Leadership-team management | **64.58** |
| | | | 6.3 | Motivation for project | **66.67** |
| | | | 6.4 | Monitoring and feedback | **58.33** |
| | | | 6.5 | Skilled personnel | **70.00** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **95.00** | 7.1 | Risk identification | **82.08** |
| 8.2 | Hazard identification | **88.33** | 7.2 | Risk response | **74.17** |
| 8.3 | Health and safety records | **65.42** | 7.3 | Coordination with subcontractors | **64.58** |
| 8.4 | Management responsibility | **74.17** | 7.4 | Risk management techniques | **68.33** |
| | | | 7.5 | Financial stability of client | **70.00** |

# Project 10

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial – Demolition, New Build
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction
**Project status:** 2010

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Project Manager | |
| 2 | | Design Director | |
| 3 | | Project Manager | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Hotel, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **78.75** | 1.1 | Clarity of contract | **74.17** |
| 1.2 | Operating costs per head | **70.00** | 1.2 | Effective preplanning | **69.17** |
| 1.3 | Productivity per employee | **68.33** | 1.3 | Project levels of decision making | **74.17** |
| 1.4 | Number of complaints | **93.33** | 1.4 | Understanding of project requirements | **80.83** |
| 1.5 | Revenue per unit area | **94.17** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **70.83** |
| 2.1 | Industry Best Practice | **91.67** | 2.2 | Constraint by government regulations | **61.67** |
| 2.2 | Project Management Guidelines - Gateway Review | **85.83** | 2.3 | Rapid decision making | **68.33** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **61.67** |
| 3.1 | Capital Cost | **67.92** | 2.5 | Adequacy of time | **60.00** |
| 3.2 | Payback | **69.17** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **81.67** | 3.1 | Rapid decision making | **65.83** |
| 3.4 | Building operating and maintenance cost | **91.67** | 3.2 | Cash flow certainty | **75.00** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **94.17** |
| 4.1 | Annual cost of heating, cooling and lighting | **92.50** | 3.4 | Over budget possibility | **80.00** |
| 4.2 | Annual cost of cleaning and maintenance | **80.83** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **88.75** | 4.1 | Material quality | **80.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **65.00** |
| 5.1 | Company image | **90.00** | 4.3 | Contracted work quality | **71.67** |
| 5.2 | Views of local planning authority | **75.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **79.17** | 5.1 | Mutual-trusting relationships | **60.00** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **88.33** | 6.1 | Team communication | **76.67** |
| 6.2 | Public survey | **78.33** | 6.2 | Leadership-team management | **64.58** |
| | | | 6.3 | Motivation for project | **66.67** |
| | | | 6.4 | Monitoring and feedback | **58.33** |
| | | | 6.5 | Skilled personnel | **70.00** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **95.00** | 7.1 | Risk identification | **82.08** |
| 8.2 | Hazard identification | **88.33** | 7.2 | Risk response | **74.17** |
| 8.3 | Health and safety records | **65.42** | 7.3 | Coordination with subcontractors | **64.58** |
| 8.4 | Management responsibility | **74.17** | 7.4 | Risk management techniques | **68.33** |
| | | | 7.5 | Financial stability of client | **70.00** |

# Project 11

**Project location: _____, Montenegro**
**Investor: _____**
**Sector:** Commercial – Reconstruction
**Project Management role:** Project Management, Cost Management, Technical Supervision of Construction and Tenant Coordination
**Project status:** 2010

1. Determine participants who will attend workshops

   List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Executive director | |
| 2 | | Financial director | |
| 3 | | Technical services manager (FM) | |
| 4 | | Operator | |
| 5 | | Operator | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

   VM workshop facilitator name:

2. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Shopping Mall, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **67.50** | 1.1 | Clarity of contract | **76.67** |
| 1.2 | Operating costs per head | **75.00** | 1.2 | Effective preplanning | **88.33** |
| 1.3 | Productivity per employee | **66.67** | 1.3 | Project levels of decision making | **93.33** |
| 1.4 | Number of complaints | **63.75** | 1.4 | Understanding of project requirements | **94.58** |
| 1.5 | Revenue per unit area | **79.58** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **94.17** |
| 2.1 | Industry Best Practice | **87.08** | 2.2 | Constraint by government regulations | **85.83** |
| 2.2 | Project Management Guidelines - Gateway Review | **80.83** | 2.3 | Rapid decision making | **81.67** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **77.50** |
| 3.1 | Capital Cost | **86.25** | 2.5 | Adequacy of time | **74.17** |
| 3.2 | Payback | **80.42** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **70.83** | 3.1 | Rapid decision making | **92.92** |
| 3.4 | Building operating and maintenance cost | **77.50** | 3.2 | Cash flow certainty | **83.33** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **91.67** |
| 4.1 | Annual cost of heating, cooling and lighting | **79.17** | 3.4 | Over budget possibility | **83.33** |
| 4.2 | Annual cost of cleaning and maintenance | **78.75** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **82.08** | 4.1 | Material quality | **75.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **85.00** |
| 5.1 | Company image | **69.17** | 4.3 | Contracted work quality | **90.42** |
| 5.2 | Views of local planning authority | **70.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **67.50** | 5.1 | Mutual-trusting relationships | **75.42** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **82.50** | 6.1 | Team communication | **92.50** |
| 6.2 | Public survey | **78.75** | 6.2 | Leadership-team management | **79.17** |
| | | | 6.3 | Motivation for project | **84.17** |
| | | | 6.4 | Monitoring and feedback | **77.50** |
| | | | 6.5 | Skilled personnel | **89.17** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **87.50** | 7.1 | Risk identification | **88.33** |
| 8.2 | Hazard identification | **81.67** | 7.2 | Risk response | **92.08** |
| 8.3 | Health and safety records | **69.17** | 7.3 | Coordination with subcontractors | **81.67** |
| 8.4 | Management responsibility | **72.50** | 7.4 | Risk management techniques | **77.50** |
| | | | 7.5 | Financial stability of client | **85.00** |

# Project 12

**Project location: _____, Croatia**
**Investor: _____**
**Sector:** Commercial - New Build
**Project Management role:** Project Management, Cost Management, Tenant Coordination
**Project status:** 2010 - 2011

12. Determine participants who will attend workshops

List Client representatives to take part in the Workshop (up to 20 Maximum)

| No | Name and Surname | Position | Contact/Note |
|---|---|---|---|
| 1 | | Owner | |
| 2 | | Managing Director | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

VM workshop facilitator name:

13. Determine type of the construction (Business/Office, Residential/Apartments, Hotel, and Shopping Mall) and select relevant scoring from previous investigations to be presented on WS. The project is Shopping Mall, so the table is:

| | Utility Factors | | | Utility Factors | |
|---|---|---|---|---|---|
| | **Value Parameters – "soft value" parameter** | | | **Critical success factors – "hard value" parameters** | |
| **1.** | **1. Maximize business effectiveness** | | **1.** | **1. Scope** | |
| 1.1 | Staff satisfaction | **67.50** | 1.1 | Clarity of contract | **76.67** |
| 1.2 | Operating costs per head | **75.00** | 1.2 | Effective preplanning | **88.33** |
| 1.3 | Productivity per employee | **66.67** | 1.3 | Project levels of decision making | **93.33** |
| 1.4 | Number of complaints | **63.75** | 1.4 | Understanding of project requirements | **94.58** |
| 1.5 | Revenue per unit area | **79.58** | 2. | **2. Time** | |
| 2. | **2. Ensure effective project management and delivery** | | 2.1 | Project time constraints | **94.17** |
| 2.1 | Industry Best Practice | **87.08** | 2.2 | Constraint by government regulations | **85.83** |
| 2.2 | Project Management Guidelines - Gateway Review | **80.83** | 2.3 | Rapid decision making | **81.67** |
| 3. | **3. Achieve the required financial performance** | | 2.4 | Overrun duration | **77.50** |
| 3.1 | Capital Cost | **86.25** | 2.5 | Adequacy of time | **74.17** |
| 3.2 | Payback | **80.42** | 3. | **3. Cost** | |
| 3.3 | Whole-life Cost | **70.83** | 3.1 | Rapid decision making | **92.92** |
| 3.4 | Building operating and maintenance cost | **77.50** | 3.2 | Cash flow certainty | **83.33** |
| 4. | **4. Minimize building operation and maintenance costs, and environmental impact** | | 3.3 | Precise project budget estimate | **91.67** |
| 4.1 | Annual cost of heating, cooling and lighting | **79.17** | 3.4 | Over budget possibility | **83.33** |
| 4.2 | Annual cost of cleaning and maintenance | **78.75** | 4. | **4. Quality** | |
| 4.3 | Frequency of periodic maintenance | **82.08** | 4.1 | Material quality | **75.00** |
| 5. | **5. Impact positively on the location of the facility** | | 4.2 | Construction quality plan | **85.00** |
| 5.1 | Company image | **69.17** | 4.3 | Contracted work quality | **90.42** |
| 5.2 | Views of local planning authority | **70.00** | 5. | **5. Contract-admin** | |
| 5.3 | Public or private survey results | **67.50** | 5.1 | Mutual-trusting relationships | **75.42** |
| 6. | **6. Comply with third party requirements** | | 6. | **6. Human resource** | |
| 6.1 | Planning approval | **82.50** | 6.1 | Team communication | **92.50** |
| 6.2 | Public survey | **78.75** | 6.2 | Leadership-team management | **79.17** |
| | | | 6.3 | Motivation for project | **84.17** |
| | | | 6.4 | Monitoring and feedback | **77.50** |
| | | | 6.5 | Skilled personnel | **89.17** |
| 8. | **8. Health and safety** | | 7. | **7. Risk** | |
| 8.1 | Management of work safety on site | **87.50** | 7.1 | Risk identification | **88.33** |
| 8.2 | Hazard identification | **81.67** | 7.2 | Risk response | **92.08** |
| 8.3 | Health and safety records | **69.17** | 7.3 | Coordination with subcontractors | **81.67** |
| 8.4 | Management responsibility | **72.50** | 7.4 | Risk management techniques | **77.50** |
| | | | 7.5 | Financial stability of client | **85.00** |

## Appendix 7.2.1 - EFTE Exercise - Round 1 Questionnaire

**Round 1: Questionnaire**

Name of participant: _____

Function in the project: _____

Guidance on completion:
From the previous paired comparison exercise, we have established what the priorities for the project are. Local experience information was presented and the reasoning behind the scoring explained.

The scoring table of this questionnaire was designed for you to assess the performance of each value parameter group with respect to project priorities. Please enter a score from **0 (least favorable)** to **10 (most favorable)** to indicate the suitability of each parameter.

**Table 1 - Scoring table**

| Criteria or parameter | |
|---|---|
| 1. Maximize business effectiveness | |
| 2. Ensure effective project management and delivery | |
| 3. Achieve the required financial performance | |
| 4. Minimize building operation and maintenance costs and environmental impact | |
| 5. Impact positively on the location of the facility | |
| 6. Comply with third-party requirements | |

| Criteria or parameter | |
|---|---|
| 1. Scope | |
| 2. Time | |
| 3. Cost | |
| 4. Quality | |
| 5. Contract-admin | |
| 6. Human resource | |
| 7. Risk | |
| 8. Health and safety | |

Please return the completed table to the workshop moderator.

## Appendix 7.2.2 - EFTE Exercise - Round 2 Questionnaire

**Round 2: Questionnaire**

Name of participant: _____

Function in the project: _____

Guidance on completion:
From the previous round, we have established what the average results for the priorities of the project are. These results are presented on the white board in front of you. Please enter "reconsidered" scores in the following table.

The scoring table of this questionnaire was designed for you to assess the performance of each value parameter group with respect to project priorities. Please enter a score from **0 (least favorable)** to **10 (most favorable)** to indicate the suitability of each parameter.

**Table 2 – Reconsidered Scoring table**

| Criteria or parameter | |
|---|---|
| 1. Maximize business effectiveness | |
| 2. Ensure effective project management and delivery | |
| 3. Achieve the required financial performance | |
| 4. Minimize building operation and maintenance costs and environmental impact | |
| 5. Impact positively on the location of the facility | |
| 6. Comply with third-party requirements | |

| Criteria or parameter | |
|---|---|
| 1. Scope | |
| 2. Time | |
| 3. Cost | |
| 4. Quality | |
| 5. Contract-admin | |
| 6. Human resource | |
| 7. Risk | |
| 8. Health and safety | |

**Questions and comments**

Please return the completed table to the workshop moderator.

## Appendix 7.3.1- Paired Comparison Exercise Results

### Project No. 1

#### 1. Paired comparison

| Score | Weight |
|---|---|
| | |

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | C | A | E | A | 1. Maximize business effectiveness | 3 | 20.00 | **8** |
| B | | B | D | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | C | E | C | 3. Achieve the required financial performance | 3 | 20.00 | **8** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | D | B | B | B | B | 2. Time | 5 | 17.86 | **8** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 6 | 21.43 | **9** |
| E | | | | | F | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 2 | 7.14 | **3** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

### Project No. 2

#### 1. Paired comparison

| Score | Weight |
|---|---|
| | |

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | B | A | A | E | A | 1. Maximize business effectiveness | 3 | 20.00 | **8** |
| B | | C | D | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | C | E | C | 3. Achieve the required financial performance | 3 | 20.00 | **8** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 6 |
| A | A | C | A | A | A | A | A | 1. Scope | 6 | 21.43 | **10** |
| B | | B | B | B | B | B | B | 2. Time | 6 | 21.43 | **10** |
| C | | | C | C | C | C | C | 3. Cost | 6 | 21.43 | **10** |
| D | | | | D | D | G | H | 4. Quality | 2 | 7.14 | **4** |
| E | | | | | F | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 3 | 10.71 | **5** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 3

### 1. Paired comparison

| | Score | Weight |
|---|---|---|
| | | |

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | C | A | E | A | 1. Maximize business effectiveness | 3 | 20.00 | **8** |
| B | | B | D | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | C | E | C | 3. Achieve the required financial performance | 3 | 20.00 | **8** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | D | B | B | B | B | 2. Time | 5 | 17.86 | **8** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 6 | 21.43 | **9** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 4

### 1. Paired comparison

| | Score | Weight |
|---|---|---|
| | | |

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 5 |
| A | A | A | A | A | A | 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | B | B | B | B | 2. Ensure effective project management and delivery | 4 | 26.67 | **8** |
| C | | | C | C | C | 3. Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 1 | 6.67 | **2** |
| E | | | | | F | 5. Impact positively on the location of the facility | 1 | 6.67 | **2** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | A | A | A | A | A | 1. Scope | 5 | 17.86 | **8** |
| B | | C | D | B | B | G | B | 2. Time | 4 | 14.29 | **6** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | G | D | 4. Quality | 4 | 14.29 | **6** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 5 | 17.86 | **8** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 5

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | A | A | E | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | B | D | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | C | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **5** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | G | A | 1. Scope | 3 | 10.71 | **5** |
| B | | C | D | B | B | B | B | 2. Time | 5 | 17.86 | **8** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 6 | 21.43 | **9** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 4 | 14.29 | **6** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 6

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 5 |
| A | A | A | A | A | A | 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | D | E | B | 2. Ensure effective project management and delivery | 1 | 6.67 | **2** |
| C | | | C | C | E | 3. Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | F | 5. Impact positively on the location of the facility | 3 | 20.00 | **6** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | D | B | B | B | B | 2. Time | 5 | 17.86 | **8** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 6 | 21.43 | **9** |
| E | | | | | G | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 0 | 0.00 | **0** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 7

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | C | A | A | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | D | E | B | 2. Ensure effective project management and delivery | 1 | 6.67 | **3** |
| C | | | C | E | C | 3. Achieve the required financial performance | 4 | 26.67 | **10** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 3 | 20.00 | **8** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | E | F | G | A | 1. Scope | 1 | 3.57 | **2** |
| B | | B | B | B | B | B | B | 2. Time | 7 | 25.00 | **10** |
| C | | | C | C | C | C | C | 3. Cost | 6 | 21.43 | **9** |
| D | | | | D | D | D | D | 4. Quality | 5 | 17.86 | **8** |
| E | | | | | F | E | H | 5. Contract-admin | 2 | 7.14 | **3** |
| F | | | | | | G | H | 6. Human resource | 2 | 7.14 | **3** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 8

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | A | A | E | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | B | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | D | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **5** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | B | B | B | B | B | 2. Time | 6 | 21.43 | **9** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 5 | 17.86 | **8** |
| E | | | | | F | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 2 | 7.14 | **3** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 9

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | A | A | E | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | B | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | D | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **5** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | B | B | B | B | B | 2. Time | 6 | 21.43 | **9** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 5 | 17.86 | **8** |
| E | | | | | F | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 2 | 7.14 | **3** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 10

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 5 |
| A | A | A | A | A | A | 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | B | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **4** |
| C | | | D | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **4** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | 5. Impact positively on the location of the facility | 4 | 26.67 | **8** |
| F | | | | | | 6. Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 6 |
| A | B | C | D | A | A | G | H | 1. Scope | 2 | 7.14 | **4** |
| B | | B | B | B | B | G | B | 2. Time | 6 | 21.43 | **10** |
| C | | | C | C | C | C | C | 3. Cost | 6 | 21.43 | **10** |
| D | | | | D | D | G | D | 4. Quality | 4 | 14.29 | **7** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 6 | 21.43 | **10** |
| H | | | | | | | | 8. Health and safety | 3 | 10.71 | **5** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 11

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 5 |
| A | A | A | A | A | A | 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | D | E | B | 2. Ensure effective project management and delivery | 1 | 6.67 | **2** |
| C | | | C | C | C | 3. Achieve the required financial performance | 4 | 26.67 | **8** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | F | 5. Impact positively on the location of the facility | 2 | 13.33 | **4** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | E | F | G | A | 1. Scope | 1 | 3.57 | **2** |
| B | | C | B | B | B | B | B | 2. Time | 6 | 21.43 | **9** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | H | 4. Quality | 4 | 14.29 | **6** |
| E | | | | | F | E | E | 5. Contract-admin | 3 | 10.71 | **5** |
| F | | | | | | G | H | 6. Human resource | 2 | 7.14 | **3** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

## Project No. 12

### 1. Paired comparison

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | B | A | A | A | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | D | B | B | 2. Ensure effective project management and delivery | 3 | 20.00 | **8** |
| C | | | C | E | C | 3. Achieve the required financial performance | 3 | 20.00 | **8** |
| D | | | | E | F | 4. Minimize building operation and maintenance costs, and environmental impact | 1 | 6.67 | **3** |
| E | | | | | F | 5. Impact positively on the location of the facility | 2 | 13.33 | **5** |
| F | | | | | | 6. Comply with third party requirements | 2 | 13.33 | **5** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 6 |
| A | B | A | D | E | F | A | A | 1. Scope | 3 | 10.71 | **5** |
| B | | B | D | B | B | B | B | 2. Time | 6 | 21.43 | **10** |
| C | | | C | C | C | C | C | 3. Cost | 5 | 17.86 | **9** |
| D | | | | D | D | D | D | 4. Quality | 6 | 21.43 | **10** |
| E | | | | | E | E | H | 5. Contract-admin | 3 | 10.71 | **5** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 2 | 7.14 | **4** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **4** |
| | | | | | | | | | 28 | 100.00 | |

**Appendix 7.3.2 - EFTE Exercise Results**

**Project No. 1**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| 8 | 7 | 7.5 | **8** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| 8 | 7 | 7.5 | **8** | 0.71 | 8 | 7 | 7.5 | **8** | 0.71 |
| 5 | 6 | 5.5 | **6** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| 9 | 8 | 8.5 | **9** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| 1 | 4 | 2.5 | **3** | 2.12 | 2 | 3 | 2.5 | **3** | 0.71 |
| 7 | 6 | 6.5 | **7** | 0.71 | 7 | 7 | 7 | **7** | 0.00 |
| 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | **8** | 0.00 |
| 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| 7 | 8 | 7.5 | **8** | 0.71 | 7 | 8 | 7.5 | **8** | 0.71 |
| 6 | 4 | 5 | **5** | 1.41 | 6 | 5 | 5.5 | **6** | 0.71 |
| 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |
| 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |

**Project No. 2**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| 7 | 8 | 7.5 | **8** | 0.71 | 7 | 8 | 7.5 | **8** | 0.71 |
| 4 | 6 | 5 | **5** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| 7 | 8 | 7.5 | **8** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| 4 | 7 | 5.5 | **6** | 2.12 | 5 | 6 | 5.5 | **6** | 0.71 |
| 9 | 10 | 9.5 | **10** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |
| 10 | 9 | 9.5 | **10** | 0.71 | 10 | 9 | 9.5 | **10** | 0.71 |
| 10 | 9 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| 5 | 7 | 6 | **6** | 1.41 | 6 | 6 | 6 | **6** | 0.00 |
| 2 | 3 | 2.5 | **3** | 0.71 | 2 | 2 | 2 | **2** | 0.00 |
| 2 | 2 | 2 | **2** | 0.00 | 2 | 2 | 2 | **2** | 0.00 |
| 4 | 4 | 4 | **4** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |
| 5 | 7 | 6 | **6** | 1.41 | 6 | 6 | 6 | **6** | 0.00 |

**Project No. 3**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | 2 round | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| 7 | 8 | 8 | 7.66667 | **8** | 0.58 | 7 | 7 | 8 | 7.33333 | **7** | 0.58 |
| 4 | 4 | 6 | 4.66667 | **5** | 1.15 | 4 | 4 | 5 | 4.33333 | **4** | 0.58 |
| 7 | 8 | 8 | 7.66667 | **8** | 0.58 | 7 | 8 | 8 | 7.66667 | **8** | 0.58 |
| 5 | 5 | 8 | 6 | **6** | 1.73 | 5 | 6 | 6 | 5.66667 | **6** | 0.58 |
| 10 | 10 | 9 | 9.66667 | **10** | 0.58 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 2 | 4 | 6 | 4 | **4** | 2.00 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| 6 | 8 | 8 | 7.33333 | **7** | 1.15 | 6 | 7 | 7 | 6.66667 | **7** | 0.58 |
| 8 | 8 | 7 | 7.66667 | **8** | 0.58 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 9 | 8 | 8 | 8.33333 | **8** | 0.58 | 9 | 8 | 9 | 8.66667 | **9** | 0.58 |
| 2 | 5 | 6 | 4.33333 | **4** | 2.08 | 3 | 5 | 5 | 4.33333 | **4** | 1.15 |
| 5 | 4 | 4 | 4.33333 | **4** | 0.58 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| 5 | 7 | 5 | 5.66667 | **6** | 1.15 | 5 | 6 | 5 | 5.33333 | **5** | 0.58 |
| 4 | 5 | 5 | 4.66667 | **5** | 0.58 | 4 | 4 | 5 | 4.33333 | **4** | 0.58 |

**Project No. 4**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 10 | 9 | 10 | 8 | 10 | 9.4 | **9** | 0.89 | 10 | 10 | 10 | 9 | 10 | 9.8 | **10** | 0.45 |
| 8 | 8 | 7 | 8 | 6 | 7.4 | **7** | 0.89 | 7 | 7 | 6 | 7 | 6 | 6.6 | **7** | 0.55 |
| 7 | 7 | 6 | 8 | 8 | 7.2 | **7** | 0.84 | 7 | 7 | 6 | 7 | 7 | 6.8 | **7** | 0.45 |
| 3 | 3 | 2 | 3 | 4 | 3 | **3** | 0.71 | 3 | 3 | 3 | 4 | 4 | 3.4 | **3** | 0.55 |
| 3 | 4 | 4 | 3 | 2 | 3.2 | **3** | 0.84 | 3 | 3 | 4 | 3 | 2 | 3 | **3** | 0.71 |
| 1 | 3 | 2 | 2 | 4 | 2.4 | **2** | 1.14 | 2 | 3 | 2 | 2 | 3 | 2.4 | **2** | 0.55 |
| 8 | 7 | 6 | 7 | 8 | 8 | **8** | 0.84 | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 6 | 8 | 6 | 6 | 7 | 6.6 | **7** | 0.89 | 6 | 7 | 7 | 6 | 7 | 6.6 | **7** | 0.55 |
| 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 6 | 8 | 6 | 8 | 6 | 6.8 | **7** | 1.10 | 7 | 7 | 7 | 8 | 6 | 7 | **7** | 0.71 |
| 2 | 4 | 7 | 6 | 4 | 4.6 | **5** | 1.95 | 3 | 5 | 5 | 5 | 4 | 4.4 | **4** | 0.89 |
| 2 | 3 | 4 | 4 | 3 | 3.2 | **3** | 0.84 | 3 | 3 | 4 | 4 | 3 | 3.4 | **3** | 0.55 |
| 8 | 7 | 8 | 9 | 8 | 8 | **8** | 0.71 | 8 | 8 | 8 | 9 | 8 | 8.2 | **8** | 0.45 |
| 3 | 4 | 4 | 5 | 5 | 4.2 | **4** | 0.84 | 3 | 4 | 4 | 5 | 4 | 4 | **4** | 0.71 |

**Project No. 5**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 7 | 8 | 8 | 8 | 6 | 7.4 | **7** | 0.89 | 7 | 8 | 8 | 8 | 7 | 7.6 | **8** | 0.55 |
| 4 | 5 | 4 | 5 | 5 | 4.6 | **5** | 0.55 | 5 | 5 | 4 | 5 | 5 | 4.8 | **5** | 0.45 |
| 6 | 6 | 5 | 5 | 6 | 5.6 | **6** | 0.55 | 6 | 5 | 5 | 5 | 6 | 5.4 | **5** | 0.55 |
| 5 | 4 | 4 | 4 | 5 | 4.4 | **4** | 0.55 | 5 | 5 | 4 | 4 | 5 | 4.6 | **5** | 0.55 |
| 9 | 10 | 10 | 9 | 9 | 9.4 | **9** | 0.55 | 9 | 10 | 10 | 10 | 9 | 9.6 | **10** | 0.55 |
| 5 | 4 | 4 | 3 | 6 | 4.4 | **4** | 1.14 | 5 | 4 | 4 | 4 | 5 | 4.4 | **4** | 0.55 |
| 6 | 5 | 5 | 6 | 5 | 5.4 | **5** | 0.55 | 6 | 6 | 5 | 6 | 6 | 5.8 | **6** | 0.45 |
| 8 | 8 | 8 | 8 | 9 | 8.2 | **8** | 0.45 | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 10 | 10 | 10 | 10 | 8 | 9.6 | **10** | 0.89 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 9 | 8 | 9 | 9 | 8 | 8.6 | **9** | 0.55 | 9 | 9 | 8 | 9 | 9 | 8.8 | **9** | 0.45 |
| 3 | 6 | 7 | 4 | 4 | 4.8 | **5** | 1.64 | 4 | 5 | 5 | 4 | 4 | 4.4 | **4** | 0.55 |
| 4 | 6 | 6 | 3 | 4 | 4.6 | **5** | 1.34 | 5 | 5 | 6 | 4 | 4 | 4.8 | **5** | 0.84 |
| 7 | 6 | 6 | 7 | 7 | 6.6 | **7** | 0.55 | 8 | 6 | 7 | 7 | 7 | 7 | **7** | 0.71 |
| 3 | 4 | 7 | 8 | 5 | 5.4 | **5** | 2.07 | 4 | 4 | 6 | 7 | 4 | 5 | **5** | 1.41 |

**Project No. 6**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | 2 round | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| 10 | 9 | 10 | 9.66667 | **10** | 0.58 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 3 | 4 | 3 | 3.33333 | **3** | 0.58 | 3 | 4 | 3 | 3.33333 | **3** | 0.58 |
| 6 | 6 | 6 | 6 | **6** | 0.00 | 6 | 6 | 6 | 6 | **6** | 0.00 |
| 5 | 4 | 4 | 4.33333 | **4** | 0.58 | 5 | 4 | 4 | 4.33333 | **4** | 0.58 |
| 8 | 7 | 7 | 7.33333 | **7** | 0.58 | 8 | 7 | 7 | 7.33333 | **7** | 0.58 |
| 2 | 5 | 3 | 3.33333 | **3** | 1.53 | 2 | 5 | 3 | 3.33333 | **3** | 1.53 |
| 7 | 8 | 6 | 7 | **7** | 1.00 | 7 | 7 | 7 | 7 | **7** | 0.00 |
| 8 | 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 9 | 8 | 9 | 8.66667 | **9** | 0.58 | 9 | 9 | 9 | 9 | **9** | 0.00 |
| 3 | 4 | 3 | 3.33333 | **3** | 0.58 | 3 | 4 | 3 | 3.33333 | **3** | 0.58 |
| 2 | 3 | 8 | 4.33333 | **4** | 3.21 | 2 | 3 | 5 | 3.33333 | **3** | 1.53 |
| 5 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | 5 | **5** | 0.00 |
| 3 | 3 | 3 | 3 | **3** | 0.00 | 3 | 3 | 3 | 3 | **3** | 0.00 |

**Project No. 7**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | | | | 1 round | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | 6 | avg | rnd | stdev |
| 10 | 9 | 10 | 10 | 9 | 10 | 9.66667 | **10** | 0.52 | 10 | 10 | 10 | 10 | 9 | 10 | 9.83333 | **10** | 0.41 |
| 5 | 6 | 3 | 5 | 9 | 3 | 5.16667 | **5** | 2.23 | 5 | 5 | 3 | 5 | 6 | 3 | 4.5 | **5** | 1.22 |
| 10 | 10 | 10 | 9 | 10 | 10 | 9.83333 | **10** | 0.41 | 10 | 10 | 10 | 9 | 10 | 10 | 9.83333 | **10** | 0.41 |
| 5 | 6 | 6 | 6 | 5 | 6 | 5.66667 | **6** | 0.52 | 5 | 6 | 6 | 6 | 5 | 6 | 5.66667 | **6** | 0.52 |
| 9 | 8 | 8 | 9 | 9 | 8 | 8.5 | **9** | 0.55 | 9 | 8 | 8 | 8 | 9 | 8 | 8.33333 | **8** | 0.52 |
| 0 | 4 | 3 | 7 | 4 | 5 | 3.83333 | **4** | 2.32 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | **4** | 0.63 |
| 7 | 6 | 3 | 2 | 3 | 8 | 4.83333 | **5** | 2.48 | 5 | 6 | 3 | 2 | 3 | 5 | 4 | **4** | 1.55 |
| 10 | 9 | 9 | 10 | 10 | 10 | 9.66667 | **10** | 0.52 | 10 | 10 | 9 | 10 | 10 | 10 | 9.83333 | **10** | 0.41 |
| 10 | 9 | 10 | 9 | 9 | 9 | 9.33333 | **9** | 0.52 | 10 | 9 | 9 | 9 | 9 | 9 | 9.16667 | **9** | 0.41 |
| 7 | 8 | 8 | 7 | 8 | 8 | 7.66667 | **8** | 0.52 | 7 | 8 | 8 | 7 | 8 | 8 | 7.66667 | **8** | 0.52 |
| 3 | 4 | 4 | 7 | 4 | 9 | 5.16667 | **5** | 2.32 | 3 | 4 | 4 | 7 | 4 | 5 | 4.5 | **5** | 1.38 |
| 2 | 4 | 2 | 3 | 7 | 9 | 4.5 | **5** | 2.88 | 4 | 4 | 3 | 3 | 7 | 5 | 4.33333 | **4** | 1.51 |
| 5 | 4 | 5 | 5 | 4 | 5 | 4.66667 | **5** | 0.52 | 5 | 4 | 5 | 5 | 4 | 5 | 4.66667 | **5** | 0.52 |
| 3 | 4 | 4 | 4 | 3 | 4 | 3.66667 | **4** | 0.52 | 3 | 4 | 4 | 4 | 3 | 4 | 3.66667 | **4** | 0.52 |

**Project No. 8**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** | 0.71 |
| 5 | 7 | 6 | **6** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| 4 | 5 | 4.5 | **5** | 0.71 | 4 | 5 | 4.5 | **5** | 0.71 |
| 5 | 6 | 5.5 | **6** | 0.71 | 5 | 6 | 5.5 | **6** | 0.71 |
| 9 | 10 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |
| 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| 0 | 2 | 1 | **1** | 1.41 | 1 | 1 | 1 | **1** | 0.00 |
| 4 | 5 | 4.5 | **5** | 0.71 | 4 | 4 | 4 | **4** | 0.00 |
| 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| 2 | 3 | 2.5 | **3** | 0.71 | 2 | 2 | 2 | **2** | 0.00 |

**Project No. 9**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** | 0.71 |
| 5 | 7 | 6 | **6** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| 4 | 5 | 4.5 | **5** | 0.71 | 4 | 5 | 4.5 | **5** | 0.71 |
| 5 | 6 | 5.5 | **6** | 0.71 | 5 | 6 | 5.5 | **6** | 0.71 |
| 9 | 10 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |
| 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| 0 | 2 | 1 | **1** | 1.41 | 1 | 1 | 1 | **1** | 0.00 |
| 4 | 5 | 4.5 | **5** | 0.71 | 4 | 4 | 4 | **4** | 0.00 |
| 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| 2 | 3 | 2.5 | **3** | 0.71 | 2 | 2 | 2 | **2** | 0.00 |

**Project No. 10**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | 2 round | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| 10 | 10 | 8 | 9.33333 | **9** | 1.15 | 10 | 10 | 9 | 9.66667 | **10** | 0.58 |
| 5 | 6 | 6 | 5.66667 | **6** | 0.58 | 6 | 6 | 6 | 6 | **6** | 0.00 |
| 4 | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| 5 | 5 | 4 | 4.66667 | **5** | 0.58 | 5 | 5 | 5 | 5 | **5** | 0.00 |
| 9 | 8 | 8 | 8.33333 | **8** | 0.58 | 9 | 9 | 8 | 8.66667 | **9** | 0.58 |
| 1 | 2 | 2 | 1.66667 | **2** | 0.58 | 1 | 2 | 1 | 1.33333 | **1** | 0.58 |
| 7 | 4 | 8 | 6.33333 | **6** | 2.08 | 7 | 6 | 7 | 6.66667 | **7** | 0.58 |
| 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 10 | 9 | 9 | 9.33333 | **9** | 0.58 | 10 | 9 | 9 | 9.33333 | **9** | 0.58 |
| 7 | 8 | 8 | 7.66667 | **8** | 0.58 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 0 | 3 | 4 | 2.33333 | **2** | 2.08 | 2 | 3 | 2 | 2.33333 | **2** | 0.58 |
| 4 | 3 | 4 | 3.66667 | **4** | 0.58 | 4 | 3 | 4 | 3.66667 | **4** | 0.58 |
| 10 | 10 | 9 | 9.66667 | **10** | 0.58 | 10 | 10 | 9 | 9.66667 | **10** | 0.58 |
| 5 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | 5 | **5** | 0.00 |

**Project No. 11**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 10 | 8 | 10 | 9 | 10 | 9.4 | **9** | 0.89 | 9 | 8 | 10 | 9 | 9 | 9 | **9** | 0.71 |
| 2 | 3 | 3 | 2 | 4 | 2.8 | **3** | 0.84 | 3 | 3 | 3 | 3 | 3 | 3 | **3** | 0.00 |
| 8 | 7 | 8 | 8 | 7 | 7.6 | **8** | 0.55 | 8 | 8 | 8 | 8 | 7 | 7.8 | **8** | 0.45 |
| 5 | 4 | 4 | 4 | 4 | 4.2 | **4** | 0.45 | 4 | 4 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| 6 | 4 | 6 | 4 | 7 | 5.4 | **5** | 1.34 | 6 | 5 | 6 | 4 | 5 | 5.2 | **5** | 0.84 |
| 2 | 1 | 2 | 1 | 1 | 1.4 | **1** | 0.55 | 1 | 1 | 1 | 1 | 1 | 1 | **1** | 0.00 |
| 2 | 2 | 3 | 2 | 3 | 2.4 | **2** | 0.55 | 2 | 2 | 2 | 2 | 3 | 2.2 | **2** | 0.45 |
| 9 | 9 | 8 | 8 | 9 | 8.6 | **9** | 0.55 | 9 | 9 | 9 | 8 | 9 | 8.8 | **9** | 0.45 |
| 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 7 | 6 | 6 | 8 | 6 | 6.6 | **7** | 0.89 | 6 | 6 | 6 | 7 | 6 | 6.2 | **6** | 0.45 |
| 5 | 4 | 5 | 4 | 4 | 4.4 | **4** | 0.55 | 5 | 5 | 5 | 4 | 4 | 4.6 | **5** | 0.55 |
| 3 | 4 | 3 | 4 | 4 | 3.6 | **4** | 0.55 | 4 | 4 | 3 | 4 | 4 | 3.8 | **4** | 0.45 |
| 5 | 5 | 5 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | 5 | 5 | 5 | **5** | 0.00 |
| 3 | 4 | 3 | 3 | 4 | 3.4 | **3** | 0.55 | 3 | 3 | 3 | 3 | 4 | 3.2 | **3** | 0.45 |

**Project No. 12**
**2. EFTE - Estimate-Talk-Feedback-Talk**

| 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** | 0.71 |
| 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | **8** | 0.00 |
| 3 | 4 | 3.5 | **4** | 0.71 | 4 | 4 | 4 | **4** | 0.00 |
| 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |
| 5 | 6 | 5.5 | **6** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| 5 | 6 | 5.5 | **6** | 0.71 | 6 | 6 | 6 | **6** | 0.00 |
| 10 | 9 | 9.5 | **10** | 0.71 | 10 | 9 | 9.5 | **10** | 0.71 |
| 9 | 9 | 9 | **9** | 0.00 | 9 | 9 | 9 | **9** | 0.00 |
| 10 | 9 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| 5 | 4 | 4.5 | **5** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| 2 | 4 | 3 | **3** | 1.41 | 3 | 4 | 3.5 | **4** | 0.71 |
| 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| 4 | 5 | 4.5 | **5** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |

**Appendix 7.4- Paired Comparison and EFTE 2rounds Exercise Results**

**Project No. 1**

**1. Paired comparison**

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 4 |
| A | 3 | 20.00 | **8** |
| B | 2 | 13.33 | **5** |
| C | 3 | 20.00 | **8** |
| D | 2 | 13.33 | **5** |
| E | 4 | 26.67 | **10** |
| F | 1 | 6.67 | **3** |
| | 15 | 100.00 | |

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 7 |
| A | 4 | 14.29 | **6** |
| B | 5 | 17.86 | **8** |
| C | 7 | 25.00 | **10** |
| D | 6 | 21.43 | **9** |
| E | 1 | 3.57 | **2** |
| F | 1 | 3.57 | **2** |
| G | 2 | 7.14 | **3** |
| H | 2 | 7.14 | **3** |
| | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| **83** | 8 | 7 | 7.5 | **8** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| **65** | 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| **82** | 8 | 7 | 7.5 | **8** | 0.71 | 8 | 7 | 7.5 | **8** | 0.71 |
| **78** | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| **69** | 9 | 8 | 8.5 | **9** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| **63** | 1 | 4 | 2.5 | **3** | 2.12 | 2 | 3 | 2.5 | **3** | 0.71 |
| **75** | 7 | 6 | 6.5 | **7** | 0.71 | 7 | 7 | 7 | **7** | 0.00 |
| **65** | 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | **8** | 0.00 |
| **79** | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| **72** | 7 | 8 | 7.5 | **8** | 0.71 | 7 | 8 | 7.5 | **8** | 0.71 |
| **60** | 6 | 4 | 5 | **5** | 1.41 | 6 | 5 | 5.5 | **6** | 0.71 |
| **67** | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| **72** | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |
| **69** | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |

**Project No. 2**

**1. Paired comparison**

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 4 |
| A | 3 | 20.00 | **8** |
| B | 2 | 13.33 | **5** |
| C | 3 | 20.00 | **8** |
| D | 2 | 13.33 | **5** |
| E | 4 | 26.67 | **10** |
| F | 1 | 6.67 | **3** |
| | 15 | 100.00 | |

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 6 |
| A | 6 | 21.43 | **10** |
| B | 6 | 21.43 | **10** |
| C | 6 | 21.43 | **10** |
| D | 2 | 7.14 | **4** |
| E | 1 | 3.57 | **2** |
| F | 1 | 3.57 | **2** |
| G | 3 | 10.71 | **5** |
| H | 3 | 10.71 | **5** |
| | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| **83** | 7 | 8 | 7.5 | **8** | 0.71 | 7 | 8 | 7.5 | **8** | 0.71 |
| **65** | 4 | 6 | 5 | **5** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| **82** | 7 | 8 | 7.5 | **8** | 0.71 | 8 | 8 | 8 | **8** | 0.00 |
| **78** | 4 | 7 | 5.5 | **6** | 2.12 | 5 | 6 | 5.5 | **6** | 0.71 |
| **69** | 9 | 10 | 9.5 | **10** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| **63** | 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |
| **75** | 10 | 9 | 9.5 | **10** | 0.71 | 10 | 9 | 9.5 | **10** | 0.71 |
| **65** | 10 | 9 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| **79** | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| **72** | 5 | 7 | 6 | **6** | 1.41 | 6 | 6 | 6 | **6** | 0.00 |
| **60** | 2 | 3 | 2.5 | **3** | 0.71 | 2 | 2 | 2 | **2** | 0.00 |
| **67** | 2 | 2 | 2 | **2** | 0.00 | 2 | 2 | 2 | **2** | 0.00 |
| **72** | 4 | 4 | 4 | **4** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |
| **69** | 5 | 7 | 6 | **6** | 1.41 | 6 | 6 | 6 | **6** | 0.00 |

**Project No. 3**

**1. Paired comparison**

| | Score | Weight |
|---|---|---|
| | | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | B | C | D | E | F | | Score | Weight % | Max 4 |
|---|---|---|---|---|---|---|---|---|---|
| A | A | C | A | E | A | 1. Maximize business effectiveness | 3 | 20.00 | **8** |
| B | | B | D | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | C | E | C | 3. Achieve the required financial performance | 3 | 20.00 | **8** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| 83 | 7 | 8 | 8 | 7.66667 | **8** | 0.58 | 7 | 7 | 8 | 7.33333 | **7** | 0.58 |
| 65 | 4 | 4 | 6 | 4.66667 | **5** | 1.15 | 4 | 4 | 5 | 4.33333 | **4** | 0.58 |
| 82 | 7 | 8 | 8 | 7.66667 | **8** | 0.58 | 7 | 8 | 8 | 7.66667 | **8** | 0.58 |
| 78 | 5 | 5 | 8 | 6 | **6** | 1.73 | 5 | 6 | 6 | 5.66667 | **6** | 0.58 |
| 69 | 10 | 10 | 9 | 9.66667 | **10** | 0.58 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 63 | 2 | 4 | 6 | 4 | **4** | 2.00 | 4 | 4 | 4 | 4 | **4** | 0.00 |

| | B | C | D | E | F | G | H | | Score | Weight % | Max 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | D | B | B | B | B | 2. Time | 5 | 17.86 | **8** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 6 | 21.43 | **9** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| 75 | 6 | 8 | 8 | 7.33333 | **7** | 1.15 | 6 | 7 | 7 | 6.66667 | **7** | 0.58 |
| 65 | 8 | 8 | 7 | 7.66667 | **8** | 0.58 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 79 | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 72 | 9 | 8 | 8 | 8.33333 | **8** | 0.58 | 9 | 8 | 9 | 8.66667 | **9** | 0.58 |
| 60 | 2 | 5 | 6 | 4.33333 | **4** | 2.08 | 3 | 5 | 5 | 4.33333 | **4** | 1.15 |
| 67 | 5 | 4 | 4 | 4.33333 | **4** | 0.58 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| 72 | 5 | 7 | 5 | 5.66667 | **6** | 1.15 | 5 | 6 | 5 | 5.33333 | **5** | 0.58 |
| 69 | 4 | 5 | 5 | 4.66667 | **5** | 0.58 | 4 | 4 | 5 | 4.33333 | **4** | 0.58 |

**Project No. 4**

**1. Paired comparison**

| | Score | Weight |
|---|---|---|
| | | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | B | C | D | E | F | | Score | Weight % | Max 5 |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | B | B | B | B | 2. Ensure effective project management and delivery | 4 | 26.67 | **8** |
| C | | | C | C | C | 3. Achieve the required financial performance | 3 | 20.00 | **6** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 1 | 6.67 | **2** |
| E | | | | | F | 5. Impact positively on the location of the facility | 1 | 6.67 | **2** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | | | | | | | 15 | 100.00 | |

| | 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 56 | 10 | 9 | 10 | 8 | 10 | 9.4 | **9** | 0.89 | 10 | 10 | 10 | 9 | 10 | 9.8 | **10** | 0.45 |
| 59 | 8 | 8 | 7 | 8 | 6 | 7.4 | **7** | 0.89 | 7 | 7 | 6 | 7 | 6 | 6.6 | **7** | 0.55 |
| 78 | 7 | 7 | 6 | 8 | 8 | 7.2 | **7** | 0.84 | 7 | 7 | 6 | 7 | 7 | 6.8 | **7** | 0.45 |
| 54 | 3 | 3 | 2 | 3 | 4 | 3 | **3** | 0.71 | 3 | 3 | 3 | 4 | 4 | 3.4 | **3** | 0.55 |
| 67 | 3 | 4 | 4 | 3 | 2 | 3.2 | **3** | 0.84 | 3 | 3 | 4 | 3 | 2 | 3 | **3** | 0.71 |
| 76 | 1 | 3 | 2 | 2 | 4 | 2.4 | **2** | 1.14 | 2 | 3 | 2 | 2 | 3 | 2.4 | **2** | 0.55 |

| | B | C | D | E | F | G | H | | Score | Weight % | Max 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | A | A | A | A | A | 1. Scope | 5 | 17.86 | **8** |
| B | | C | D | B | B | G | B | 2. Time | 4 | 14.29 | **6** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | G | D | 4. Quality | 4 | 14.29 | **6** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 5 | 17.86 | **8** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

| | 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 67 | 8 | 7 | 6 | 7 | 8 | 8 | **8** | 0.84 | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 76 | 6 | 8 | 6 | 6 | 7 | 6.6 | **7** | 0.89 | 6 | 7 | 7 | 6 | 7 | 6.6 | **7** | 0.55 |
| 77 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 74 | 6 | 8 | 6 | 8 | 6 | 6.8 | **7** | 1.10 | 7 | 7 | 7 | 8 | 6 | 7 | **7** | 0.71 |
| 70 | 2 | 4 | 7 | 6 | 4 | 4.6 | **5** | 1.95 | 3 | 5 | 5 | 5 | 4 | 4.4 | **4** | 0.89 |
| 66 | 2 | 3 | 4 | 4 | 3 | 3.2 | **3** | 0.84 | 3 | 3 | 4 | 4 | 3 | 3.4 | **3** | 0.55 |
| 70 | 8 | 7 | 8 | 9 | 8 | 8 | **8** | 0.71 | 8 | 8 | 8 | 9 | 8 | 8.2 | **8** | 0.45 |
| 79 | 3 | 4 | 4 | 5 | 5 | 4.2 | **4** | 0.84 | 3 | 4 | 4 | 5 | 4 | 4 | **4** | 0.71 |

**Project No. 5**

**1. Paired comparison**

| | Score | Weight | |
|---|---|---|---|
| | | % | 4 |
| 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| 3. Achieve the required financial performance | 2 | 13.33 | **5** |
| 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | 15 | 100.00 | |

| | Score | Weight | |
|---|---|---|---|
| | | % | 7 |
| 1. Scope | 3 | 10.71 | **5** |
| 2. Time | 5 | 17.86 | **8** |
| 3. Cost | 7 | 25.00 | **10** |
| 4. Quality | 6 | 21.43 | **9** |
| 5. Contract-admin | 0 | 0.00 | **0** |
| 6. Human resource | 1 | 3.57 | **2** |
| 7. Risk | 4 | 14.29 | **6** |
| 8. Health and safety | 2 | 7.14 | **3** |
| | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 56 | 7 | 8 | 8 | 8 | 6 | 7.4 | **7** | 0.89 | 7 | 8 | 8 | 8 | 7 | 7.6 | **8** | 0.55 |
| 59 | 4 | 5 | 4 | 5 | 5 | 4.6 | **5** | 0.55 | 5 | 5 | 4 | 5 | 5 | 4.8 | **5** | 0.45 |
| 78 | 6 | 6 | 5 | 5 | 6 | 5.6 | **6** | 0.55 | 6 | 5 | 5 | 5 | 6 | 5.4 | **5** | 0.55 |
| 54 | 5 | 4 | 4 | 4 | 5 | 4.4 | **4** | 0.55 | 5 | 5 | 4 | 4 | 5 | 4.6 | **5** | 0.55 |
| 67 | 9 | 10 | 10 | 9 | 9 | 9.4 | **9** | 0.55 | 9 | 10 | 10 | 10 | 9 | 9.6 | **10** | 0.55 |
| 76 | 5 | 4 | 4 | 3 | 6 | 4.4 | **4** | 1.14 | 5 | 4 | 4 | 4 | 5 | 4.4 | **4** | 0.55 |
| | | | | | | | | | | | | | | | | |
| 67 | 6 | 5 | 5 | 6 | 5 | 5.4 | **5** | 0.55 | 6 | 6 | 5 | 6 | 6 | 5.8 | **6** | 0.45 |
| 76 | 8 | 8 | 8 | 8 | 9 | 8.2 | **8** | 0.45 | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 77 | 10 | 10 | 10 | 10 | 8 | 9.6 | **10** | 0.89 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 74 | 9 | 8 | 9 | 9 | 8 | 8.6 | **9** | 0.55 | 9 | 9 | 8 | 9 | 9 | 8.8 | **9** | 0.45 |
| 70 | 3 | 6 | 7 | 4 | 4 | 4.8 | **5** | 1.64 | 4 | 5 | 5 | 4 | 4 | 4.4 | **4** | 0.55 |
| 66 | 4 | 6 | 6 | 3 | 4 | 4.6 | **5** | 1.34 | 5 | 5 | 6 | 4 | 4 | 4.8 | **5** | 0.84 |
| 70 | 7 | 6 | 6 | 7 | 7 | 6.6 | **7** | 0.55 | 8 | 6 | 7 | 7 | 7 | 7 | **7** | 0.71 |
| 79 | 3 | 4 | 7 | 8 | 5 | 5.4 | **5** | 2.07 | 4 | 4 | 6 | 7 | 4 | 5 | **5** | 1.41 |

**Project No. 6**

**1. Paired comparison**

| | Score | Weight | |
|---|---|---|---|
| | | % | 5 |
| 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| 2. Ensure effective project management and delivery | 1 | 6.67 | **2** |
| 3. Achieve the required financial performance | 3 | 20.00 | **6** |
| 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| 5. Impact positively on the location of the facility | 3 | 20.00 | **6** |
| 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | 15 | 100.00 | |

| | Score | Weight | |
|---|---|---|---|
| | | % | 7 |
| 1. Scope | 4 | 14.29 | **6** |
| 2. Time | 5 | 17.86 | **8** |
| 3. Cost | 7 | 25.00 | **10** |
| 4. Quality | 6 | 21.43 | **9** |
| 5. Contract-admin | 1 | 3.57 | **2** |
| 6. Human resource | 0 | 0.00 | **0** |
| 7. Risk | 3 | 10.71 | **5** |
| 8. Health and safety | 2 | 7.14 | **3** |
| | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | | | 2 round | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| 81 | 10 | 9 | 10 | 9.66667 | **10** | 0.58 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 89 | 3 | 4 | 3 | 3.33333 | **3** | 0.58 | 3 | 4 | 3 | 3.33333 | **3** | 0.58 |
| 78 | 6 | 6 | 6 | 6 | **6** | 0.00 | 6 | 6 | 6 | 6 | **6** | 0.00 |
| 87 | 5 | 4 | 4 | 4.33333 | **4** | 0.58 | 5 | 4 | 4 | 4.33333 | **4** | 0.58 |
| 83 | 8 | 7 | 7 | 7.33333 | **7** | 0.58 | 8 | 7 | 7 | 7.33333 | **7** | 0.58 |
| 83 | 2 | 5 | 3 | 3.33333 | **3** | 1.53 | 2 | 5 | 3 | 3.33333 | **3** | 1.53 |
| | | | | | | | | | | | | |
| 93 | 7 | 8 | 6 | 7 | **7** | 1.00 | 7 | 7 | 7 | 7 | **7** | 0.00 |
| 85 | 8 | 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| 82 | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 94 | 9 | 8 | 9 | 8.66667 | **9** | 0.58 | 9 | 9 | 9 | 9 | **9** | 0.00 |
| 85 | 3 | 4 | 3 | 3.33333 | **3** | 0.58 | 3 | 4 | 3 | 3.33333 | **3** | 0.58 |
| 91 | 2 | 3 | 8 | 4.33333 | **4** | 3.21 | 2 | 3 | 5 | 3.33333 | **3** | 1.53 |
| 90 | 5 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | 5 | **5** | 0.00 |
| 81 | 3 | 3 | 3 | 3 | **3** | 0.00 | 3 | 3 | 3 | 3 | **3** | 0.00 |

**Project No. 7**

**1. Paired comparison**

| | B | C | D | E | F | | Score | Weight % | Max 4 |
|---|---|---|---|---|---|---|---|---|---|
| A | A | C | A | A | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | D | E | B | 2. Ensure effective project management and delivery | 1 | 6.67 | **3** |
| C | | | C | E | C | 3. Achieve the required financial performance | 4 | 26.67 | **10** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 3 | 20.00 | **8** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight % | Max 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | A | 1. Scope | 1 | 3.57 | **2** |
| B | | B | B | B | B | B | B | 2. Time | 7 | 25.00 | **10** |
| C | | | C | C | C | C | C | 3. Cost | 6 | 21.43 | **9** |
| D | | | | D | D | D | D | 4. Quality | 5 | 17.86 | **8** |
| E | | | | | F | E | H | 5. Contract-admin | 2 | 7.14 | **3** |
| F | | | | | | G | H | 6. Human resource | 2 | 7.14 | **3** |
| G | | | | | | | G | 7. Risk | 3 | 10.71 | **5** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | | | | | 1 round | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **avg** | **rnd** | **stdev** | **1** | **2** | **3** | **4** | **5** | **6** | **avg** | **rnd** | **stdev** |
| **81** | 10 | 9 | 10 | 10 | 9 | 10 | 9.66667 | **10** | 0.52 | 10 | 10 | 10 | 10 | 9 | 10 | 9.83333 | **10** | 0.41 |
| **89** | 5 | 6 | 3 | 5 | 9 | 3 | 5.16667 | **5** | 2.23 | 5 | 5 | 3 | 5 | 6 | 3 | 4.5 | **5** | 1.22 |
| **78** | 10 | 10 | 10 | 9 | 10 | 10 | 9.83333 | **10** | 0.41 | 10 | 10 | 10 | 9 | 10 | 10 | 9.83333 | **10** | 0.41 |
| **87** | 5 | 6 | 6 | 6 | 5 | 6 | 5.66667 | **6** | 0.52 | 5 | 6 | 6 | 6 | 5 | 6 | 5.66667 | **6** | 0.52 |
| **83** | 9 | 8 | 8 | 9 | 9 | 8 | 8.5 | **9** | 0.55 | 9 | 8 | 8 | 8 | 9 | 8 | 8.33333 | **8** | 0.52 |
| **83** | 0 | 4 | 3 | 7 | 4 | 5 | 3.83333 | **4** | 2.32 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | **4** | 0.63 |
| **93** | 7 | 6 | 3 | 2 | 3 | 8 | 4.83333 | **5** | 2.48 | 5 | 6 | 3 | 2 | 3 | 5 | 4 | **4** | 1.55 |
| **85** | 10 | 9 | 9 | 10 | 10 | 10 | 9.66667 | **10** | 0.52 | 10 | 10 | 9 | 10 | 10 | 10 | 9.83333 | **10** | 0.41 |
| **82** | 10 | 9 | 10 | 9 | 9 | 9 | 9.33333 | **9** | 0.52 | 10 | 9 | 9 | 9 | 9 | 9 | 9.16667 | **9** | 0.41 |
| **94** | 7 | 8 | 8 | 7 | 8 | 8 | 7.66667 | **8** | 0.52 | 7 | 8 | 8 | 7 | 8 | 8 | 7.66667 | **8** | 0.52 |
| **85** | 3 | 4 | 4 | 7 | 4 | 9 | 5.16667 | **5** | 2.32 | 3 | 4 | 4 | 7 | 4 | 5 | 4.5 | **5** | 1.38 |
| **91** | 2 | 4 | 2 | 3 | 7 | 9 | 4.5 | **5** | 2.88 | 4 | 4 | 3 | 3 | 7 | 5 | 4.33333 | **4** | 1.51 |
| **90** | 5 | 4 | 5 | 5 | 4 | 5 | 4.66667 | **5** | 0.52 | 5 | 4 | 5 | 5 | 4 | 5 | 4.66667 | **5** | 0.52 |
| **81** | 3 | 4 | 4 | 4 | 3 | 4 | 3.66667 | **4** | 0.52 | 3 | 4 | 4 | 4 | 3 | 4 | 3.66667 | **4** | 0.52 |

**Project No. 8**

**1. Paired comparison**

| | B | C | D | E | F | | Score | Weight % | Max 4 |
|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | E | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | B | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | D | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **5** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | B | C | D | E | F | G | H | | Score | Weight % | Max 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | B | B | B | B | B | 2. Time | 6 | 21.43 | **9** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 5 | 17.86 | **8** |
| E | | | | | F | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 2 | 7.14 | **3** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **avg** | **rnd** | **stdev** | **1** | **2** | **avg** | **rnd** | **stdev** |
| **81** | 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** | 0.71 |
| **89** | 5 | 7 | 6 | **6** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| **78** | 4 | 5 | 4.5 | **5** | 0.71 | 4 | 5 | 4.5 | **5** | 0.71 |
| **87** | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 6 | 5.5 | **6** | 0.71 |
| **83** | 9 | 10 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| **83** | 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |
| **93** | 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| **85** | 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| **82** | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| **94** | 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| **85** | 0 | 2 | 1 | **1** | 1.41 | 1 | 1 | 1 | **1** | 0.00 |
| **91** | 4 | 5 | 4.5 | **5** | 0.71 | 4 | 4 | 4 | **4** | 0.00 |
| **90** | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| **81** | 2 | 3 | 2.5 | **3** | 0.71 | 2 | 2 | 2 | **2** | 0.00 |

**Project No. 9**

**1. Paired comparison**

| Score | Weight |
|---|---|
| | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 4 |
| A | A | A | A | E | A | 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| B | | C | B | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **5** |
| C | | | D | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **5** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **5** |
| E | | | | | F | 5. Impact positively on the location of the facility | 4 | 26.67 | **10** |
| F | | | | | | 6. Comply with third party requirements | 1 | 6.67 | **3** |
| | | | | | | | 15 | 100.00 | |

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| **81** | 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** | 0.71 |
| **89** | 5 | 7 | 6 | **6** | 1.41 | 5 | 6 | 5.5 | **6** | 0.71 |
| **78** | 4 | 5 | 4.5 | **5** | 0.71 | 4 | 5 | 4.5 | **5** | 0.71 |
| **87** | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 6 | 5.5 | **6** | 0.71 |
| **83** | 9 | 10 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| **83** | 2 | 4 | 3 | **3** | 1.41 | 3 | 3 | 3 | **3** | 0.00 |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 7 |
| A | B | C | D | A | A | A | A | 1. Scope | 4 | 14.29 | **6** |
| B | | C | B | B | B | B | B | 2. Time | 6 | 21.43 | **9** |
| C | | | C | C | C | C | C | 3. Cost | 7 | 25.00 | **10** |
| D | | | | D | D | D | D | 4. Quality | 5 | 17.86 | **8** |
| E | | | | | F | E | H | 5. Contract-admin | 1 | 3.57 | **2** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 2 | 7.14 | **3** |
| H | | | | | | | | 8. Health and safety | 2 | 7.14 | **3** |
| | | | | | | | | | 28 | 100.00 | |

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| **93** | 7 | 6 | 6.5 | **7** | 0.71 | 7 | 6 | 6.5 | **7** | 0.71 |
| **85** | 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| **82** | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| **94** | 9 | 8 | 8.5 | **9** | 0.71 | 9 | 9 | 9 | **9** | 0.00 |
| **85** | 0 | 2 | 1 | **1** | 1.41 | 1 | 1 | 1 | **1** | 0.00 |
| **91** | 4 | 5 | 4.5 | **5** | 0.71 | 4 | 4 | 4 | **4** | 0.00 |
| **90** | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| **81** | 2 | 3 | 2.5 | **3** | 0.71 | 2 | 2 | 2 | **2** | 0.00 |

**Project No. 10**

**1. Paired comparison**

| Score | Weight |
|---|---|
| | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | B | C | D | E | F | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % | 5 |
| A | A | A | A | A | A | 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| B | | C | B | E | B | 2. Ensure effective project management and delivery | 2 | 13.33 | **4** |
| C | | | D | E | C | 3. Achieve the required financial performance | 2 | 13.33 | **4** |
| D | | | | E | D | 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| E | | | | | E | 5. Impact positively on the location of the facility | 4 | 26.67 | **8** |
| F | | | | | | 6. Comply with third party requirements | 0 | 0.00 | **0** |
| | | | | | | | 15 | 100.00 | |

| | 1 round | | | | | | 2 round | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| **81** | 10 | 10 | 8 | 9.33333 | **9** | 1.15 | 10 | 10 | 9 | 9.66667 | **10** | 0.58 |
| **89** | 5 | 6 | 6 | 5.66667 | **6** | 0.58 | 6 | 6 | 6 | 6 | **6** | 0.00 |
| **78** | 4 | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| **87** | 5 | 5 | 4 | 4.66667 | **5** | 0.58 | 5 | 5 | 5 | 5 | **5** | 0.00 |
| **83** | 9 | 8 | 8 | 8.33333 | **8** | 0.58 | 9 | 9 | 8 | 8.66667 | **9** | 0.58 |
| **83** | 1 | 2 | 2 | 1.66667 | **2** | 0.58 | 1 | 2 | 1 | 1.33333 | **1** | 0.58 |

| | B | C | D | E | F | G | H | | Score | Weight | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % | 6 |
| A | B | C | D | A | A | G | H | 1. Scope | 2 | 7.14 | **4** |
| B | | B | B | B | B | G | B | 2. Time | 6 | 21.43 | **10** |
| C | | | C | C | C | C | C | 3. Cost | 6 | 21.43 | **10** |
| D | | | | D | D | G | D | 4. Quality | 4 | 14.29 | **7** |
| E | | | | | F | G | H | 5. Contract-admin | 0 | 0.00 | **0** |
| F | | | | | | G | H | 6. Human resource | 1 | 3.57 | **2** |
| G | | | | | | | G | 7. Risk | 6 | 21.43 | **10** |
| H | | | | | | | | 8. Health and safety | 3 | 10.71 | **5** |
| | | | | | | | | | 28 | 100.00 | |

| | 1 round | | | | | | 2 round | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | avg | rnd | stdev | 1 | 2 | 3 | avg | rnd | stdev |
| **93** | 7 | 4 | 8 | 6.33333 | **6** | 2.08 | 7 | 6 | 7 | 6.66667 | **7** | 0.58 |
| **85** | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| **82** | 10 | 9 | 9 | 9.33333 | **9** | 0.58 | 10 | 9 | 9 | 9.33333 | **9** | 0.58 |
| **94** | 7 | 8 | 8 | 7.66667 | **8** | 0.58 | 8 | 8 | 8 | 8 | **8** | 0.00 |
| **85** | 0 | 3 | 4 | 2.33333 | **2** | 2.08 | 2 | 3 | 2 | 2.33333 | **2** | 0.58 |
| **91** | 4 | 3 | 4 | 3.66667 | **4** | 0.58 | 4 | 3 | 4 | 3.66667 | **4** | 0.58 |
| **90** | 10 | 10 | 9 | 9.66667 | **10** | 0.58 | 10 | 10 | 9 | 9.66667 | **10** | 0.58 |
| **81** | 5 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | 5 | **5** | 0.00 |

**Project No. 11**

**1. Paired comparison**

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 5 |
| 1. Maximize business effectiveness | 5 | 33.33 | **10** |
| 2. Ensure effective project management and delivery | 1 | 6.67 | **2** |
| 3. Achieve the required financial performance | 4 | 26.67 | **8** |
| 4. Minimize building operation and maintenance costs, and environmental impact | 2 | 13.33 | **4** |
| 5. Impact positively on the location of the facility | 2 | 13.33 | **4** |
| 6. Comply with third party requirements | 1 | 6.67 | **2** |
| | 15 | 100.00 | |

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 7 |
| 1. Scope | 1 | 3.57 | **2** |
| 2. Time | 6 | 21.43 | **9** |
| 3. Cost | 7 | 25.00 | **10** |
| 4. Quality | 4 | 14.29 | **6** |
| 5. Contract-admin | 3 | 10.71 | **5** |
| 6. Human resource | 2 | 7.14 | **3** |
| 7. Risk | 3 | 10.71 | **5** |
| 8. Health and safety | 2 | 7.14 | **3** |
| | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | | | | 2 round | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev | 1 | 2 | 3 | 4 | 5 | avg | rnd | stdev |
| 71 | 10 | 8 | 10 | 9 | 10 | 9.4 | **9** | 0.89 | 9 | 8 | 10 | 9 | 9 | 9 | **9** | 0.71 |
| 84 | 2 | 3 | 3 | 2 | 4 | 2.8 | **3** | 0.84 | 3 | 3 | 3 | 3 | 3 | 3 | **3** | 0.00 |
| 79 | 8 | 7 | 8 | 8 | 7 | 7.6 | **8** | 0.55 | 8 | 8 | 8 | 8 | 7 | 7.8 | **8** | 0.45 |
| 80 | 5 | 4 | 4 | 4 | 4 | 4.2 | **4** | 0.45 | 4 | 4 | 4 | 4 | 4 | 4 | **4** | 0.00 |
| 72 | 6 | 4 | 6 | 4 | 7 | 5.4 | **5** | 1.34 | 6 | 5 | 6 | 4 | 5 | 5.2 | **5** | 0.84 |
| 81 | 2 | 1 | 2 | 1 | 1 | 1.4 | **1** | 0.55 | 1 | 1 | 1 | 1 | 1 | 1 | **1** | 0.00 |
| 88 | 2 | 2 | 3 | 2 | 3 | 2.4 | **2** | 0.55 | 2 | 2 | 2 | 2 | 3 | 2.2 | **2** | 0.45 |
| 83 | 9 | 9 | 8 | 8 | 9 | 8.6 | **9** | 0.55 | 9 | 9 | 9 | 8 | 9 | 8.8 | **9** | 0.45 |
| 88 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | 10 | 10 | 10 | **10** | 0.00 |
| 83 | 7 | 6 | 6 | 8 | 6 | 6.6 | **7** | 0.89 | 6 | 6 | 6 | 7 | 6 | 6.2 | **6** | 0.45 |
| 75 | 5 | 4 | 5 | 4 | 4 | 4.4 | **4** | 0.55 | 5 | 5 | 5 | 4 | 4 | 4.6 | **5** | 0.55 |
| 85 | 3 | 4 | 3 | 4 | 4 | 3.6 | **4** | 0.55 | 4 | 4 | 3 | 4 | 4 | 3.8 | **4** | 0.45 |
| 85 | 5 | 5 | 5 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | 5 | 5 | 5 | **5** | 0.00 |
| 78 | 3 | 4 | 3 | 3 | 4 | 3.4 | **3** | 0.55 | 3 | 3 | 3 | 3 | 4 | 3.2 | **3** | 0.45 |

**Project No. 12**

**1. Paired comparison**

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 4 |
| 1. Maximize business effectiveness | 4 | 26.67 | **10** |
| 2. Ensure effective project management and delivery | 3 | 20.00 | **8** |
| 3. Achieve the required financial performance | 3 | 20.00 | **8** |
| 4. Minimize building operation and maintenance costs, and environmental impact | 1 | 6.67 | **3** |
| 5. Impact positively on the location of the facility | 2 | 13.33 | **5** |
| 6. Comply with third party requirements | 2 | 13.33 | **5** |
| | 15 | 100.00 | |

| | Score | Weight | Max |
|---|---|---|---|
| | | % | 6 |
| 1. Scope | 3 | 10.71 | **5** |
| 2. Time | 6 | 21.43 | **10** |
| 3. Cost | 5 | 17.86 | **9** |
| 4. Quality | 6 | 21.43 | **10** |
| 5. Contract-admin | 3 | 10.71 | **5** |
| 6. Human resource | 1 | 3.57 | **2** |
| 7. Risk | 2 | 7.14 | **4** |
| 8. Health and safety | 2 | 7.14 | **4** |
| | 28 | 100.00 | |

**Local exp 2. EFTE - Estimate-Talk-Feedback-Talk**

| | 1 round | | | | | 2 round | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | avg | rnd | stdev | 1 | 2 | avg | rnd | stdev |
| 71 | 10 | 10 | 10 | **10** | 0.00 | 10 | 10 | 10 | **10** | 0.00 |
| 84 | 8 | 9 | 8.5 | **9** | 0.71 | 8 | 9 | 8.5 | **9** | 0.71 |
| 79 | 8 | 8 | 8 | **8** | 0.00 | 8 | 8 | 8 | **8** | 0.00 |
| 80 | 3 | 4 | 3.5 | **4** | 0.71 | 4 | 4 | 4 | **4** | 0.00 |
| 72 | 5 | 5 | 5 | **5** | 0.00 | 5 | 5 | 5 | **5** | 0.00 |
| 81 | 5 | 6 | 5.5 | **6** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| 88 | 5 | 6 | 5.5 | **6** | 0.71 | 6 | 6 | 6 | **6** | 0.00 |
| 83 | 10 | 9 | 9.5 | **10** | 0.71 | 10 | 9 | 9.5 | **10** | 0.71 |
| 88 | 9 | 9 | 9 | **9** | 0.00 | 9 | 9 | 9 | **9** | 0.00 |
| 83 | 10 | 9 | 9.5 | **10** | 0.71 | 10 | 10 | 10 | **10** | 0.00 |
| 75 | 5 | 4 | 4.5 | **5** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |
| 85 | 2 | 4 | 3 | **3** | 1.41 | 3 | 4 | 3.5 | **4** | 0.71 |
| 85 | 4 | 4 | 4 | **4** | 0.00 | 4 | 4 | 4 | **4** | 0.00 |
| 78 | 4 | 5 | 4.5 | **5** | 0.71 | 5 | 5 | 5 | **5** | 0.00 |

Appendix 7.5.1 - Kendall W1 coefficient of concordance for VP

```
GET DATA
  /TYPE=XLS
  /FILE='D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika1\Client workshop condense
  /SHEET=name 'denormalized by Q'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
```

## Dataset Name

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-Дец-2012 16-51-42 |
| Comments | | |
| Input | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 84 |
| Syntax | | DATASET NAME DataSet1 WINDOW=FRONT. |
| Resources | Processor Time | 00 00:00:00,000 |
| | Elapsed Time | 00 00:00:00,003 |

**Warnings**

| |
|---|
| The active dataset will replace the existing dataset named DataSet1. |

```
SORT CASES  BY Project Round.
SPLIT FILE SEPARATE BY Project Round.
NPAR TESTS
  /KENDALL=Q1 Q2 Q3 Q4 Q5 Q6
  /MISSING LISTWISE
  /METHOD=MC CIN(95) SAMPLES(10000).
```

## NPar Tests

[DataSet1]

## Project = 1, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,50 |
| Q2 | 2,75 |
| Q3 | 4,50 |
| Q4 | 2,25 |
| Q5 | 6,00 |
| Q6 | 1,00 |

a. Project = 1, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,925 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 1, Round = 1

## Project = 1, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 3,00 |
| Q3 | 4,50 |
| Q4 | 2,00 |
| Q5 | 5,25 |
| Q6 | 1,00 |

a. Project = 1, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,977 |
| Chi-Square | | | 9,769 |
| df | | | 5 |
| Asymp. Sig. | | | ,082 |
| Monte Carlo Sig. | Sig. | | ,009[b] |
| | 95% Confidence Interval | Lower Bound | ,007 |
| | | Upper Bound | ,010 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 1, Round = 2

## Project = 2, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,25 |
| Q6 | 2,75 |

a. Project = 2, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,985 |
| Chi-Square | | | 9,853 |
| df | | | 5 |
| Asymp. Sig. | | | ,080 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 2, Round = 1

## Project = 2, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,50 |
| Q6 | 2,50 |

a. Project = 2, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,925 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 2, Round = 2

## Project = 3, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,33 |
| Q2 | 1,67 |
| Q3 | 4,33 |
| Q4 | 3,33 |
| Q5 | 6,00 |
| Q6 | 1,33 |

a. Project = 3, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,973 |
| Chi-Square | | | 14,588 |
| df | | | 5 |
| Asymp. Sig. | | | ,012 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 3, Round = 1

## Project = 3, Round = 2

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 4,33 |
| Q2 | 1,67 |
| Q3 | 4,67 |
| Q4 | 3,00 |
| Q5 | 6,00 |
| Q6 | 1,33 |

a. Project = 3, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,987 |
| Chi-Square | | | 14,802 |
| df | | | 5 |
| Asymp. Sig. | | | ,011 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 3, Round = 2

## Project = 4, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,80 |
| Q2 | 4,80 |
| Q3 | 4,40 |
| Q4 | 2,10 |
| Q5 | 2,40 |
| Q6 | 1,50 |

a. Project = 4, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,901 |
| Chi-Square | | | 22,530 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 4, Round = 1

## Project = 4, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,40 |
| Q3 | 4,60 |
| Q4 | 2,50 |
| Q5 | 2,10 |
| Q6 | 1,40 |

a. Project = 4, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,942 |
| Chi-Square | | | 23,554 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 4, Round = 2

## Project = 5, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,80 |
| Q2 | 2,20 |
| Q3 | 3,90 |
| Q4 | 1,90 |
| Q5 | 6,00 |
| Q6 | 2,20 |

a. Project = 5, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,861 |
| Chi-Square | | | 21,534 |
| df | | | 5 |
| Asymp. Sig. | | | ,001 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 5, Round = 1

## Project = 5, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 2,50 |
| Q3 | 3,70 |
| Q4 | 2,10 |
| Q5 | 6,00 |
| Q6 | 1,70 |

a. Project = 5, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,939 |
| Chi-Square | | | 23,471 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 5, Round = 2

## Project = 6, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 1,67 |
| Q3 | 4,00 |
| Q4 | 2,50 |
| Q5 | 5,00 |
| Q6 | 1,83 |

a. Project = 6, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,926 |
| Chi-Square | | | 13,883 |
| df | | | 5 |
| Asymp. Sig. | | | ,016 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 6, Round = 1

## Project = 6, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 1,67 |
| Q3 | 4,00 |
| Q4 | 2,50 |
| Q5 | 5,00 |
| Q6 | 1,83 |

a. Project = 6, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,926 |
| Chi-Square | | | 13,883 |
| df | | | 5 |
| Asymp. Sig. | | | ,016 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 6, Round = 2

## Project = 7, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 2,08 |
| Q3 | 5,50 |
| Q4 | 2,50 |
| Q5 | 4,08 |
| Q6 | 1,58 |

a. Project = 7, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,849 |
| Chi-Square | | | 25,477 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 7, Round = 1

## Project = 7, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,42 |
| Q2 | 2,00 |
| Q3 | 5,50 |
| Q4 | 2,75 |
| Q5 | 4,08 |
| Q6 | 1,25 |

a. Project = 7, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,939 |
| Chi-Square | | | 28,177 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 7, Round = 2

## Project = 8, Round = 1

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 5,13 |
| Q2 | 3,75 |
| Q3 | 2,50 |
| Q4 | 2,75 |
| Q5 | 5,88 |
| Q6 | 1,00 |

a. Project = 8, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,972 |
| Chi-Square | | | 19,436 |
| df | | | 5 |
| Asymp. Sig. | | | ,002 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 8, Round = 1

## Project = 8, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 3,88 |
| Q3 | 2,63 |
| Q4 | 2,50 |
| Q5 | 5,75 |
| Q6 | 1,00 |

a. Project = 8, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,965 |
| Chi-Square | | | 19,296 |
| df | | | 5 |
| Asymp. Sig. | | | ,002 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 8, Round = 2

## Project = 9, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 3,75 |
| Q3 | 2,00 |
| Q4 | 3,25 |
| Q5 | 6,00 |
| Q6 | 1,00 |

a. Project = 9, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,928 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,004[b] |
| | 95% Confidence Interval | Lower Bound | ,003 |
| | | Upper Bound | ,005 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 9, Round = 1

## Project = 9, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 3,50 |
| Q3 | 2,00 |
| Q4 | 3,50 |
| Q5 | 6,00 |
| Q6 | 1,00 |

a. Project = 9, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | 1,000 |
| Chi-Square | | | 10,000 |
| df | | | 5 |
| Asymp. Sig. | | | ,075 |
| Monte Carlo Sig. | Sig. | | ,004[b] |
| | 95% Confidence Interval | Lower Bound | ,003 |
| | | Upper Bound | ,005 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 9, Round = 2

## Project = 10, Round = 1

## Kendall's W Test

**Ranks** [a]

| | Mean Rank |
|---|---|
| Q1 | 5,83 |
| Q2 | 3,83 |
| Q3 | 2,17 |
| Q4 | 3,00 |
| Q5 | 5,17 |
| Q6 | 1,00 |

a. Project = 10, Round = 1

**Test Statistics** [c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W [a] | | | ,977 |
| Chi-Square | | | 14,657 |
| df | | | 5 |
| Asymp. Sig. | | | ,012 |
| Monte Carlo Sig. | Sig. | | ,000 [b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 10, Round = 1

## Project = 10, Round = 2

## Kendall's W Test

**Ranks** [a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,00 |
| Q3 | 2,00 |
| Q4 | 3,00 |
| Q5 | 5,00 |
| Q6 | 1,00 |

a. Project = 10, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | 1,000 |
| Chi-Square | | | 15,000 |
| df | | | 5 |
| Asymp. Sig. | | | ,010 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 10, Round = 2

## Project = 11, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 2,00 |
| Q3 | 4,90 |
| Q4 | 3,10 |
| Q5 | 3,90 |
| Q6 | 1,10 |

a. Project = 11, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,973 |
| Chi-Square | | | 24,324 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 11, Round = 1

## Project = 11, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,90 |
| Q2 | 2,00 |
| Q3 | 5,10 |
| Q4 | 3,10 |
| Q5 | 3,90 |
| Q6 | 1,00 |

a. Project = 11, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,991 |
| Chi-Square | | | 24,769 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 11, Round = 2

## Project = 12, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,25 |
| Q6 | 2,75 |

a. Project = 12, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,985 |
| Chi-Square | | | 9,853 |
| df | | | 5 |
| Asymp. Sig. | | | ,080 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 12, Round = 1

## Project = 12, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,50 |
| Q6 | 2,50 |

a. Project = 12, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,925 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 12, Round = 2

Appendix 7.5.2 - Kendall W2 coefficient of concordance for VP

```
GET DATA
  /TYPE=XLS
  /FILE='D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika1\Client workshop condense
  /SHEET=name 'denormalized by Q'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
```

## Dataset Name

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-Дец-2012 16-51-42 |
| Comments | | |
| Input | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 84 |
| Syntax | | DATASET NAME DataSet1 WINDOW=FRONT. |
| Resources | Processor Time | 00 00:00:00,000 |
| | Elapsed Time | 00 00:00:00,003 |

**Warnings**

| |
|---|
| The active dataset will replace the existing dataset named DataSet1. |

```
SORT CASES  BY Project Round.
SPLIT FILE SEPARATE BY Project Round.
NPAR TESTS
  /KENDALL=Q1 Q2 Q3 Q4 Q5 Q6
  /MISSING LISTWISE
  /METHOD=MC CIN(95) SAMPLES(10000).
```

## NPar Tests

[DataSet1]

## Project = 1, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,50 |
| Q2 | 2,75 |
| Q3 | 4,50 |
| Q4 | 2,25 |
| Q5 | 6,00 |
| Q6 | 1,00 |

a. Project = 1, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,925 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 1, Round = 1

## Project = 1, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 3,00 |
| Q3 | 4,50 |
| Q4 | 2,00 |
| Q5 | 5,25 |
| Q6 | 1,00 |

a. Project = 1, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,977 |
| Chi-Square | | | 9,769 |
| df | | | 5 |
| Asymp. Sig. | | | ,082 |
| Monte Carlo Sig. | Sig. | | ,009[b] |
| | 95% Confidence Interval | Lower Bound | ,007 |
| | | Upper Bound | ,010 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 1, Round = 2

## Project = 2, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,25 |
| Q6 | 2,75 |

a. Project = 2, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,985 |
| Chi-Square | | | 9,853 |
| df | | | 5 |
| Asymp. Sig. | | | ,080 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 2, Round = 1

## Project = 2, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,50 |
| Q6 | 2,50 |

a. Project = 2, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,925 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 2, Round = 2

## Project = 3, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,33 |
| Q2 | 1,67 |
| Q3 | 4,33 |
| Q4 | 3,33 |
| Q5 | 6,00 |
| Q6 | 1,33 |

a. Project = 3, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,973 |
| Chi-Square | | | 14,588 |
| df | | | 5 |
| Asymp. Sig. | | | ,012 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 3, Round = 1

## Project = 3, Round = 2

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 4,33 |
| Q2 | 1,67 |
| Q3 | 4,67 |
| Q4 | 3,00 |
| Q5 | 6,00 |
| Q6 | 1,33 |

a. Project = 3, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,987 |
| Chi-Square | | | 14,802 |
| df | | | 5 |
| Asymp. Sig. | | | ,011 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 3, Round = 2

## Project = 4, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,80 |
| Q2 | 4,80 |
| Q3 | 4,40 |
| Q4 | 2,10 |
| Q5 | 2,40 |
| Q6 | 1,50 |

a. Project = 4, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,901 |
| Chi-Square | | | 22,530 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 4, Round = 1

## Project = 4, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,40 |
| Q3 | 4,60 |
| Q4 | 2,50 |
| Q5 | 2,10 |
| Q6 | 1,40 |

a. Project = 4, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,942 |
| Chi-Square | | | 23,554 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 4, Round = 2

## Project = 5, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,80 |
| Q2 | 2,20 |
| Q3 | 3,90 |
| Q4 | 1,90 |
| Q5 | 6,00 |
| Q6 | 2,20 |

a. Project = 5, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,861 |
| Chi-Square | | | 21,534 |
| df | | | 5 |
| Asymp. Sig. | | | ,001 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 5, Round = 1

## Project = 5, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 2,50 |
| Q3 | 3,70 |
| Q4 | 2,10 |
| Q5 | 6,00 |
| Q6 | 1,70 |

a. Project = 5, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,939 |
| Chi-Square | | | 23,471 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 5, Round = 2

## Project = 6, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 1,67 |
| Q3 | 4,00 |
| Q4 | 2,50 |
| Q5 | 5,00 |
| Q6 | 1,83 |

a. Project = 6, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,926 |
| Chi-Square | | | 13,883 |
| df | | | 5 |
| Asymp. Sig. | | | ,016 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 6, Round = 1

## Project = 6, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 1,67 |
| Q3 | 4,00 |
| Q4 | 2,50 |
| Q5 | 5,00 |
| Q6 | 1,83 |

a. Project = 6, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,926 |
| Chi-Square | | | 13,883 |
| df | | | 5 |
| Asymp. Sig. | | | ,016 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 6, Round = 2

## Project = 7, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 2,08 |
| Q3 | 5,50 |
| Q4 | 2,50 |
| Q5 | 4,08 |
| Q6 | 1,58 |

a. Project = 7, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,849 |
| Chi-Square | | | 25,477 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 7, Round = 1

## Project = 7, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,42 |
| Q2 | 2,00 |
| Q3 | 5,50 |
| Q4 | 2,75 |
| Q5 | 4,08 |
| Q6 | 1,25 |

a. Project = 7, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,939 |
| Chi-Square | | | 28,177 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 7, Round = 2

## Project = 8, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,13 |
| Q2 | 3,75 |
| Q3 | 2,50 |
| Q4 | 2,75 |
| Q5 | 5,88 |
| Q6 | 1,00 |

a. Project = 8, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,972 |
| Chi-Square | | | 19,436 |
| df | | | 5 |
| Asymp. Sig. | | | ,002 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 8, Round = 1

## Project = 8, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 3,88 |
| Q3 | 2,63 |
| Q4 | 2,50 |
| Q5 | 5,75 |
| Q6 | 1,00 |

a. Project = 8, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,965 |
| Chi-Square | | | 19,296 |
| df | | | 5 |
| Asymp. Sig. | | | ,002 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 8, Round = 2

## Project = 9, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 3,75 |
| Q3 | 2,00 |
| Q4 | 3,25 |
| Q5 | 6,00 |
| Q6 | 1,00 |

a. Project = 9, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,928 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,004[b] |
| | 95% Confidence Interval | Lower Bound | ,003 |
| | | Upper Bound | ,005 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 9, Round = 1

## Project = 9, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 3,50 |
| Q3 | 2,00 |
| Q4 | 3,50 |
| Q5 | 6,00 |
| Q6 | 1,00 |

a. Project = 9, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | 1,000 |
| Chi-Square | | | 10,000 |
| df | | | 5 |
| Asymp. Sig. | | | ,075 |
| Monte Carlo Sig. | Sig. | | ,004[b] |
| | 95% Confidence Interval | Lower Bound | ,003 |
| | | Upper Bound | ,005 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 9, Round = 2

## Project = 10, Round = 1

## Kendall's W Test

**Ranks** [a]

| | Mean Rank |
|---|---|
| Q1 | 5,83 |
| Q2 | 3,83 |
| Q3 | 2,17 |
| Q4 | 3,00 |
| Q5 | 5,17 |
| Q6 | 1,00 |

a. Project = 10, Round = 1

**Test Statistics** [c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W [a] | | | ,977 |
| Chi-Square | | | 14,657 |
| df | | | 5 |
| Asymp. Sig. | | | ,012 |
| Monte Carlo Sig. | Sig. | | ,000 [b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 10, Round = 1

## Project = 10, Round = 2

## Kendall's W Test

**Ranks** [a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,00 |
| Q3 | 2,00 |
| Q4 | 3,00 |
| Q5 | 5,00 |
| Q6 | 1,00 |

a. Project = 10, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | 1,000 |
| Chi-Square | | | 15,000 |
| df | | | 5 |
| Asymp. Sig. | | | ,010 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 10, Round = 2

## Project = 11, Round = 1

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 2,00 |
| Q3 | 4,90 |
| Q4 | 3,10 |
| Q5 | 3,90 |
| Q6 | 1,10 |

a. Project = 11, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,973 |
| Chi-Square | | | 24,324 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 11, Round = 1

## Project = 11, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,90 |
| Q2 | 2,00 |
| Q3 | 5,10 |
| Q4 | 3,10 |
| Q5 | 3,90 |
| Q6 | 1,00 |

a. Project = 11, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,991 |
| Chi-Square | | | 24,769 |
| df | | | 5 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 11, Round = 2

## Project = 12, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,25 |
| Q6 | 2,75 |

a. Project = 12, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,985 |
| Chi-Square | | | 9,853 |
| df | | | 5 |
| Asymp. Sig. | | | ,080 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 12, Round = 1

## Project = 12, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,00 |
| Q2 | 4,75 |
| Q3 | 4,25 |
| Q4 | 1,00 |
| Q5 | 2,50 |
| Q6 | 2,50 |

a. Project = 12, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,993 |
| Chi-Square | | | 9,925 |
| df | | | 5 |
| Asymp. Sig. | | | ,077 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,004 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 2000000.
c. Project = 12, Round = 2

```
GET DATA
  /TYPE=XLS
  /FILE='D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika2\Client workshop condense
  /SHEET=name 'denormalized by Q'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
```

## Dataset Name

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-Дец-2012 16-45-26 |
| Comments | | |
| Input | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 84 |
| Syntax | | DATASET NAME DataSet1 WINDOW=FRONT. |
| Resources | Processor Time | 00 00:00:00,000 |
| | Elapsed Time | 00 00:00:00,001 |

**Warnings**

| |
|---|
| The active dataset will replace the existing dataset named DataSet1. |

```
SORT CASES  BY Project Round.
SPLIT FILE SEPARATE BY Project Round.
NPAR TESTS
  /KENDALL=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /METHOD=MC CIN(95) SAMPLES(10000).
```

## NPar Tests

[DataSet1]

## Project = 1, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 6,75 |
| Q3 | 8,00 |
| Q4 | 6,00 |
| Q5 | 2,75 |
| Q6 | 1,25 |
| Q7 | 3,00 |
| Q8 | 3,00 |

a. Project = 1, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,939 |
| Chi-Square | | | 13,141 |
| df | | | 7 |
| Asymp. Sig. | | | ,069 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,003 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 1, Round = 1

## Project = 1, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 6,75 |
| Q3 | 8,00 |
| Q4 | 6,00 |
| Q5 | 3,50 |
| Q6 | 1,00 |
| Q7 | 2,75 |
| Q8 | 2,75 |

a. Project = 1, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,981 |
| Chi-Square | | | 13,739 |
| df | | | 7 |
| Asymp. Sig. | | | ,056 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 1, Round = 2

## Project = 2, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,75 |
| Q2 | 6,75 |
| Q3 | 7,50 |
| Q4 | 4,50 |
| Q5 | 1,75 |
| Q6 | 1,25 |
| Q7 | 3,00 |
| Q8 | 4,50 |

a. Project = 2, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,987 |
| Chi-Square | | | 13,825 |
| df | | | 7 |
| Asymp. Sig. | | | ,054 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 2, Round = 1

## Project = 2, Round = 2

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 6,50 |
| Q2 | 7,25 |
| Q3 | 7,25 |
| Q4 | 4,50 |
| Q5 | 1,50 |
| Q6 | 1,50 |
| Q7 | 3,00 |
| Q8 | 4,50 |

a. Project = 2, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,991 |
| Chi-Square | | | 13,868 |
| df | | | 7 |
| Asymp. Sig. | | | ,054 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 2, Round = 2

## Project = 3, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,83 |
| Q2 | 5,67 |
| Q3 | 8,00 |
| Q4 | 6,50 |
| Q5 | 2,50 |
| Q6 | 1,83 |
| Q7 | 3,33 |
| Q8 | 2,33 |

a. Project = 3, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,899 |
| Chi-Square | | | 18,877 |
| df | | | 7 |
| Asymp. Sig. | | | ,009 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 3, Round = 1

## Project = 3, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,17 |
| Q3 | 8,00 |
| Q4 | 6,83 |
| Q5 | 2,33 |
| Q6 | 1,67 |
| Q7 | 3,67 |
| Q8 | 2,33 |

a. Project = 3, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,951 |
| Chi-Square | | | 19,971 |
| df | | | 7 |
| Asymp. Sig. | | | ,006 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 3, Round = 2

## Project = 4, Round = 1

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 5,30 |
| Q2 | 4,70 |
| Q3 | 8,00 |
| Q4 | 5,00 |
| Q5 | 3,10 |
| Q6 | 1,20 |
| Q7 | 6,30 |
| Q8 | 2,40 |

a. Project = 4, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,828 |
| Chi-Square | | | 28,963 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 4, Round = 1

## Project = 4, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,30 |
| Q2 | 4,40 |
| Q3 | 8,00 |
| Q4 | 4,70 |
| Q5 | 2,60 |
| Q6 | 1,30 |
| Q7 | 6,60 |
| Q8 | 2,10 |

a. Project = 4, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,974 |
| Chi-Square | | | 34,103 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 4, Round = 2

## Project = 5, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 2,70 |
| Q2 | 6,40 |
| Q3 | 7,70 |
| Q4 | 6,80 |
| Q5 | 2,70 |
| Q6 | 2,40 |
| Q7 | 4,10 |
| Q8 | 3,20 |

a. Project = 5, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,781 |
| Chi-Square | | | 27,348 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 5, Round = 1

## Project = 5, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 3,40 |
| Q2 | 6,00 |
| Q3 | 8,00 |
| Q4 | 6,90 |
| Q5 | 1,80 |
| Q6 | 2,50 |
| Q7 | 4,90 |
| Q8 | 2,50 |

a. Project = 5, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,907 |
| Chi-Square | | | 31,749 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 5, Round = 2

## Project = 6, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 5,83 |
| Q3 | 8,00 |
| Q4 | 6,67 |
| Q5 | 2,33 |
| Q6 | 2,67 |
| Q7 | 3,67 |
| Q8 | 1,83 |

a. Project = 6, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,857 |
| Chi-Square | | | 17,988 |
| df | | | 7 |
| Asymp. Sig. | | | ,012 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 6, Round = 1

## Project = 6, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,00 |
| Q3 | 8,00 |
| Q4 | 7,00 |
| Q5 | 2,33 |
| Q6 | 2,00 |
| Q7 | 3,83 |
| Q8 | 1,83 |

a. Project = 6, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,956 |
| Chi-Square | | | 20,069 |
| df | | | 7 |
| Asymp. Sig. | | | ,005 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 6, Round = 2

## Project = 7, Round = 1

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 3,08 |
| Q2 | 7,67 |
| Q3 | 7,17 |
| Q4 | 5,42 |
| Q5 | 3,92 |
| Q6 | 2,92 |
| Q7 | 3,50 |
| Q8 | 2,33 |

a. Project = 7, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,712 |
| Chi-Square | | | 29,892 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 7, Round = 1

## Project = 7, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 2,83 |
| Q2 | 7,83 |
| Q3 | 7,17 |
| Q4 | 5,92 |
| Q5 | 3,33 |
| Q6 | 2,92 |
| Q7 | 3,83 |
| Q8 | 2,17 |

a. Project = 7, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,828 |
| Chi-Square | | | 34,764 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 7, Round = 2

## Project = 8, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,50 |
| Q2 | 6,38 |
| Q3 | 7,75 |
| Q4 | 6,38 |
| Q5 | 1,38 |
| Q6 | 2,25 |
| Q7 | 3,25 |
| Q8 | 3,13 |

a. Project = 8, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,919 |
| Chi-Square | | | 25,732 |
| df | | | 7 |
| Asymp. Sig. | | | ,001 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 8, Round = 1

## Project = 8, Round = 2

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 5,38 |
| Q2 | 6,50 |
| Q3 | 7,75 |
| Q4 | 6,38 |
| Q5 | 1,13 |
| Q6 | 2,38 |
| Q7 | 3,38 |
| Q8 | 3,13 |

a. Project = 8, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,936 |
| Chi-Square | | | 26,207 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 8, Round = 2

## Project = 9, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,50 |
| Q3 | 8,00 |
| Q4 | 6,50 |
| Q5 | 1,00 |
| Q6 | 3,75 |
| Q7 | 3,25 |
| Q8 | 2,00 |

a. Project = 9, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,997 |
| Chi-Square | | | 13,958 |
| df | | | 7 |
| Asymp. Sig. | | | ,052 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 9, Round = 1

## Project = 9, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,50 |
| Q3 | 8,00 |
| Q4 | 6,50 |
| Q5 | 1,00 |
| Q6 | 3,50 |
| Q7 | 3,50 |
| Q8 | 2,00 |

a. Project = 9, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | 1,000 |
| Chi-Square | | | 14,000 |
| df | | | 7 |
| Asymp. Sig. | | | ,051 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 9, Round = 2

## Project = 10, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,00 |
| Q2 | 7,50 |
| Q3 | 6,50 |
| Q4 | 4,67 |
| Q5 | 1,33 |
| Q6 | 1,67 |
| Q7 | 7,00 |
| Q8 | 3,33 |

a. Project = 10, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,966 |
| Chi-Square | | | 20,277 |
| df | | | 7 |
| Asymp. Sig. | | | ,005 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 10, Round = 1

## Project = 10, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,00 |
| Q2 | 7,50 |
| Q3 | 6,50 |
| Q4 | 5,00 |
| Q5 | 1,17 |
| Q6 | 1,83 |
| Q7 | 7,00 |
| Q8 | 3,00 |

a. Project = 10, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,985 |
| Chi-Square | | | 20,686 |
| df | | | 7 |
| Asymp. Sig. | | | ,004 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 10, Round = 2

## Project = 11, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 1,20 |
| Q2 | 6,90 |
| Q3 | 8,00 |
| Q4 | 6,10 |
| Q5 | 3,70 |
| Q6 | 2,80 |
| Q7 | 4,80 |
| Q8 | 2,50 |

a. Project = 11, Round = 1

**Test Statistics** [c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W [a] | | | ,970 |
| Chi-Square | | | 33,940 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000 [b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 11, Round = 1

## Project = 11, Round = 2

## Kendall's W Test

**Ranks** [a]

| | Mean Rank |
|---|---|
| Q1 | 1,00 |
| Q2 | 7,00 |
| Q3 | 8,00 |
| Q4 | 6,00 |
| Q5 | 4,00 |
| Q6 | 3,00 |
| Q7 | 4,70 |
| Q8 | 2,30 |

a. Project = 11, Round = 2

**Test Statistics** [c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W [a] | | | ,982 |
| Chi-Square | | | 34,387 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000 [b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 11, Round = 2

## Project = 12, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,75 |
| Q2 | 7,25 |
| Q3 | 6,50 |
| Q4 | 7,25 |
| Q5 | 3,25 |
| Q6 | 1,50 |
| Q7 | 2,25 |
| Q8 | 3,25 |

a. Project = 12, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,927 |
| Chi-Square | | | 12,975 |
| df | | | 7 |
| Asymp. Sig. | | | ,073 |
| Monte Carlo Sig. | Sig. | | ,008[b] |
| | 95% Confidence Interval | Lower Bound | ,006 |
| | | Upper Bound | ,009 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 12, Round = 1

## Project = 12, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 7,00 |
| Q3 | 6,25 |
| Q4 | 7,75 |
| Q5 | 3,50 |
| Q6 | 1,25 |
| Q7 | 1,75 |
| Q8 | 3,50 |

a. Project = 12, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,988 |
| Chi-Square | | | 13,828 |
| df | | | 7 |
| Asymp. Sig. | | | ,054 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 12, Round = 2

```
GET DATA
  /TYPE=XLS
  /FILE='D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika2\Client workshop condense
  /SHEET=name 'denormalized by Q'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
```

## Dataset Name

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-Дец-2012 16-45-26 |
| Comments | | |
| Input | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 84 |
| Syntax | | DATASET NAME DataSet1 WINDOW=FRONT. |
| Resources | Processor Time | 00 00:00:00,000 |
| | Elapsed Time | 00 00:00:00,001 |

**Warnings**

The active dataset will replace the existing dataset named DataSet1.

```
SORT CASES  BY Project Round.
SPLIT FILE SEPARATE BY Project Round.
NPAR TESTS
  /KENDALL=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /METHOD=MC CIN(95) SAMPLES(10000).
```

## NPar Tests

[DataSet1]

## Project = 1, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 6,75 |
| Q3 | 8,00 |
| Q4 | 6,00 |
| Q5 | 2,75 |
| Q6 | 1,25 |
| Q7 | 3,00 |
| Q8 | 3,00 |

a. Project = 1, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,939 |
| Chi-Square | | | 13,141 |
| df | | | 7 |
| Asymp. Sig. | | | ,069 |
| Monte Carlo Sig. | Sig. | | ,005[b] |
| | 95% Confidence Interval | Lower Bound | ,003 |
| | | Upper Bound | ,006 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 1, Round = 1

## Project = 1, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,25 |
| Q2 | 6,75 |
| Q3 | 8,00 |
| Q4 | 6,00 |
| Q5 | 3,50 |
| Q6 | 1,00 |
| Q7 | 2,75 |
| Q8 | 2,75 |

a. Project = 1, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,981 |
| Chi-Square | | | 13,739 |
| df | | | 7 |
| Asymp. Sig. | | | ,056 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 1, Round = 2

## Project = 2, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,75 |
| Q2 | 6,75 |
| Q3 | 7,50 |
| Q4 | 4,50 |
| Q5 | 1,75 |
| Q6 | 1,25 |
| Q7 | 3,00 |
| Q8 | 4,50 |

a. Project = 2, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,987 |
| Chi-Square | | | 13,825 |
| df | | | 7 |
| Asymp. Sig. | | | ,054 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 2, Round = 1

## Project = 2, Round = 2

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 6,50 |
| Q2 | 7,25 |
| Q3 | 7,25 |
| Q4 | 4,50 |
| Q5 | 1,50 |
| Q6 | 1,50 |
| Q7 | 3,00 |
| Q8 | 4,50 |

a. Project = 2, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,991 |
| Chi-Square | | | 13,868 |
| df | | | 7 |
| Asymp. Sig. | | | ,054 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 2, Round = 2

## Project = 3, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,83 |
| Q2 | 5,67 |
| Q3 | 8,00 |
| Q4 | 6,50 |
| Q5 | 2,50 |
| Q6 | 1,83 |
| Q7 | 3,33 |
| Q8 | 2,33 |

a. Project = 3, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,899 |
| Chi-Square | | | 18,877 |
| df | | | 7 |
| Asymp. Sig. | | | ,009 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 3, Round = 1

## Project = 3, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,17 |
| Q3 | 8,00 |
| Q4 | 6,83 |
| Q5 | 2,33 |
| Q6 | 1,67 |
| Q7 | 3,67 |
| Q8 | 2,33 |

a. Project = 3, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,951 |
| Chi-Square | | | 19,971 |
| df | | | 7 |
| Asymp. Sig. | | | ,006 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 3, Round = 2

## Project = 4, Round = 1

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 5,30 |
| Q2 | 4,70 |
| Q3 | 8,00 |
| Q4 | 5,00 |
| Q5 | 3,10 |
| Q6 | 1,20 |
| Q7 | 6,30 |
| Q8 | 2,40 |

a. Project = 4, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,828 |
| Chi-Square | | | 28,963 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 4, Round = 1

## Project = 4, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 6,30 |
| Q2 | 4,40 |
| Q3 | 8,00 |
| Q4 | 4,70 |
| Q5 | 2,60 |
| Q6 | 1,30 |
| Q7 | 6,60 |
| Q8 | 2,10 |

a. Project = 4, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,974 |
| Chi-Square | | | 34,103 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 4, Round = 2

## Project = 5, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 2,70 |
| Q2 | 6,40 |
| Q3 | 7,70 |
| Q4 | 6,80 |
| Q5 | 2,70 |
| Q6 | 2,40 |
| Q7 | 4,10 |
| Q8 | 3,20 |

a. Project = 5, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,781 |
| Chi-Square | | | 27,348 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 5, Round = 1

## Project = 5, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 3,40 |
| Q2 | 6,00 |
| Q3 | 8,00 |
| Q4 | 6,90 |
| Q5 | 1,80 |
| Q6 | 2,50 |
| Q7 | 4,90 |
| Q8 | 2,50 |

a. Project = 5, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W[a] | | | ,907 |
| Chi-Square | | | 31,749 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 5, Round = 2

## Project = 6, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 5,83 |
| Q3 | 8,00 |
| Q4 | 6,67 |
| Q5 | 2,33 |
| Q6 | 2,67 |
| Q7 | 3,67 |
| Q8 | 1,83 |

a. Project = 6, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,857 |
| Chi-Square | | | 17,988 |
| df | | | 7 |
| Asymp. Sig. | | | ,012 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 6, Round = 1

## Project = 6, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,00 |
| Q3 | 8,00 |
| Q4 | 7,00 |
| Q5 | 2,33 |
| Q6 | 2,00 |
| Q7 | 3,83 |
| Q8 | 1,83 |

a. Project = 6, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,956 |
| Chi-Square | | | 20,069 |
| df | | | 7 |
| Asymp. Sig. | | | ,005 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 6, Round = 2

## Project = 7, Round = 1

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 3,08 |
| Q2 | 7,67 |
| Q3 | 7,17 |
| Q4 | 5,42 |
| Q5 | 3,92 |
| Q6 | 2,92 |
| Q7 | 3,50 |
| Q8 | 2,33 |

a. Project = 7, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,712 |
| Chi-Square | | | 29,892 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 7, Round = 1

## Project = 7, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 2,83 |
| Q2 | 7,83 |
| Q3 | 7,17 |
| Q4 | 5,92 |
| Q5 | 3,33 |
| Q6 | 2,92 |
| Q7 | 3,83 |
| Q8 | 2,17 |

a. Project = 7, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 6 |
| Kendall's W[a] | | | ,828 |
| Chi-Square | | | 34,764 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 7, Round = 2

## Project = 8, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,50 |
| Q2 | 6,38 |
| Q3 | 7,75 |
| Q4 | 6,38 |
| Q5 | 1,38 |
| Q6 | 2,25 |
| Q7 | 3,25 |
| Q8 | 3,13 |

a. Project = 8, Round = 1

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,919 |
| Chi-Square | | | 25,732 |
| df | | | 7 |
| Asymp. Sig. | | | ,001 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 8, Round = 1

## Project = 8, Round = 2

## Kendall's W Test

**Ranks[a]**

| | Mean Rank |
|---|---|
| Q1 | 5,38 |
| Q2 | 6,50 |
| Q3 | 7,75 |
| Q4 | 6,38 |
| Q5 | 1,13 |
| Q6 | 2,38 |
| Q7 | 3,38 |
| Q8 | 3,13 |

a. Project = 8, Round = 2

**Test Statistics[c]**

| | | | |
|---|---|---|---|
| N | | | 4 |
| Kendall's W[a] | | | ,936 |
| Chi-Square | | | 26,207 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 8, Round = 2

## Project = 9, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,50 |
| Q3 | 8,00 |
| Q4 | 6,50 |
| Q5 | 1,00 |
| Q6 | 3,75 |
| Q7 | 3,25 |
| Q8 | 2,00 |

a. Project = 9, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,997 |
| Chi-Square | | | 13,958 |
| df | | | 7 |
| Asymp. Sig. | | | ,052 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 9, Round = 1

## Project = 9, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 6,50 |
| Q3 | 8,00 |
| Q4 | 6,50 |
| Q5 | 1,00 |
| Q6 | 3,50 |
| Q7 | 3,50 |
| Q8 | 2,00 |

a. Project = 9, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | 1,000 |
| Chi-Square | | | 14,000 |
| df | | | 7 |
| Asymp. Sig. | | | ,051 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 9, Round = 2

## Project = 10, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,00 |
| Q2 | 7,50 |
| Q3 | 6,50 |
| Q4 | 4,67 |
| Q5 | 1,33 |
| Q6 | 1,67 |
| Q7 | 7,00 |
| Q8 | 3,33 |

a. Project = 10, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,966 |
| Chi-Square | | | 20,277 |
| df | | | 7 |
| Asymp. Sig. | | | ,005 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 10, Round = 1

## Project = 10, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,00 |
| Q2 | 7,50 |
| Q3 | 6,50 |
| Q4 | 5,00 |
| Q5 | 1,17 |
| Q6 | 1,83 |
| Q7 | 7,00 |
| Q8 | 3,00 |

a. Project = 10, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 3 |
| Kendall's W[a] | | | ,985 |
| Chi-Square | | | 20,686 |
| df | | | 7 |
| Asymp. Sig. | | | ,004 |
| Monte Carlo Sig. | Sig. | | ,000[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 10, Round = 2

## Project = 11, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 1,20 |
| Q2 | 6,90 |
| Q3 | 8,00 |
| Q4 | 6,10 |
| Q5 | 3,70 |
| Q6 | 2,80 |
| Q7 | 4,80 |
| Q8 | 2,50 |

a. Project = 11, Round = 1

**Test Statistics** [c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W [a] | | | ,970 |
| Chi-Square | | | 33,940 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000 [b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 11, Round = 1

## Project = 11, Round = 2

## Kendall's W Test

**Ranks** [a]

| | Mean Rank |
|---|---|
| Q1 | 1,00 |
| Q2 | 7,00 |
| Q3 | 8,00 |
| Q4 | 6,00 |
| Q5 | 4,00 |
| Q6 | 3,00 |
| Q7 | 4,70 |
| Q8 | 2,30 |

a. Project = 11, Round = 2

**Test Statistics** [c]

| | | | |
|---|---|---|---|
| N | | | 5 |
| Kendall's W [a] | | | ,982 |
| Chi-Square | | | 34,387 |
| df | | | 7 |
| Asymp. Sig. | | | ,000 |
| Monte Carlo Sig. | Sig. | | ,000 [b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,000 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 11, Round = 2

## Project = 12, Round = 1

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 4,75 |
| Q2 | 7,25 |
| Q3 | 6,50 |
| Q4 | 7,25 |
| Q5 | 3,25 |
| Q6 | 1,50 |
| Q7 | 2,25 |
| Q8 | 3,25 |

a. Project = 12, Round = 1

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,927 |
| Chi-Square | | | 12,975 |
| df | | | 7 |
| Asymp. Sig. | | | ,073 |
| Monte Carlo Sig. | Sig. | | ,008[b] |
| | 95% Confidence Interval | Lower Bound | ,006 |
| | | Upper Bound | ,009 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 12, Round = 1

## Project = 12, Round = 2

## Kendall's W Test

**Ranks**[a]

| | Mean Rank |
|---|---|
| Q1 | 5,00 |
| Q2 | 7,00 |
| Q3 | 6,25 |
| Q4 | 7,75 |
| Q5 | 3,50 |
| Q6 | 1,25 |
| Q7 | 1,75 |
| Q8 | 3,50 |

a. Project = 12, Round = 2

**Test Statistics**[c]

| | | | |
|---|---|---|---|
| N | | | 2 |
| Kendall's W[a] | | | ,988 |
| Chi-Square | | | 13,828 |
| df | | | 7 |
| Asymp. Sig. | | | ,054 |
| Monte Carlo Sig. | Sig. | | ,001[b] |
| | 95% Confidence Interval | Lower Bound | ,000 |
| | | Upper Bound | ,001 |

a. Kendall's Coefficient of Concordance
b. Based on 10000 sampled tables with starting seed 475497203.
c. Project = 12, Round = 2

Appendix 7.6.1 - Shapiro-Wilk's test for VP

```
EXAMINE VARIABLES=Q1before Q2before Q3before Q4before Q5before Q6before Q1after Q2after Q3af
  /PLOT BOXPLOT STEMLEAF NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

## Explore

**Notes**

| | | |
|---|---|---|
| Output Created | | 17-Нов-2012 15-05-24 |
| Comments | | |
| Input | Data | D:\akcijanje\ostalo ebojsa\Nebojsa Surlan PhD\All projects before and after.sav |
| | Active Dataset | DataSet2 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 12 |
| Missing Value Handling | Definition of Missing | User-defined missing values for dependent variables are treated as missing. |
| | Cases Used | Statistics are based on cases with no missing values for any dependent variable or factor used. |
| Syntax | | EXAMINE VARIABLES=Q1before Q2before Q3before Q4before Q5before Q6before Q1after Q2after Q3after Q4after Q5after Q6after<br>/PLOT BOXPLOT STEMLEAF NPPLOT<br>/COMPARE GROUPS<br>/STATISTICS DESCRIPTIVES<br>/CINTERVAL 95<br>/MISSING LISTWISE<br>/NOTOTAL. |
| Resources | Processor Time | 00 00:00:08,674 |
| | Elapsed Time | 00 00:00:07,166 |

[DataSet2] D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\All projects before and after.sav

**Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Q1before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q2before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q3before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q4before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q5before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q6before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q1after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q2after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q3after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q4after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q5after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q6after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q1before | Mean | | 9,50 | ,261 |
| | 95% Confidence Interval for Mean | Lower Bound | 8,93 | |
| | | Upper Bound | 10,07 | |
| | 5% Trimmed Mean | | 9,56 | |
| | Median | | 10,00 | |
| | Variance | | ,818 | |
| | Std. Deviation | | ,905 | |
| | Minimum | | 8 | |
| | Maximum | | 10 | |
| | Range | | 2 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -1,327 | ,637 |
| | Kurtosis | | -,326 | 1,232 |
| Q2before | Mean | | 4,75 | ,552 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,53 | |
| | | Upper Bound | 5,97 | |
| | 5% Trimmed Mean | | 4,72 | |
| | Median | | 5,00 | |
| | Variance | | 3,659 | |
| | Std. Deviation | | 1,913 | |
| | Minimum | | 2 | |
| | Maximum | | 8 | |
| | Range | | 6 | |
| | Interquartile Range | | 2 | |
| | Skewness | | ,333 | ,637 |
| | Kurtosis | | ,053 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q3before | Mean | | 6,75 | ,524 |
| | 95% Confidence Interval for Mean | Lower Bound | 5,60 | |
| | | Upper Bound | 7,90 | |
| | 5% Trimmed Mean | | 6,72 | |
| | Median | | 7,00 | |
| | Variance | | 3,295 | |
| | Std. Deviation | | 1,815 | |
| | Minimum | | 4 | |
| | Maximum | | 10 | |
| | Range | | 6 | |
| | Interquartile Range | | 3 | |
| | Skewness | | ,116 | ,637 |
| | Kurtosis | | -,990 | 1,232 |
| Q4before | Mean | | 4,33 | ,284 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,71 | |
| | | Upper Bound | 4,96 | |
| | 5% Trimmed Mean | | 4,43 | |
| | Median | | 5,00 | |
| | Variance | | ,970 | |
| | Std. Deviation | | ,985 | |
| | Minimum | | 2 | |
| | Maximum | | 5 | |
| | Range | | 3 | |
| | Interquartile Range | | 1 | |
| | Skewness | | -1,498 | ,637 |
| | Kurtosis | | 1,702 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q5before | Mean | | 7,75 | ,818 |
| | 95% Confidence Interval for Mean | Lower Bound | 5,95 | |
| | | Upper Bound | 9,55 | |
| | 5% Trimmed Mean | | 7,94 | |
| | Median | | 9,00 | |
| | Variance | | 8,023 | |
| | Std. Deviation | | 2,832 | |
| | Minimum | | 2 | |
| | Maximum | | 10 | |
| | Range | | 8 | |
| | Interquartile Range | | 5 | |
| | Skewness | | -,963 | ,637 |
| | Kurtosis | | -,334 | 1,232 |
| Q6before | Mean | | 2,67 | ,333 |
| | 95% Confidence Interval for Mean | Lower Bound | 1,93 | |
| | | Upper Bound | 3,40 | |
| | 5% Trimmed Mean | | 2,69 | |
| | Median | | 3,00 | |
| | Variance | | 1,333 | |
| | Std. Deviation | | 1,155 | |
| | Minimum | | 0 | |
| | Maximum | | 5 | |
| | Range | | 5 | |
| | Interquartile Range | | 1 | |
| | Skewness | | -,488 | ,637 |
| | Kurtosis | | 3,136 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q1after | Mean | | 9,00 | ,302 |
| | 95% Confidence Interval for Mean | Lower Bound | 8,34 | |
| | | Upper Bound | 9,66 | |
| | 5% Trimmed Mean | | 9,06 | |
| | Median | | 9,00 | |
| | Variance | | 1,091 | |
| | Std. Deviation | | 1,044 | |
| | Minimum | | 7 | |
| | Maximum | | 10 | |
| | Range | | 3 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,574 | ,637 |
| | Kurtosis | | -,856 | 1,232 |
| Q2after | Mean | | 5,58 | ,499 |
| | 95% Confidence Interval for Mean | Lower Bound | 4,48 | |
| | | Upper Bound | 6,68 | |
| | 5% Trimmed Mean | | 5,54 | |
| | Median | | 6,00 | |
| | Variance | | 2,992 | |
| | Std. Deviation | | 1,730 | |
| | Minimum | | 3 | |
| | Maximum | | 9 | |
| | Range | | 6 | |
| | Interquartile Range | | 3 | |
| | Skewness | | ,148 | ,637 |
| | Kurtosis | | ,191 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q3after | Mean | | 6,83 | ,520 |
| | 95% Confidence Interval for Mean | Lower Bound | 5,69 | |
| | | Upper Bound | 7,98 | |
| | 5% Trimmed Mean | | 6,81 | |
| | Median | | 7,50 | |
| | Variance | | 3,242 | |
| | Std. Deviation | | 1,801 | |
| | Minimum | | 4 | |
| | Maximum | | 10 | |
| | Range | | 6 | |
| | Interquartile Range | | 3 | |
| | Skewness | | -,039 | ,637 |
| | Kurtosis | | -,906 | 1,232 |
| Q4after | Mean | | 4,92 | ,288 |
| | 95% Confidence Interval for Mean | Lower Bound | 4,28 | |
| | | Upper Bound | 5,55 | |
| | 5% Trimmed Mean | | 4,96 | |
| | Median | | 5,00 | |
| | Variance | | ,992 | |
| | Std. Deviation | | ,996 | |
| | Minimum | | 3 | |
| | Maximum | | 6 | |
| | Range | | 3 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,470 | ,637 |
| | Kurtosis | | -,654 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q5after | Mean | | 7,83 | ,683 |
| | 95% Confidence Interval for Mean | Lower Bound | 6,33 | |
| | | Upper Bound | 9,34 | |
| | 5% Trimmed Mean | | 7,98 | |
| | Median | | 8,50 | |
| | Variance | | 5,606 | |
| | Std. Deviation | | 2,368 | |
| | Minimum | | 3 | |
| | Maximum | | 10 | |
| | Range | | 7 | |
| | Interquartile Range | | 5 | |
| | Skewness | | -,946 | ,637 |
| | Kurtosis | | -,188 | 1,232 |
| Q6after | Mean | | 3,00 | ,348 |
| | 95% Confidence Interval for Mean | Lower Bound | 2,23 | |
| | | Upper Bound | 3,77 | |
| | 5% Trimmed Mean | | 3,00 | |
| | Median | | 3,00 | |
| | Variance | | 1,455 | |
| | Std. Deviation | | 1,206 | |
| | Minimum | | 1 | |
| | Maximum | | 5 | |
| | Range | | 4 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,373 | ,637 |
| | Kurtosis | | -,160 | 1,232 |

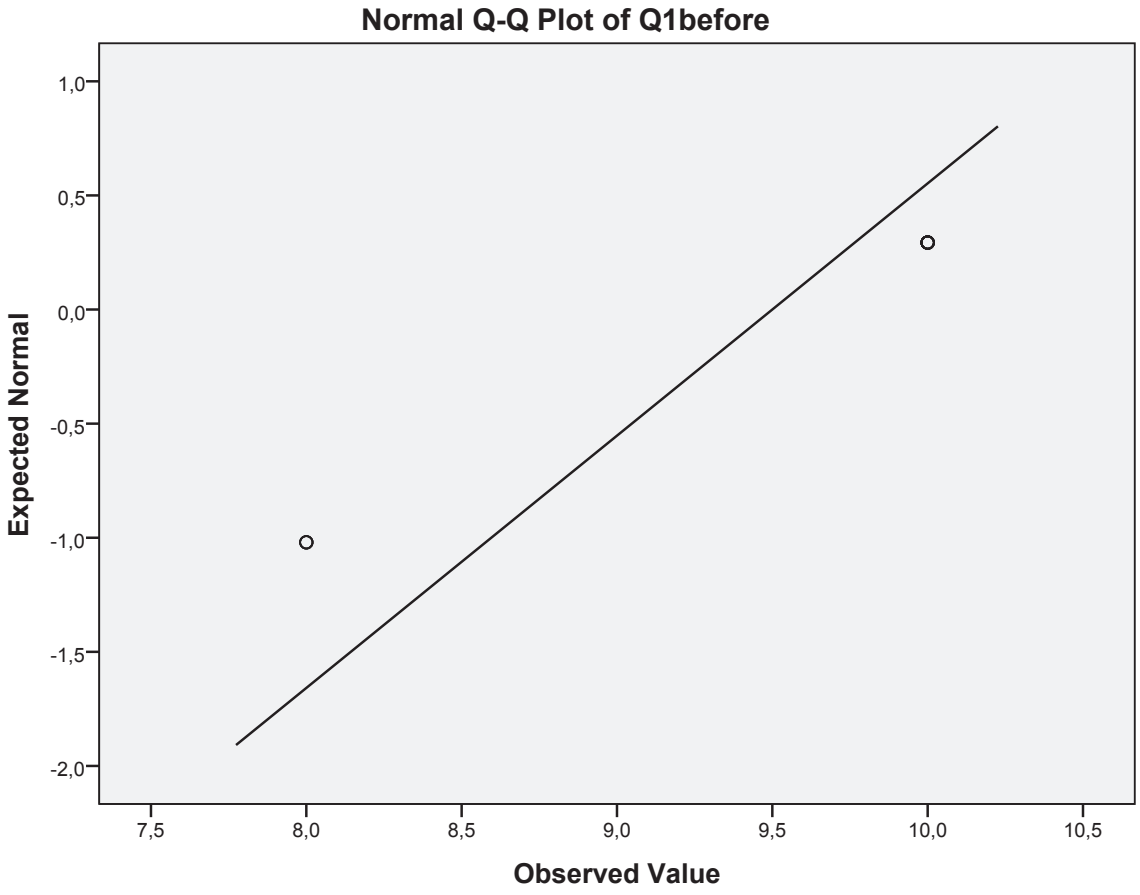
**Tests of Normality**

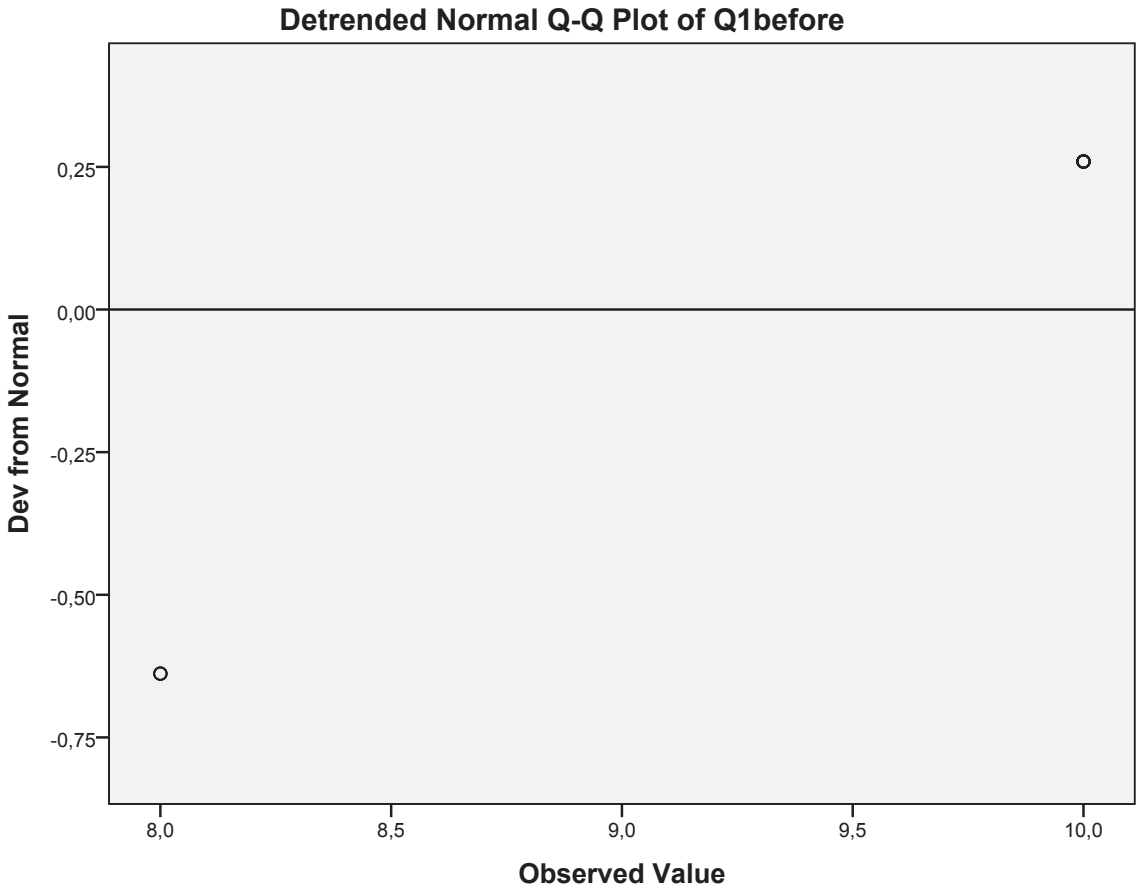
| | Kolmogorov-Smirnov [a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Q1before | ,460 | 12 | ,000 | ,552 | 12 | ,000 |
| Q2before | ,281 | 12 | ,009 | ,867 | 12 | ,060 |
| Q3before | ,254 | 12 | ,031 | ,899 | 12 | ,153 |
| Q4before | ,334 | 12 | ,001 | ,731 | 12 | ,002 |
| Q5before | ,287 | 12 | ,007 | ,805 | 12 | ,011 |
| Q6before | ,303 | 12 | ,003 | ,818 | 12 | ,015 |
| Q1after | ,247 | 12 | ,041 | ,846 | 12 | ,033 |
| Q2after | ,179 | 12 | ,200* | ,942 | 12 | ,531 |
| Q3after | ,241 | 12 | ,052 | ,904 | 12 | ,178 |
| Q4after | ,200 | 12 | ,200* | ,877 | 12 | ,080 |
| Q5after | ,195 | 12 | ,200* | ,856 | 12 | ,044 |
| Q6after | ,250 | 12 | ,037 | ,910 | 12 | ,212 |

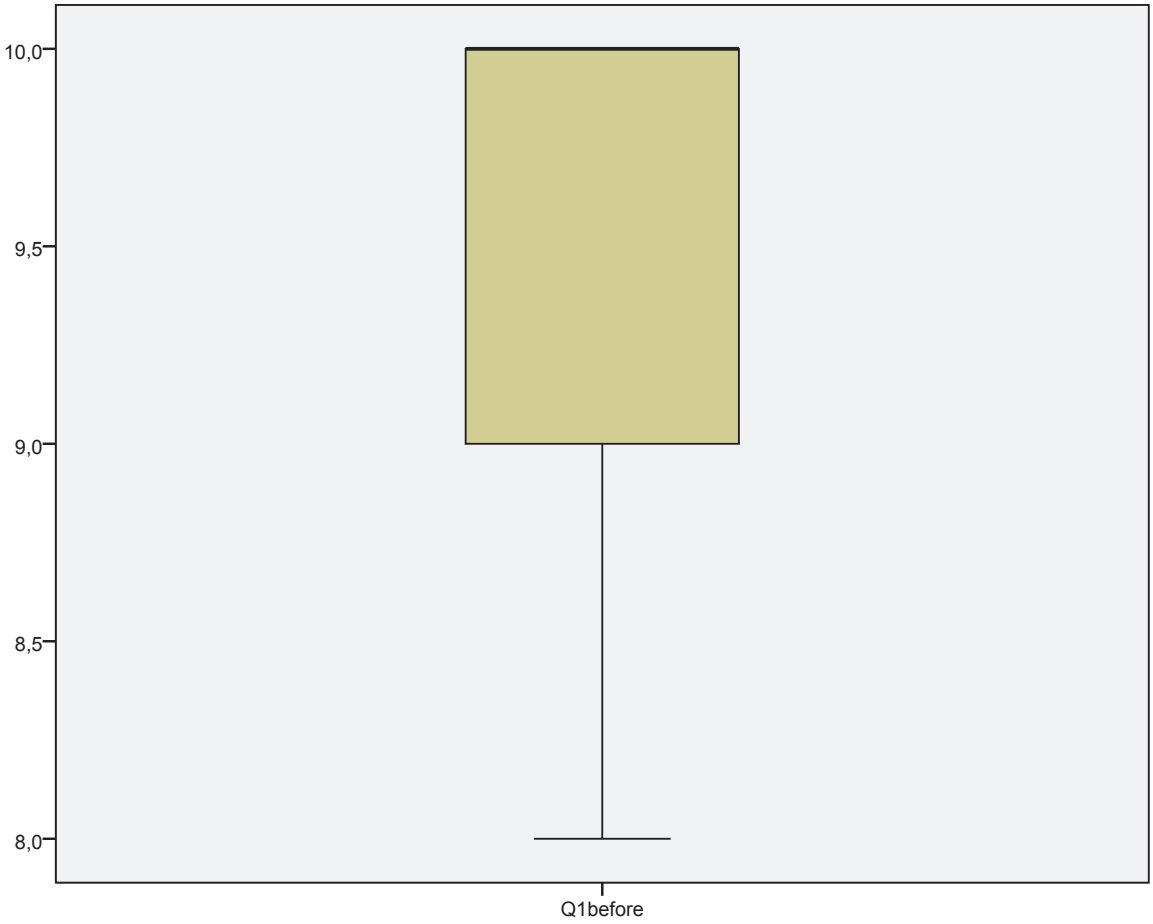
a. Lilliefors Significance Correction
*. This is a lower bound of the true significance.

## Q1before

```
Q1before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     3.00        8 .  000
      .00        8 .
      .00        9 .
      .00        9 .
     9.00       10 .  000000000

 Stem width:         1
 Each leaf:       1 case(s)
```

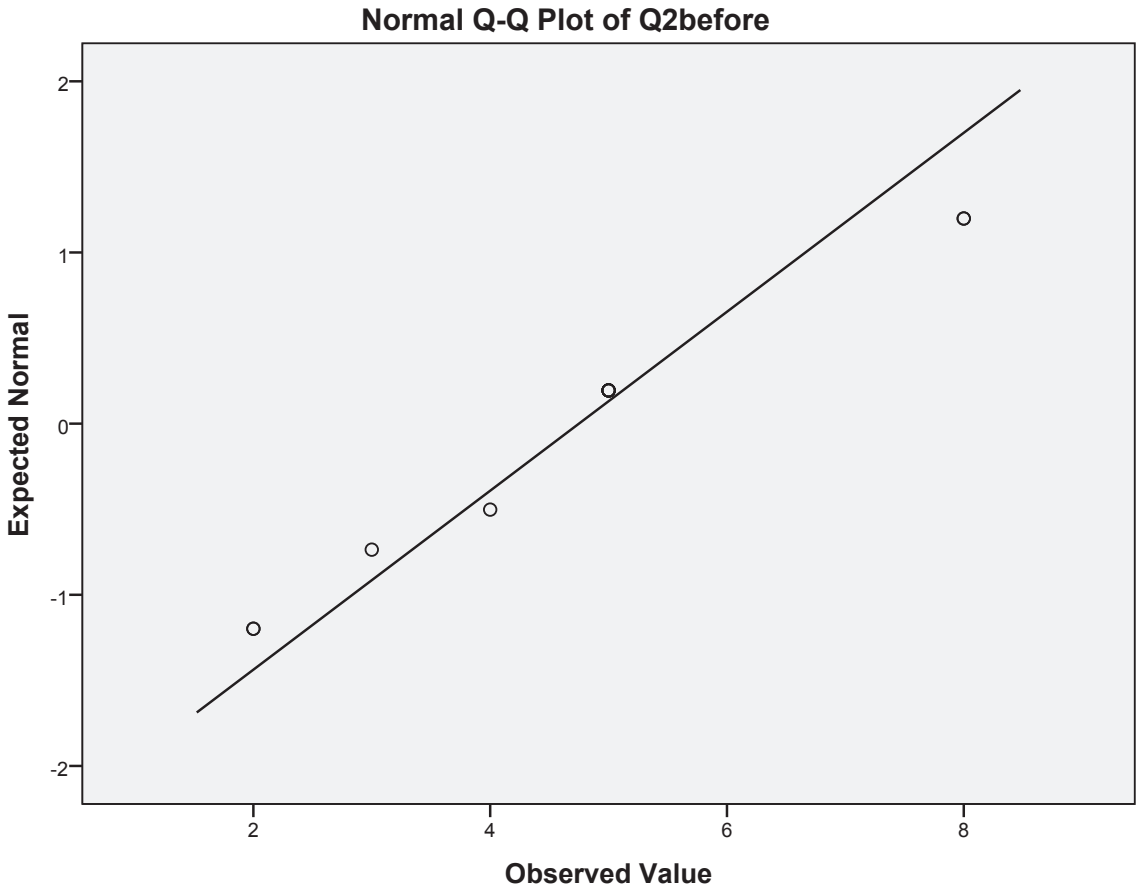

Normal Q-Q Plot of Q1before
Expected Normal
1,0
0,5
0,0
-0,5
-1,0
-1,5
-2,0
7,5
8,0
8,5
9,0
9,5
10,0
10,5
Observed Value

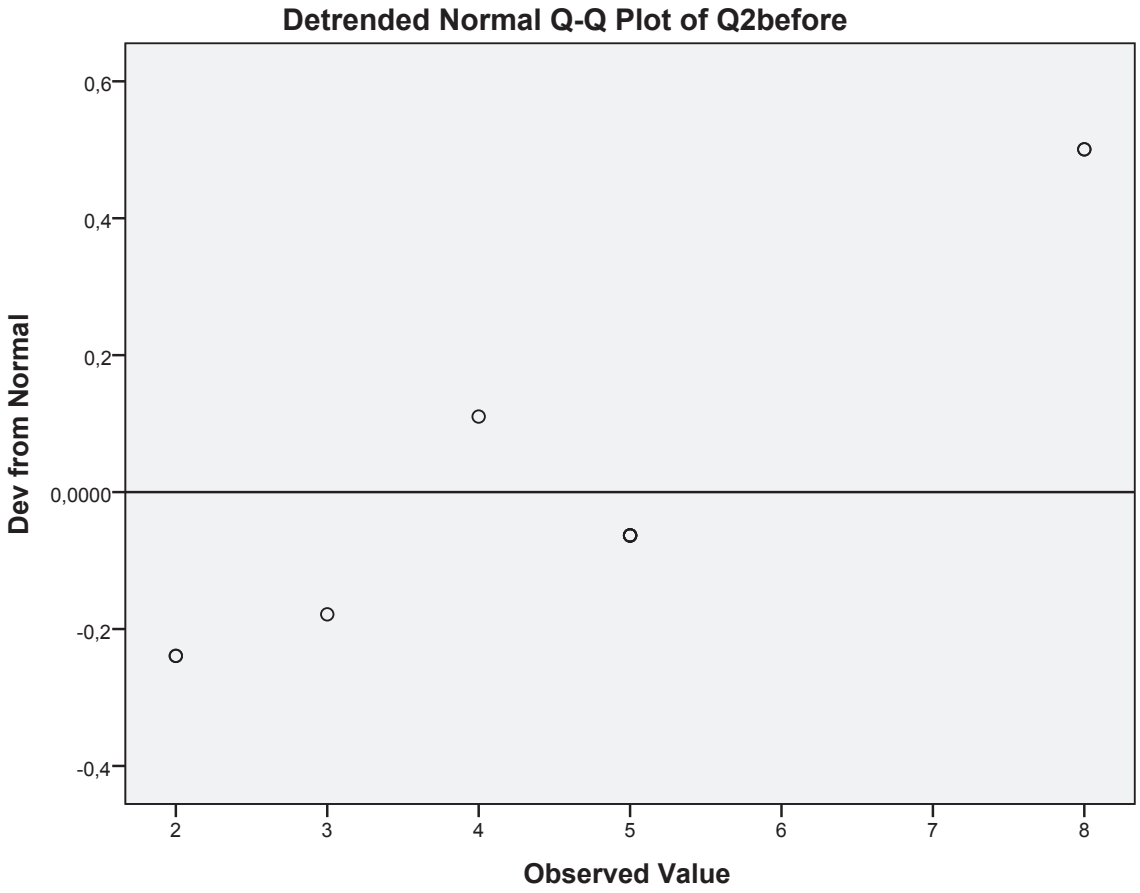

Detrended Normal Q-Q Plot of Q1before
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
8,0
8,5
9,0
9,5
10,0
Observed Value

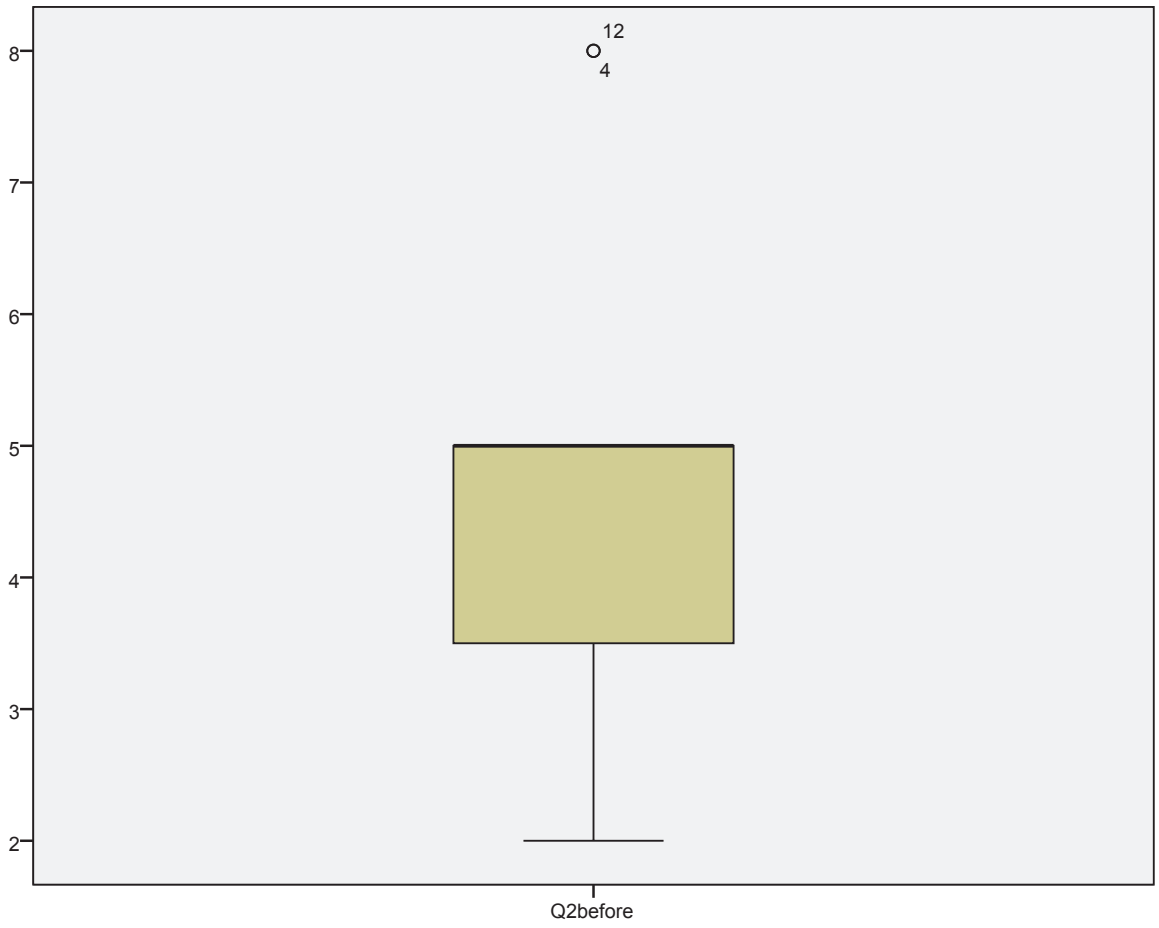



## Q2before

```
Q2before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     2.00        2 .  00
     1.00        3 .  0
     1.00        4 .  0
     6.00        5 .  000000
     2.00 Extremes    (>=8.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

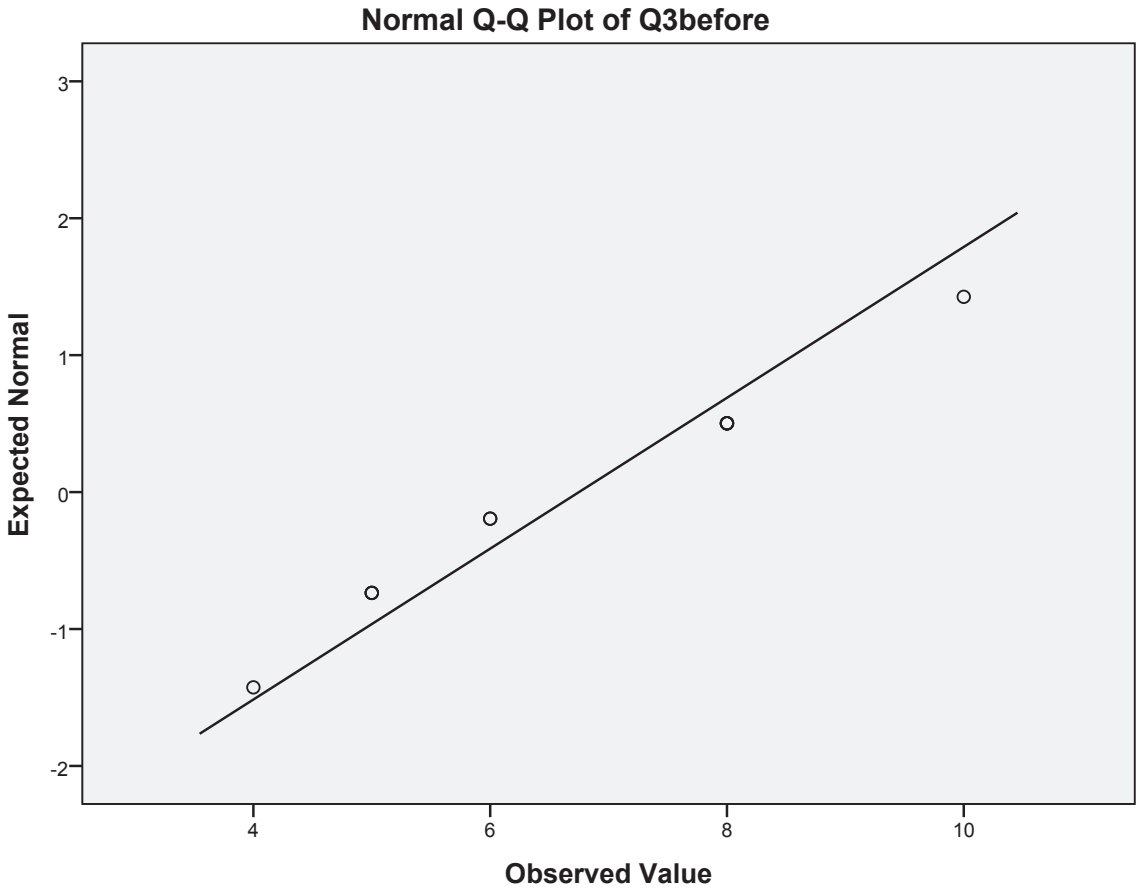

Normal Q-Q Plot of Q2before
Expected Normal
2
1
0
-1
-2
2
4
6
8
Observed Value

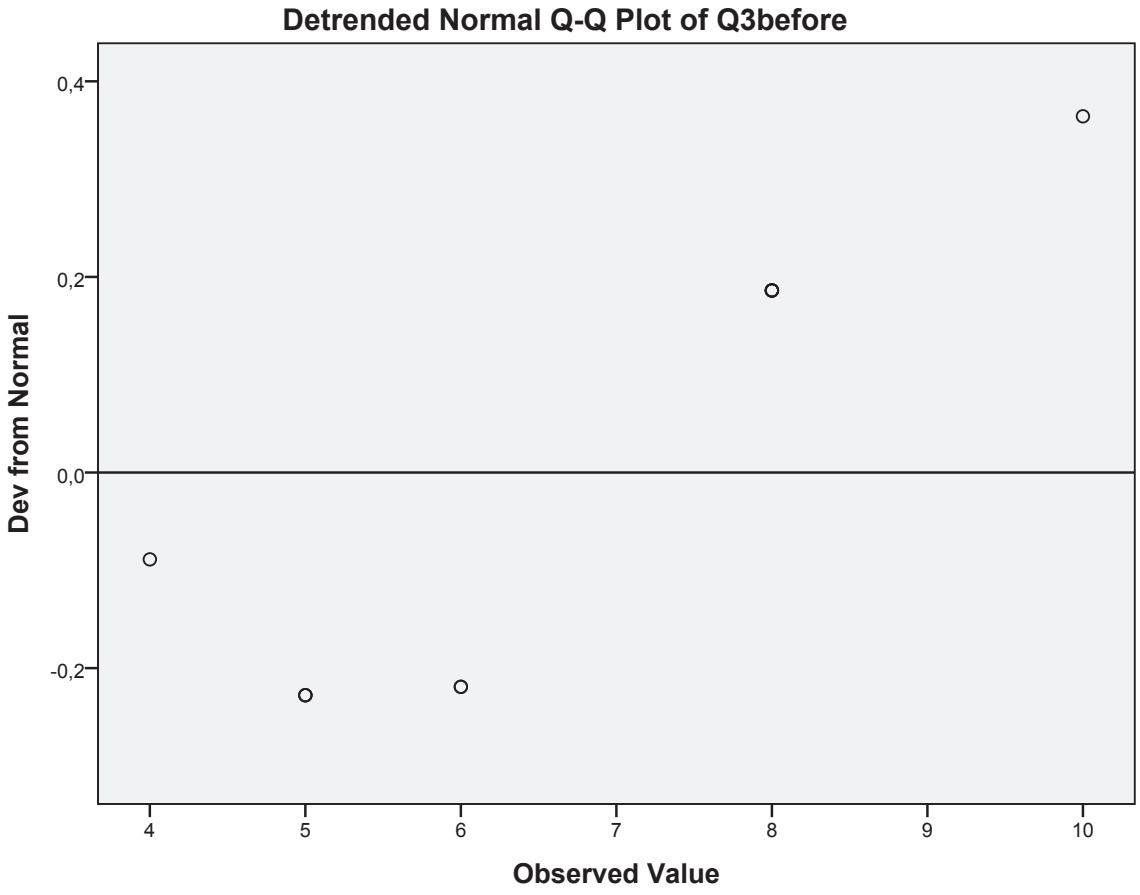

Detrended Normal Q-Q Plot of Q2before
Dev from Normal
0,6
0,4
0,2
0,0000
-0,2
-0,4
2
3
4
5
6
7
8
Observed Value

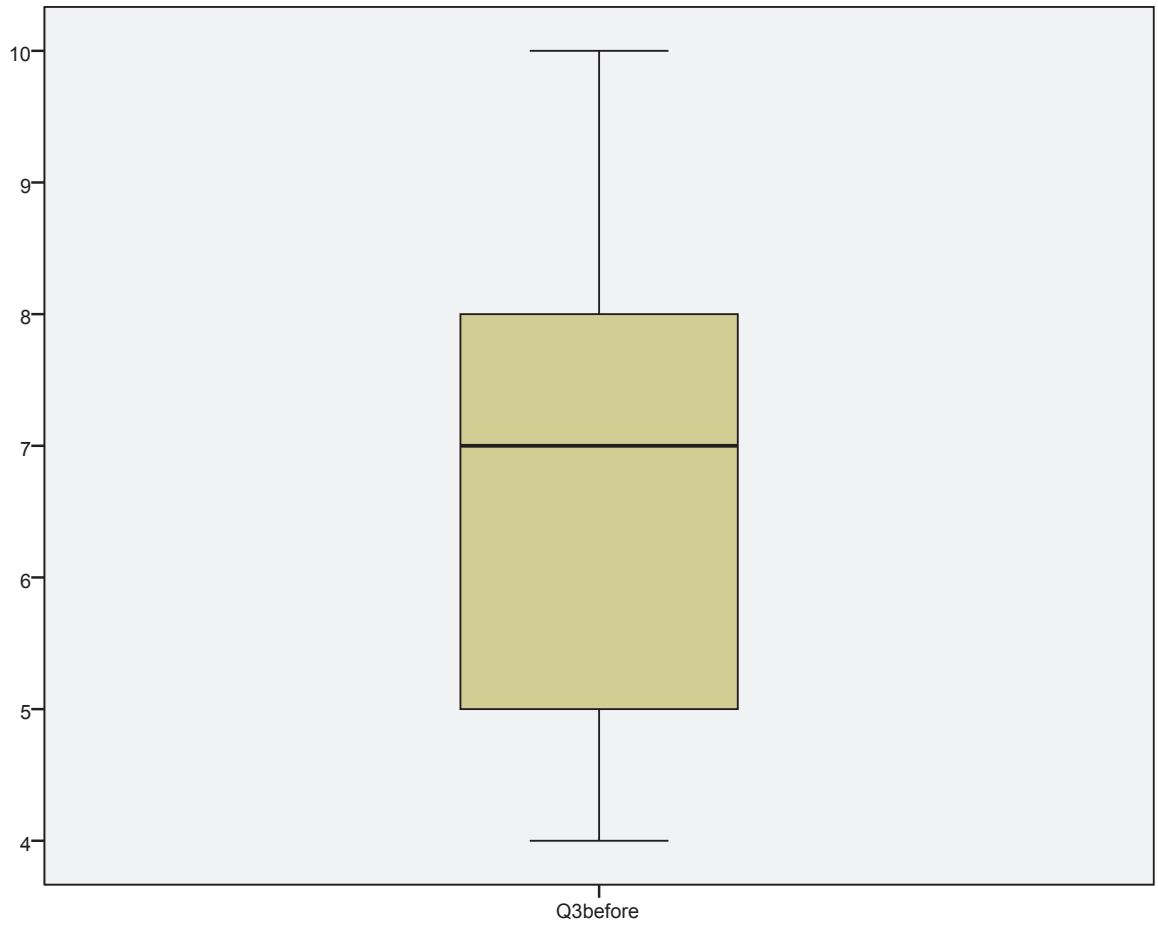



## Q3before

```
Q3before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        0 .  4
    10.00        0 .  5556688888
     1.00        1 .  0

 Stem width:        10
 Each leaf:       1 case(s)
```

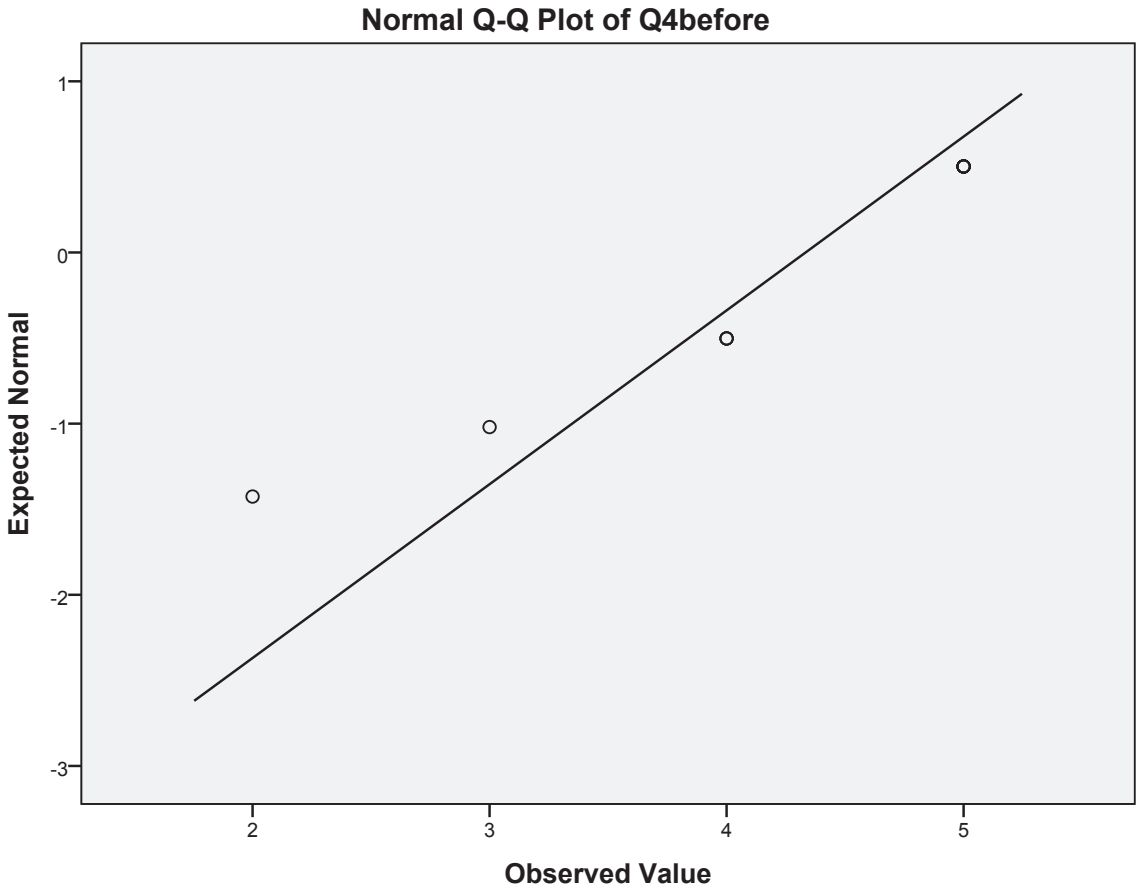

Normal Q-Q Plot of Q3before
Expected Normal
3
2
1
0
-1
-2
4
6
8
10
Observed Value

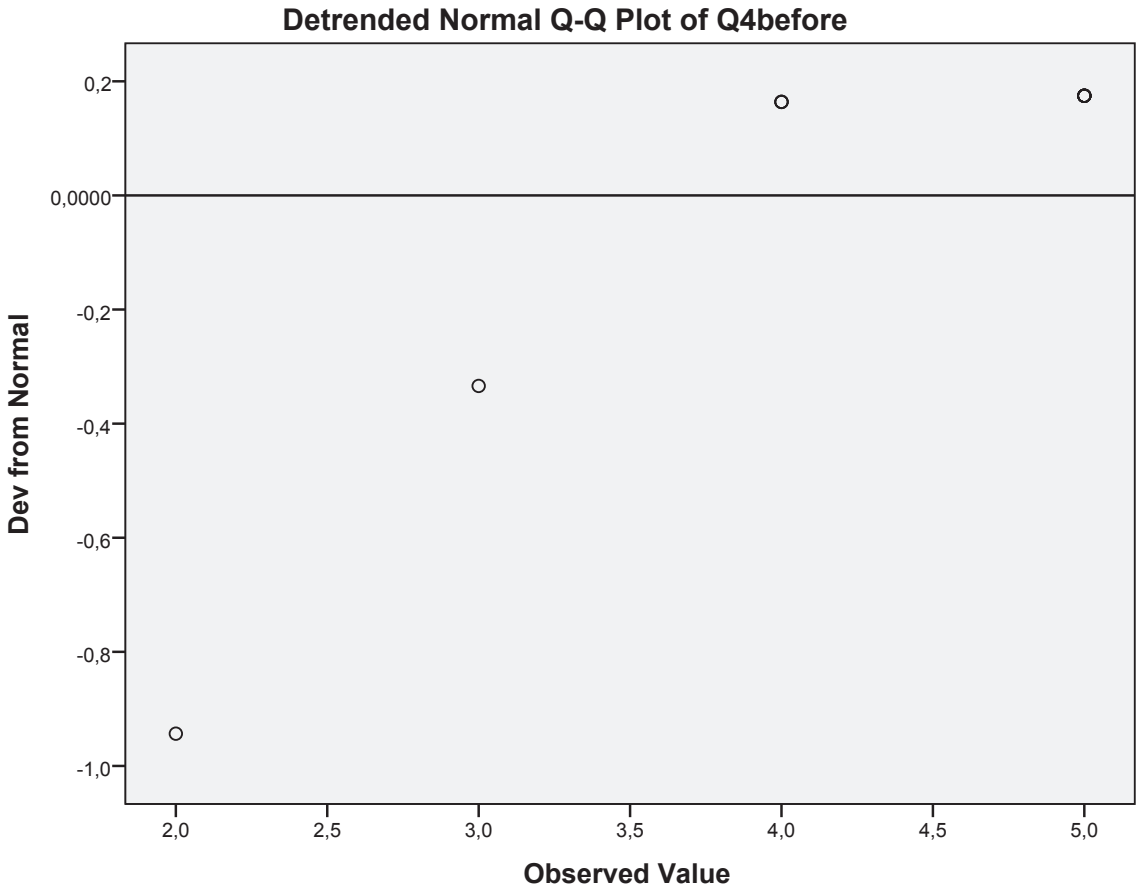

Detrended Normal Q-Q Plot of Q3before
Dev from Normal
0,4
0,2
0,0
-0,2
4
5
6
7
8
9
10
Observed Value

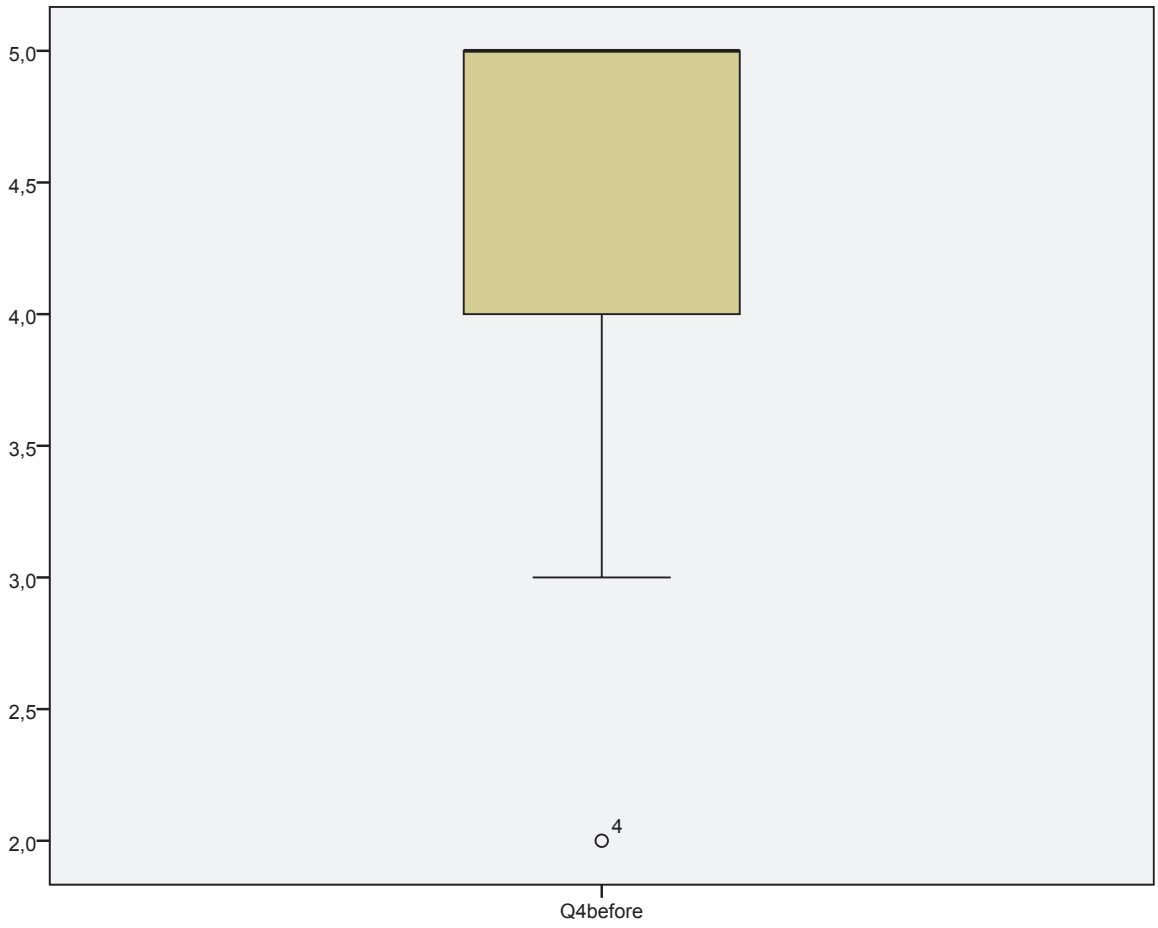



## Q4before

```
Q4before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00 Extremes    (=<2.0)
     1.00         3 .  0
      .00         3 .
     3.00         4 .  000
      .00         4 .
     7.00         5 .  0000000

 Stem width:          1
 Each leaf:        1 case(s)
```


Normal Q-Q Plot of Q4before
Expected Normal
1
0
-1
-2
-3
2
3
4
5
Observed Value


Detrended Normal Q-Q Plot of Q4before
Dev from Normal
0,2
0,0000
-0,2
-0,4
-0,6
-0,8
-1,0
2,0
2,5
3,0
3,5
4,0
4,5
5,0
Observed Value

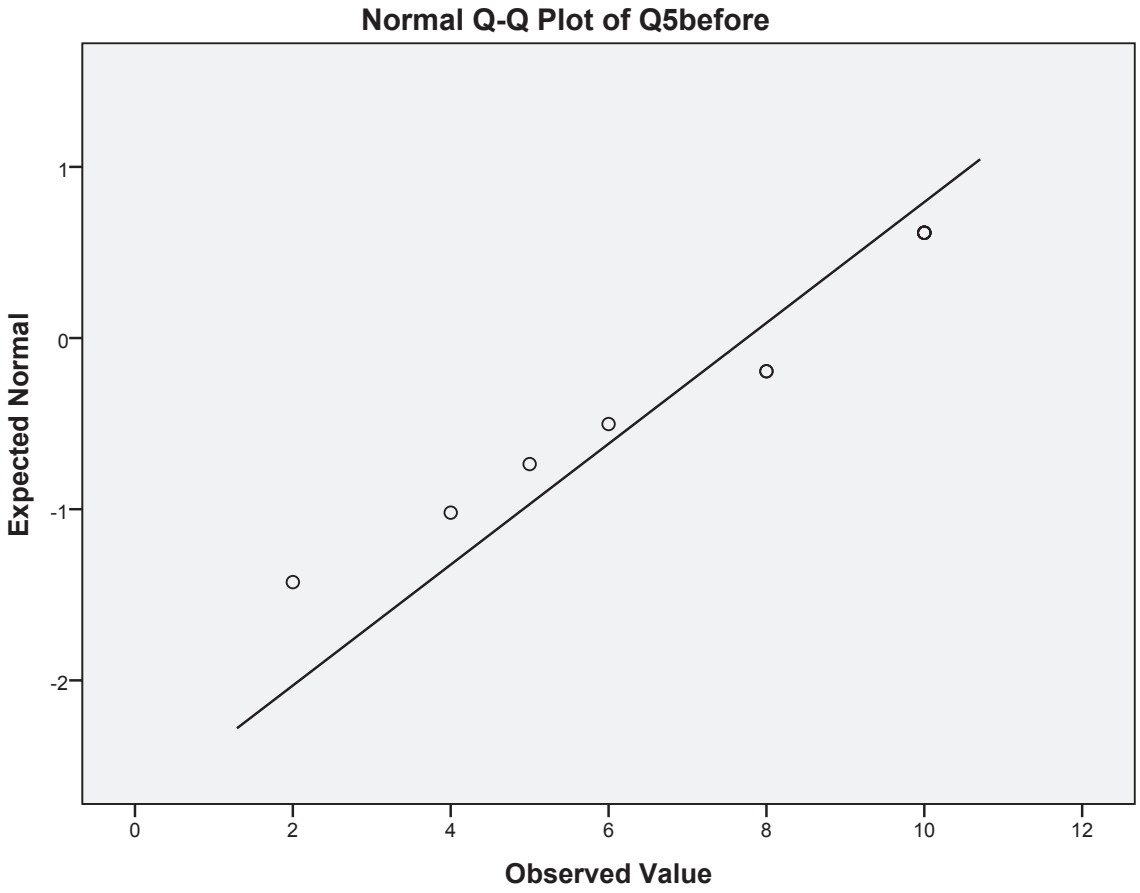


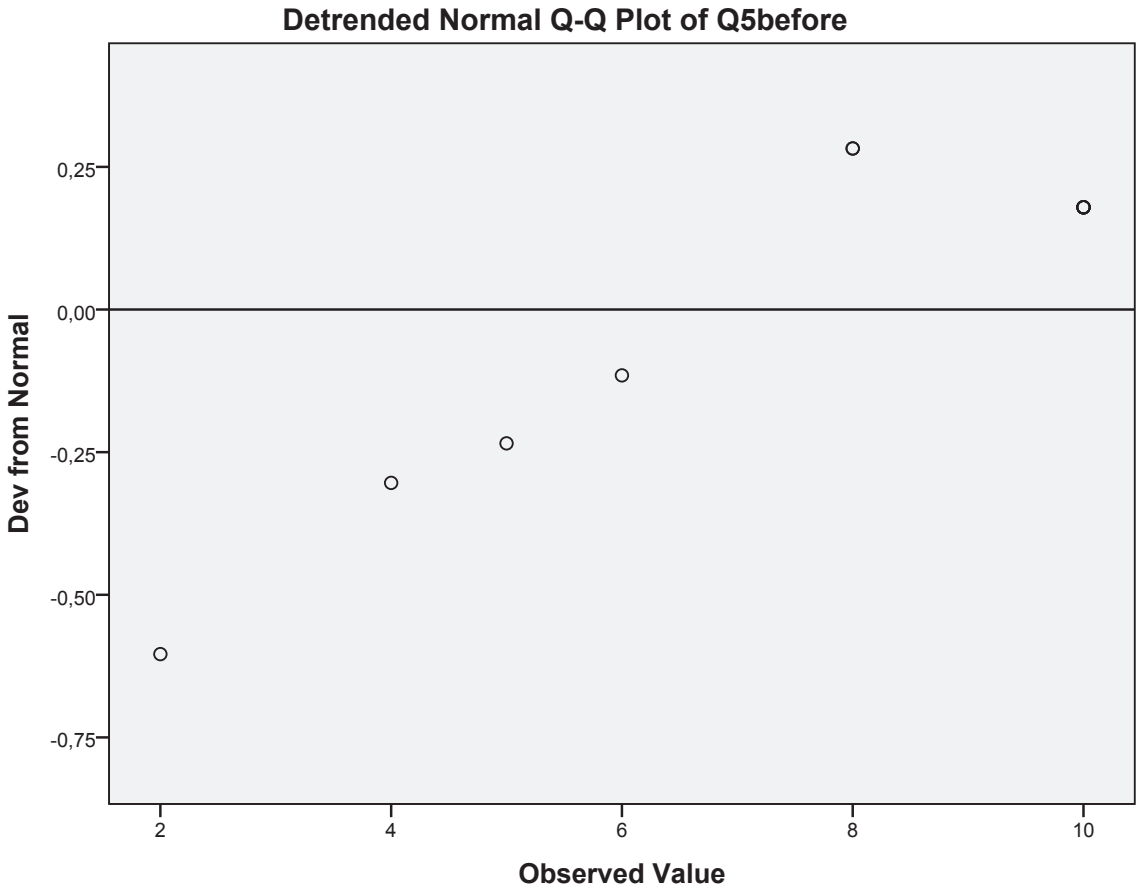

## Q5before

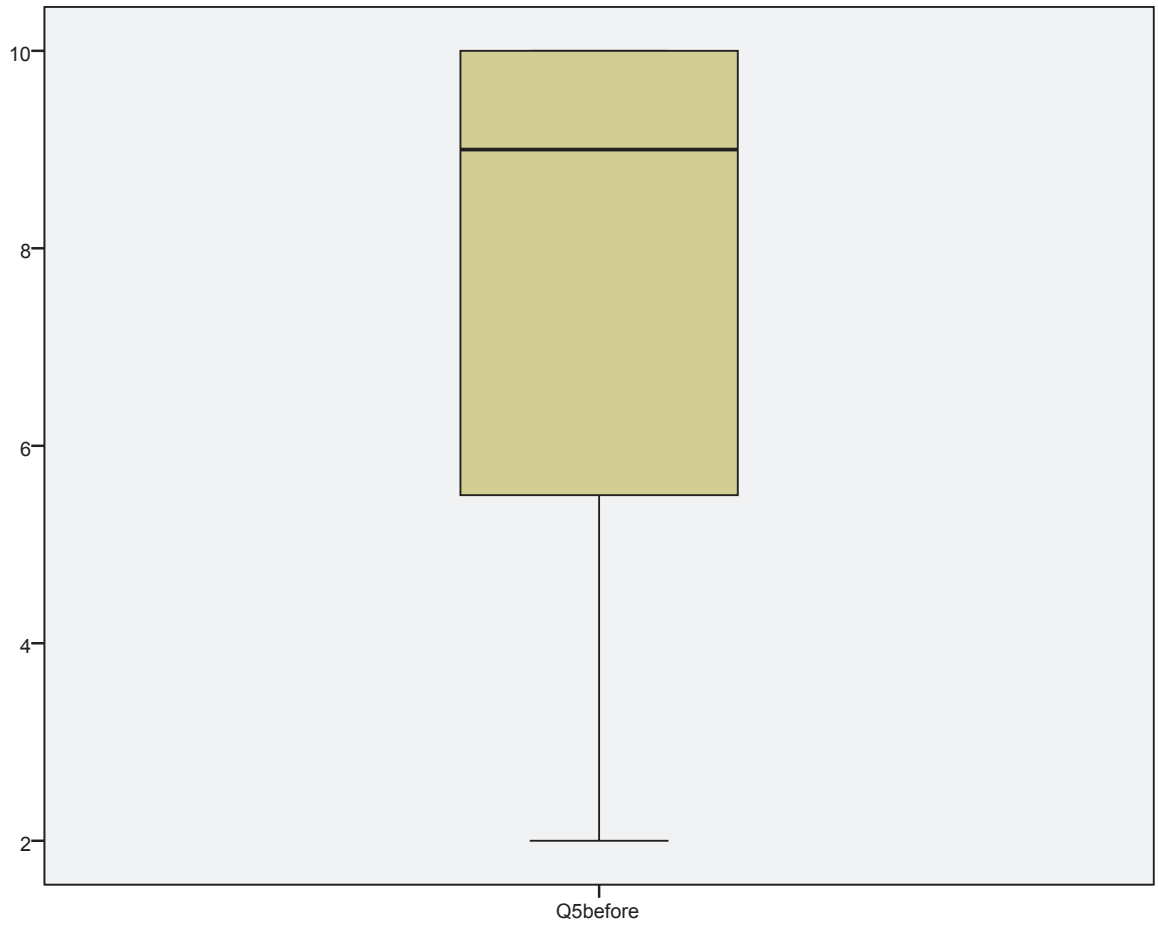
Q5before Stem-and-Leaf Plot

| Frequency | Stem & | Leaf |
|---|---|---|
| 2.00 | 0 . | 24 |
| 4.00 | 0 . | 5688 |
| 6.00 | 1 . | 000000 |

Stem width: 10
Each leaf: 1 case(s)

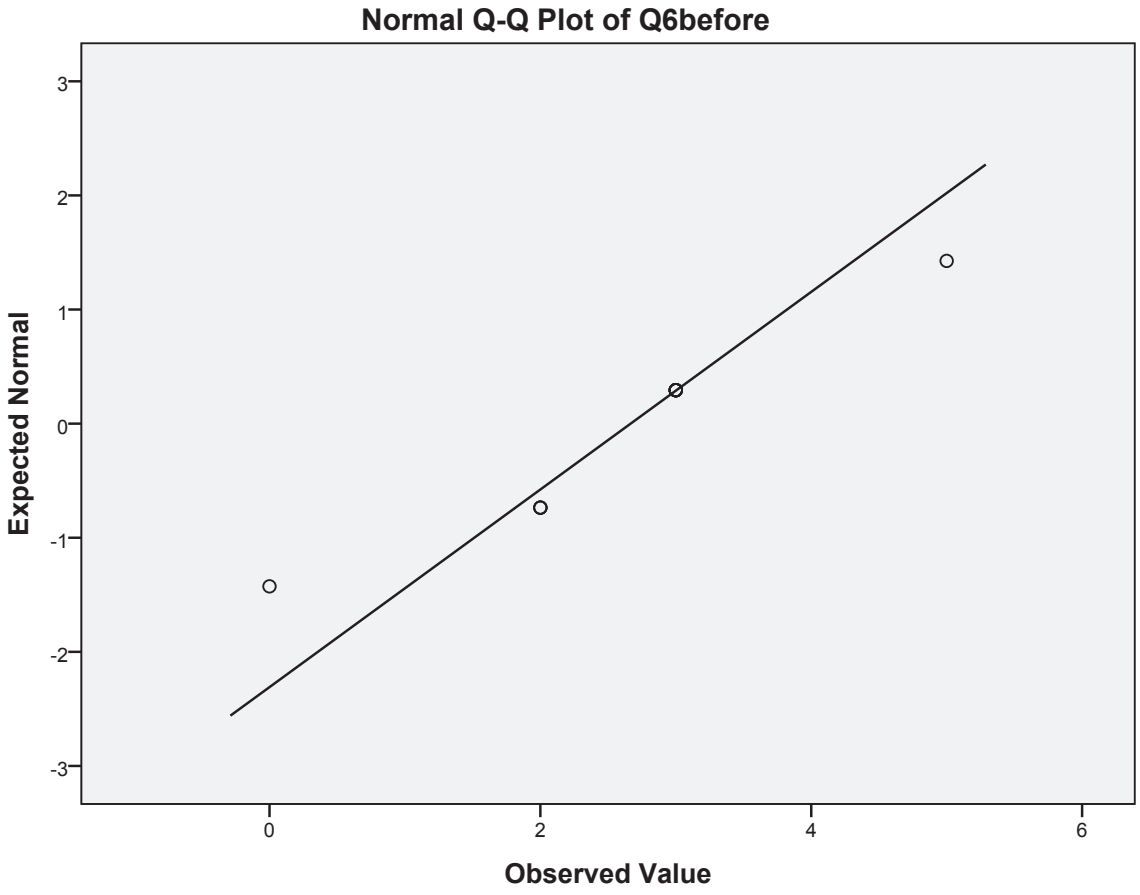

Normal Q-Q Plot of Q5before
Expected Normal
1
0
-1
-2
0
2
4
6
8
10
12
Observed Value

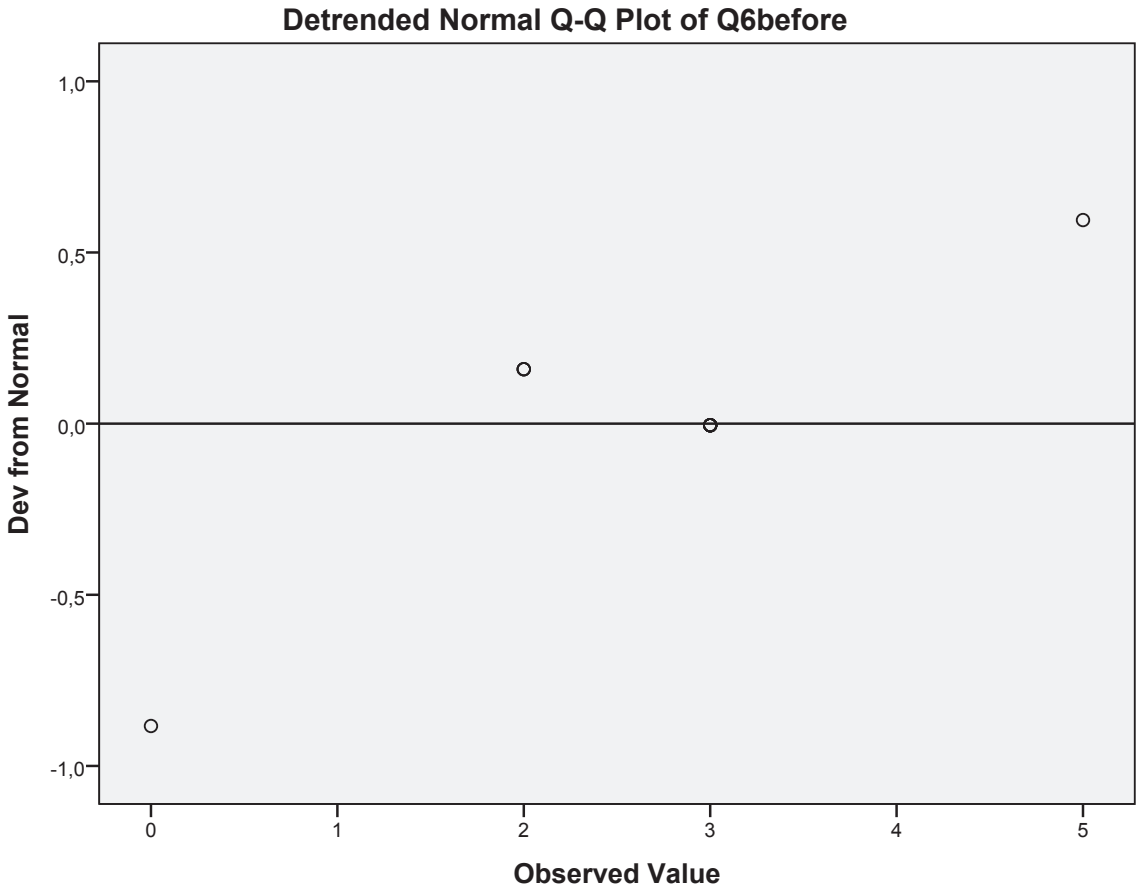

Detrended Normal Q-Q Plot of Q5before
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
2
4
6
8
10
Observed Value

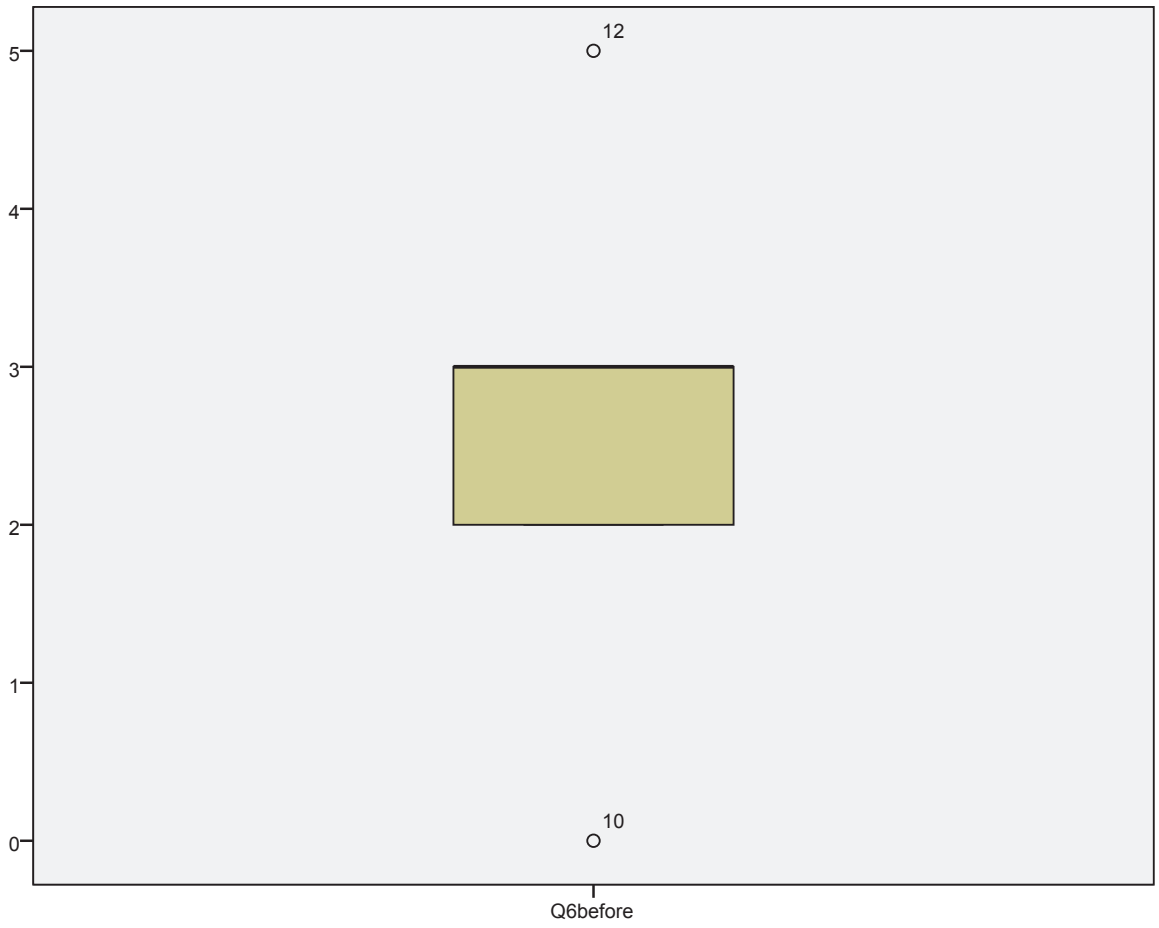



## Q6before

```
Q6before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00 Extremes    (=<.0)
     3.00        2 .  000
      .00        2 .
     7.00        3 .  0000000
     1.00 Extremes    (>=5.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

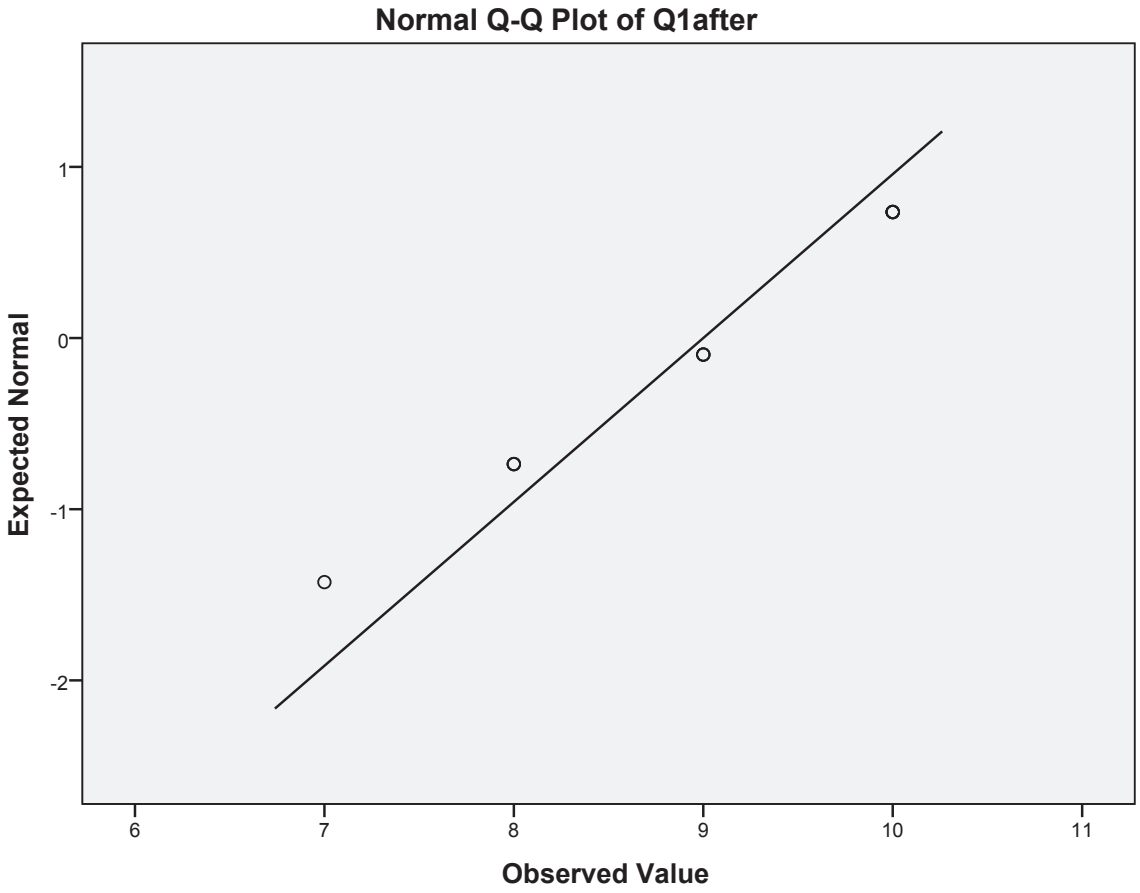

Normal Q-Q Plot of Q6before
Expected Normal
3
2
1
0
-1
-2
-3
0
2
4
6
Observed Value

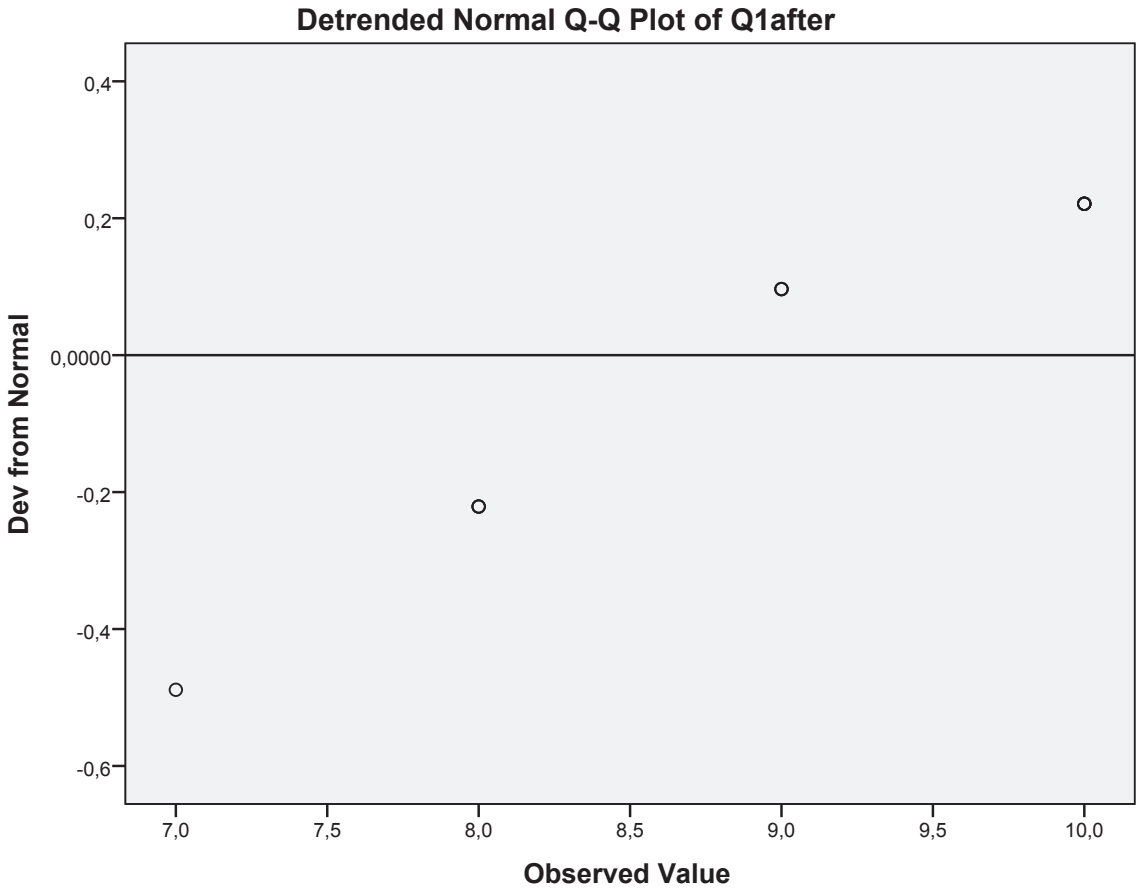

Detrended Normal Q-Q Plot of Q6before
Dev from Normal
1,0
0,5
0,0
-0,5
-1,0
0
1
2
3
4
5
Observed Value

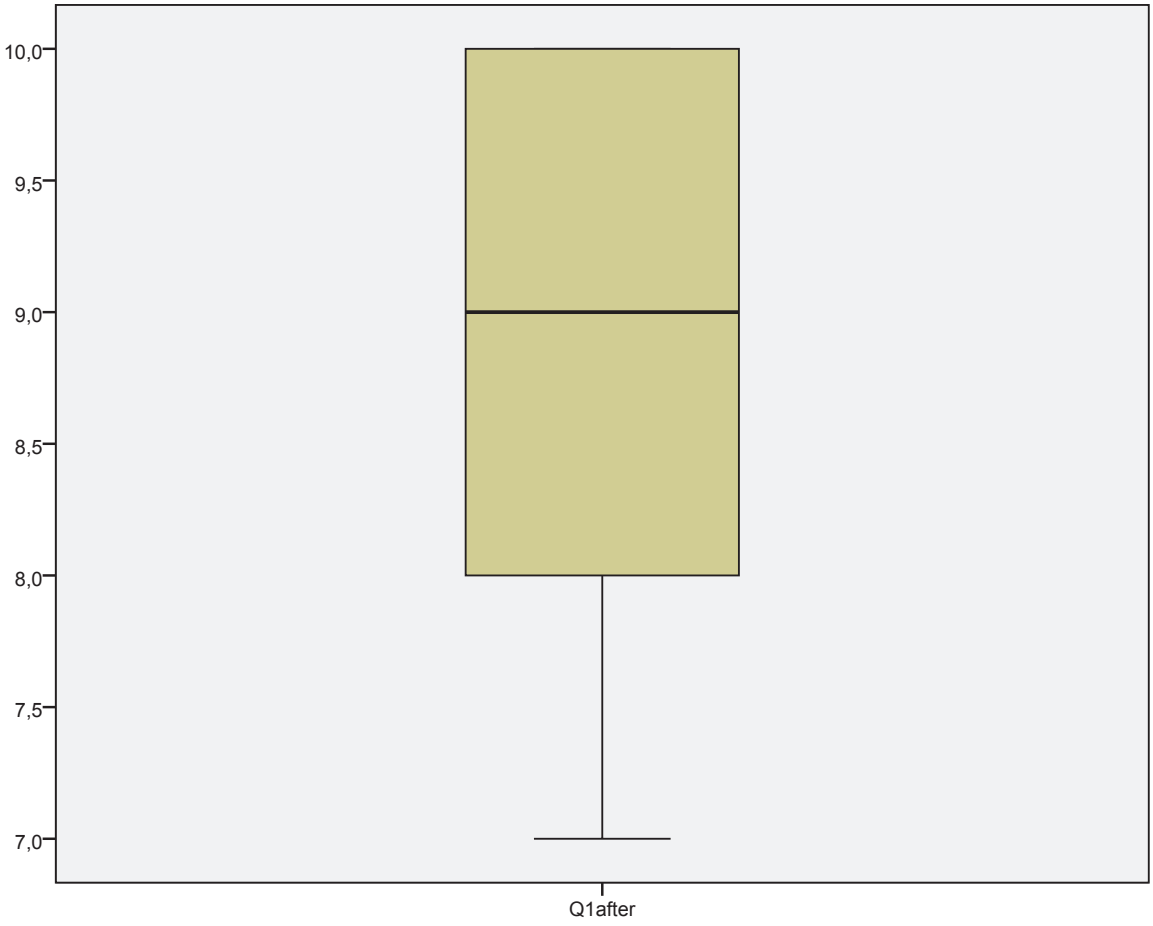



## Q1after

```
Q1after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        7 .  0
     3.00        8 .  000
     3.00        9 .  000
     5.00       10 .  00000

 Stem width:         1
 Each leaf:       1 case(s)
```

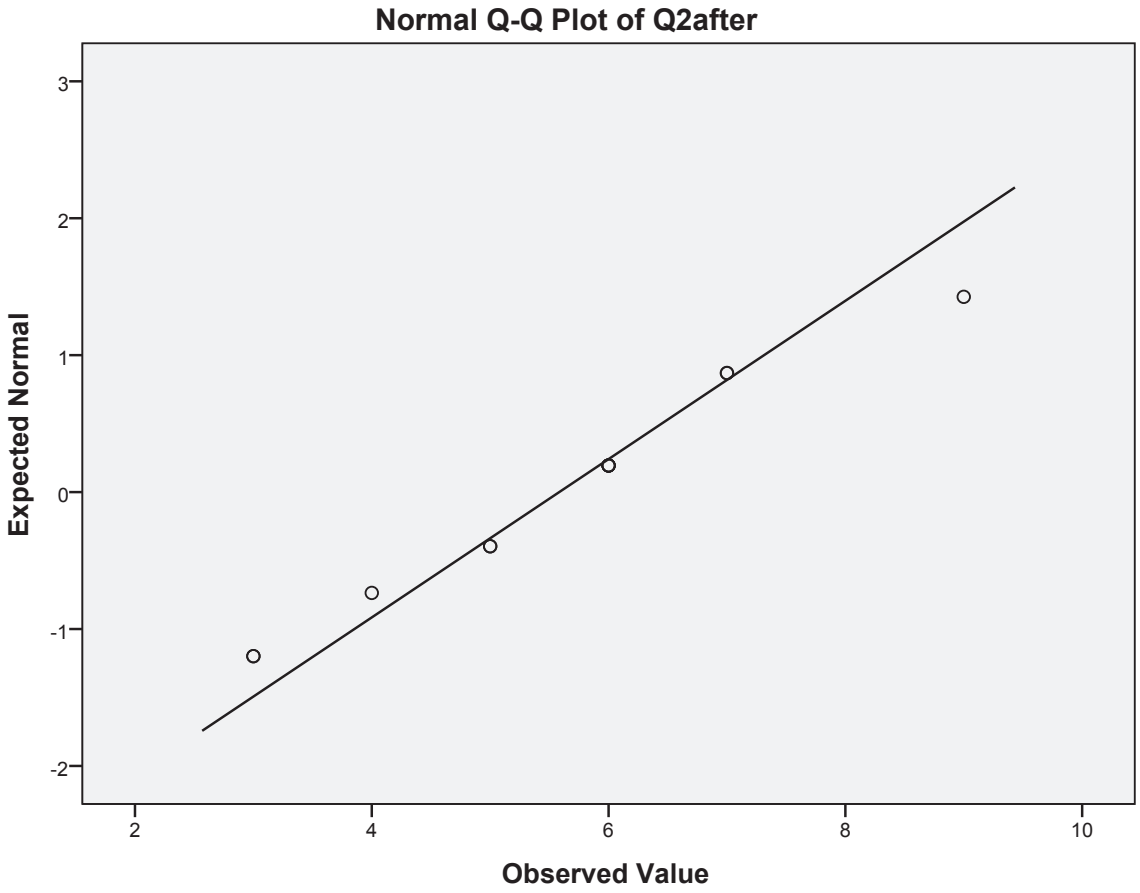

Normal Q-Q Plot of Q1after
Expected Normal
1
0
-1
-2
6
7
8
9
10
11
Observed Value

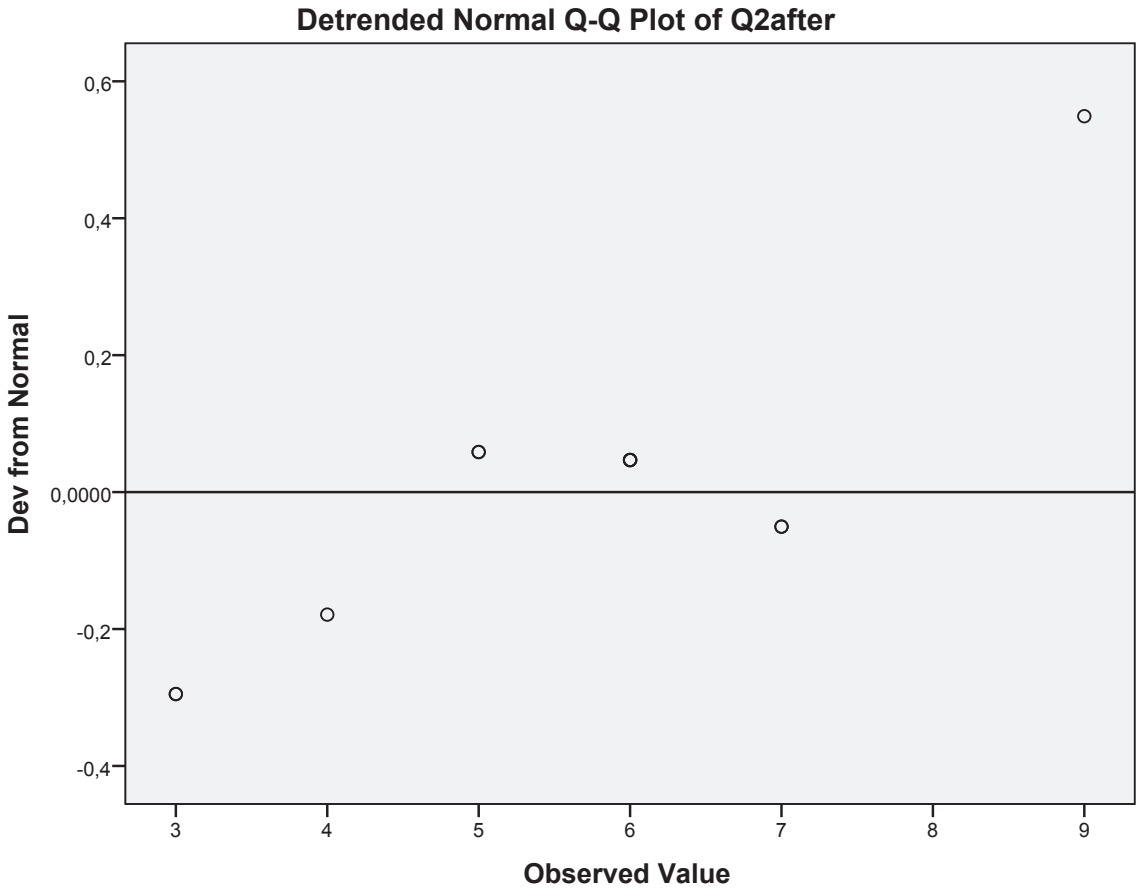

Detrended Normal Q-Q Plot of Q1after
Dev from Normal
0,4
0,2
0,0000
-0,2
-0,4
-0,6
7,0
7,5
8,0
8,5
9,0
9,5
10,0
Observed Value

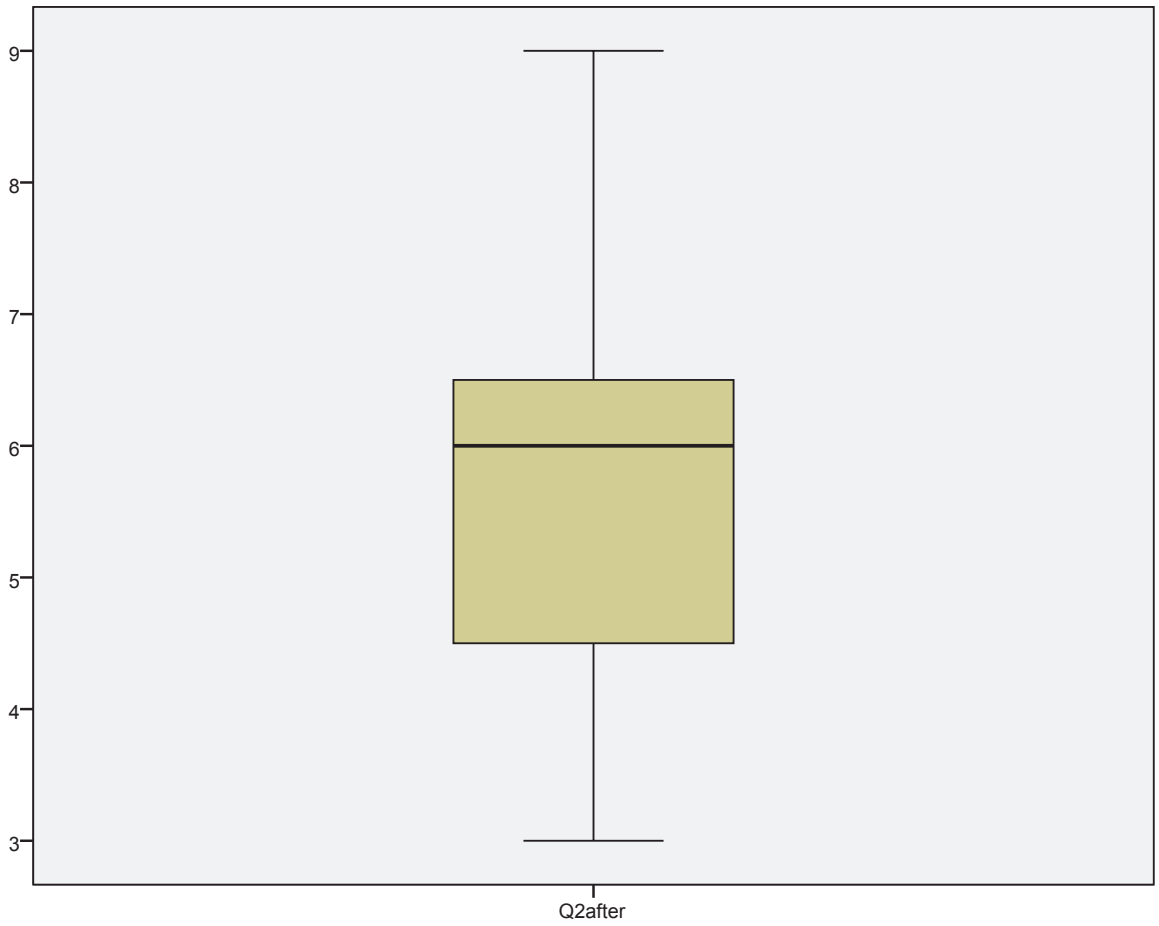



## Q2after

```
Q2after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     2.00        0 .  33
     3.00        0 .  455
     6.00        0 .  666677
     1.00        0 .  9

 Stem width:        10
 Each leaf:       1 case(s)
```

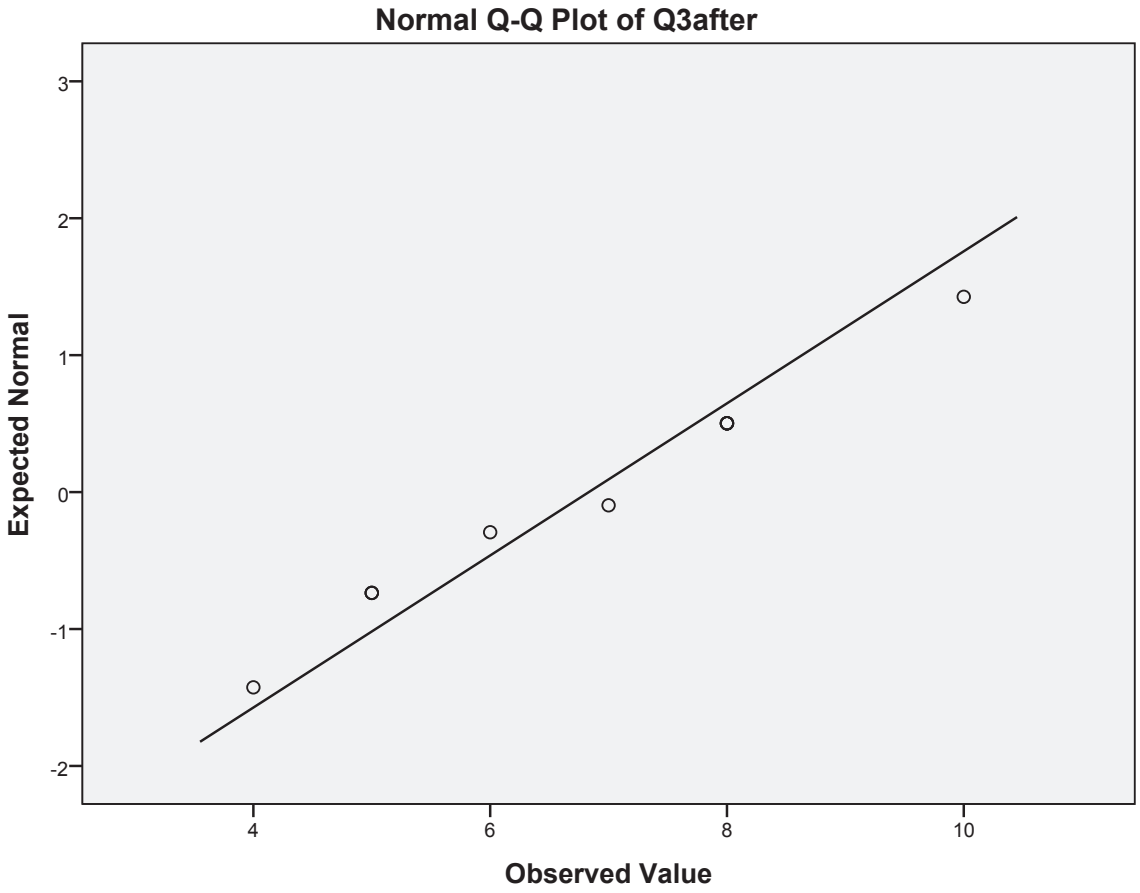

Normal Q-Q Plot of Q2after
Expected Normal
3
2
1
0
-1
-2
2
4
6
8
10
Observed Value

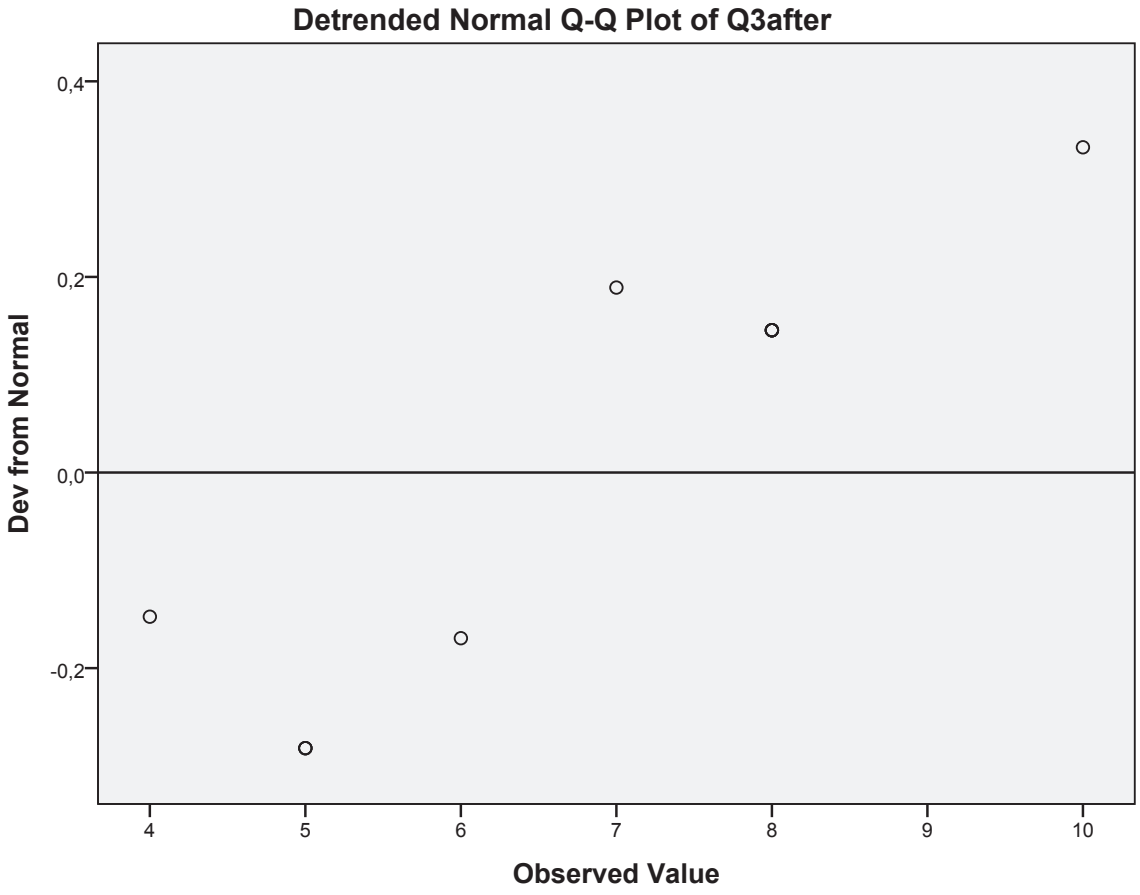

Detrended Normal Q-Q Plot of Q2after
Dev from Normal
0,6
0,4
0,2
0,0000
-0,2
-0,4
3
4
5
6
7
8
9
Observed Value

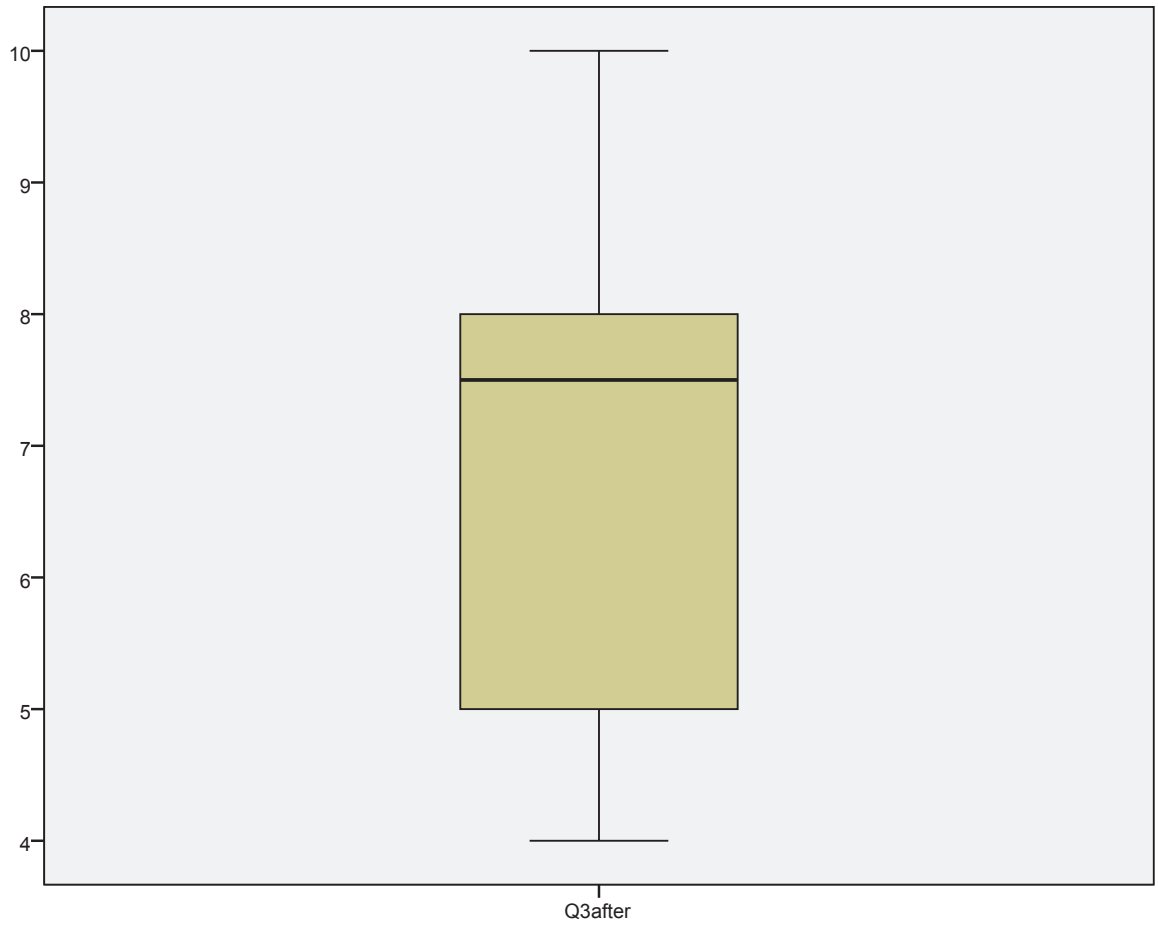



## Q3after

```
Q3after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        0 .  4
    10.00        0 .  5556788888
     1.00        1 .  0

 Stem width:        10
 Each leaf:       1 case(s)
```

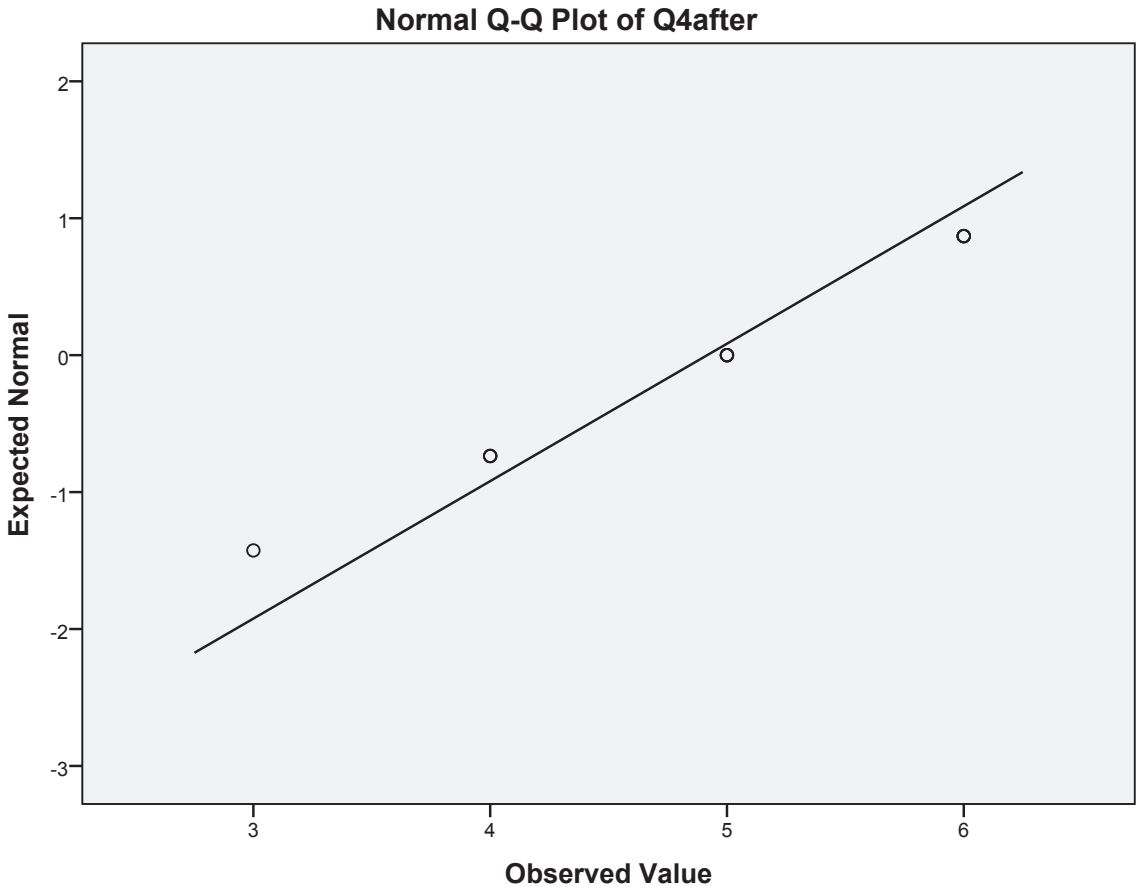

Normal Q-Q Plot of Q3after
Expected Normal
3
2
1
0
-1
-2
4
6
8
10
Observed Value

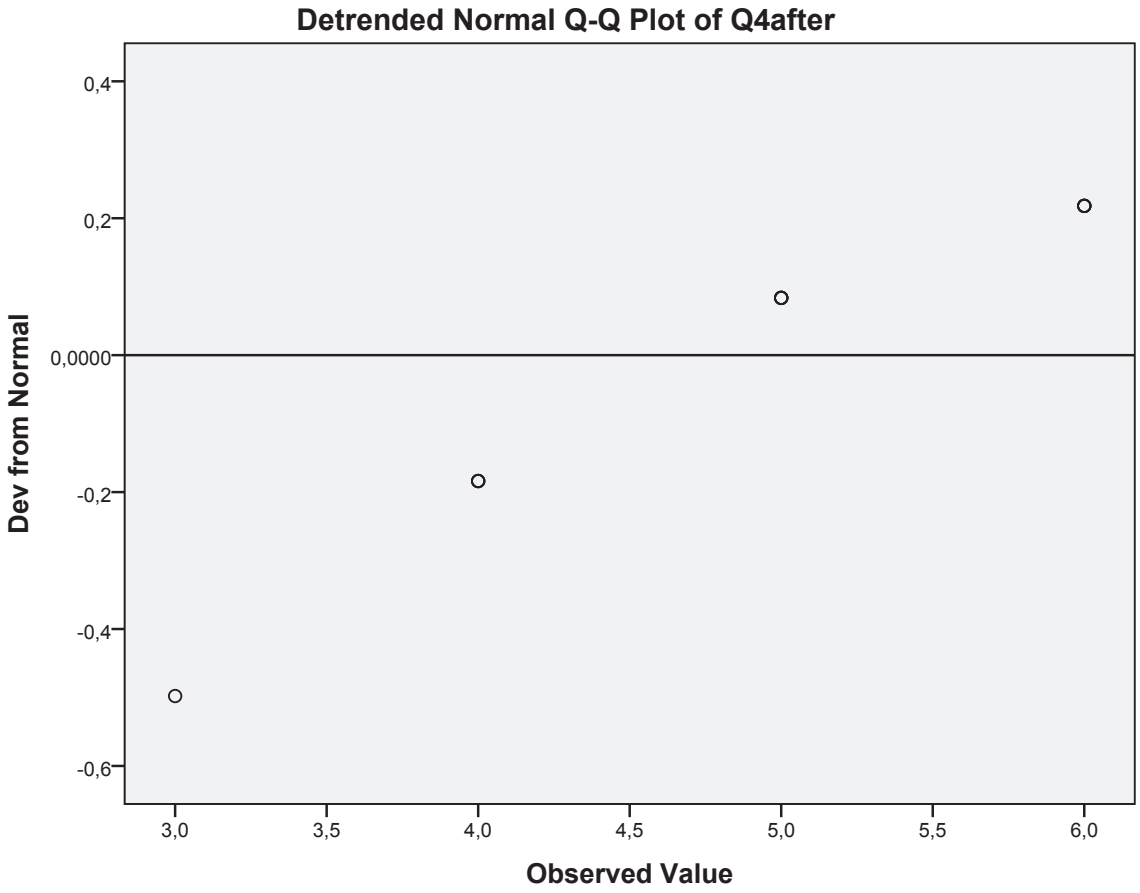

Detrended Normal Q-Q Plot of Q3after
Dev from Normal
0,4
0,2
0,0
-0,2
4
5
6
7
8
9
10
Observed Value

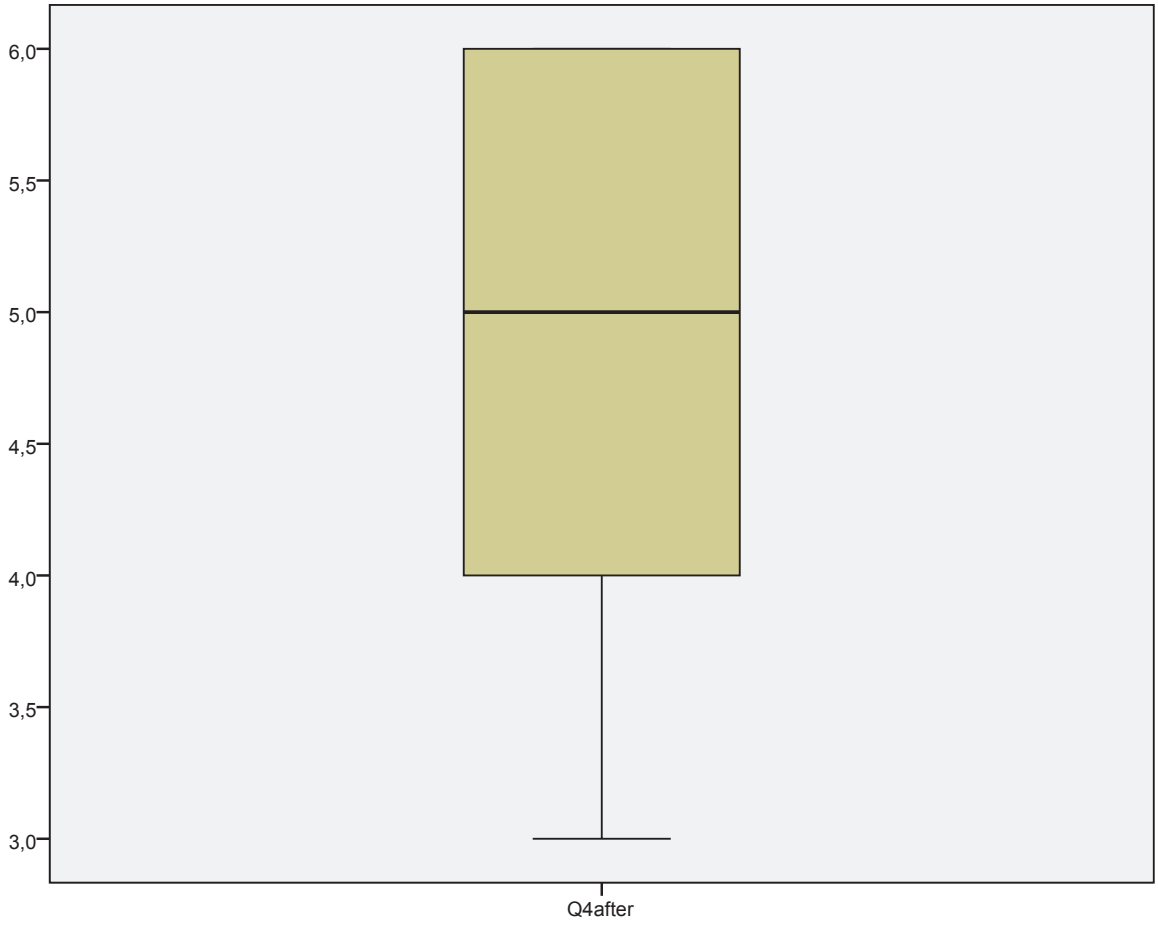



## Q4after

```
Q4after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        3 .  0
     3.00        4 .  000
     4.00        5 .  0000
     4.00        6 .  0000

 Stem width:         1
 Each leaf:       1 case(s)
```

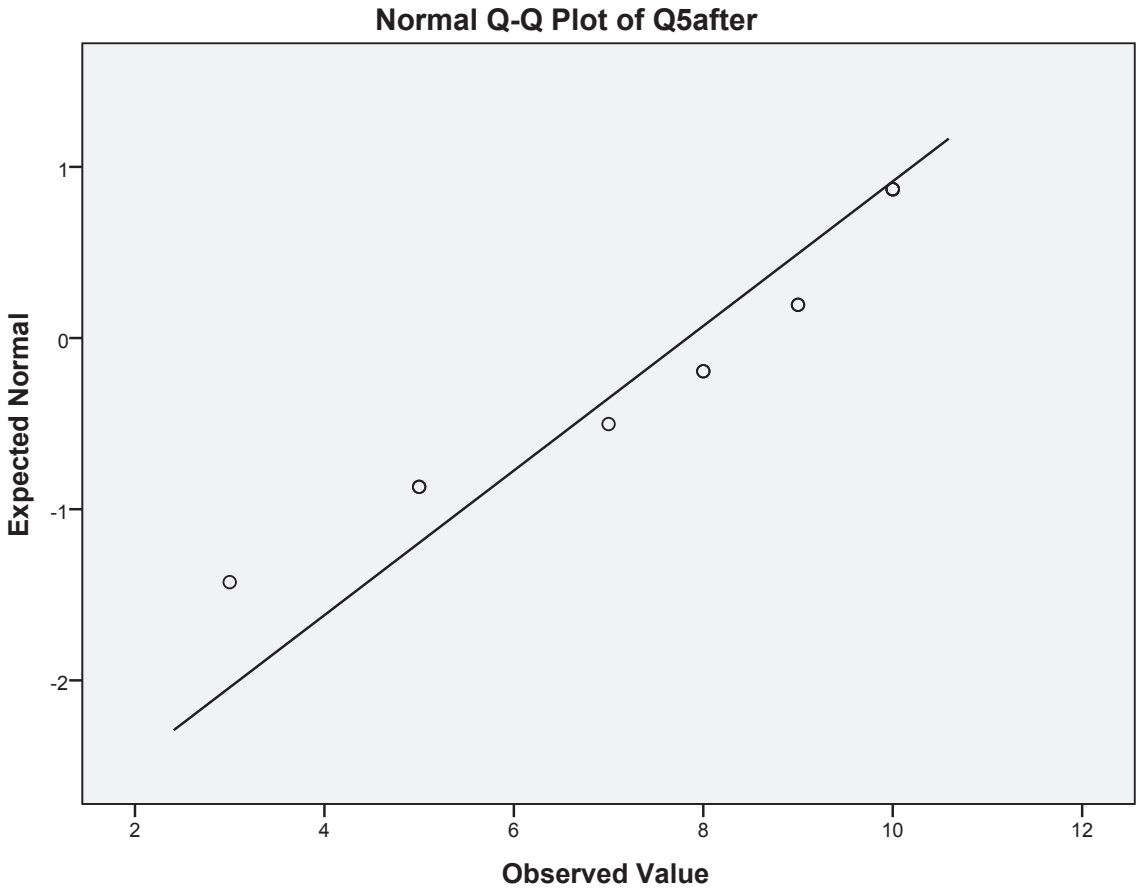

Normal Q-Q Plot of Q4after
Expected Normal
2
1
0
-1
-2
-3
3
4
5
6
Observed Value

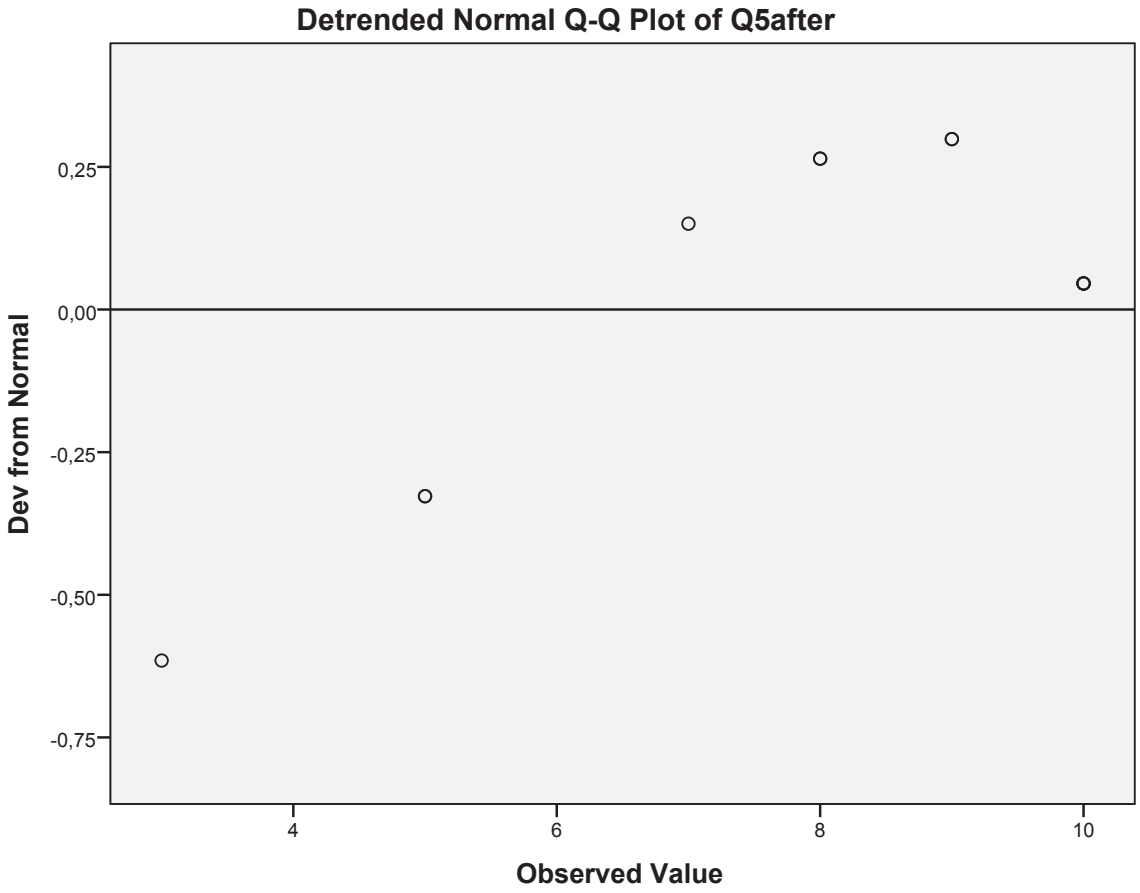

Detrended Normal Q-Q Plot of Q4after
Dev from Normal
0,4
0,2
0,0000
-0,2
-0,4
-0,6
3,0
3,5
4,0
4,5
5,0
5,5
6,0
Observed Value

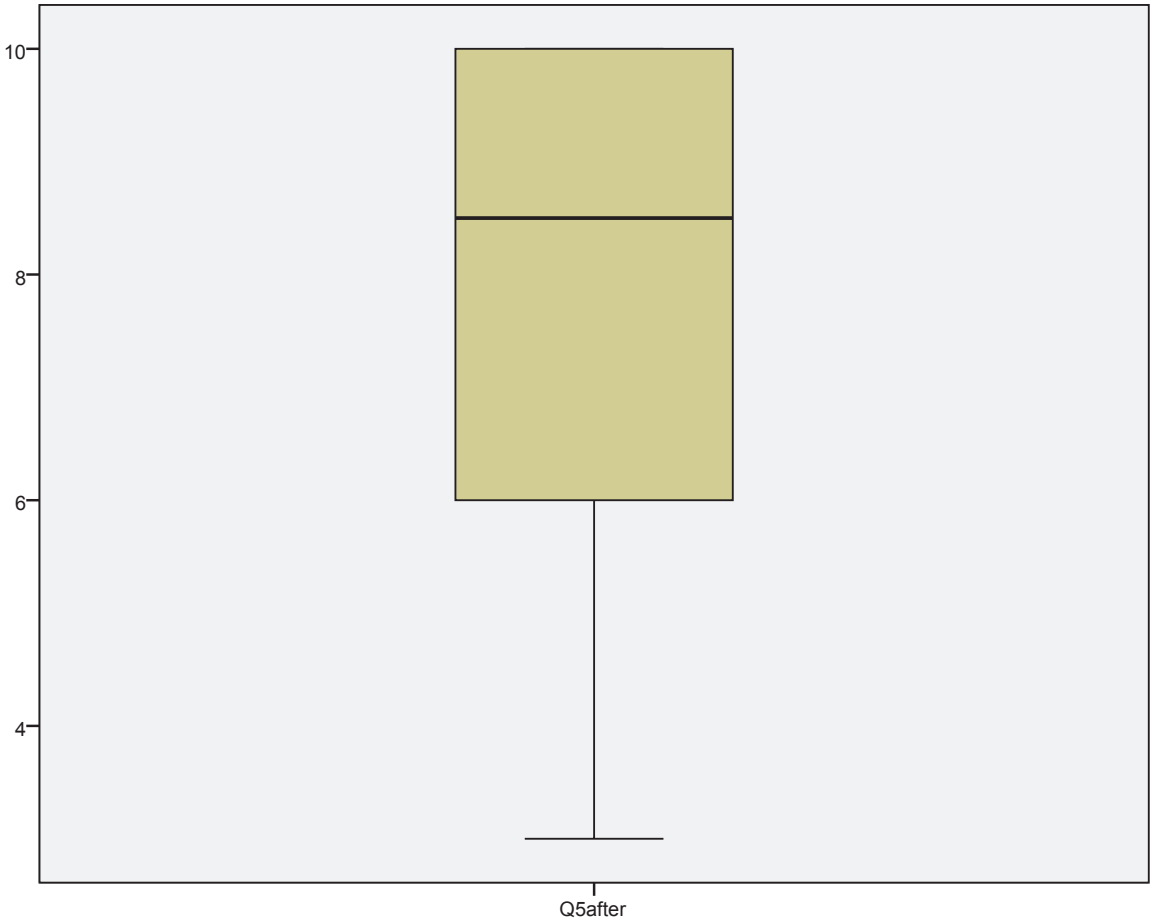



## Q5after

```
Q5after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        0 .  3
     7.00        0 .  5578899
     4.00        1 .  0000

 Stem width:        10
 Each leaf:       1 case(s)
```

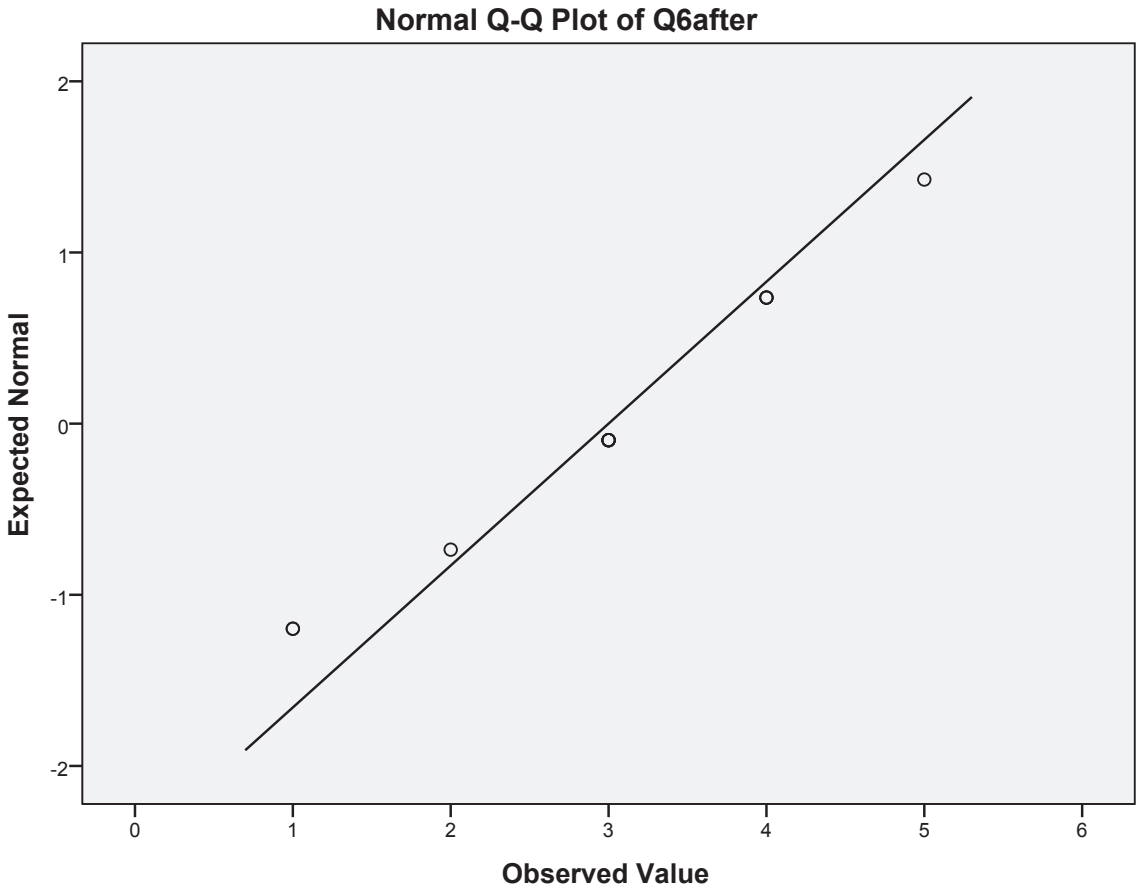

Normal Q-Q Plot of Q5after
Expected Normal
1
0
-1
-2
2
4
6
8
10
12
Observed Value

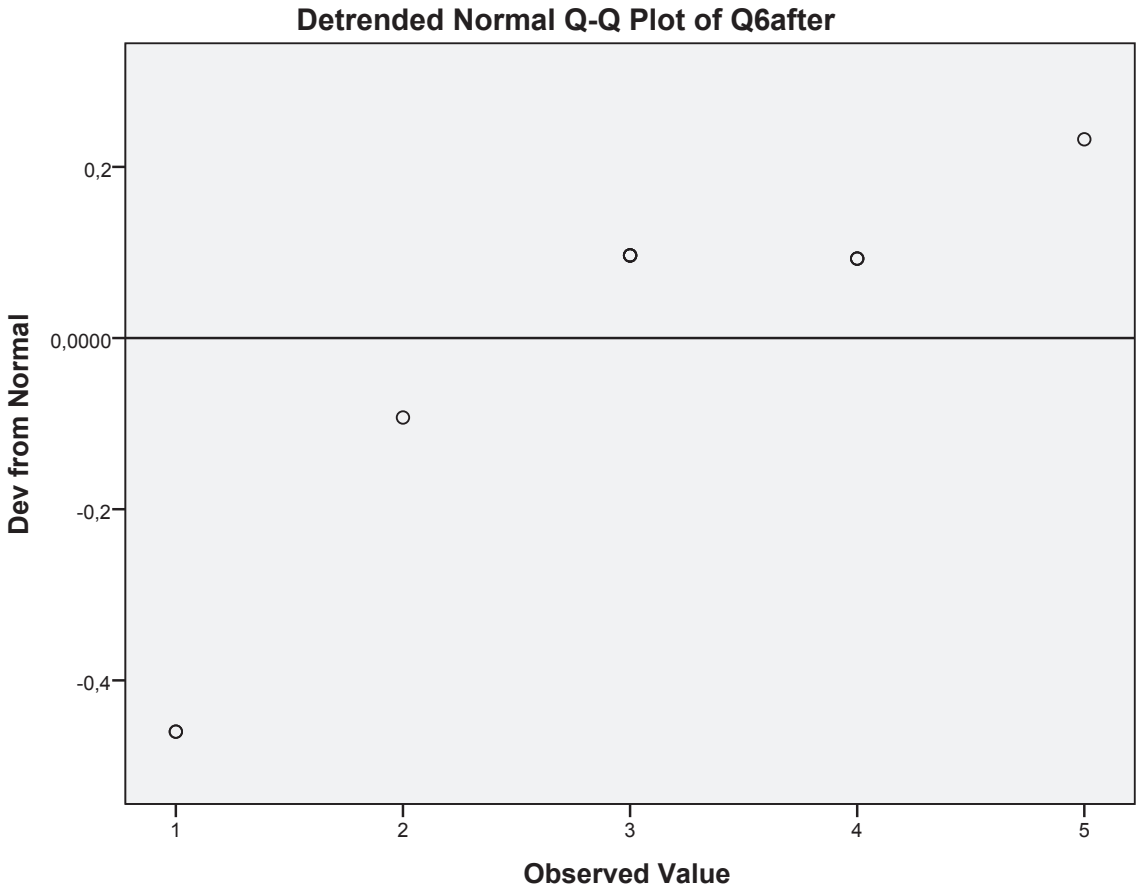

Detrended Normal Q-Q Plot of Q5after
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
4
6
8
10
Observed Value

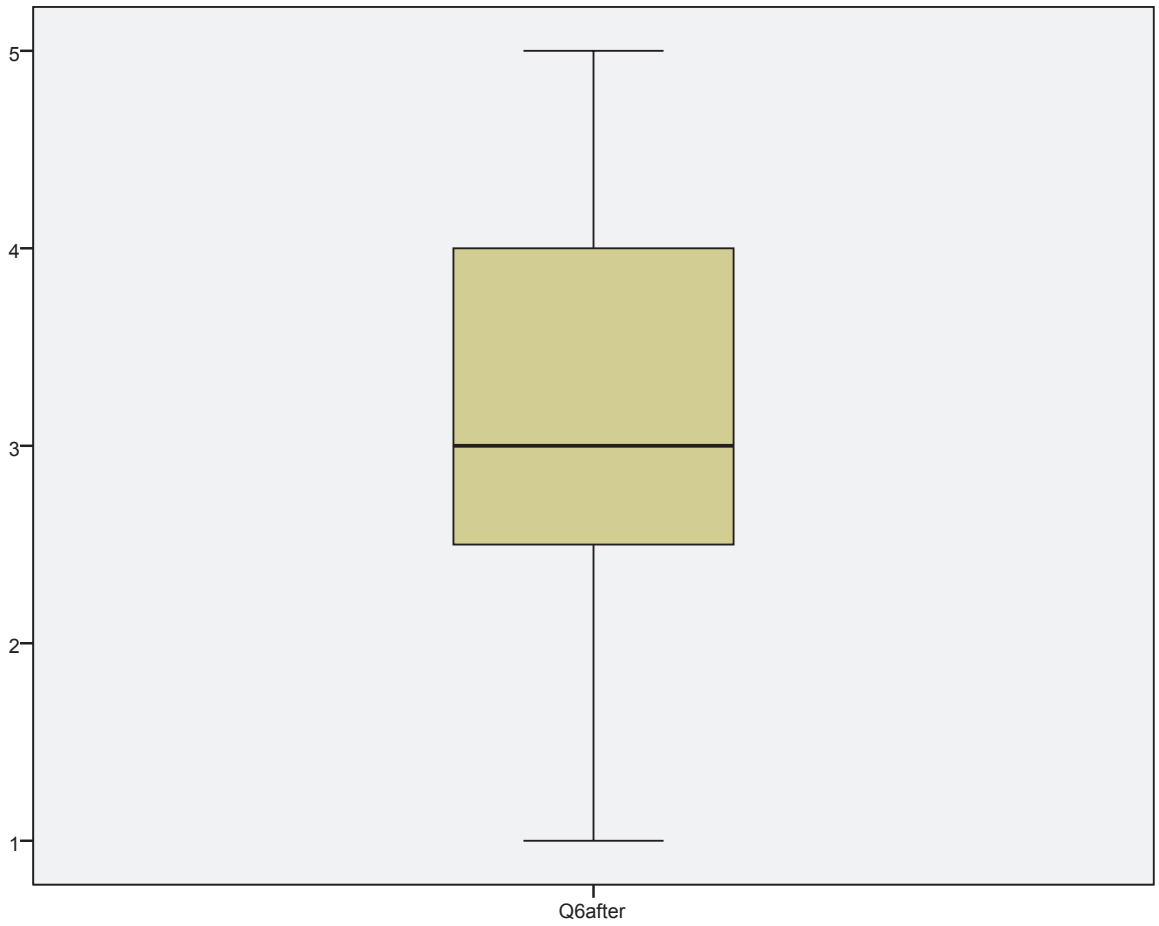



## Q6after

```
Q6after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     2.00        1 .  00
     1.00        2 .  0
     5.00        3 .  00000
     3.00        4 .  000
     1.00        5 .  0

 Stem width:         1
 Each leaf:       1 case(s)
```


Normal Q-Q Plot of Q6after
Expected Normal
2
1
0
-1
-2
0
1
2
3
4
5
6
Observed Value


Detrended Normal Q-Q Plot of Q6after
Dev from Normal
0,2
0,0000
-0,2
-0,4
1
2
3
4
5
Observed Value


5
4
3
2
1
Q6after

Appendix 7.6.2 - Shapiro-Wilk's test for CSF

```
GET
  FILE='D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika2\1 All projects before and
GET
  FILE='D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika2\1 All projects before and
DATASET NAME DataSet1 WINDOW=FRONT.

EXAMINE VARIABLES=Q1before Q2before Q3before Q4before Q5before Q6before Q7before Q8before Q1
  /PLOT BOXPLOT STEMLEAF NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

## Explore

**Notes**

| | | |
|---|---|---|
| Output Created | | 30-Нов-2012 19-26-03 |
| Comments | | |
| Input | Data | D:\akcijanje\ostalo ebojsa\Nebojsa Surlan PhD\statistika2\1 All projects before and after.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 12 |
| Missing Value Handling | Definition of Missing | User-defined missing values for dependent variables are treated as missing. |
| | Cases Used | Statistics are based on cases with no missing values for any dependent variable or factor used. |
| Syntax | | EXAMINE VARIABLES=Q1before Q2before Q3before Q4before Q5before Q6before Q7before Q8before Q1after Q2after Q3after Q4after Q5after Q6after Q7after Q8after /PLOT BOXPLOT STEMLEAF NPPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL. |
| Resources | Processor Time | 00 00:00:19,250 |
| | Elapsed Time | 00 00:00:16,839 |

```
[DataSet1] D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika2\1 All
 projects before and after.sav
```

**Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Q1before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q2before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q3before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q4before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q5before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q6before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q7before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q8before | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q1after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q2after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q3after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q4after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q5after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q6after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q7after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |
| Q8after | 12 | 100,0% | 0 | ,0% | 12 | 100,0% |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q1before | Mean | | 5,50 | ,645 |
| | 95% Confidence Interval for Mean | Lower Bound | 4,08 | |
| | | Upper Bound | 6,92 | |
| | 5% Trimmed Mean | | 5,44 | |
| | Median | | 6,00 | |
| | Variance | | 5,000 | |
| | Std. Deviation | | 2,236 | |
| | Minimum | | 2 | |
| | Maximum | | 10 | |
| | Range | | 8 | |
| | Interquartile Range | | 2 | |
| | Skewness | | ,176 | ,637 |
| | Kurtosis | | ,724 | 1,232 |
| Q2before | Mean | | 8,75 | ,351 |
| | 95% Confidence Interval for Mean | Lower Bound | 7,98 | |
| | | Upper Bound | 9,52 | |
| | 5% Trimmed Mean | | 8,83 | |
| | Median | | 9,00 | |
| | Variance | | 1,477 | |
| | Std. Deviation | | 1,215 | |
| | Minimum | | 6 | |
| | Maximum | | 10 | |
| | Range | | 4 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,889 | ,637 |
| | Kurtosis | | ,894 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q3before | Mean | | 9,83 | ,112 |
| | 95% Confidence Interval for Mean | Lower Bound | 9,59 | |
| | | Upper Bound | 10,08 | |
| | 5% Trimmed Mean | | 9,87 | |
| | Median | | 10,00 | |
| | Variance | | ,152 | |
| | Std. Deviation | | ,389 | |
| | Minimum | | 9 | |
| | Maximum | | 10 | |
| | Range | | 1 | |
| | Interquartile Range | | 0 | |
| | Skewness | | -2,055 | ,637 |
| | Kurtosis | | 2,640 | 1,232 |
| Q4before | Mean | | 7,75 | ,494 |
| | 95% Confidence Interval for Mean | Lower Bound | 6,66 | |
| | | Upper Bound | 8,84 | |
| | 5% Trimmed Mean | | 7,83 | |
| | Median | | 8,00 | |
| | Variance | | 2,932 | |
| | Std. Deviation | | 1,712 | |
| | Minimum | | 4 | |
| | Maximum | | 10 | |
| | Range | | 6 | |
| | Interquartile Range | | 3 | |
| | Skewness | | -,970 | ,637 |
| | Kurtosis | | ,591 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q5before | Mean | | 1,92 | ,514 |
| | 95% Confidence Interval for Mean | Lower Bound | ,78 | |
| | | Upper Bound | 3,05 | |
| | 5% Trimmed Mean | | 1,85 | |
| | Median | | 2,00 | |
| | Variance | | 3,174 | |
| | Std. Deviation | | 1,782 | |
| | Minimum | | 0 | |
| | Maximum | | 5 | |
| | Range | | 5 | |
| | Interquartile Range | | 3 | |
| | Skewness | | ,612 | ,637 |
| | Kurtosis | | -,341 | 1,232 |
| Q6before | Mean | | 2,00 | ,213 |
| | 95% Confidence Interval for Mean | Lower Bound | 1,53 | |
| | | Upper Bound | 2,47 | |
| | 5% Trimmed Mean | | 2,06 | |
| | Median | | 2,00 | |
| | Variance | | ,545 | |
| | Std. Deviation | | ,739 | |
| | Minimum | | 0 | |
| | Maximum | | 3 | |
| | Range | | 3 | |
| | Interquartile Range | | 0 | |
| | Skewness | | -1,625 | ,637 |
| | Kurtosis | | 5,500 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q7before | Mean | | 5,17 | ,601 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,84 | |
| | | Upper Bound | 6,49 | |
| | 5% Trimmed Mean | | 5,02 | |
| | Median | | 5,00 | |
| | Variance | | 4,333 | |
| | Std. Deviation | | 2,082 | |
| | Minimum | | 3 | |
| | Maximum | | 10 | |
| | Range | | 7 | |
| | Interquartile Range | | 3 | |
| | Skewness | | 1,259 | ,637 |
| | Kurtosis | | 1,662 | 1,232 |
| Q8before | Mean | | 3,42 | ,229 |
| | 95% Confidence Interval for Mean | Lower Bound | 2,91 | |
| | | Upper Bound | 3,92 | |
| | 5% Trimmed Mean | | 3,35 | |
| | Median | | 3,00 | |
| | Variance | | ,629 | |
| | Std. Deviation | | ,793 | |
| | Minimum | | 3 | |
| | Maximum | | 5 | |
| | Range | | 2 | |
| | Interquartile Range | | 1 | |
| | Skewness | | 1,638 | ,637 |
| | Kurtosis | | 1,130 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q1after | Mean | | 6,58 | ,583 |
| | 95% Confidence Interval for Mean | Lower Bound | 5,30 | |
| | | Upper Bound | 7,87 | |
| | 5% Trimmed Mean | | 6,65 | |
| | Median | | 7,00 | |
| | Variance | | 4,083 | |
| | Std. Deviation | | 2,021 | |
| | Minimum | | 2 | |
| | Maximum | | 10 | |
| | Range | | 8 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,899 | ,637 |
| | Kurtosis | | 1,926 | 1,232 |
| Q2after | Mean | | 8,83 | ,297 |
| | 95% Confidence Interval for Mean | Lower Bound | 8,18 | |
| | | Upper Bound | 9,49 | |
| | 5% Trimmed Mean | | 8,87 | |
| | Median | | 9,00 | |
| | Variance | | 1,061 | |
| | Std. Deviation | | 1,030 | |
| | Minimum | | 7 | |
| | Maximum | | 10 | |
| | Range | | 3 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,211 | ,637 |
| | Kurtosis | | -1,142 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q3after | Mean | | 9,75 | ,131 |
| | 95% Confidence Interval for Mean | Lower Bound | 9,46 | |
| | | Upper Bound | 10,04 | |
| | 5% Trimmed Mean | | 9,78 | |
| | Median | | 10,00 | |
| | Variance | | ,205 | |
| | Std. Deviation | | ,452 | |
| | Minimum | | 9 | |
| | Maximum | | 10 | |
| | Range | | 1 | |
| | Interquartile Range | | 1 | |
| | Skewness | | -1,327 | ,637 |
| | Kurtosis | | -,326 | 1,232 |
| Q4after | Mean | | 8,17 | ,366 |
| | 95% Confidence Interval for Mean | Lower Bound | 7,36 | |
| | | Upper Bound | 8,97 | |
| | 5% Trimmed Mean | | 8,19 | |
| | Median | | 8,50 | |
| | Variance | | 1,606 | |
| | Std. Deviation | | 1,267 | |
| | Minimum | | 6 | |
| | Maximum | | 10 | |
| | Range | | 4 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,691 | ,637 |
| | Kurtosis | | -,390 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q5after | Mean | | 3,58 | ,452 |
| | 95% Confidence Interval for Mean | Lower Bound | 2,59 | |
| | | Upper Bound | 4,58 | |
| | 5% Trimmed Mean | | 3,59 | |
| | Median | | 4,00 | |
| | Variance | | 2,447 | |
| | Std. Deviation | | 1,564 | |
| | Minimum | | 1 | |
| | Maximum | | 6 | |
| | Range | | 5 | |
| | Interquartile Range | | 3 | |
| | Skewness | | -,185 | ,637 |
| | Kurtosis | | -1,144 | 1,232 |
| Q6after | Mean | | 3,67 | ,225 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,17 | |
| | | Upper Bound | 4,16 | |
| | 5% Trimmed Mean | | 3,69 | |
| | Median | | 4,00 | |
| | Variance | | ,606 | |
| | Std. Deviation | | ,778 | |
| | Minimum | | 2 | |
| | Maximum | | 5 | |
| | Range | | 3 | |
| | Interquartile Range | | 1 | |
| | Skewness | | -,668 | ,637 |
| | Kurtosis | | ,924 | 1,232 |

**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Q7after | Mean | | 5,58 | ,529 |
| | 95% Confidence Interval for Mean | Lower Bound | 4,42 | |
| | | Upper Bound | 6,75 | |
| | 5% Trimmed Mean | | 5,43 | |
| | Median | | 5,00 | |
| | Variance | | 3,356 | |
| | Std. Deviation | | 1,832 | |
| | Minimum | | 4 | |
| | Maximum | | 10 | |
| | Range | | 6 | |
| | Interquartile Range | | 2 | |
| | Skewness | | 1,597 | ,637 |
| | Kurtosis | | 2,097 | 1,232 |
| Q8after | Mean | | 4,17 | ,322 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,46 | |
| | | Upper Bound | 4,87 | |
| | 5% Trimmed Mean | | 4,19 | |
| | Median | | 4,00 | |
| | Variance | | 1,242 | |
| | Std. Deviation | | 1,115 | |
| | Minimum | | 2 | |
| | Maximum | | 6 | |
| | Range | | 4 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -,385 | ,637 |
| | Kurtosis | | -,055 | 1,232 |

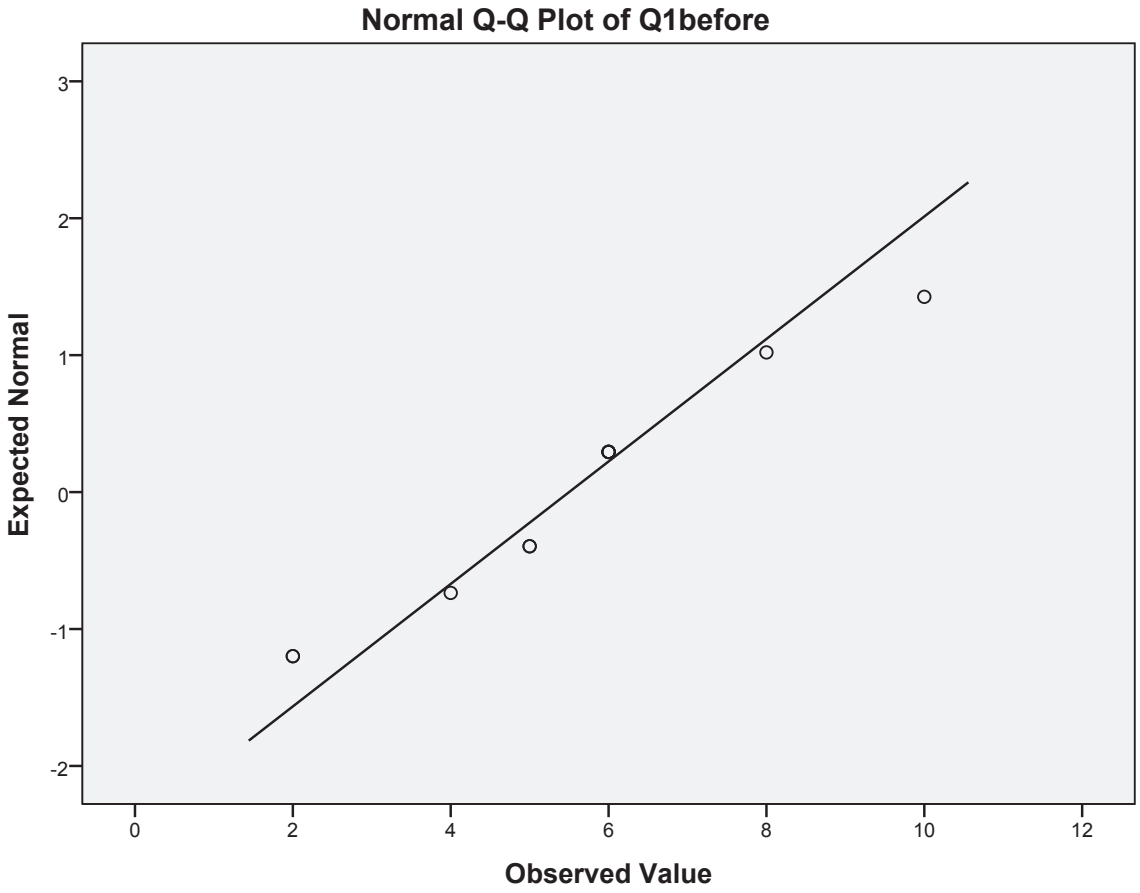
**Tests of Normality**

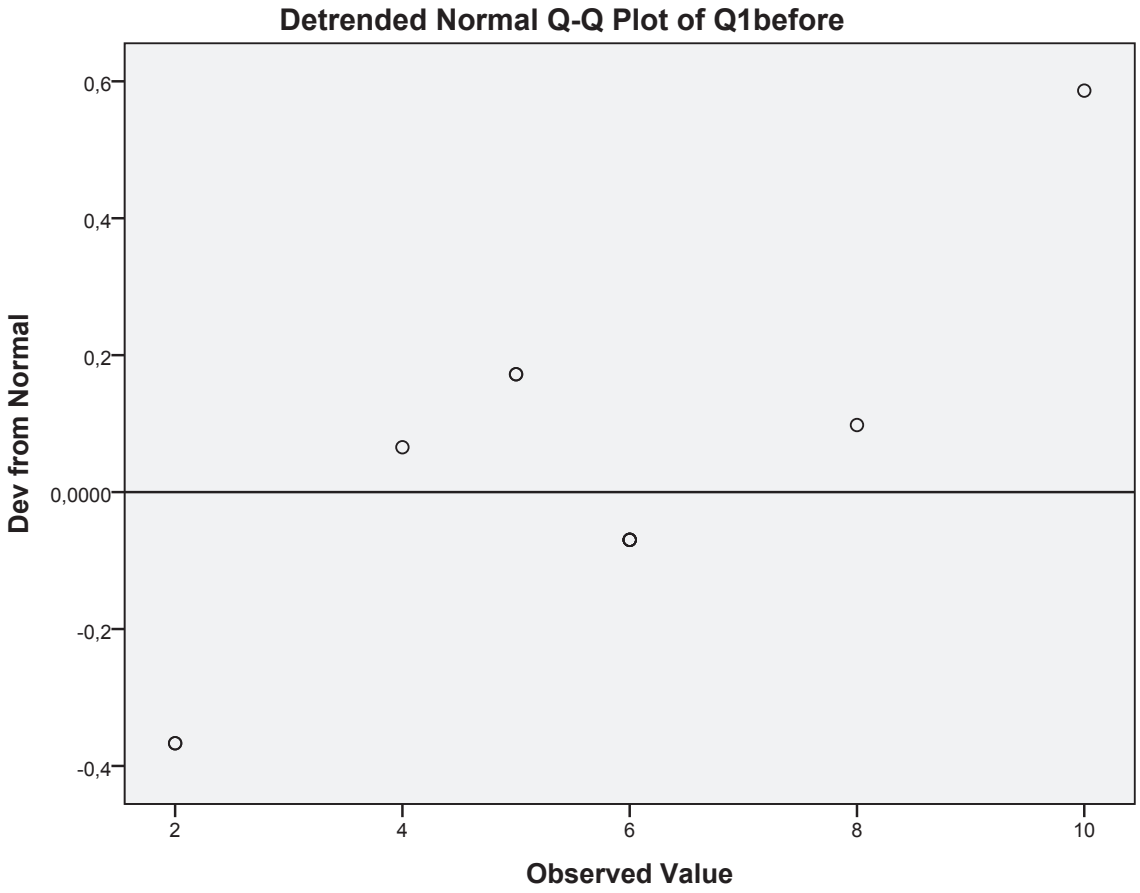
| | Kolmogorov-Smirnov [a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Q1before | ,245 | 12 | ,045 | ,915 | 12 | ,250 |
| Q2before | ,185 | 12 | ,200* | ,858 | 12 | ,046 |
| Q3before | ,499 | 12 | ,000 | ,465 | 12 | ,000 |
| Q4before | ,225 | 12 | ,096 | ,903 | 12 | ,173 |
| Q5before | ,231 | 12 | ,076 | ,842 | 12 | ,029 |
| Q6before | ,417 | 12 | ,000 | ,650 | 12 | ,000 |
| Q7before | ,282 | 12 | ,009 | ,848 | 12 | ,035 |
| Q8before | ,450 | 12 | ,000 | ,575 | 12 | ,000 |
| Q1after | ,248 | 12 | ,039 | ,894 | 12 | ,134 |
| Q2after | ,207 | 12 | ,163 | ,870 | 12 | ,066 |
| Q3after | ,460 | 12 | ,000 | ,552 | 12 | ,000 |
| Q4after | ,245 | 12 | ,046 | ,878 | 12 | ,082 |
| Q5after | ,188 | 12 | ,200* | ,932 | 12 | ,397 |
| Q6after | ,332 | 12 | ,001 | ,841 | 12 | ,029 |
| Q7after | ,375 | 12 | ,000 | ,766 | 12 | ,004 |
| Q8after | ,191 | 12 | ,200* | ,935 | 12 | ,440 |

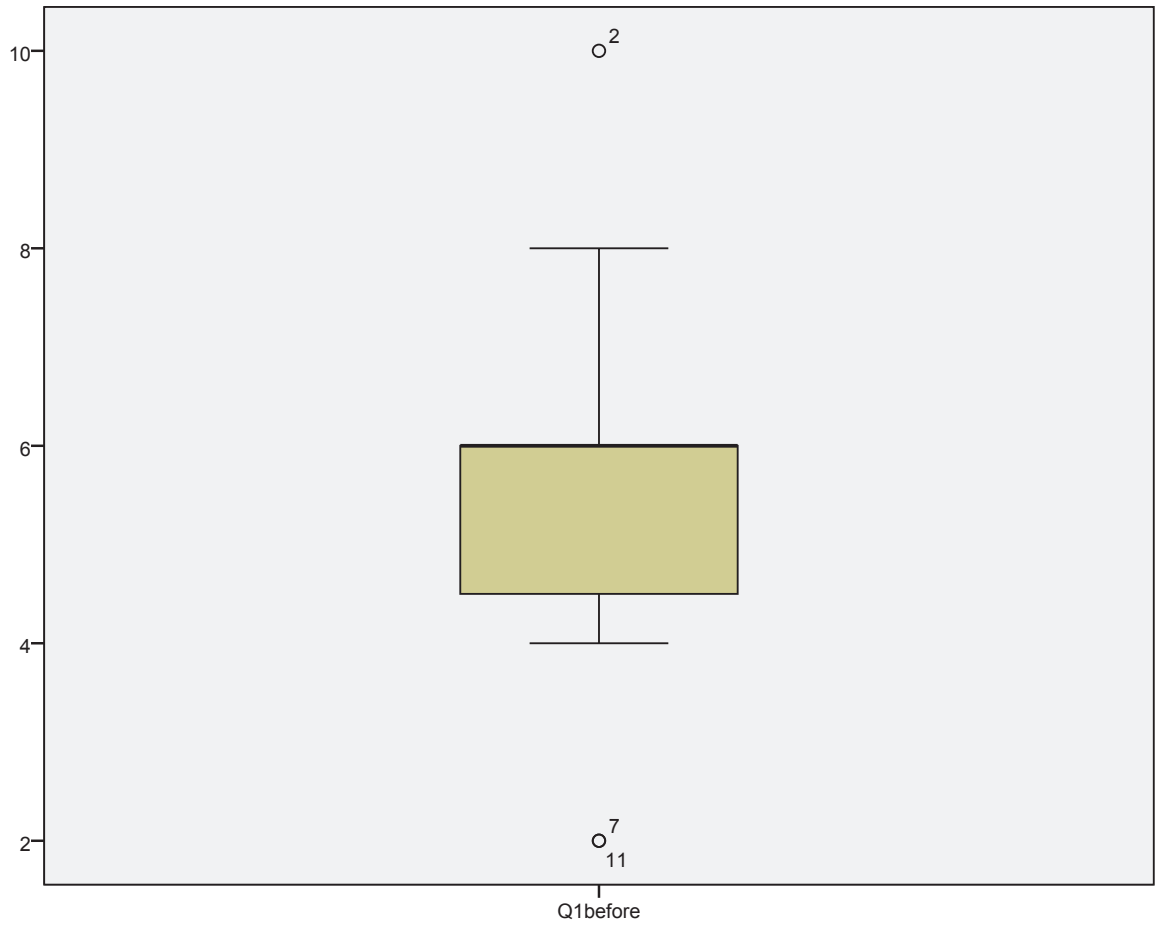
a. Lilliefors Significance Correction
*. This is a lower bound of the true significance.

## Q1before

```
Q1before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     2.00 Extremes    (=<2.0)
     1.00         4 .  0
     2.00         5 .  00
     5.00         6 .  00000
      .00         7 .
     1.00         8 .  0
     1.00 Extremes    (>=10.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

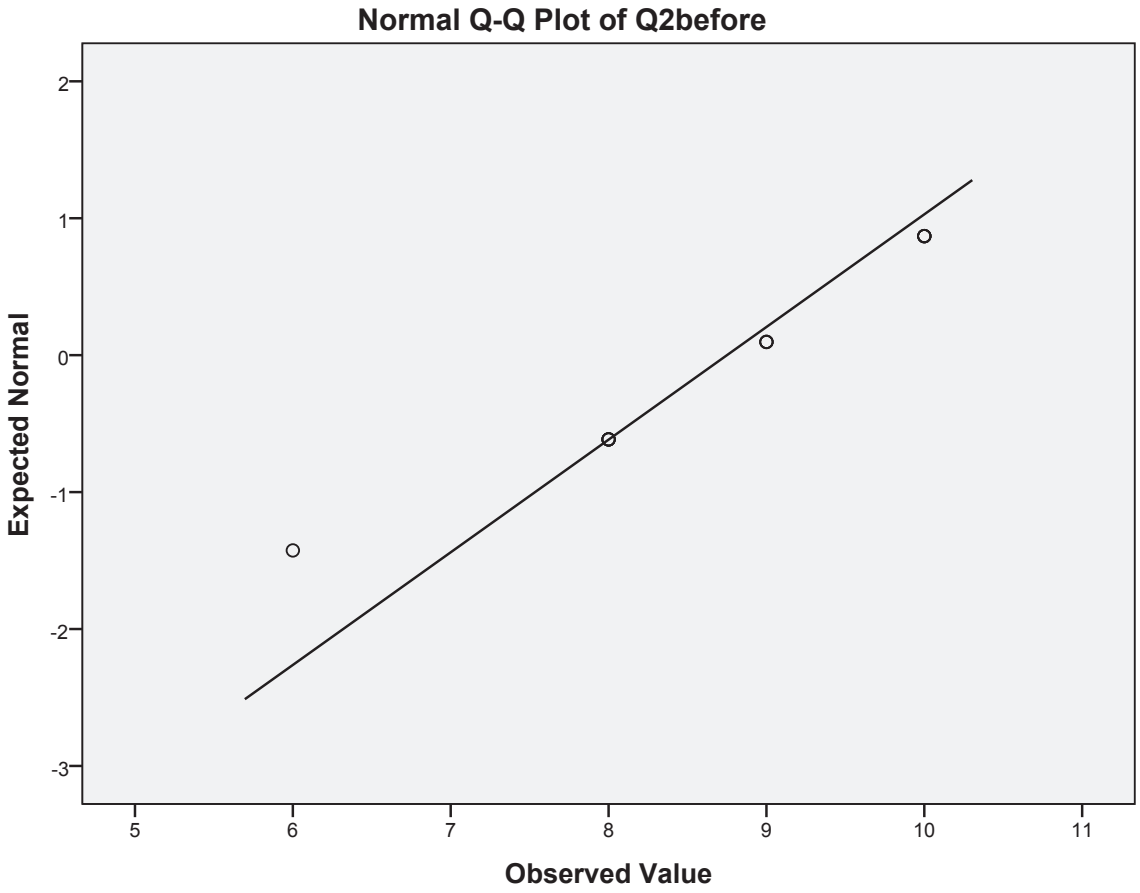

Normal Q-Q Plot of Q1before
Expected Normal
3
2
1
0
-1
-2
0
2
4
6
8
10
12
Observed Value

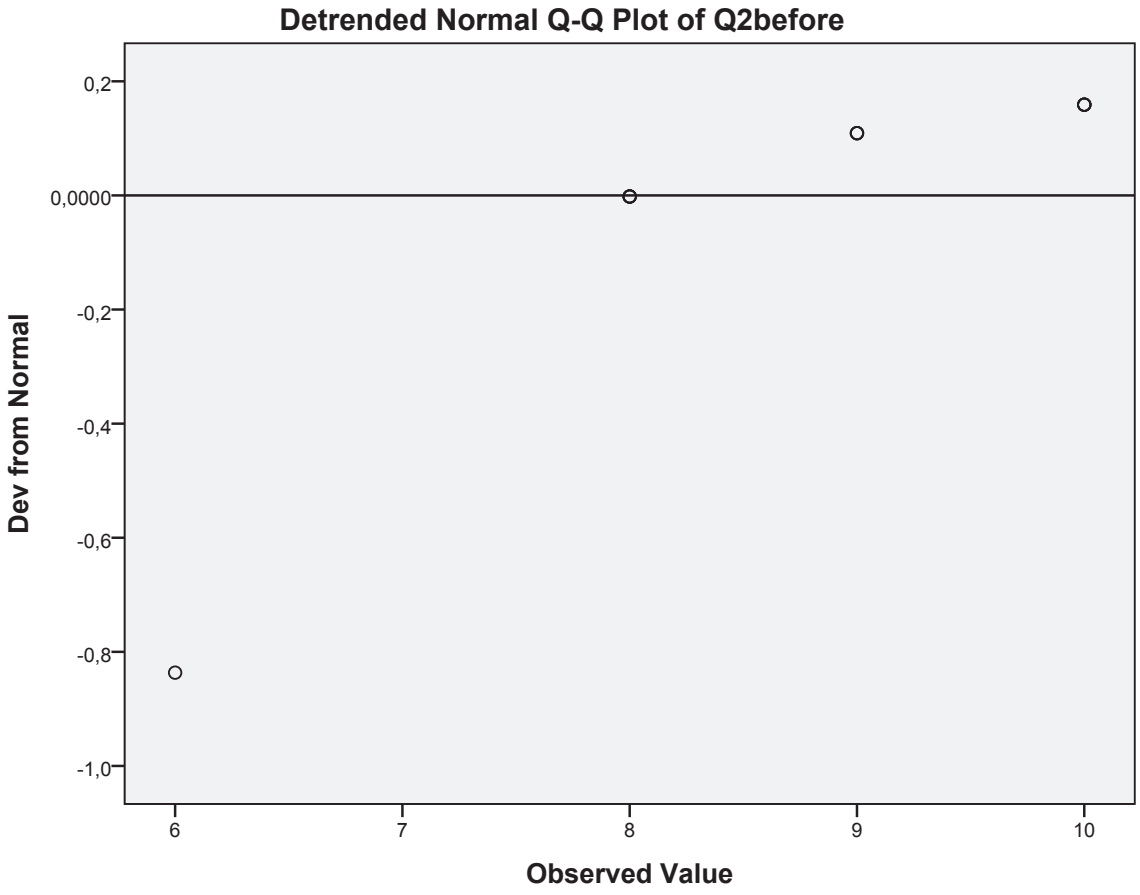

Detrended Normal Q-Q Plot of Q1before
Dev from Normal
0,6
0,4
0,2
0,0000
-0,2
-0,4
2
4
6
8
10
Observed Value

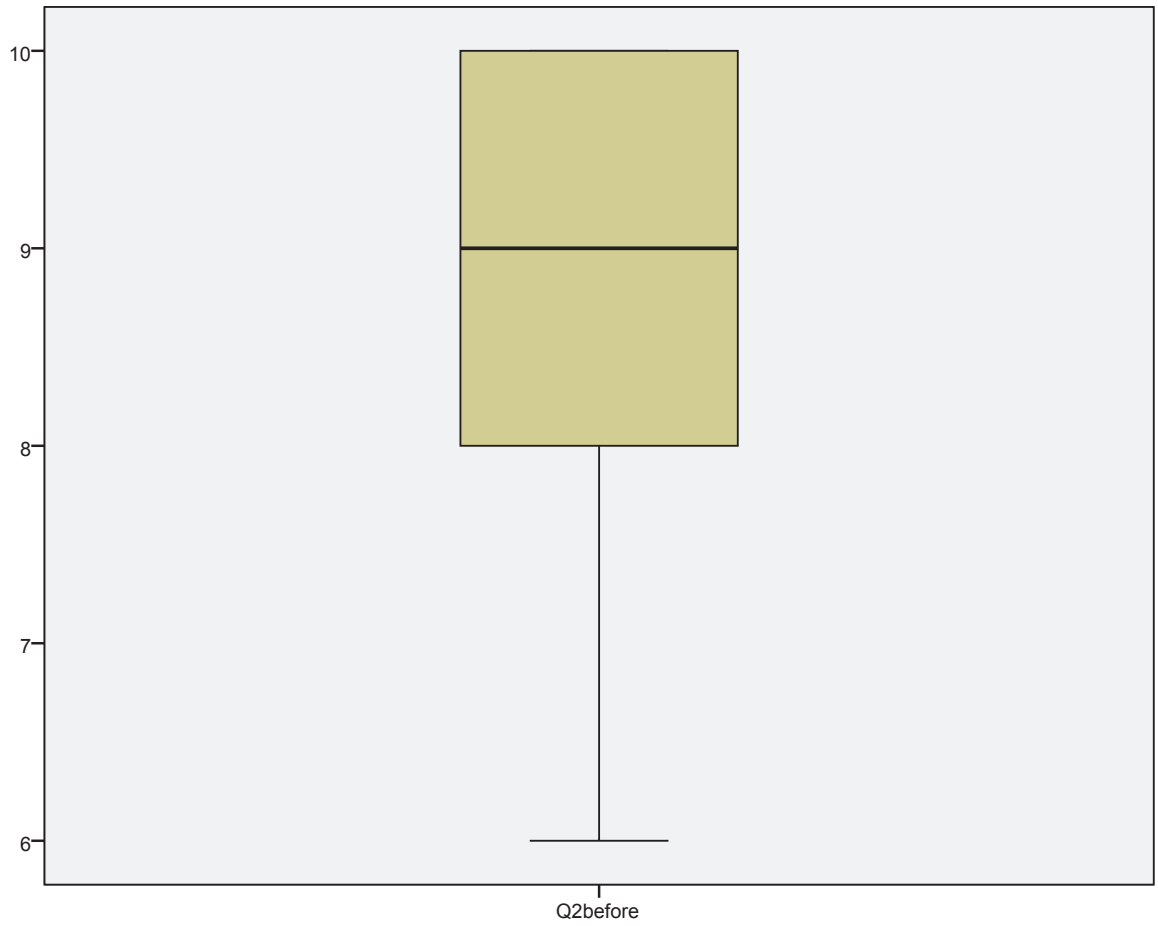



## Q2before

```
Q2before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        6 .  0
      .00        7 .
     4.00        8 .  0000
     3.00        9 .  000
     4.00       10 .  0000

 Stem width:         1
 Each leaf:       1 case(s)
```

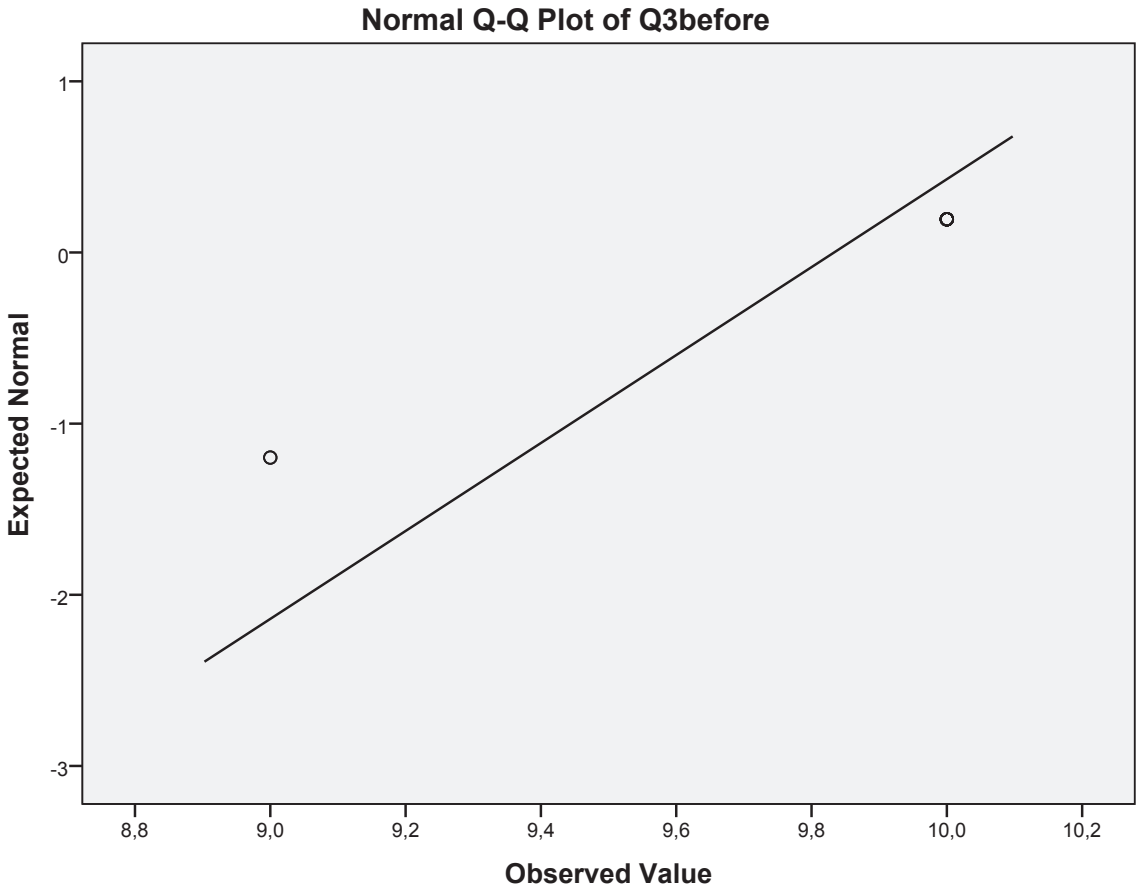

Normal Q-Q Plot of Q2before
Expected Normal
2
1
0
-1
-2
-3
5
6
7
8
9
10
11
Observed Value

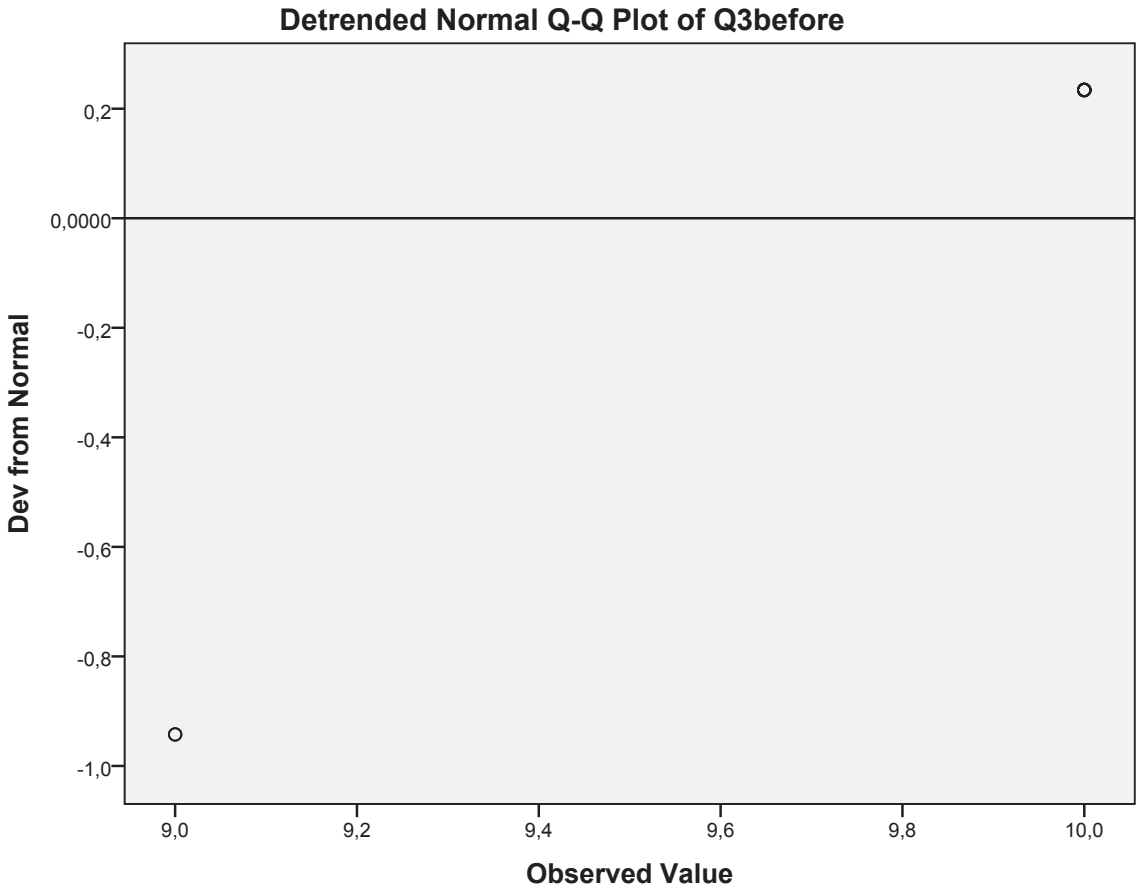

Detrended Normal Q-Q Plot of Q2before
Dev from Normal
0,2
0,0000
-0,2
-0,4
-0,6
-0,8
-1,0
6
7
8
9
10
Observed Value

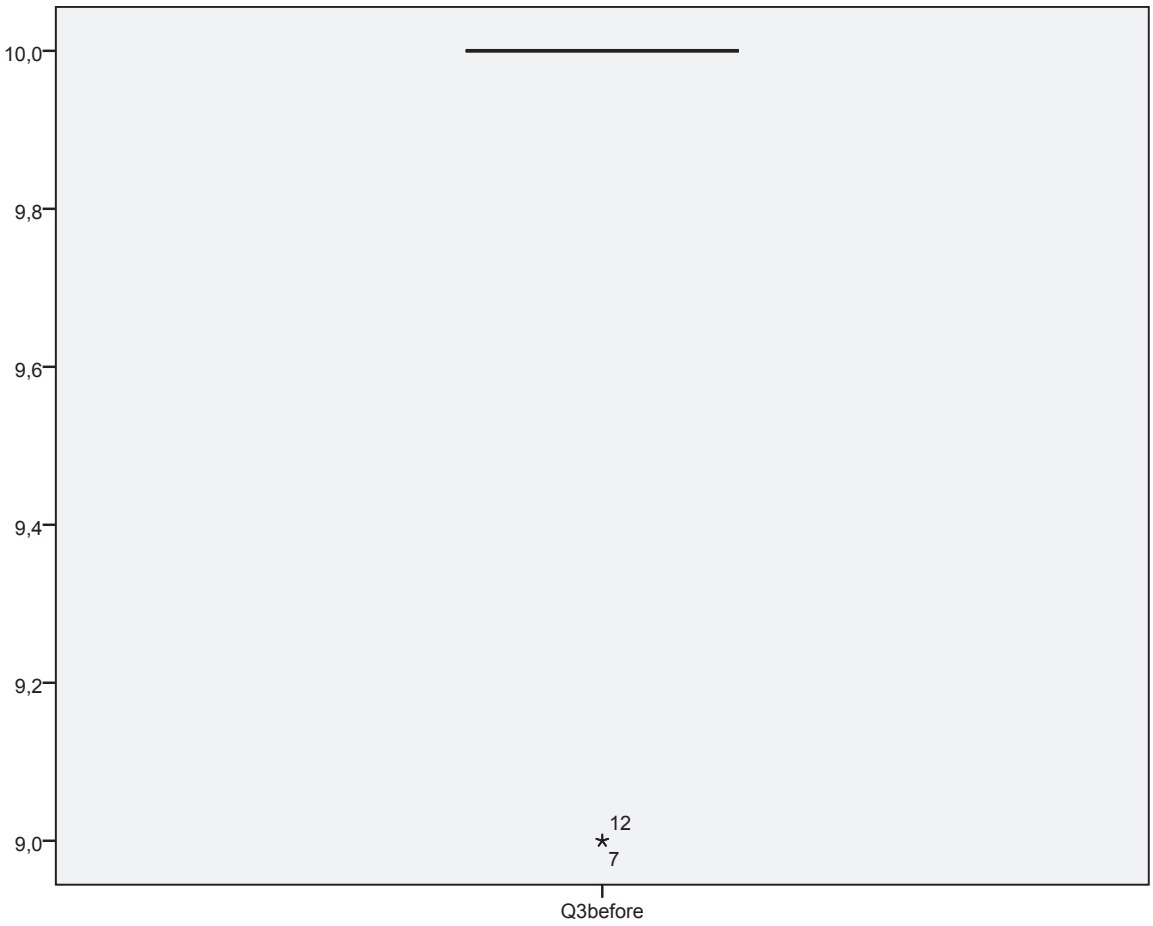



## Q3before

```
Q3before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     2.00 Extremes    (=<9)
    10.00        1 .  0000000000

 Stem width:        10
 Each leaf:       1 case(s)
```

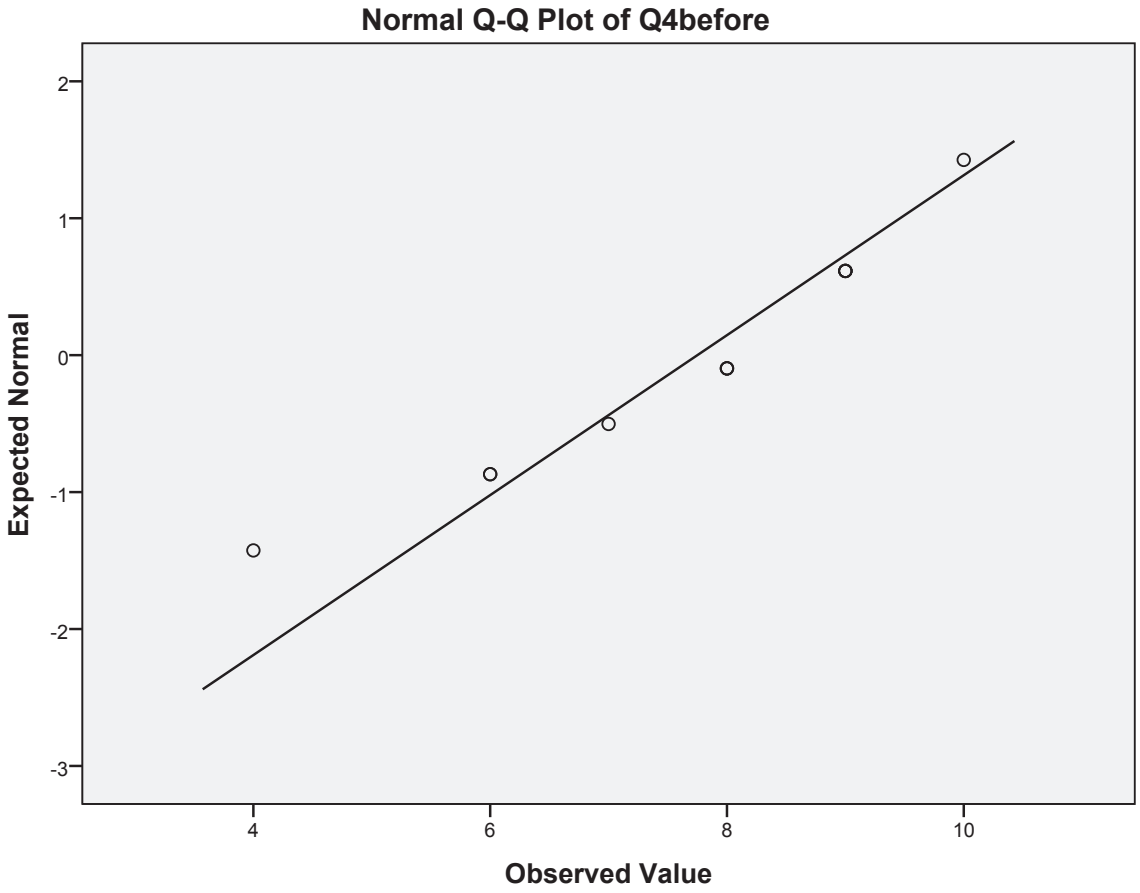

Normal Q-Q Plot of Q3before
Expected Normal
1
0
-1
-2
-3
8,8
9,0
9,2
9,4
9,6
9,8
10,0
10,2
Observed Value

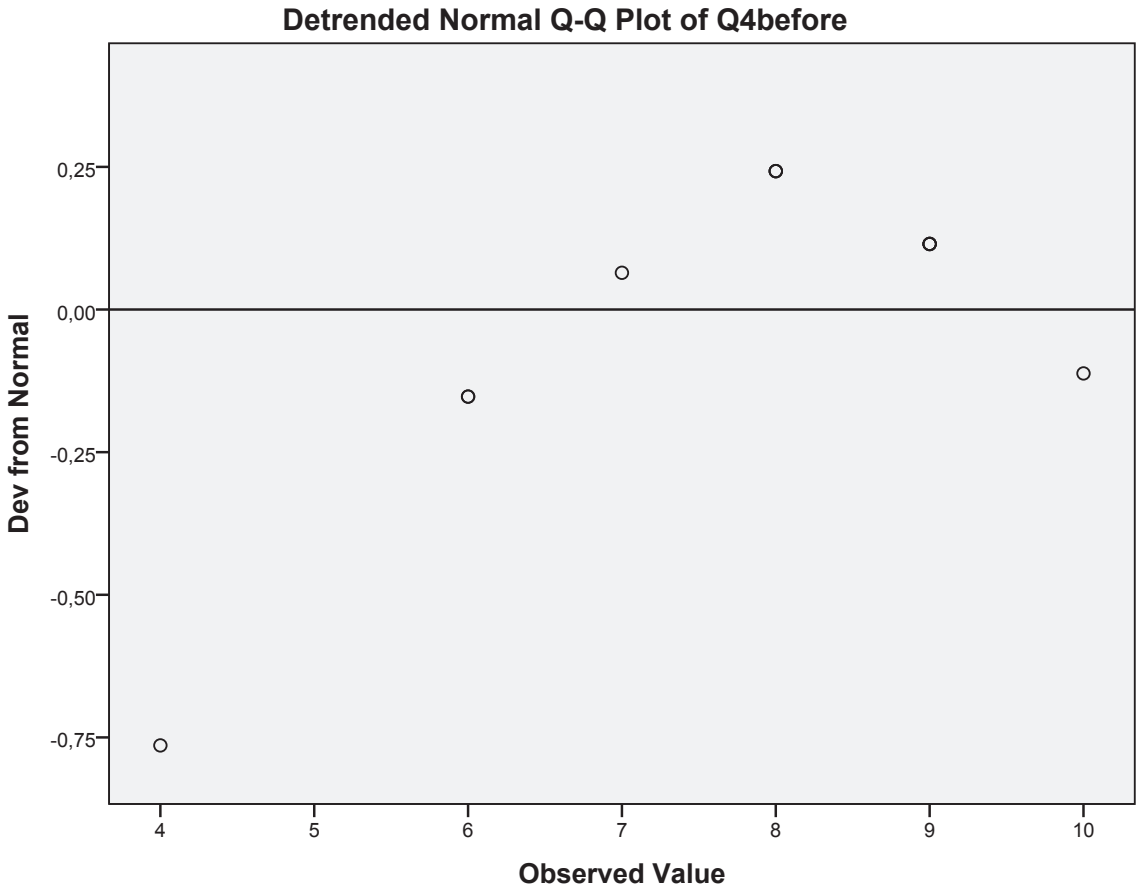

Detrended Normal Q-Q Plot of Q3before
Dev from Normal
0,2
0,0000
-0,2
-0,4
-0,6
-0,8
-1,0
9,0
9,2
9,4
9,6
9,8
10,0
Observed Value

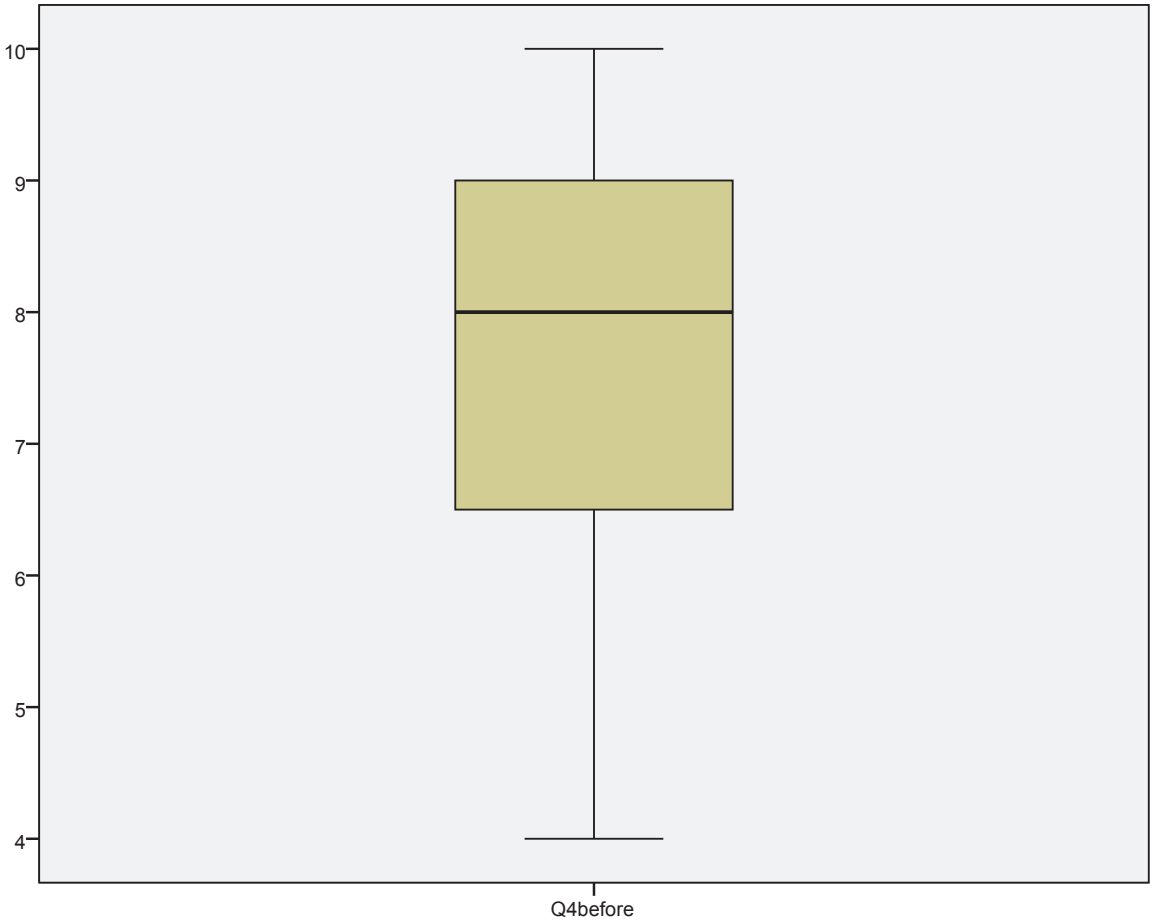



## Q4before

```
Q4before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        0 .  4
    10.00        0 .  6678889999
     1.00        1 .  0

 Stem width:        10
 Each leaf:       1 case(s)
```

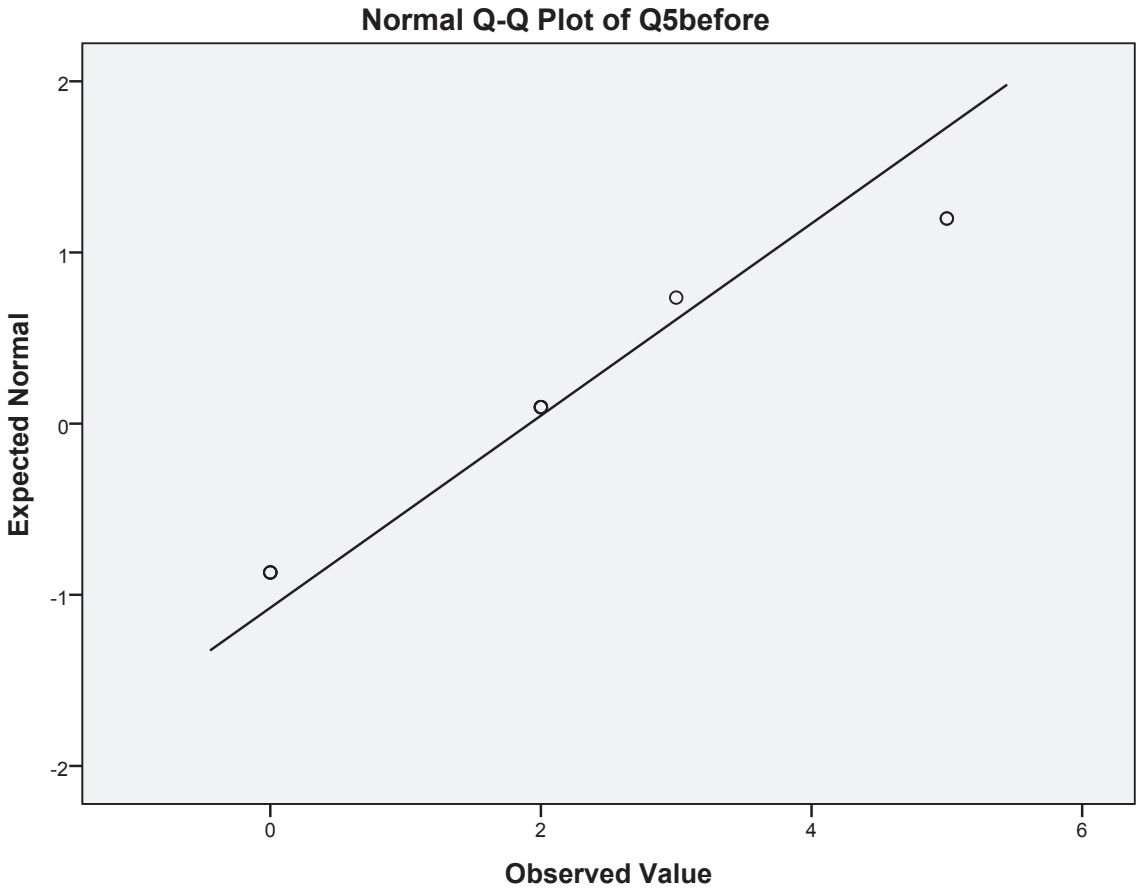

Normal Q-Q Plot of Q4before
Expected Normal
2
1
0
-1
-2
-3
4
6
8
10
Observed Value

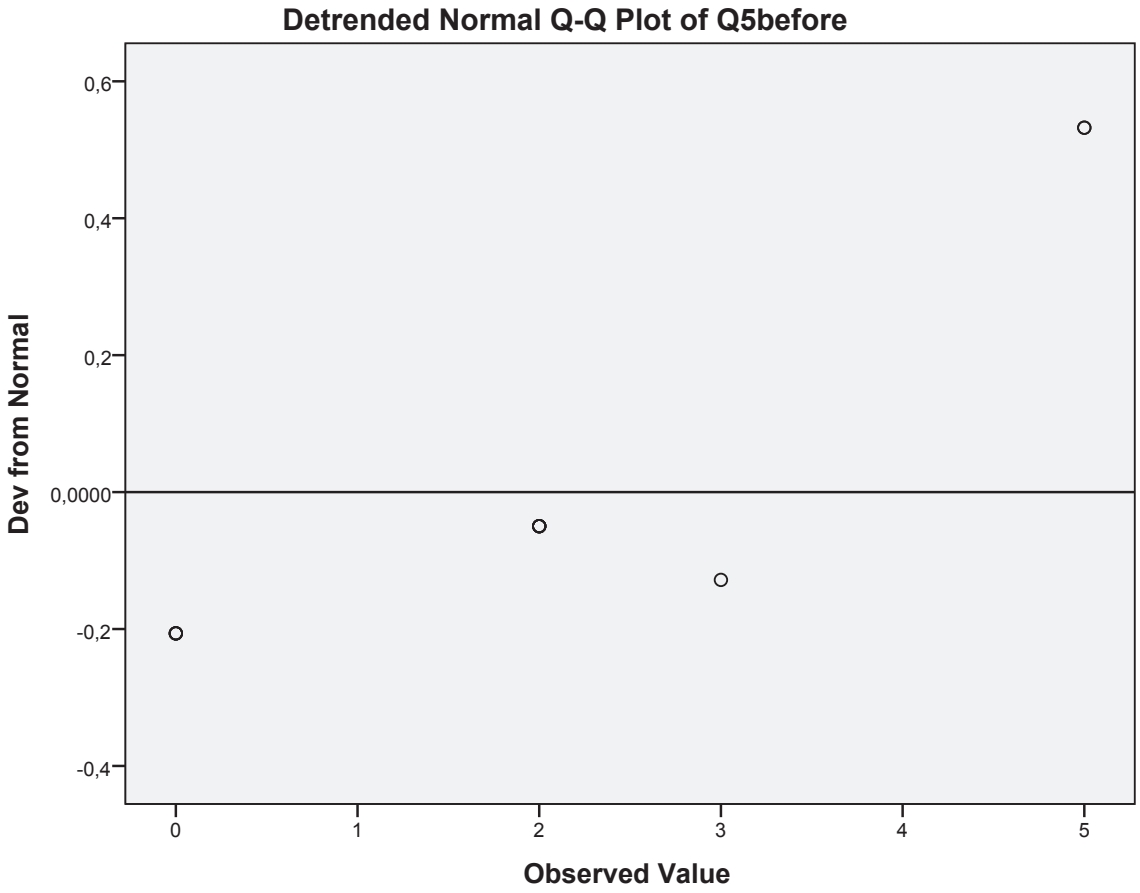

Detrended Normal Q-Q Plot of Q4before
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
4
5
6
7
8
9
10
Observed Value




## Q5before

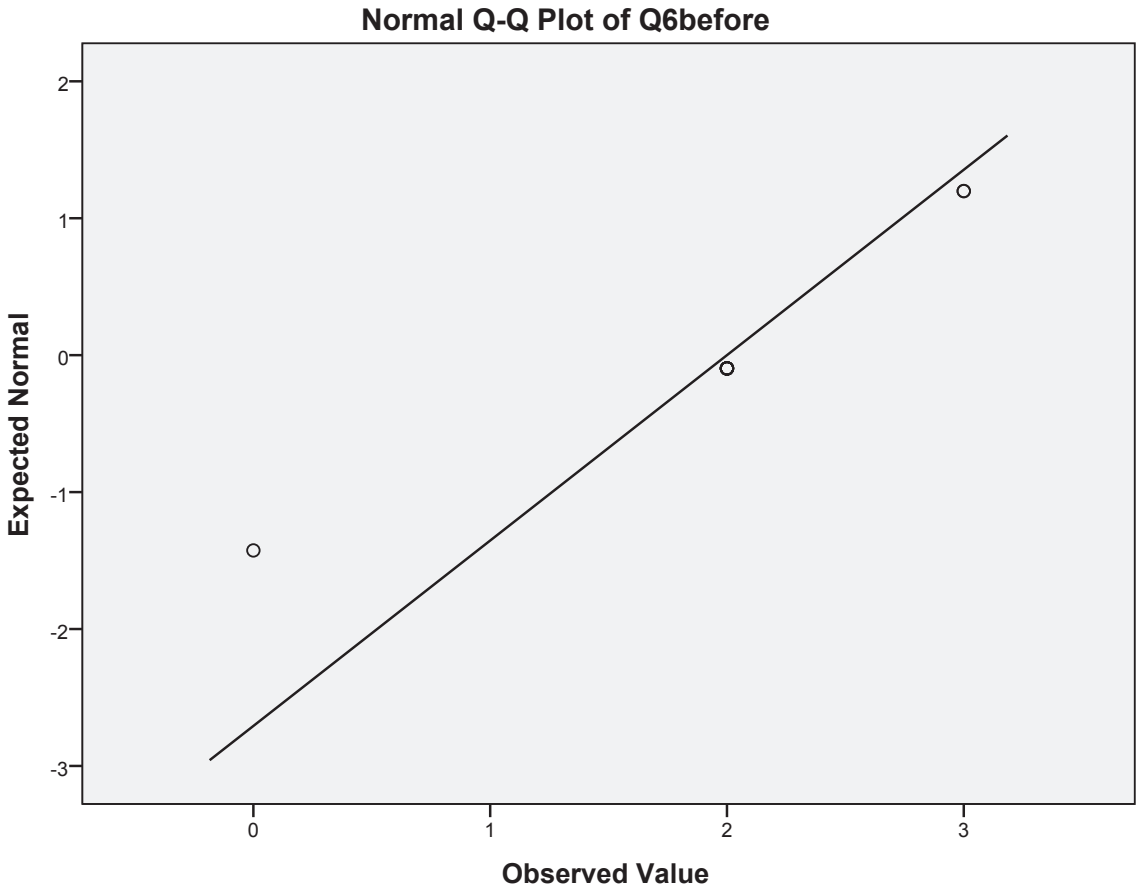
```
Q5before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     4.00        0 .  0000
      .00        1 .
     5.00        2 .  00000
     1.00        3 .  0
      .00        4 .
     2.00        5 .  00

 Stem width:         1
 Each leaf:       1 case(s)
```

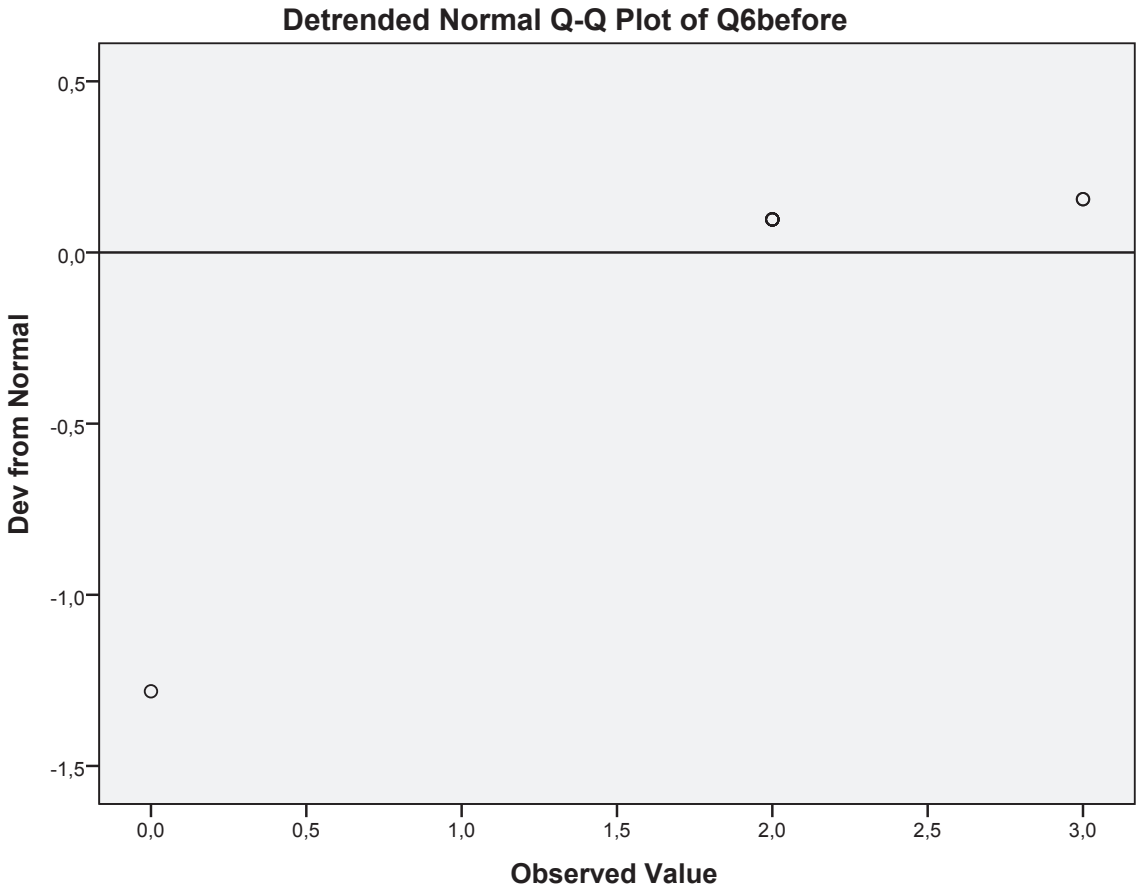

Normal Q-Q Plot of Q5before
Expected Normal
2
1
0
-1
-2
0
2
4
6
Observed Value

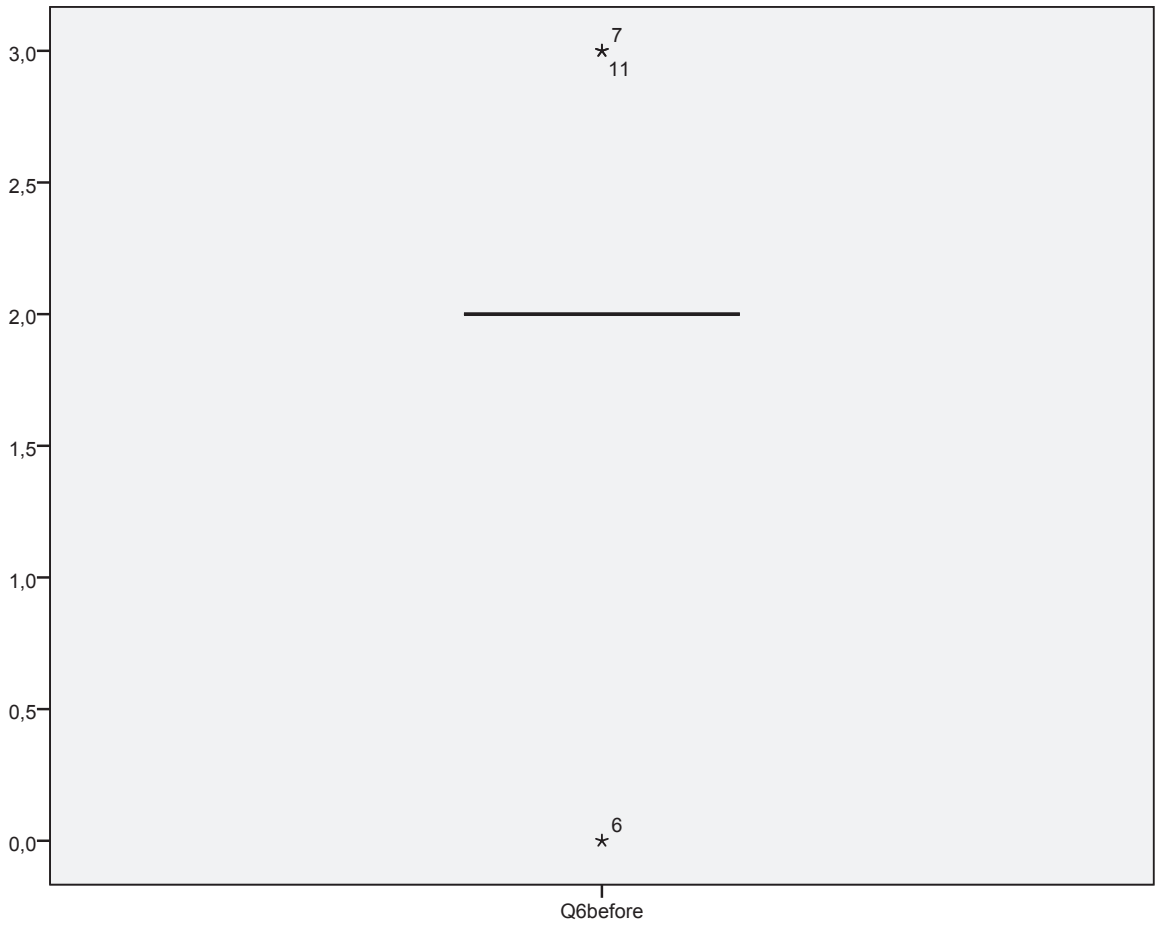

Detrended Normal Q-Q Plot of Q5before
Dev from Normal
0,6
0,4
0,2
0,0000
-0,2
-0,4
0
1
2
3
4
5
Observed Value


## Q6before

```
Q6before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00 Extremes    (=<0)
      .00        0 .
     9.00        0 .  222222222
     2.00 Extremes    (>=3)

 Stem width:        10
 Each leaf:       1 case(s)
```

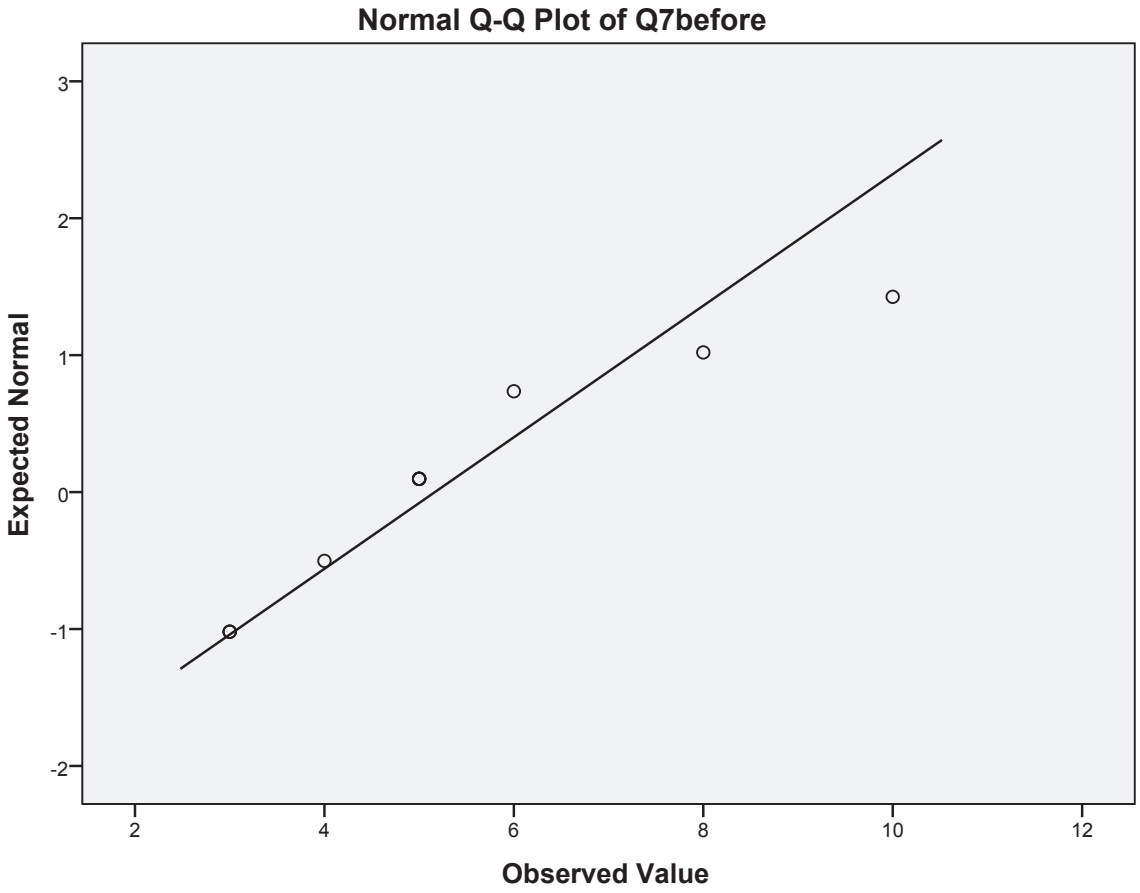

Normal Q-Q Plot of Q6before
Expected Normal
2
1
0
-1
-2
-3
0
1
2
3
Observed Value

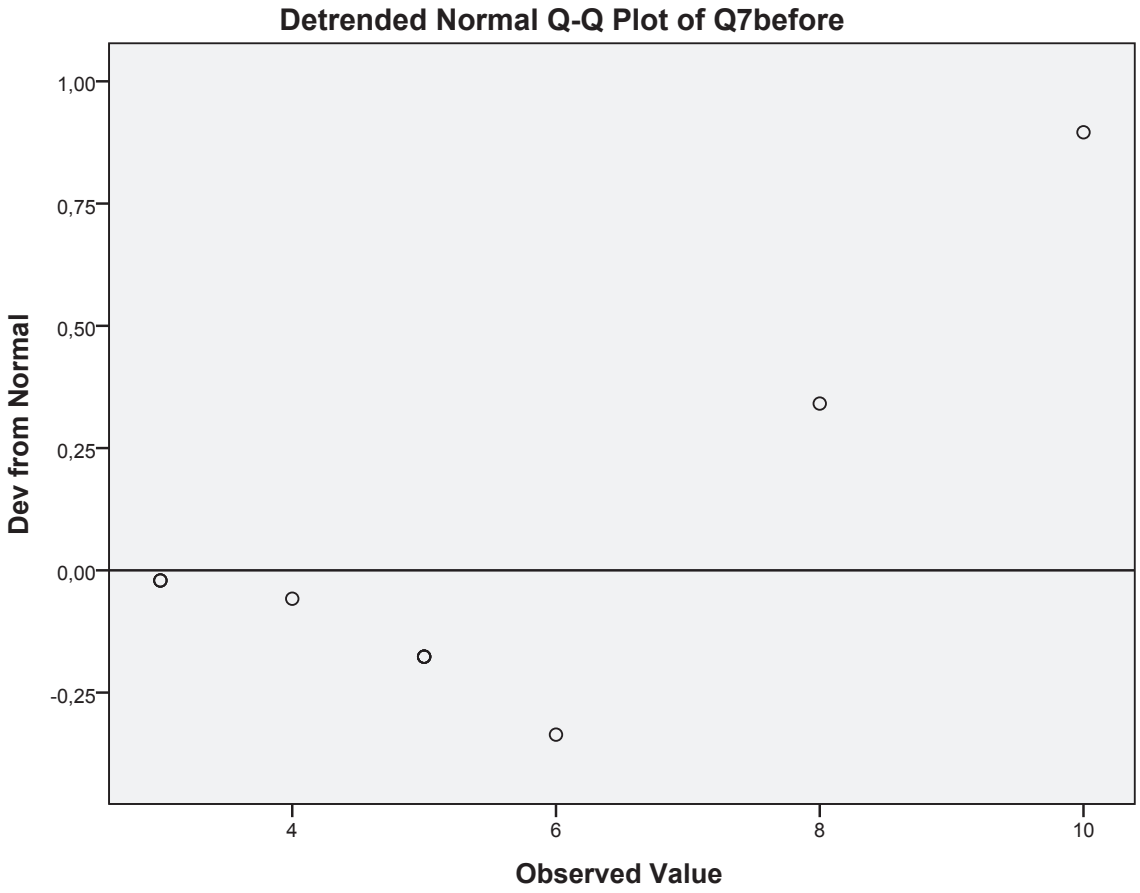

Detrended Normal Q-Q Plot of Q6before
Dev from Normal
0,5
0,0
-0,5
-1,0
-1,5
0,0
0,5
1,0
1,5
2,0
2,5
3,0
Observed Value

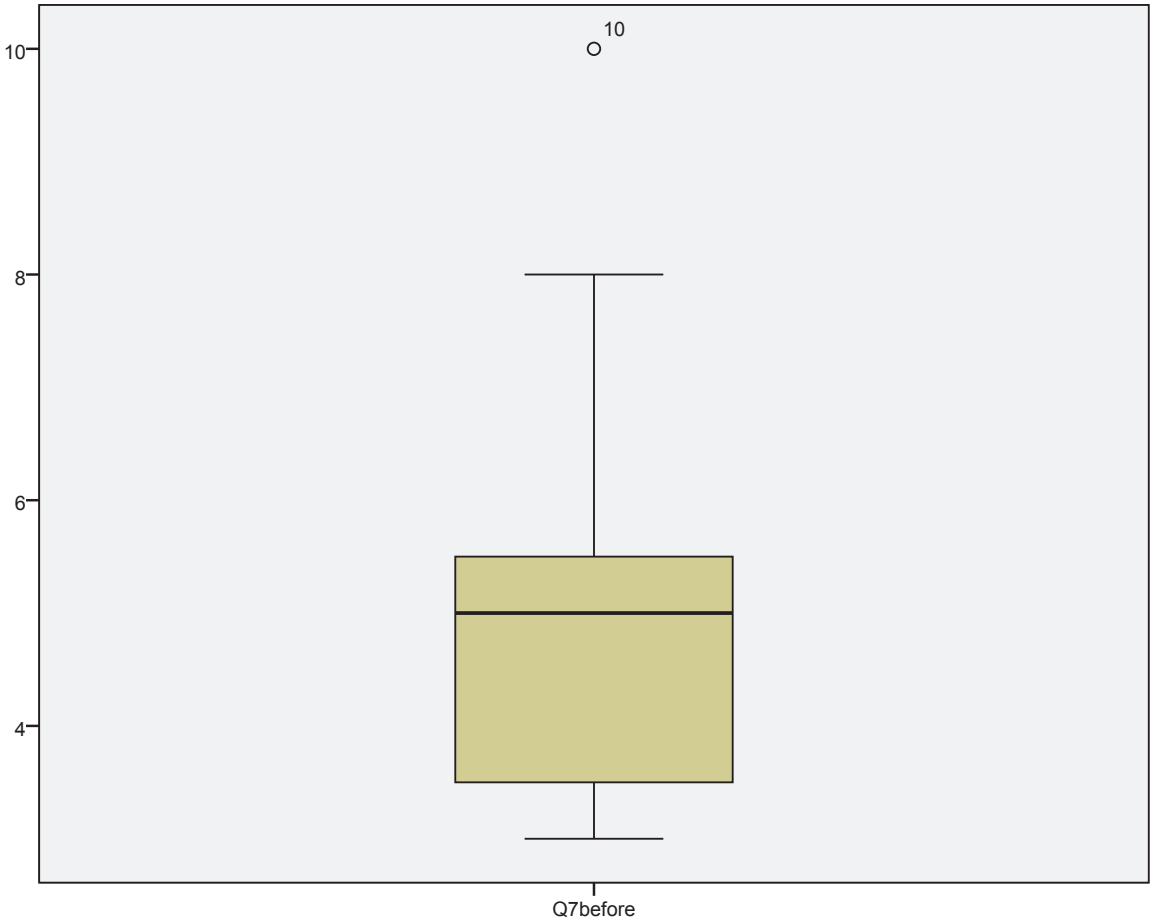



## Q7before

```
Q7before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     3.00        3 .  000
     1.00        4 .  0
     5.00        5 .  00000
     1.00        6 .  0
      .00        7 .
     1.00        8 .  0
     1.00 Extremes    (>=10.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

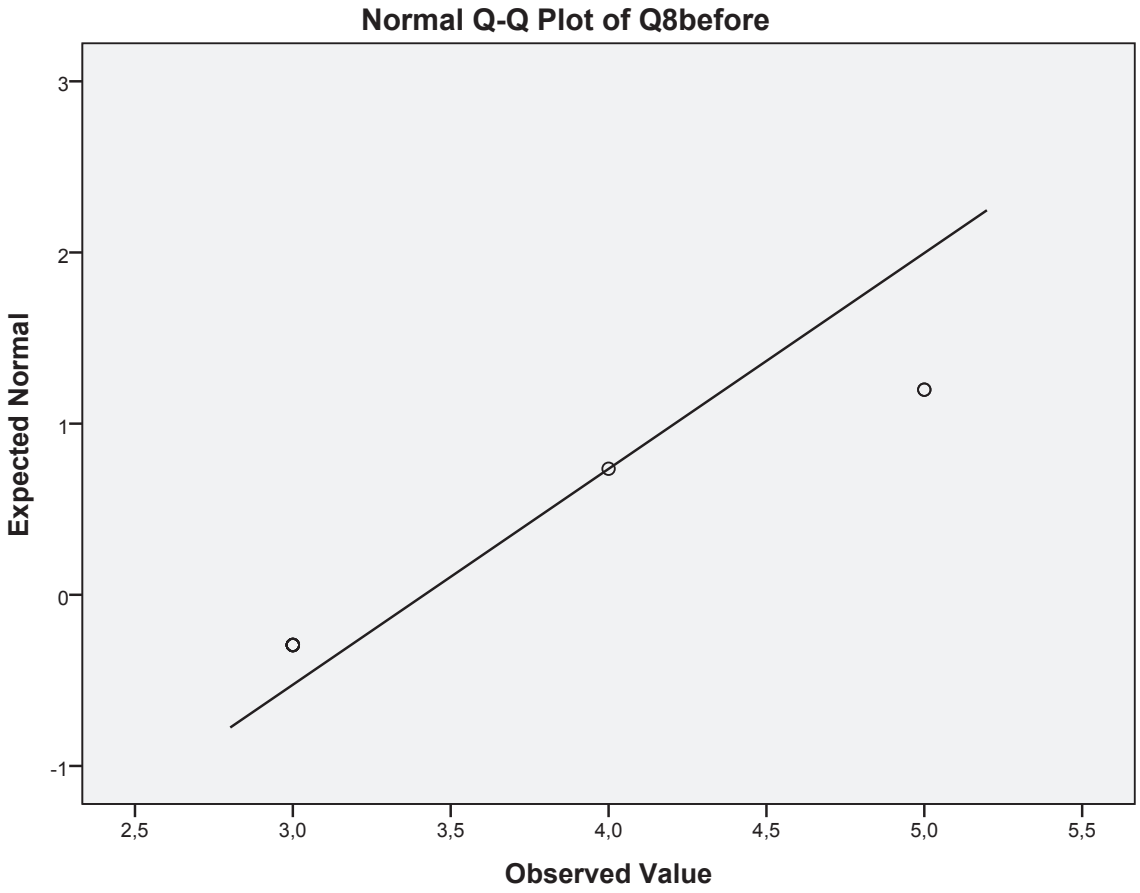

Normal Q-Q Plot of Q7before
Expected Normal
3
2
1
0
-1
-2
2
4
6
8
10
12
Observed Value

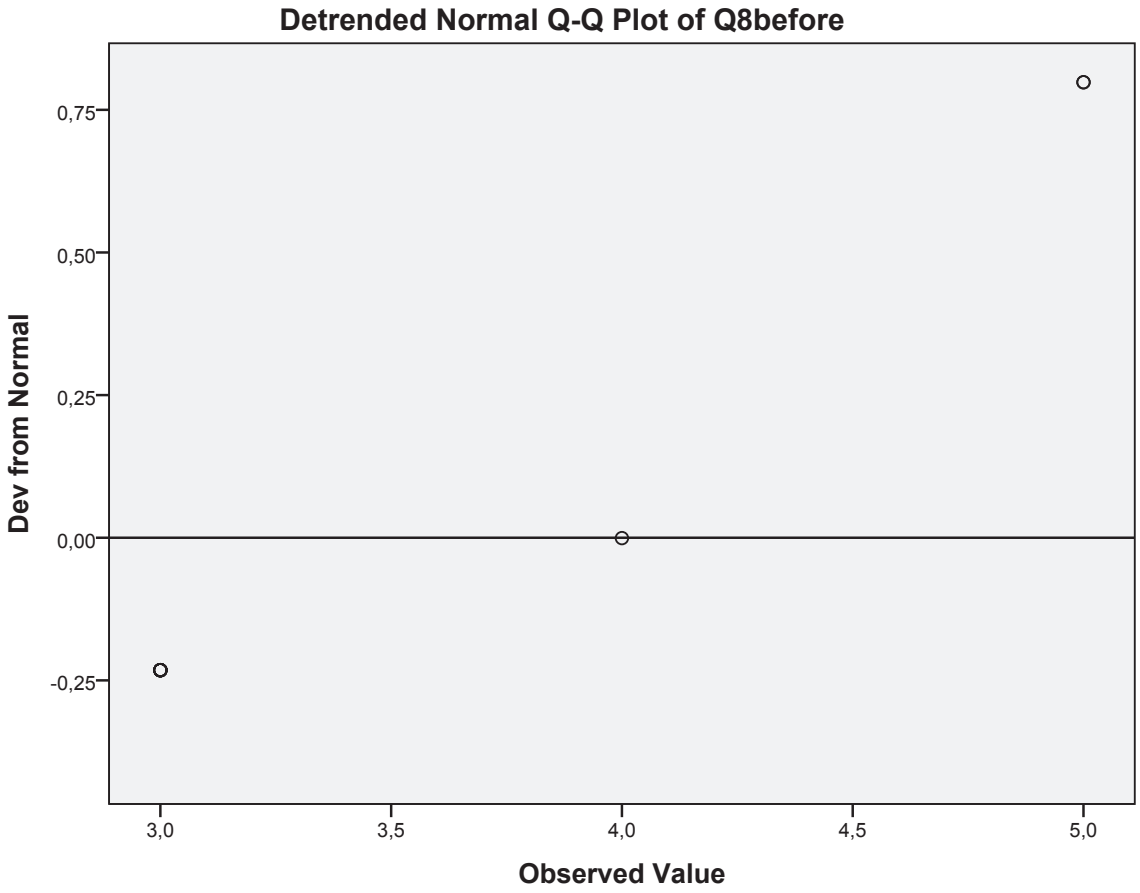

Detrended Normal Q-Q Plot of Q7before
Dev from Normal
1,00
0,75
0,50
0,25
0,00
-0,25
4
6
8
10
Observed Value

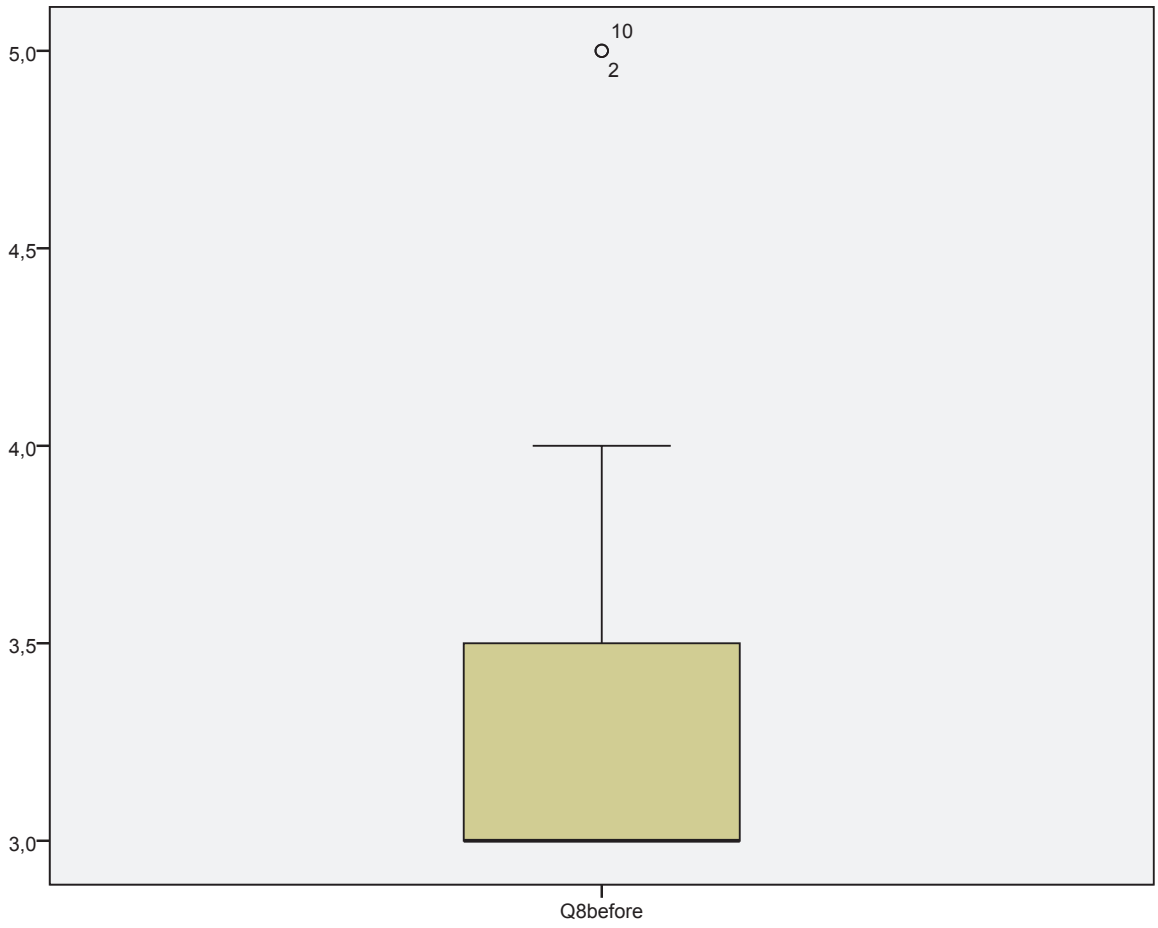



## Q8before

```
Q8before Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     9.00        3 .  000000000
      .00        3 .
     1.00        4 .  0
     2.00 Extremes    (>=5.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

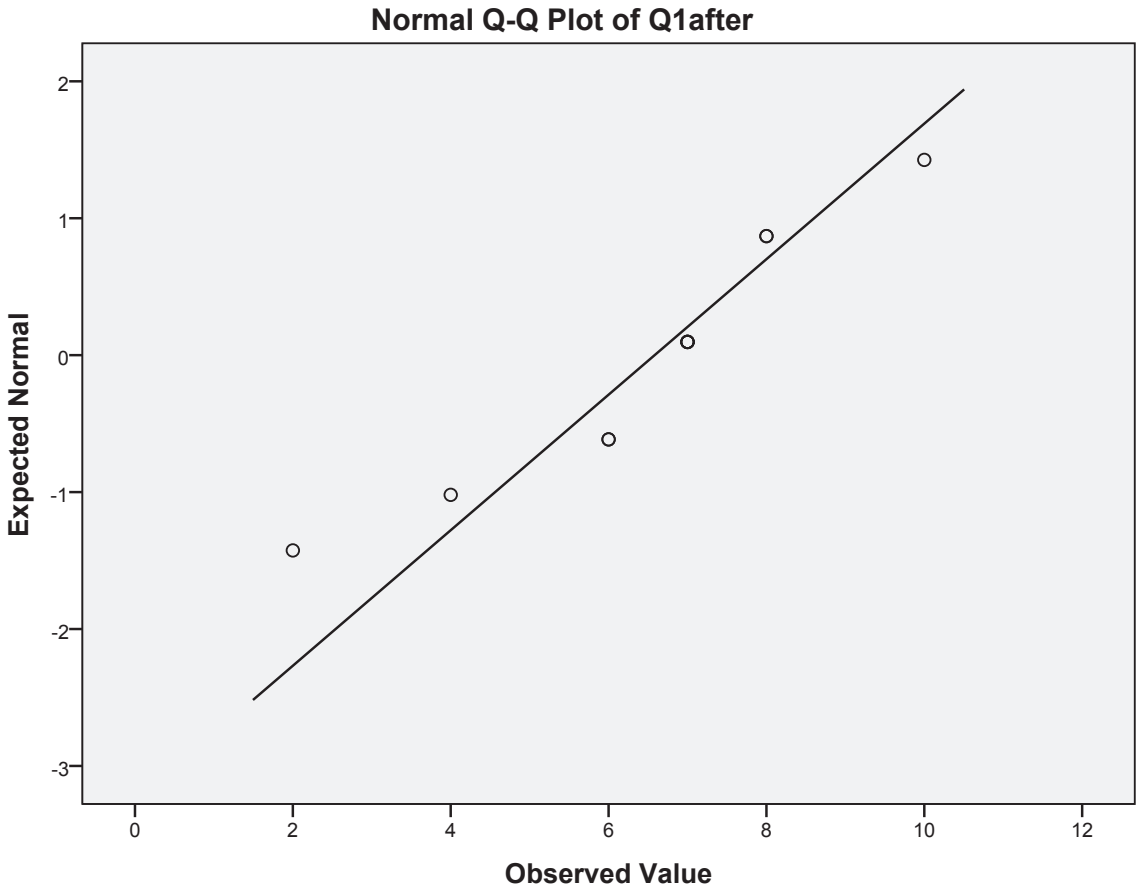

Normal Q-Q Plot of Q8before
Expected Normal
3
2
1
0
-1
2,5
3,0
3,5
4,0
4,5
5,0
5,5
Observed Value

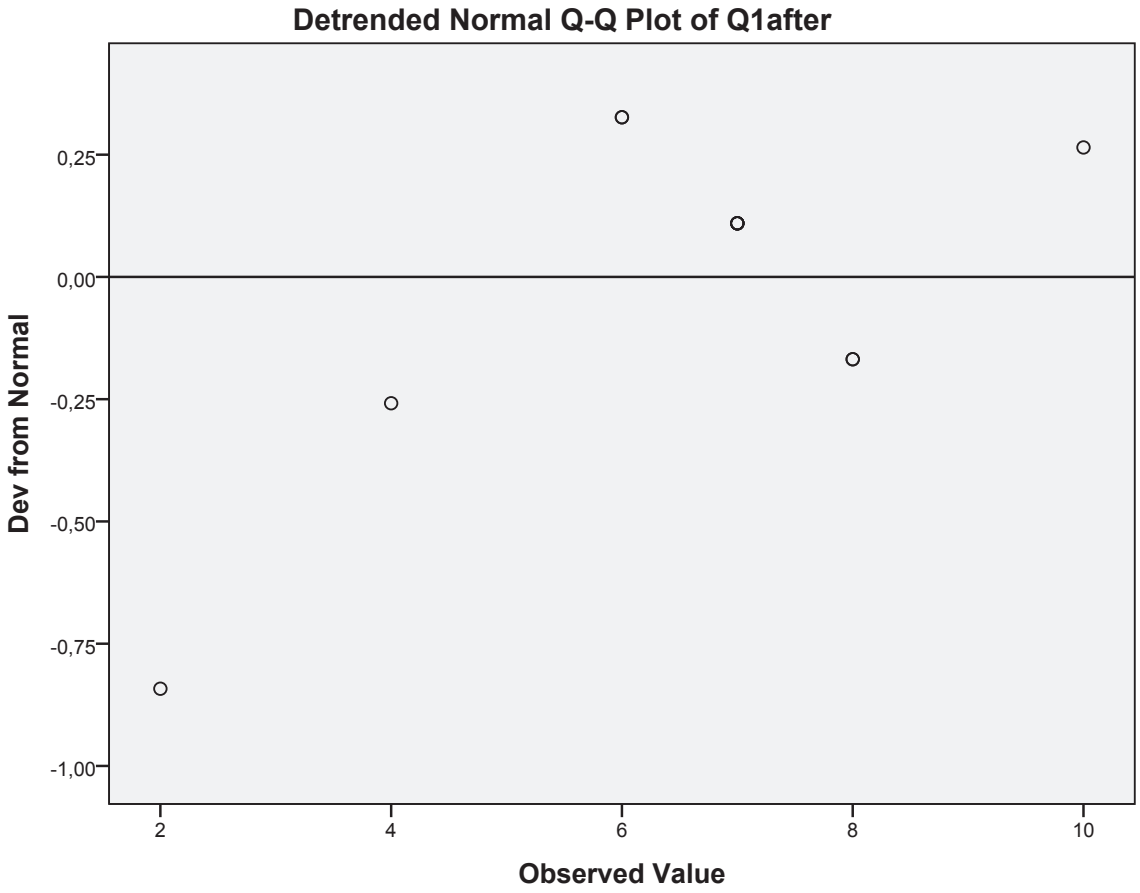

Detrended Normal Q-Q Plot of Q8before
Dev from Normal
0,75
0,50
0,25
0,00
-0,25
3,0
3,5
4,0
4,5
5,0
Observed Value

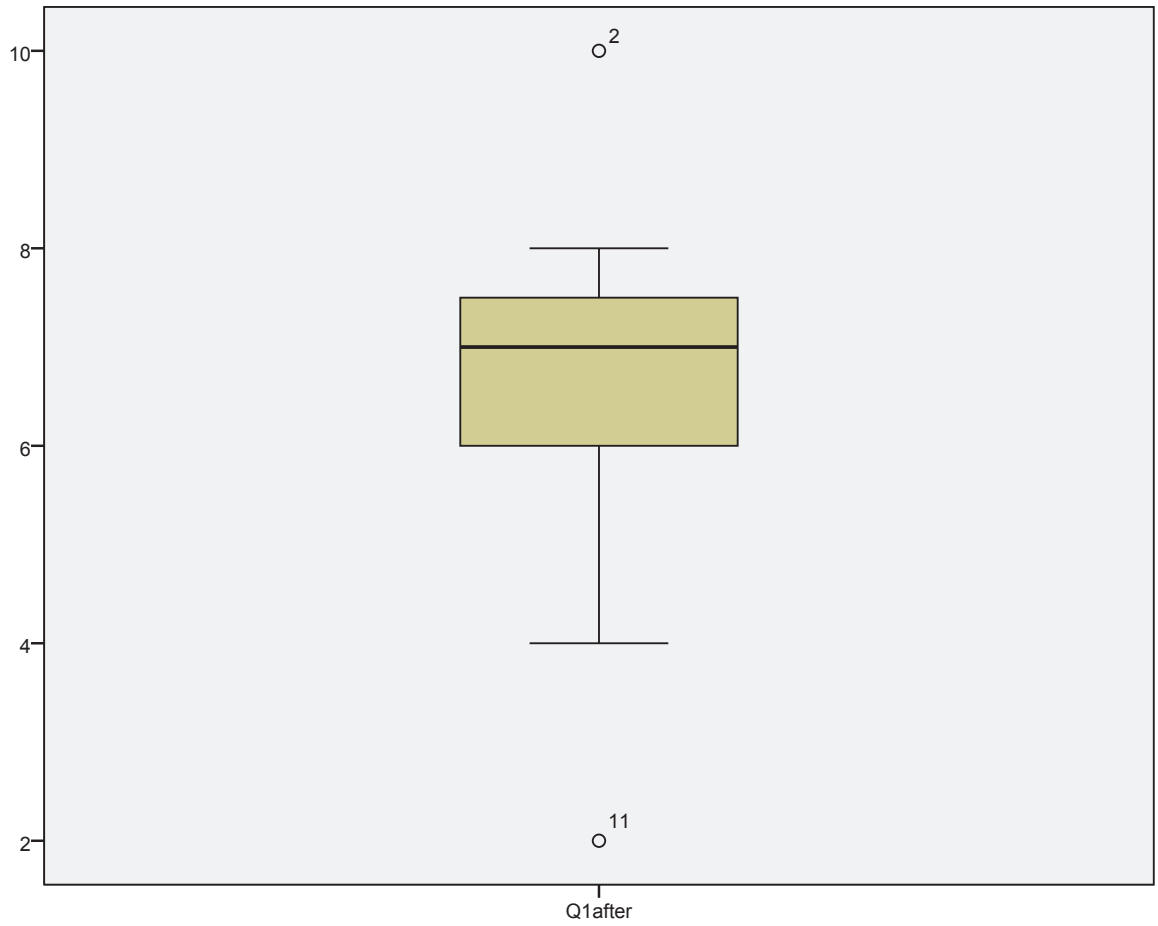



## Q1after

```
Q1after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00 Extremes    (=<2.0)
     1.00        4 .  0
      .00        5 .
     2.00        6 .  00
     5.00        7 .  00000
     2.00        8 .  00
     1.00 Extremes    (>=10.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

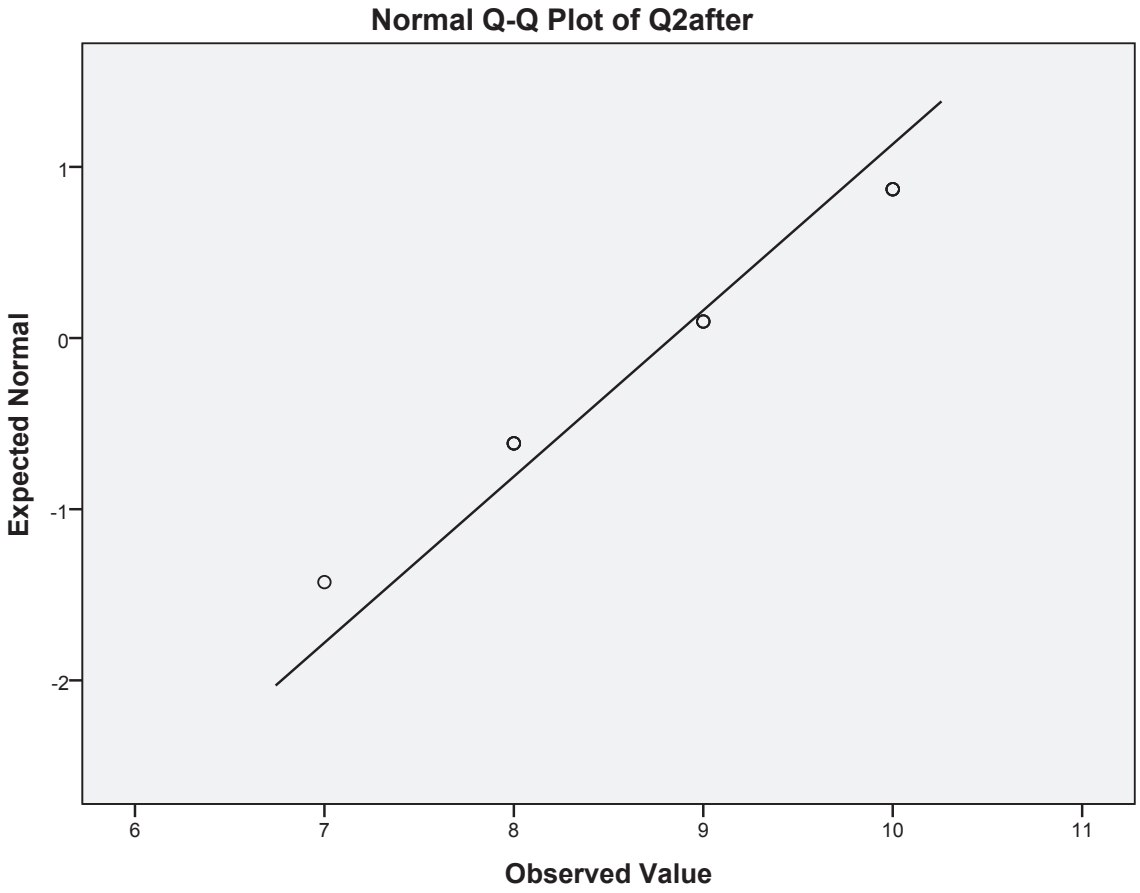

Normal Q-Q Plot of Q1after
Expected Normal
2
1
0
-1
-2
-3
0
2
4
6
8
10
12
Observed Value

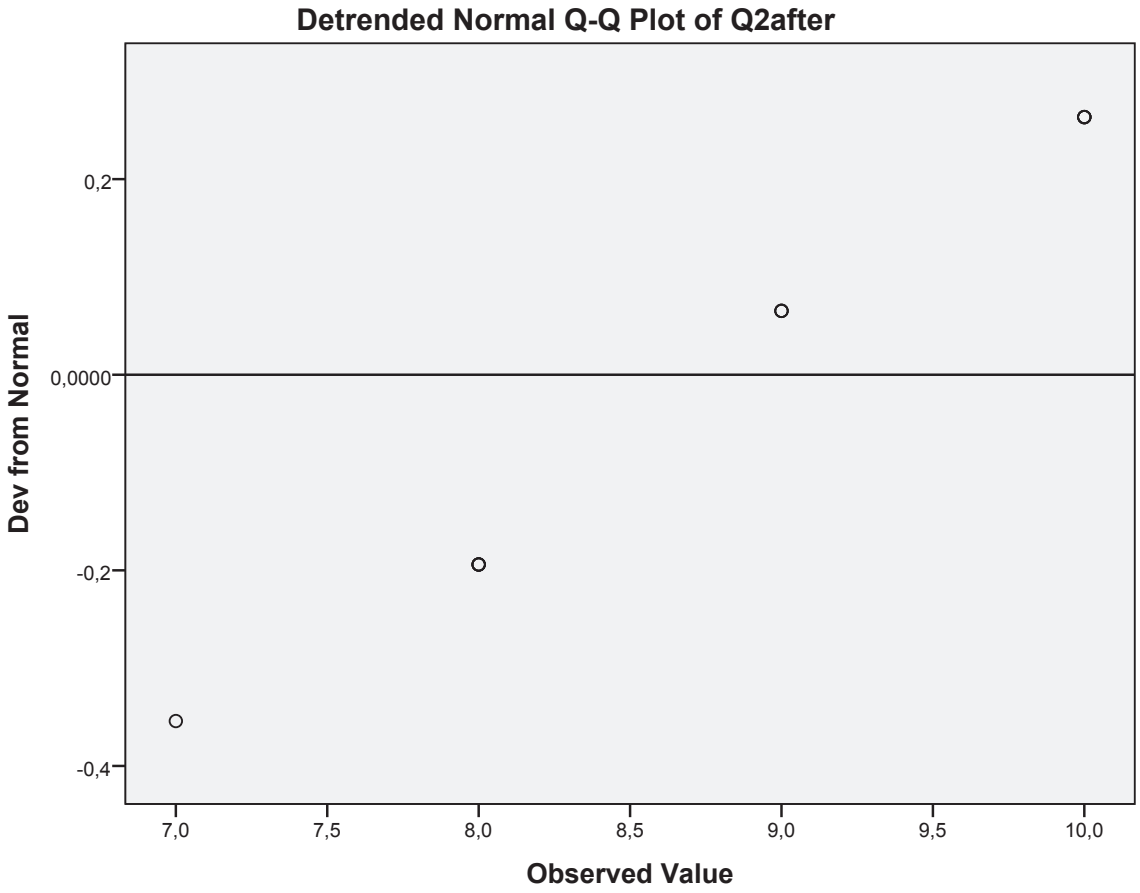

Detrended Normal Q-Q Plot of Q1after
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
-1,00
2
4
6
8
10
Observed Value

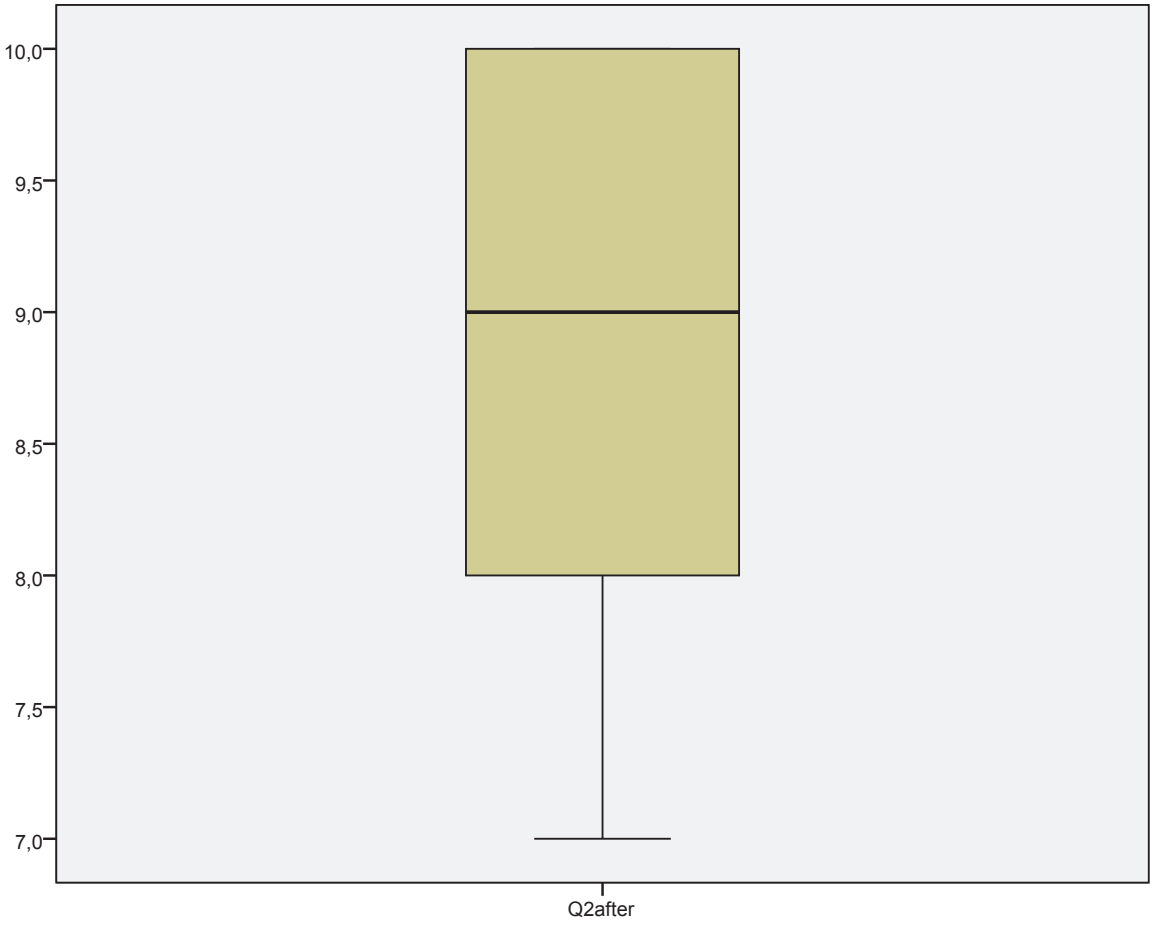



## Q2after

```
Q2after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        7 .  0
     4.00        8 .  0000
     3.00        9 .  000
     4.00       10 .  0000

 Stem width:         1
 Each leaf:       1 case(s)
```

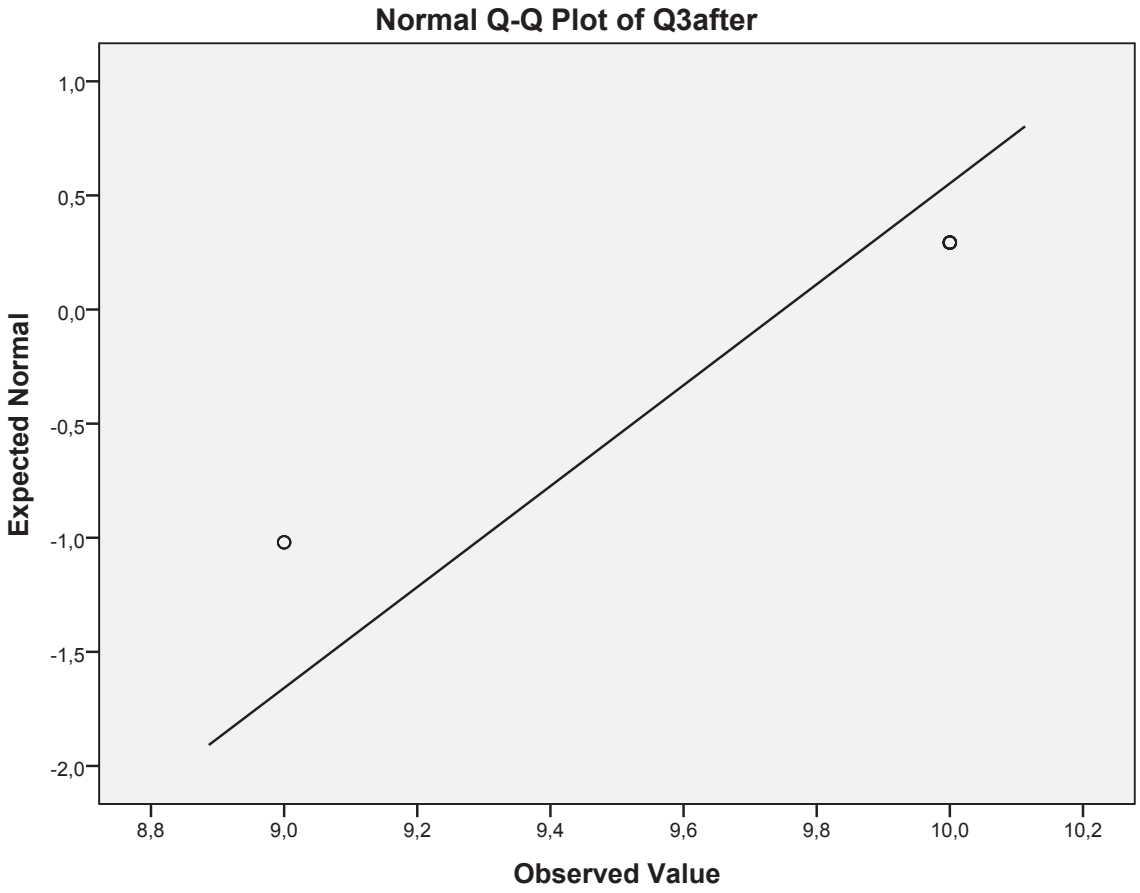

Normal Q-Q Plot of Q2after
Expected Normal
1
0
-1
-2
6
7
8
9
10
11
Observed Value

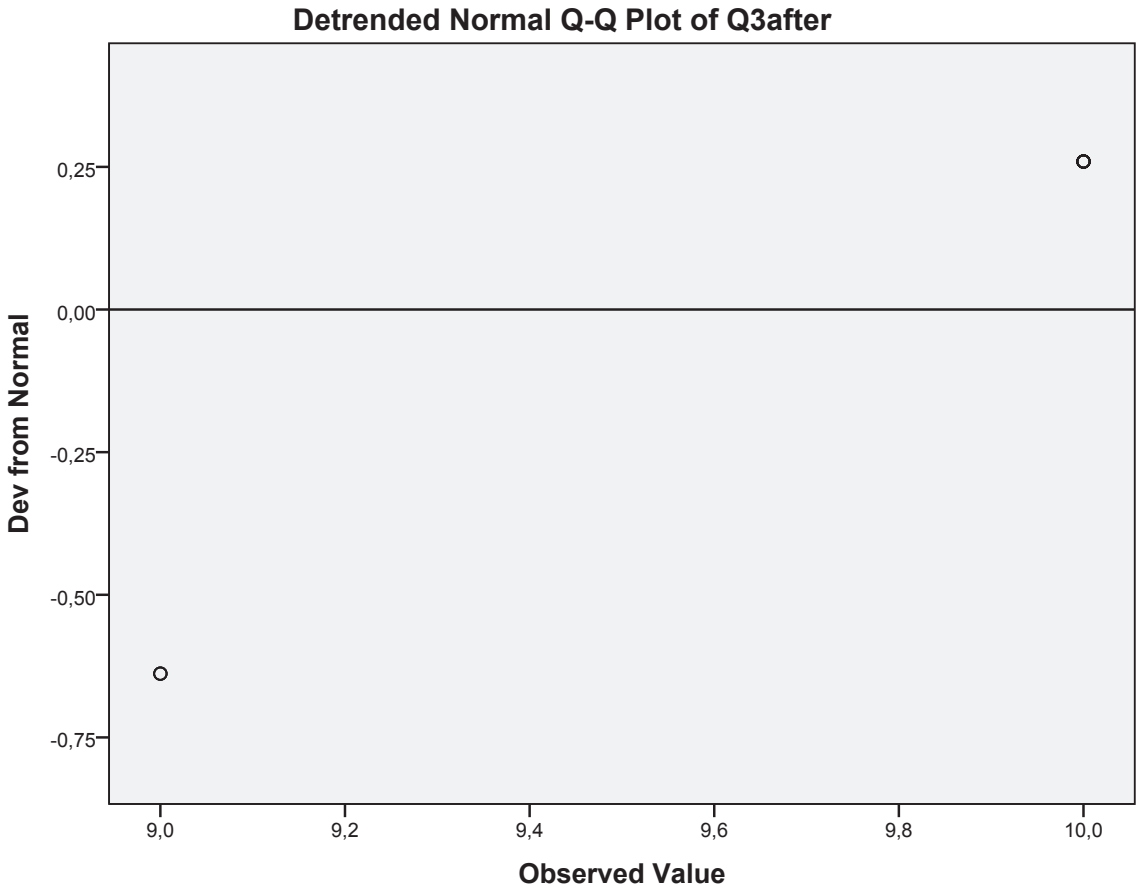

Detrended Normal Q-Q Plot of Q2after
Dev from Normal
0,2
0,0000
-0,2
-0,4
7,0
7,5
8,0
8,5
9,0
9,5
10,0
Observed Value

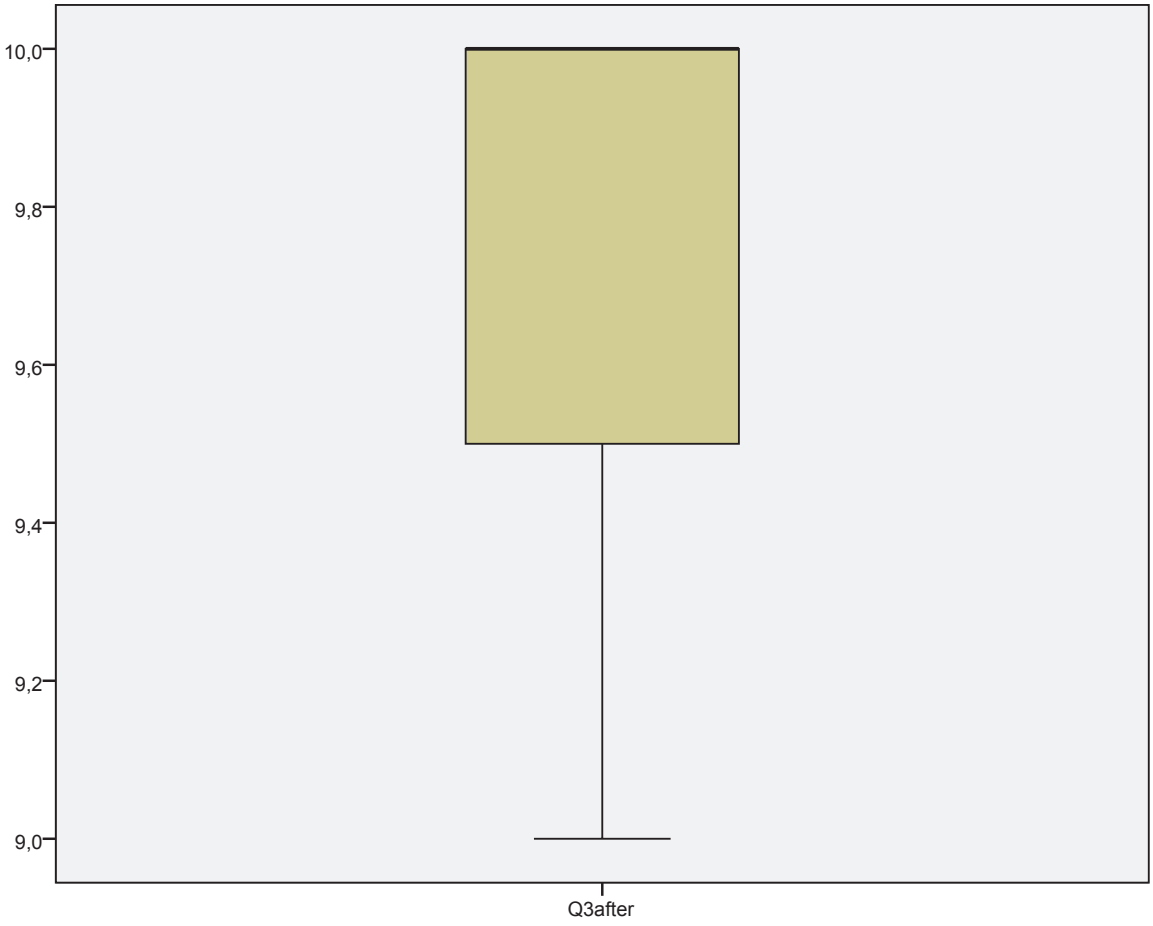



## Q3after

```
Q3after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     3.00        9 .  000
      .00        9 .
     9.00       10 .  000000000

 Stem width:         1
 Each leaf:       1 case(s)
```

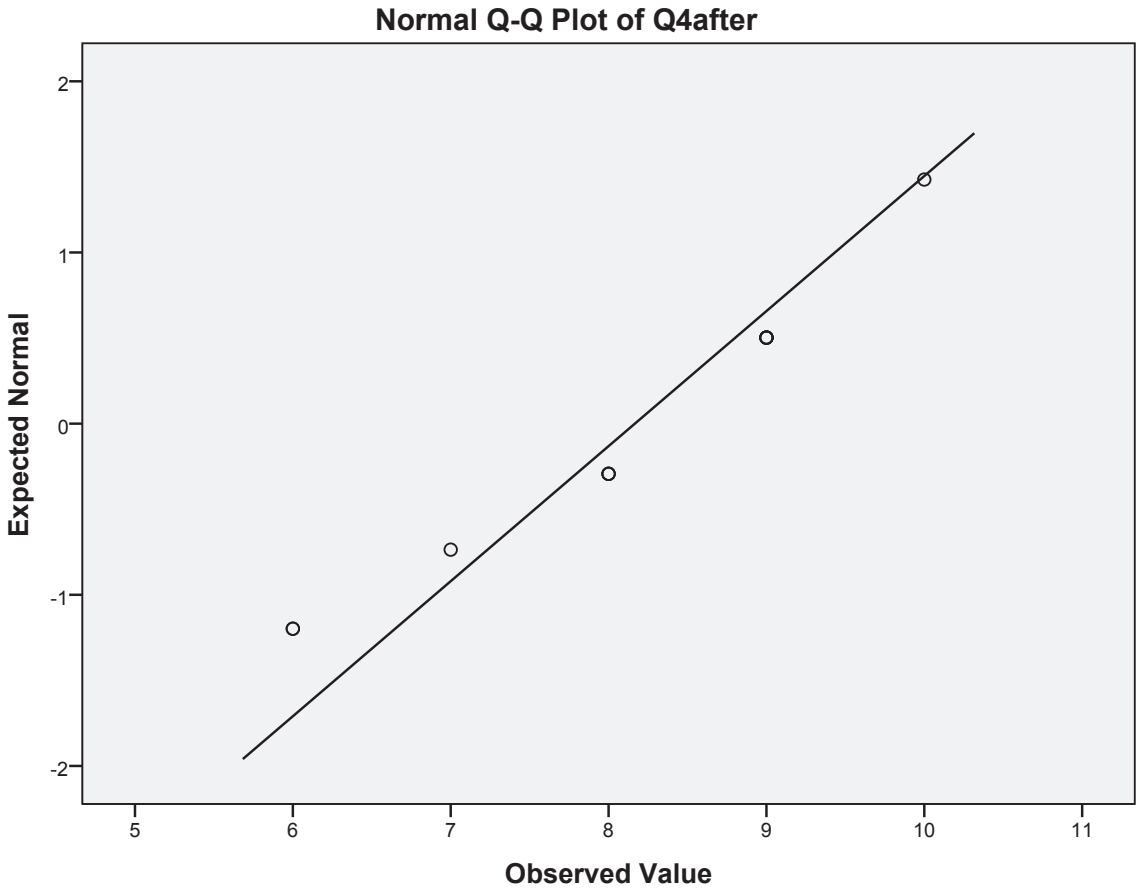

Normal Q-Q Plot of Q3after
Expected Normal
1,0
0,5
0,0
-0,5
-1,0
-1,5
-2,0
8,8
9,0
9,2
9,4
9,6
9,8
10,0
10,2
Observed Value

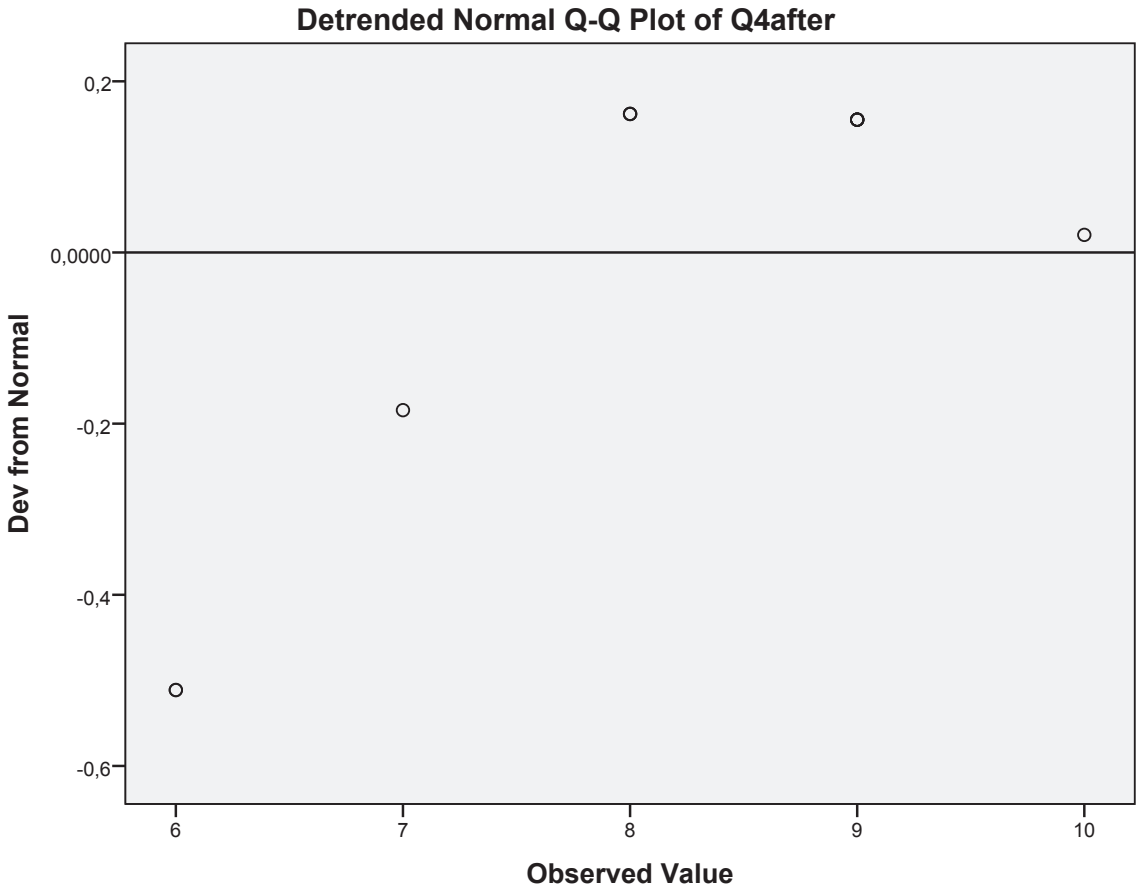

Detrended Normal Q-Q Plot of Q3after
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
9,0
9,2
9,4
9,6
9,8
10,0
Observed Value

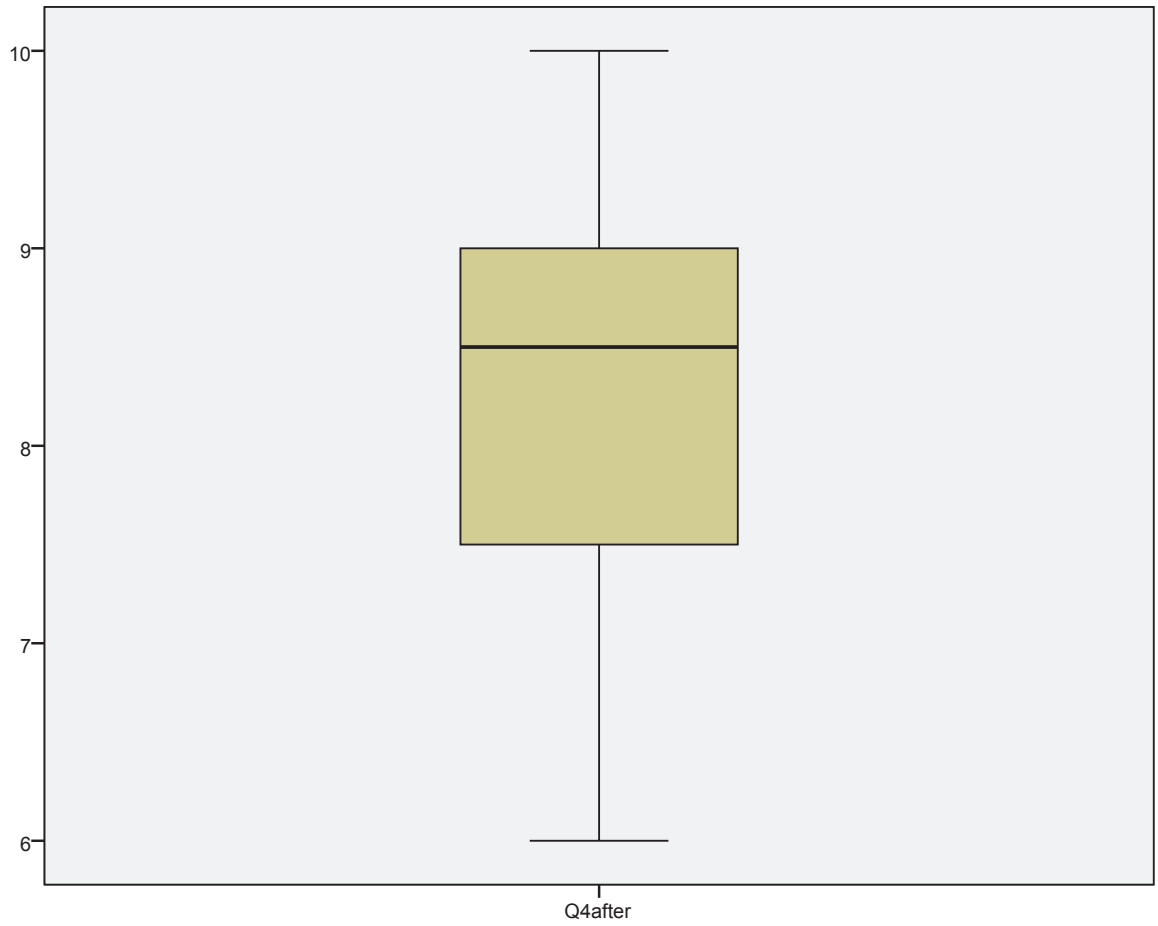



## Q4after

```
Q4after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     2.00        6 .  00
     1.00        7 .  0
     3.00        8 .  000
     5.00        9 .  00000
     1.00       10 .  0

 Stem width:         1
 Each leaf:       1 case(s)
```

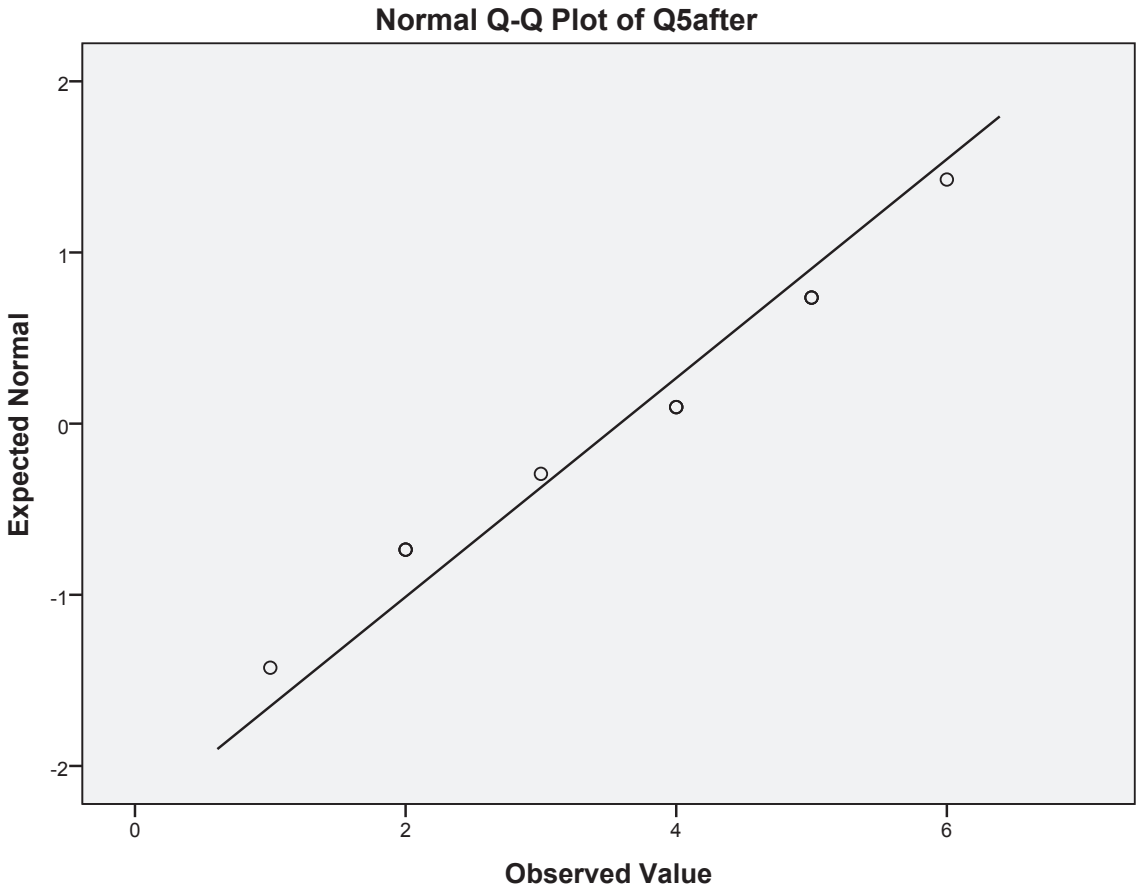

Normal Q-Q Plot of Q4after
Expected Normal
2
1
0
-1
-2
5
6
7
8
9
10
11
Observed Value

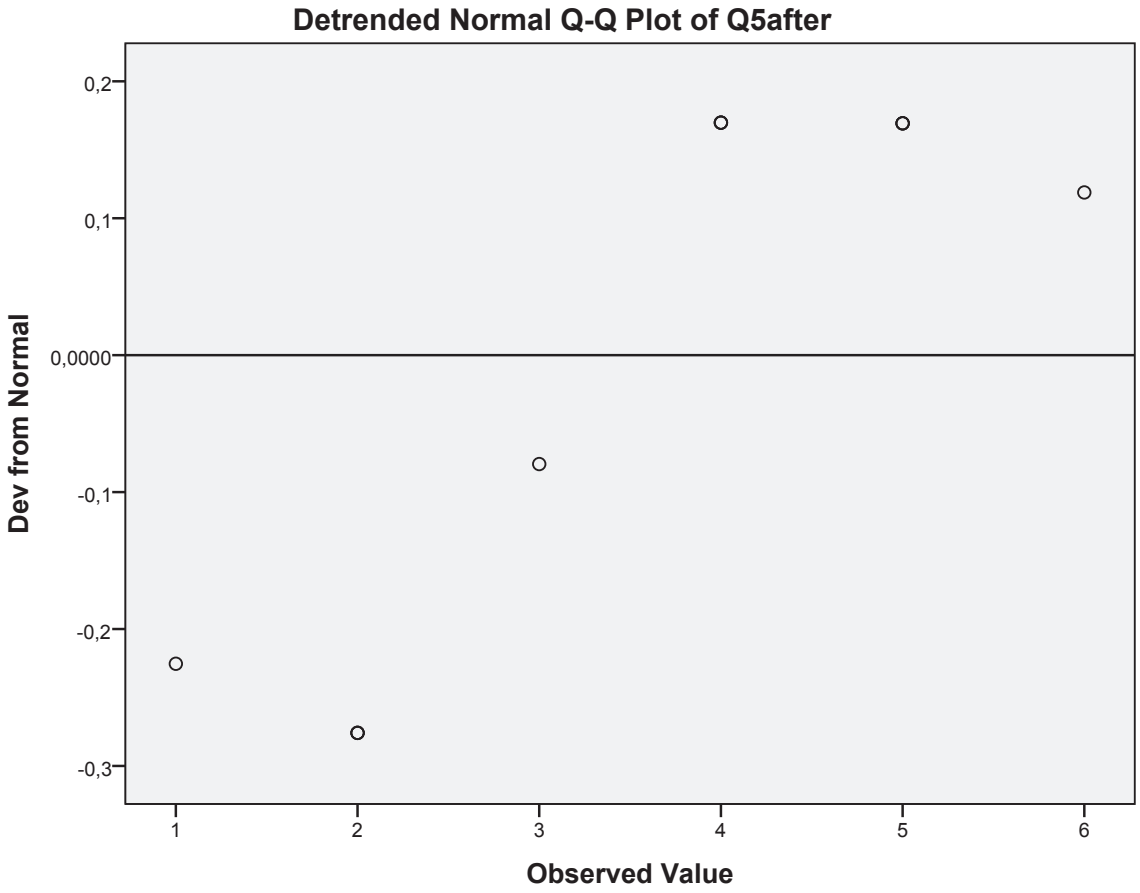

Detrended Normal Q-Q Plot of Q4after
Dev from Normal
0,2
0,0000
-0,2
-0,4
-0,6
6
7
8
9
10
Observed Value




## Q5after

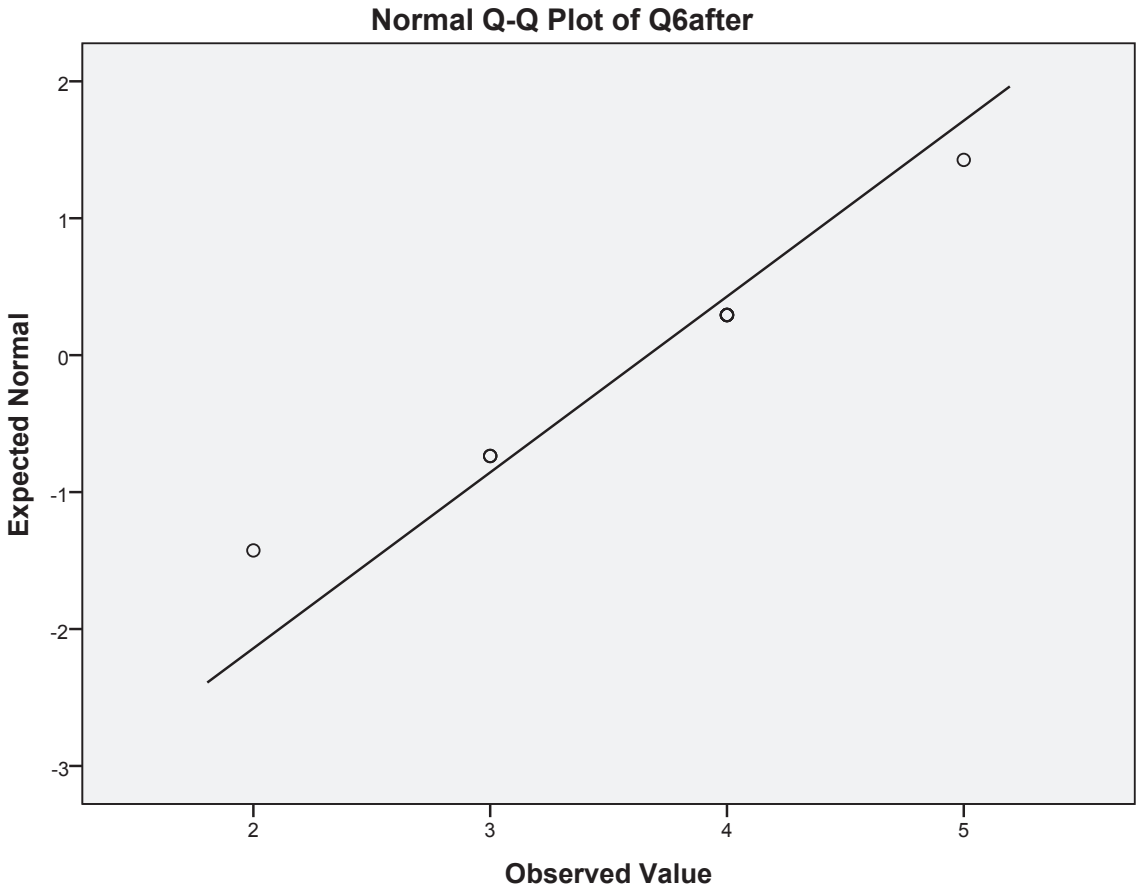
```
Q5after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        1 .  0
     3.00        2 .  000
     1.00        3 .  0
     3.00        4 .  000
     3.00        5 .  000
     1.00        6 .  0

 Stem width:         1
 Each leaf:       1 case(s)
```

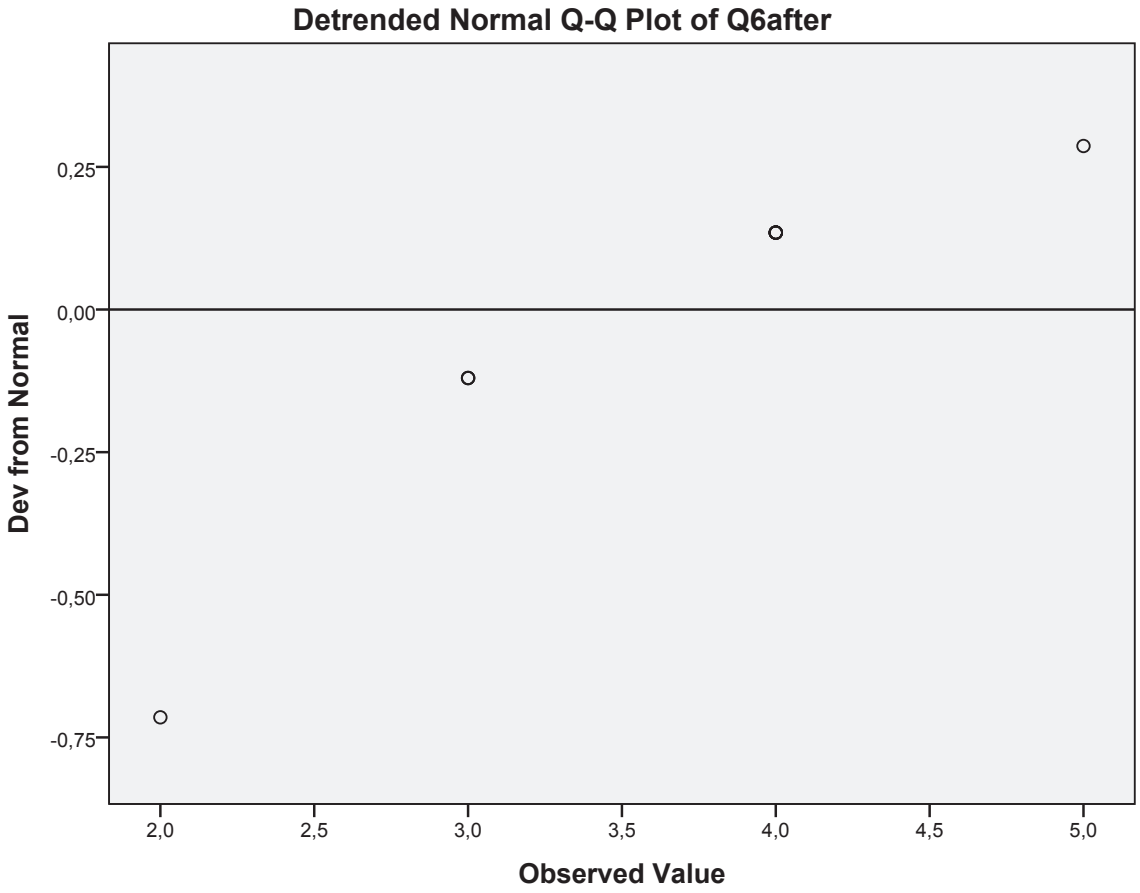

Normal Q-Q Plot of Q5after
Expected Normal
2
1
0
-1
-2
0
2
4
6
Observed Value

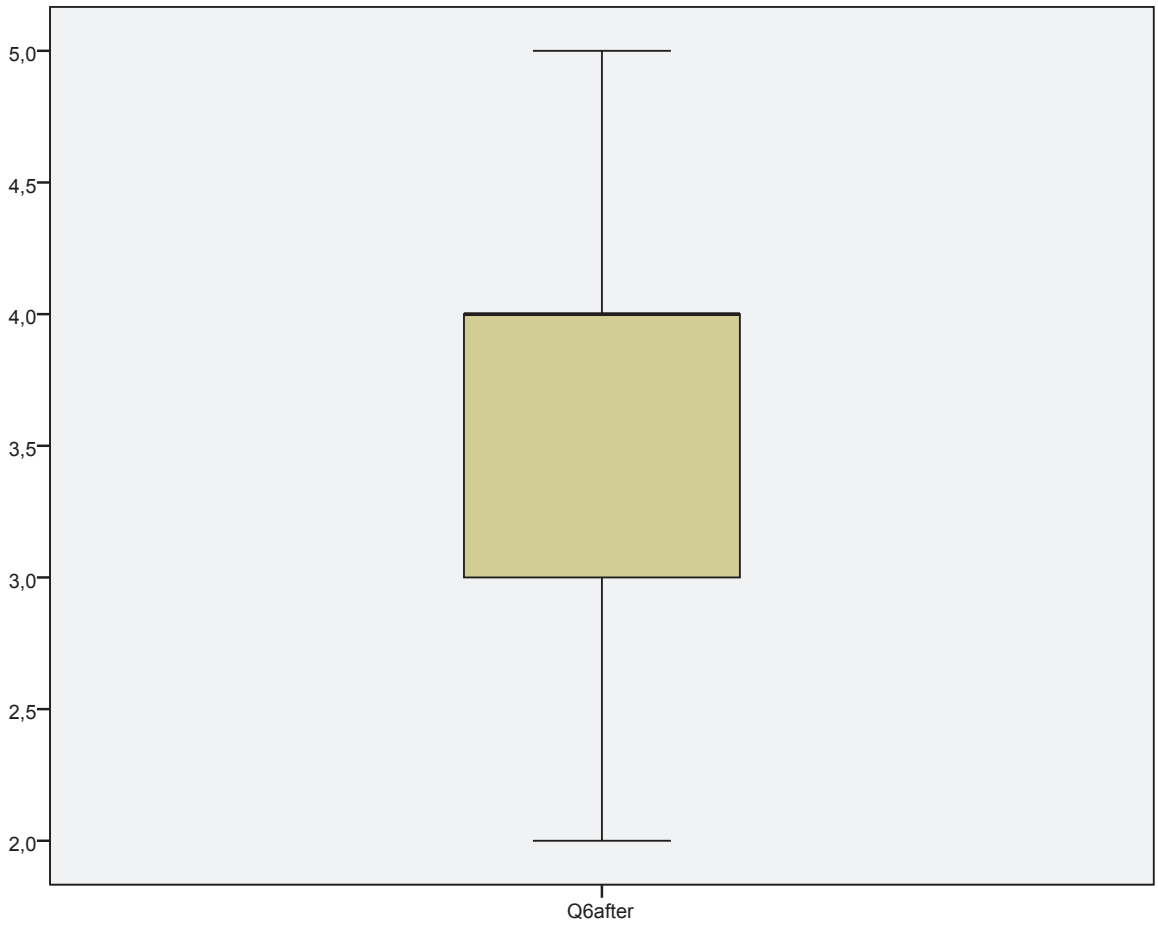

Detrended Normal Q-Q Plot of Q5after
Dev from Normal
0,2
0,1
0,0000
-0,1
-0,2
-0,3
1
2
3
4
5
6
Observed Value


## Q6after

```
Q6after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        2 .  0
     3.00        3 .  000
     7.00        4 .  0000000
     1.00        5 .  0

 Stem width:         1
 Each leaf:       1 case(s)
```

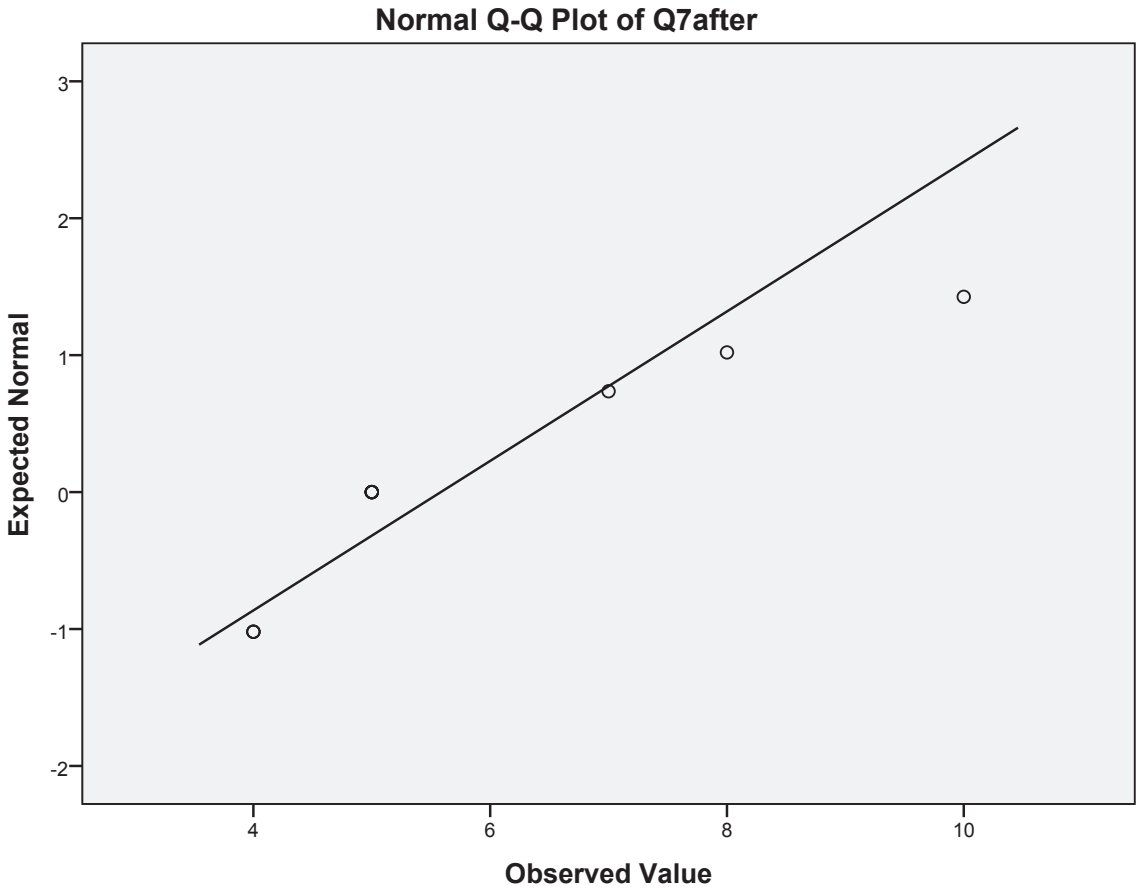

Normal Q-Q Plot of Q6after
Expected Normal
2
1
0
-1
-2
-3
2
3
4
5
Observed Value

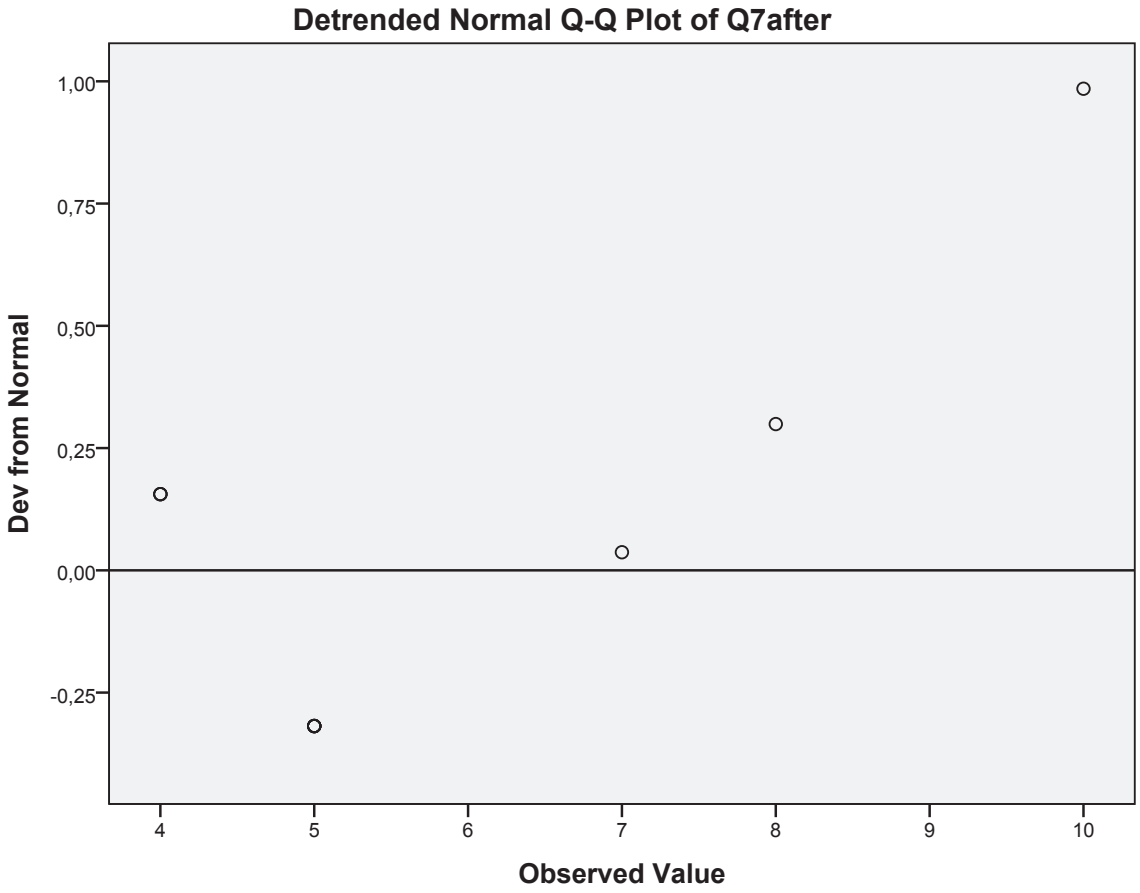

Detrended Normal Q-Q Plot of Q6after
Dev from Normal
0,25
0,00
-0,25
-0,50
-0,75
2,0
2,5
3,0
3,5
4,0
4,5
5,0
Observed Value




## Q7after

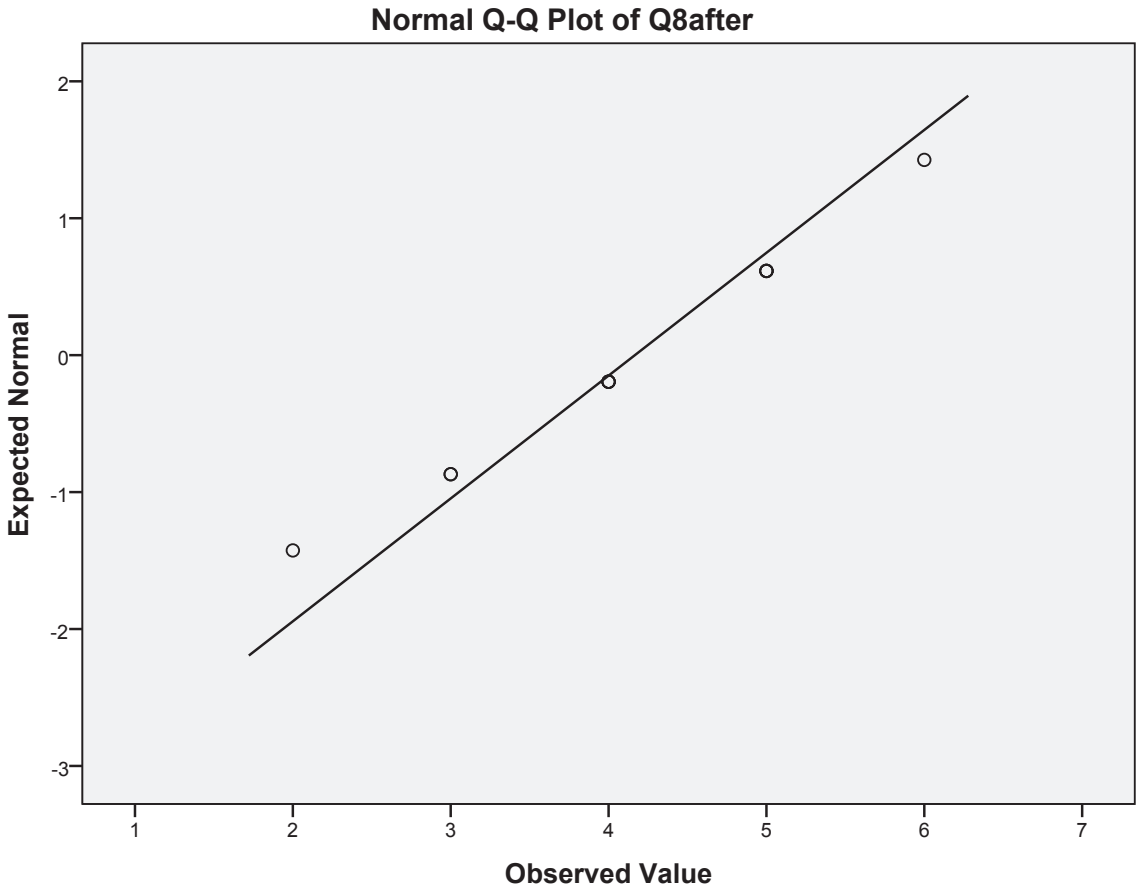
```
Q7after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     3.00        4 .  000
     6.00        5 .  000000
      .00        6 .
     1.00        7 .  0
     1.00        8 .  0
     1.00 Extremes    (>=10.0)

 Stem width:         1
 Each leaf:       1 case(s)
```

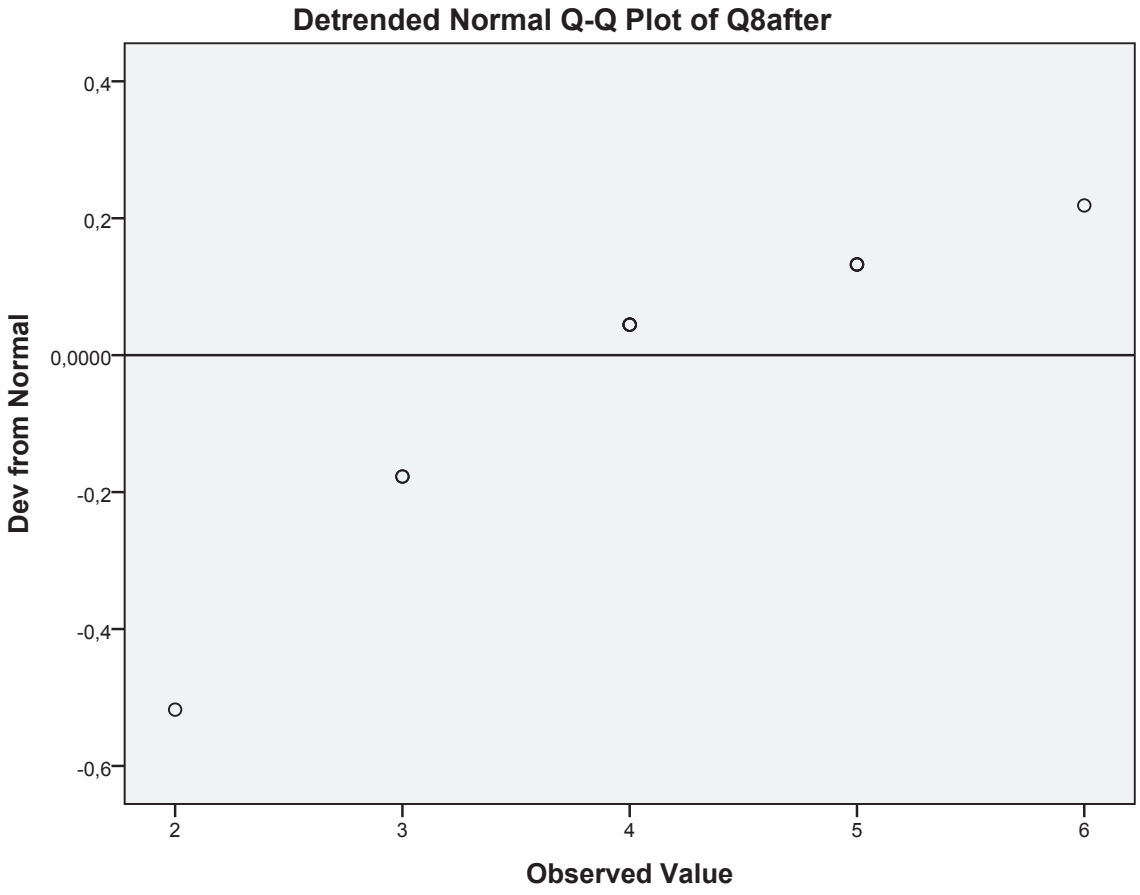

Normal Q-Q Plot of Q7after
Expected Normal
3
2
1
0
-1
-2
4
6
8
10
Observed Value

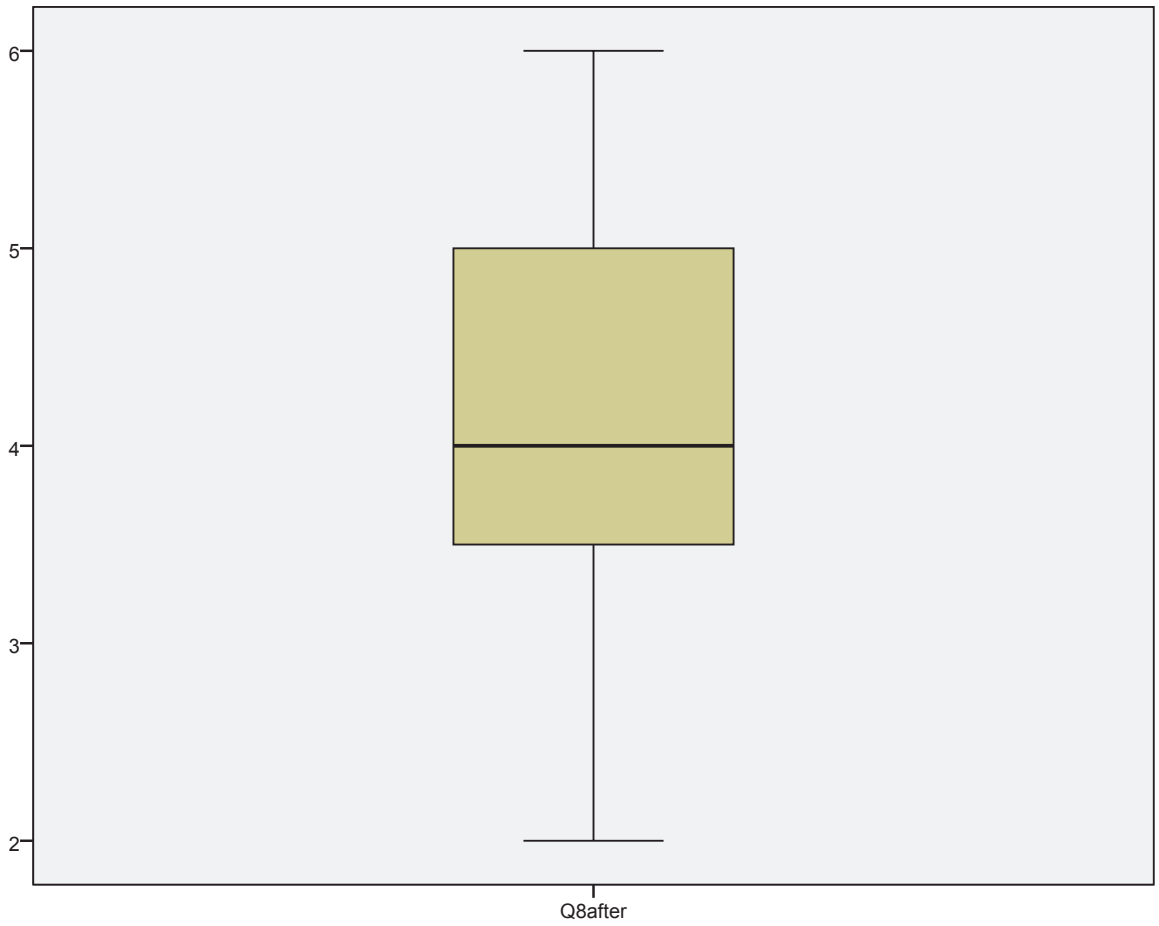

Detrended Normal Q-Q Plot of Q7after
Dev from Normal
1,00
0,75
0,50
0,25
0,00
-0,25
4
5
6
7
8
9
10
Observed Value


## Q8after

```
Q8after Stem-and-Leaf Plot

 Frequency    Stem &  Leaf

     1.00        2 .  0
     2.00        3 .  00
     4.00        4 .  0000
     4.00        5 .  0000
     1.00        6 .  0

 Stem width:         1
 Each leaf:       1 case(s)
```


Normal Q-Q Plot of Q8after
Expected Normal
2
1
0
-1
-2
-3
1
2
3
4
5
6
7
Observed Value


Detrended Normal Q-Q Plot of Q8after
Dev from Normal
0,4
0,2
0,0000
-0,2
-0,4
-0,6
2
3
4
5
6
Observed Value


6
5
4
3
2
Q8after

Appendix 7.7.1 - Wilcoxon test for VP

```
NPAR TESTS
  /WILCOXON=Q1before Q2before Q3before Q4before Q5before Q6before WITH Q1after Q2after Q3aft
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS.
```

## NPar Tests

**Notes**

| | | |
|---|---|---|
| Output Created | | 17-Нов-2012 15-09-04 |
| Comments | | |
| Input | Data | D:\akcijanje\ostalo ebojsa\Nebojsa Surlan PhD\All projects before and after.sav |
| | Active Dataset | DataSet2 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 12 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each test are based on all cases with valid data for the variable(s) used in that test. |
| Syntax | | NPAR TESTS /WILCOXON=Q1before Q2before Q3before Q4before Q5before Q6before WITH Q1after Q2after Q3after Q4after Q5after Q6after (PAIRED) /STATISTICS DESCRIPTIVES /MISSING ANALYSIS. |
| Resources | Processor Time | 00 00:00:00,015 |
| | Elapsed Time | 00 00:00:00,008 |
| | Number of Cases Allowed[a] | 46260 |

a. Based on availability of workspace memory.

```
[DataSet2] D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\All projects befo
re and after.sav
```

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Q1before | 12 | 9,50 | ,905 | 8 | 10 |
| Q2before | 12 | 4,75 | 1,913 | 2 | 8 |
| Q3before | 12 | 6,75 | 1,815 | 4 | 10 |
| Q4before | 12 | 4,33 | ,985 | 2 | 5 |
| Q5before | 12 | 7,75 | 2,832 | 2 | 10 |
| Q6before | 12 | 2,67 | 1,155 | 0 | 5 |
| Q1after | 12 | 9,00 | 1,044 | 7 | 10 |
| Q2after | 12 | 5,58 | 1,730 | 3 | 9 |
| Q3after | 12 | 6,83 | 1,801 | 4 | 10 |
| Q4after | 12 | 4,92 | ,996 | 3 | 6 |
| Q5after | 12 | 7,83 | 2,368 | 3 | 10 |
| Q6after | 12 | 3,00 | 1,206 | 1 | 5 |

## Wilcoxon Signed Ranks Test

**Ranks**

| | | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Q1after - Q1before | Negative Ranks | 5[a] | 3,00 | 15,00 |
| | Positive Ranks | 0[b] | ,00 | ,00 |
| | Ties | 7[c] | | |
| | Total | 12 | | |
| Q2after - Q2before | Negative Ranks | 2[d] | 4,50 | 9,00 |
| | Positive Ranks | 9[e] | 6,33 | 57,00 |
| | Ties | 1[f] | | |
| | Total | 12 | | |
| Q3after - Q3before | Negative Ranks | 0[g] | ,00 | ,00 |
| | Positive Ranks | 1[h] | 1,00 | 1,00 |
| | Ties | 11[i] | | |
| | Total | 12 | | |
| Q4after - Q4before | Negative Ranks | 0[j] | ,00 | ,00 |
| | Positive Ranks | 7[k] | 4,00 | 28,00 |
| | Ties | 5[l] | | |
| | Total | 12 | | |
| Q5after - Q5before | Negative Ranks | 2[m] | 4,50 | 9,00 |
| | Positive Ranks | 4[n] | 3,00 | 12,00 |
| | Ties | 6[o] | | |
| | Total | 12 | | |
| Q6after - Q6before | Negative Ranks | 1[p] | 3,50 | 3,50 |
| | Positive Ranks | 5[q] | 3,50 | 17,50 |
| | Ties | 6[r] | | |
| | Total | 12 | | |

a. Q1after < Q1before
b. Q1after > Q1before
c. Q1after = Q1before
d. Q2after < Q2before
e. Q2after > Q2before
f. Q2after = Q2before
g. Q3after < Q3before
h. Q3after > Q3before
i. Q3after = Q3before
j. Q4after < Q4before
k. Q4after > Q4before
l. Q4after = Q4before
m. Q5after < Q5before
n. Q5after > Q5before
o. Q5after = Q5before
p. Q6after < Q6before
q. Q6after > Q6before
r. Q6after = Q6before

**Test Statistics**[c]

| | Q1after - Q1before | Q2after - Q2before | Q3after - Q3before | Q4after - Q4before |
|---|---|---|---|---|
| Z | -2,121[a] | -2,233[b] | -1,000[b] | -2,646[b] |
| Asymp. Sig. (2-tailed) | ,034 | ,026 | ,317 | ,008 |

**Test Statistics**[c]

| | Q5after - Q5before | Q6after - Q6before |
|---|---|---|
| Z | -,333[b] | -1,633[b] |
| Asymp. Sig. (2-tailed) | ,739 | ,102 |

a. Based on positive ranks.
b. Based on negative ranks.
c. Wilcoxon Signed Ranks Test

Appendix 7.7.2 - Wilcoxon test for CSF

```
NPAR TESTS
  /WILCOXON=Q1before Q2before Q3before Q4before Q5before Q6before Q7before Q8before WITH Q1a
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS.
```

## NPar Tests

**Notes**

| | | |
|---|---|---|
| Output Created | | 30-Нов-2012 19-30-11 |
| Comments | | |
| Input | Data | D:\akcijanje\ostalo ebojsa\Nebojsa Surlan PhD\statistika2\1 All projects before and after.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 12 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each test are based on all cases with valid data for the variable(s) used in that test. |
| Syntax | | NPAR TESTS /WILCOXON=Q1before Q2before Q3before Q4before Q5before Q6before Q7before Q8before WITH Q1after Q2after Q3after Q4after Q5after Q6after Q7after Q8after (PAIRED) /STATISTICS DESCRIPTIVES /MISSING ANALYSIS. |
| Resources | Processor Time | 00 00:00:00,015 |
| | Elapsed Time | 00 00:00:00,018 |
| | Number of Cases Allowed[a] | 37449 |

a. Based on availability of workspace memory.

```
[DataSet1] D:\akcijanje\ostalo\nebojsa\Nebojsa Surlan PhD\statistika2\1 All
 projects before and after.sav
```

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Q1before | 12 | 5,50 | 2,236 | 2 | 10 |
| Q2before | 12 | 8,75 | 1,215 | 6 | 10 |
| Q3before | 12 | 9,83 | ,389 | 9 | 10 |
| Q4before | 12 | 7,75 | 1,712 | 4 | 10 |
| Q5before | 12 | 1,92 | 1,782 | 0 | 5 |
| Q6before | 12 | 2,00 | ,739 | 0 | 3 |
| Q7before | 12 | 5,17 | 2,082 | 3 | 10 |
| Q8before | 12 | 3,42 | ,793 | 3 | 5 |
| Q1after | 12 | 6,58 | 2,021 | 2 | 10 |
| Q2after | 12 | 8,83 | 1,030 | 7 | 10 |
| Q3after | 12 | 9,75 | ,452 | 9 | 10 |
| Q4after | 12 | 8,17 | 1,267 | 6 | 10 |
| Q5after | 12 | 3,58 | 1,564 | 1 | 6 |
| Q6after | 12 | 3,67 | ,778 | 2 | 5 |
| Q7after | 12 | 5,58 | 1,832 | 4 | 10 |
| Q8after | 12 | 4,17 | 1,115 | 2 | 6 |

## Wilcoxon Signed Ranks Test

**Ranks**

| | | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Q1after - Q1before | Negative Ranks | 0[a] | ,00 | ,00 |
| | Positive Ranks | 9[b] | 5,00 | 45,00 |
| | Ties | 3[c] | | |
| | Total | 12 | | |
| Q2after - Q2before | Negative Ranks | 0[d] | ,00 | ,00 |
| | Positive Ranks | 1[e] | 1,00 | 1,00 |
| | Ties | 11[f] | | |
| | Total | 12 | | |
| Q3after - Q3before | Negative Ranks | 1[g] | 1,00 | 1,00 |
| | Positive Ranks | 0[h] | ,00 | ,00 |
| | Ties | 11[i] | | |
| | Total | 12 | | |
| Q4after - Q4before | Negative Ranks | 1[j] | 3,00 | 3,00 |
| | Positive Ranks | 5[k] | 3,60 | 18,00 |
| | Ties | 6[l] | | |
| | Total | 12 | | |
| Q5after - Q5before | Negative Ranks | 1[m] | 1,50 | 1,50 |
| | Positive Ranks | 7[n] | 4,93 | 34,50 |
| | Ties | 4[o] | | |
| | Total | 12 | | |
| Q6after - Q6before | Negative Ranks | 0[p] | ,00 | ,00 |
| | Positive Ranks | 11[q] | 6,00 | 66,00 |
| | Ties | 1[r] | | |
| | Total | 12 | | |
| Q7after - Q7before | Negative Ranks | 0[s] | ,00 | ,00 |
| | Positive Ranks | 4[t] | 2,50 | 10,00 |
| | Ties | 8[u] | | |
| | Total | 12 | | |
| Q8after - Q8before | Negative Ranks | 1[v] | 4,00 | 4,00 |
| | Positive Ranks | 8[w] | 5,13 | 41,00 |
| | Ties | 3[x] | | |
| | Total | 12 | | |

a. Q1after < Q1before
b. Q1after > Q1before
c. Q1after = Q1before
d. Q2after < Q2before
e. Q2after > Q2before
f. Q2after = Q2before
g. Q3after < Q3before
h. Q3after > Q3before
i. Q3after = Q3before
j. Q4after < Q4before
k. Q4after > Q4before
l. Q4after = Q4before

m. Q5after < Q5before
n. Q5after > Q5before
o. Q5after = Q5before
p. Q6after < Q6before
q. Q6after > Q6before
r. Q6after = Q6before
s. Q7after < Q7before
t. Q7after > Q7before
u. Q7after = Q7before
v. Q8after < Q8before
w. Q8after > Q8before
x. Q8after = Q8before

**Test Statistics[c]**

| | Q1after - Q1before | Q2after - Q2before | Q3after - Q3before | Q4after - Q4before |
|---|---|---|---|---|
| Z | -2,754[a] | -1,000[a] | -1,000[b] | -1,667[a] |
| Asymp. Sig. (2-tailed) | ,006 | ,317 | ,317 | ,096 |

**Test Statistics[c]**

| | Q5after - Q5before | Q6after - Q6before | Q7after - Q7before | Q8after - Q8before |
|---|---|---|---|---|
| Z | -2,345[a] | -2,980[a] | -1,890[a] | -2,310[a] |
| Asymp. Sig. (2-tailed) | ,019 | ,003 | ,059 | ,021 |

a. Based on negative ranks.
b. Based on positive ranks.
c. Wilcoxon Signed Ranks Test

# Appendix 7.8.1 - Value Parameters results comparison

| | PC | | | | | | | | | | | | | ETE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | **avg** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | **avg** |
| 1. Maximize business effectiveness | 8 | 8 | 8 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 9,50 | 8 | 8 | 7 | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 9 | 10 | 9,00 |
| 2. Ensure effective project management and delivery | 5 | 5 | 5 | 8 | 5 | 2 | 3 | 5 | 5 | 4 | 2 | 8 | 4,75 | 7 | 6 | 4 | 7 | 5 | 3 | 5 | 6 | 6 | 6 | 3 | 9 | 5,58 |
| 3. Achieve the required financial performance | 8 | 8 | 8 | 6 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | 6,75 | 8 | 8 | 8 | 7 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | 6,83 |
| 4. Minimize building operation and maintenance costs, and environmental impact | 5 | 5 | 5 | 2 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | 4,33 | 5 | 6 | 6 | 3 | 5 | 4 | 6 | 5 | 6 | 5 | 4 | 4 | 4,92 |
| 5. Impact positively on the location of the facility | 10 | 10 | 10 | 2 | 10 | 6 | 8 | 10 | 10 | 8 | 4 | 5 | 7,75 | 8 | 9 | 10 | 3 | 10 | 7 | 8 | 10 | 10 | 9 | 5 | 5 | 7,83 |
| 6. Comply with third party requirements | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 0 | 2 | 5 | 2,67 | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 1 | 1 | 5 | 3,00 |

| Standard deviation | | | | | | | | | | | | | Increase | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 0,00 | 0,00 | 0,71 | 0,00 | 1,41 | 0,00 | 0,00 | 0,71 | 0,71 | 0,00 | 0,71 | 0,00 | | 0 | 0 | -1 | 0 | -2 | 0 | 0 | -1 | -1 | 0 | -1 | 0 | -0,50 |
| 1,41 | 0,71 | 0,71 | 0,71 | 0,00 | 0,71 | 1,41 | 0,71 | 0,71 | 1,41 | 0,71 | 0,71 | | 2 | 1 | -1 | -1 | 0 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 0,83 |
| 0,00 | 0,00 | 0,00 | 0,71 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,08 |
| 0,00 | 0,71 | 0,71 | 0,71 | 0,00 | 0,00 | 0,71 | 0,00 | 0,71 | 0,71 | 0,00 | 0,71 | | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0,58 |
| 1,41 | 0,71 | 0,00 | 0,71 | 0,00 | 0,71 | 0,00 | 0,00 | 0,00 | 0,71 | 0,71 | 0,00 | | -2 | -1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0,08 |
| 0,00 | 0,00 | 0,71 | 0,00 | 0,71 | 0,71 | 0,71 | 0,00 | 0,00 | 0,71 | 0,71 | 0,00 | | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | -1 | 0 | 0,33 |

Appendix 7.8.1 - Value Parameters results comparison

# Appendix 7.8.2 - Critical Success Factors results comparison

| | PC | | | | | | | | | | | | | ETE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | **avg** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | **avg** |
| 1. Scope | 6 | 10 | 6 | 8 | 5 | 6 | 2 | 6 | 6 | 4 | 2 | 5 | 5,50 | 7 | 10 | 7 | 8 | 6 | 7 | 4 | 8 | 7 | 7 | 2 | 6 | 6,58 |
| 2. Time | 8 | 10 | 8 | 6 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | 8,75 | 8 | 10 | 8 | 7 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | 8,83 |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | 9 | 9,83 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 9 | 9,75 |
| 4. Quality | 9 | 4 | 9 | 6 | 9 | 9 | 8 | 8 | 8 | 7 | 6 | 10 | 7,75 | 8 | 6 | 9 | 7 | 9 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | 8,17 |
| 5. Contract-admin | 2 | 2 | 0 | 0 | 0 | 2 | 3 | 2 | 2 | 0 | 5 | 5 | 1,92 | 6 | 2 | 4 | 4 | 4 | 3 | 5 | 2 | 1 | 2 | 5 | 5 | 3,58 |
| 6. Human resource | 2 | 2 | 2 | 2 | 2 | 0 | 3 | 2 | 2 | 2 | 3 | 2 | 2,00 | 4 | 2 | 4 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3,67 |
| 7. Risk | 3 | 5 | 5 | 8 | 6 | 5 | 5 | 3 | 3 | 10 | 5 | 4 | 5,17 | 5 | 5 | 5 | 8 | 7 | 5 | 5 | 4 | 4 | 10 | 5 | 4 | 5,58 |
| 8. Health and safety | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 4 | 3,42 | 5 | 6 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 3 | 5 | 4,17 |

| Standard deviation | | | | | | | | | | | | | Increase | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 0,71 | 0,00 | 0,71 | 0,00 | 0,71 | 0,71 | 1,41 | 1,41 | 0,71 | 2,12 | 0,00 | 0,71 | | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 3 | 0 | 1 | 1,08 |
| 0,00 | 0,00 | 0,00 | 0,71 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,08 |
| 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,71 | 0,00 | 0,00 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | -0,08 |
| 0,71 | 1,41 | 0,00 | 0,71 | 0,00 | 0,00 | 0,00 | 0,71 | 0,71 | 0,71 | 0,00 | 0,00 | | -1 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0,42 |
| 2,83 | 0,00 | 2,83 | 2,83 | 2,83 | 0,71 | 1,41 | 0,00 | 0,71 | 1,41 | 0,00 | 0,00 | | 4 | 0 | 4 | 4 | 4 | 1 | 2 | 0 | -1 | 2 | 0 | 0 | 1,67 |
| 1,41 | 0,00 | 1,41 | 0,71 | 2,12 | 2,12 | 0,71 | 0,71 | 1,41 | 1,41 | 0,71 | 1,41 | | 2 | 0 | 2 | 1 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 2 | 1,67 |

Appendix 8.1 – Questioner survey from

Dear colleague,

My name is Nebojsa Surlan and I have been a Project Manager with XXXX International in Serbia and Montenegro region for last 8 years. Additional to my work, I am working on an academic dissertation were as part of a wider study I am building a project database. I would appreciate your help in completing this short questionnaire below and returning it via email.

I have located your information by our company intranet and would ask you to provide scoring on the project(s) where you have been indicated as a Project Manager. Please enter a score from **0 (least favorable)** to **10 (most favorable)** to indicate the importance of the value parameter on the project that you have been managing, either from your or Clients perspective.

| Project No | Project Name | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs, and environmental impact | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract/admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Design stage | | | | | | Construction stage | | | | | | | |
| 250xx | Sample Project xx | 9 | 8 | 8 | 5 | 4 | 6 | 9 | 9 | 9 | 7 | 6 | 7 | 8 | 9 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

Additional explanations on parameters are below:

**1. Maximize business effectiveness**
Describes how the facility delivers the benefits required by the business case. This includes issues relating to staff productivity, unit costs of production and ease of working. It also includes creating environments that employees and users enjoy and that encourage effective business processes.

**2. Ensure effective project management and delivery**
Relates to the management processes used, and the selection of an integrated team working throughout the supply chain.

**3. Achieve the required financial performance**
Defined by the business case for the project. It includes achieving the optimum balance between capital costs, a building's operating and maintenance costs and residual whole-life value.

**4. Impact positively on the locality**
Describes issues that relate to the building's aesthetics, the way it conveys the organization's corporate image, and the building's relationship to its context.

**5. Minimize building operation and maintenance costs, and environmental impact**
Issues to do with maintaining, operating and cleaning the facility once it is in use. This also includes minimizing impact on the environment and environmental sustainability.

**6. Comply with third party requirements**
Describes statutory and other requirements including planning consent. Covers all aspects of Health and Safety both during and after construction, and addresses adherence to Central Government guidance.

Taken from: NAO - National Audit Office, Getting Value for Money from Construction Projects through Design, Davis Langdon & Everest 2004

I appreciate you are busy, but also appreciate any help given and the completion of this questionnaire by Thursday 21st April. Whether you to choose to reply to this email or not I like to wish you the best for the future and thank you for your time.

Best regards,

Nebojsa Surlan
Project Manager

**Contacted:**

1. James, Adam
2. Richmond, Adam
3. Jones, Adrian
4. Petrovits, Agis
5. Macdonald, Alan
6. Quigley, Alan
7. Robinson, Alan
8. Smith, Alan M.
9. Pauseback, Alexander
10. Prims, Alexander
11. Fawthrop, Alison
12. Young, Alistair
13. Kelaher, Allen
14. Abbas, Altaf
15. Ali, Amjad
16. McNally, Andrea
17. Jackson, Andrew
18. Kayes, Andrew
19. Lennox, Andrew
20. Mitchell, Andrew
21. Pechey, Andrew
22. Starkie, Andrew
23. Sweeney, Andrew
24. Wilson, Andrew
25. Brown, Andy
26. Manning, Andy
27. Summerscales, Andy
28. Palmieri, Anna
29. Ventress, Aron
30. Thorp, Ashley
31. Willeke, Astrid
32. Chandler, Benn
33. Coe, Bob
34. Davis, Bob
35. Wilson, Bob
36. Holland, Brendan
37. Mathers, Brian
38. Silva, Bruno
39. Wright, Carl
40. Armero, Carlos
41. Bouma, Catherine
42. Jarman, Chris
43. Merrin, Chris
44. Mole, Chris
45. Travers, Chris
46. Browne, Christopher
47. Cook, Colin
48. Hardy, Colin
49. Smith, Colin
50. Williams, Colin
51. Ingram, Craig
52. Morrison, Craig
53. Pollock, Danny
54. Balls, Darren
55. Jones, Dave
56. Bancroft, David
57. Beere, David
58. Bill, David
59. Coulson, David
60. Entwistle, David
61. Jolley, David
62. Leverett, David
63. Reynolds, David
64. Rumsey, David
65. Walker, David

66. Watkins, David
67. White, David
68. Whittington, David
69. Hill, Debs
70. Drake, Dennis
71. Grimes, Des
72. Mazitova, Dina
73. Barenbruegge, Dirk
74. Holmes, Dominic
75. Lees, Dominic
76. Joyce, Don
77. Mahon, Donald
78. Heath, Donna
79. Azariah, Durand
80. Sellars, Elliot
81. Browning, Euan
82. Princi, Frank
83. Curtis, Gareth
84. Nisbet, Garry
85. Snowsill, Gary
86. Baffoe-Djan, George
87. Karam, George
88. Moore, Gerry
89. Brisbane, Gordon
90. Gray, Gordon
91. Macmillan, Graeme
92. Knight, Graham
93. Blackshaw, Guy
94. Deadman, Gwenda
95. Griffiths, Huw
96. Eggers, Ian
97. Milner, Ian
98. Range, Ian
99. Zamorano, Ignacio
100. Steele, Imanuel
101. Pickett, Jack
102. Cochrane, James
103. McMylor, James
104. Meaden, James
105. Merrett, James
106. Windsor, James
107. Salamanca, Javier
108. Kenyon, Jeanette
109. Damrel, Jeremy
110. Davey, Jeremy
111. Oakes, Jeremy
112. Wheatcroft, Jeremy
113. Eades, Jeremy
114. Ledger, Jim
115. Mould, Jim
116. Hanley, Jimmy
117. Kinau, Jochen
118. Harvey, John
119. Jeffery, John
120. Kane, John
121. Martinus, John
122. Newman, John
123. Peel, John
124. Plumer, John
125. Turnbull, John
126. Worthington, John
127. Vos, Jonald
128. Emmines, Jonathan
129. Foster, Jonathan
130. Tucker, Jonathan
131. Munday, Julian

132. Menzel, Kai
133. England, Karis
134. Stansfield, Kate
135. Cowin, Kevin
136. Goddard, Kevin
137. Murray, Kevin
138. Madbouli, Khalid
139. Solomon, Leo
140. Connolly, Liam
141. Hartley, Liz
142. Moreira, Luis
143. Jacobs, Luke
144. Parker, Lynne
145. Tyas, Lynne
146. Comba, Mafalda
147. Hannon, Malcolm
148. Marczak, Malgorzata
149. Ruiz, Manuel
150. Jelly, Marc
151. Baraniuk, Marcin
152. Beaver, Mark
153. Cheetham, Mark
154. Dawkins, Mark
155. Gibson, Mark
156. Holmes, Mark
157. Kennedy, Mark
158. Reynolds, Mark
159. Childerhouse, Martin
160. Hamp, Martin
161. Martinez, Martin
162. Sanders, Martin
163. Scott, Martin
164. Stevinson, Martin
165. Gruber, Max
166. Chambers, Mel
167. Prichard, Mel
168. Corby, Michael
169. Horenko, Michael
170. Molyneaux, Michael
171. Humphreys, Michelle
172. Healy, Mike
173. Brown, Miles
174. Haque, Naveed
175. Dunkerley, Neil
176. Hallett, Neil
177. McConalogue, Neil
178. Shanley, Neil
179. Hamlin, Nic
180. Moore, Nick
181. Thurtle, Nick
182. Waller, Nick
183. Cole, Nigel
184. Follows, Nigel
185. Midmer, Nigel
186. Gaffney, Noel
187. Staton, Oliver
188. Cobb, Paul
189. Davey, Paul
190. Hackwell, Paul
191. Holt, Paul
192. Mulcahey, Paul
193. Murray, Paul
194. Oliveira, Pedro
195. Chapman, Peter
196. George, Peter
197. Harvey, Peter

198. McIlhagger, Peter
199. Smedmor, Peter
200. Welsby, Peter
201. Coetzee, Petrus
202. Robinson, Phil
203. Beato, Philip
204. Day, Philip
205. Osmond, Philip
206. Rose, Philip
207. Solomon, Philip
208. Kocinski, Przemyslaw
209. Cheshire, Rebecca
210. Salahi, Reza
211. Mullane, Richard
212. Palmer, Richard
213. Smedley, Richard
214. Smith, Richard
215. Thorpe, Richard
216. Dutt, Rima
217. Ewen, Rob
218. Faulkner, Rob
219. Smith, Robbie
220. Cooper, Robert
221. Hollingsworth, Robert
222. Pettifar, Robert
223. Conway, Roy
224. McIvor, Ryan
225. McGowan, Sara
226. Silva, Sarah
227. Matthews, Scott
228. Green, Shaun
229. Tate, Shaun
230. Bloss, Simon
231. Braithwaite, Simon
232. Briddon, Simon
233. Hall, Simon
234. Moorhouse, Simon
235. Newland, Simon
236. Hull, Stephanie
237. Henley, Stephen
238. Jones, Stephen
239. Few, Steve
240. Gillingham, Steve
241. Tighe, Steve
242. Gregson, Stewart
243. Fory, Stuart
244. Green, Stuart
245. Richmond, Stuart
246. Rasul, Tarik
247. Caneira, Tiago
248. Court, Tim
249. Laycock, Tim
250. Wright, Tim
251. Butcher, Tom
252. Geard, Tom
253. Sampson, Tom
254. Morrice, Tony
255. Palgrave, Tony
256. Pennington, Tony
257. Castle, Trevor
258. Hicks, Trevor
259. Marshall, Trevor
260. Bywater, Vanessa
261. Matyas, Werner
262. Kassem, Youssef
263. Boston, Yvette

| No | Project No | Project Name | Project Manager | Project Value | Area | Start date | End data | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs, and environmental | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract/admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 25522 | | | 12`000`000.00 | | 10/02/2009 | | 8 | 5 | 8 | 3 | 0 | 2 | 7 | 8 | 7 | 3 | 5 | 0 | 3 | 3 |
| 2 | 26315 | | | | | 14/04/10 | 31/12/10 | 9 | 8 | 9 | 8 | 9 | 5 | 6 | 7 | 8 | 9 | 6 | 7 | 8 | 9 |
| 3 | 23618 | | | 35`000`000.00 | 10419 | 09/03/09 | | 10 | 8 | 9 | 5 | 4 | 5 | 8 | 5 | 8 | 8 | 9 | 6 | 5 | 5 |
| 4 | 26508 | | | 490`000.00 | | 01/07/10 | 31/07/2011 | 10 | 8 | 9 | 5 | 6 | 7 | 8 | 6 | 7 | 8 | 9 | 6 | 7 | 9 |
| 5 | 23296 | | | 1`269`000.00 | | 01/02/06 | | 8 | 6 | 7 | 8 | 6 | 7 | 9 | 9 | 9 | 7 | 5 | 5 | 9 | 7 |
| 6 | 23295 | | | 275`600.00 | | 01/02/06 | 08/05/2008 | 8 | 6 | 7 | 8 | 6 | 7 | 8 | 8 | 9 | 7 | 5 | 5 | 8 | 7 |
| 7 | 24030 | | | | | 01/04/07 | | 9 | 7 | 8 | 6 | 9 | 7 | 8 | 5 | 8 | 9 | 7 | 6 | 7 | 6 |
| 8 | 24093 | | | 10`000`000.00 | | 30/05/07 | | 8 | 8 | 9 | 5 | 6 | 7 | 8 | 9 | 8 | 10 | 6 | 5 | 9 | 7 |
| 9 | 23562 | | | 200`000`000.00 | | 01/08/06 | | 5 | 10 | 7 | 7 | 9 | 8 | 9 | 9 | 9 | 6 | 7 | 6 | 8 | 8 |
| 10 | 25161 | | | 120`000`000.00 | | 01/09/08 | 31/10/08 | 10 | 8 | 7 | 7 | 7 | 10 | 10 | 10 | 7 | 10 | 9 | 9 | 10 | 10 |
| 11 | 26093 | | | 3`800`000.00 | 8990 | 01/11/09 | 06/04/10 | 8 | 9 | 9 | 8 | 7 | 5 | 9 | 9 | 10 | 9 | 8 | 7 | 7 | 7 |
| 12 | 24600 | | | | | 01/03/08 | 29/02/12 | 8 | 10 | 10 | 7 | 7 | 5 | 9 | 10 | 10 | 9 | 7 | 7 | 10 | 10 |
| 13 | 25616 | | | | | 01/03/09 | | 8 | 7 | 7 | 8 | 9 | 7 | 5 | 7 | 6 | 8 | 5 | 5 | 5 | 5 |
| 14 | 25730 | | | | | | | 9 | 6 | 7 | 9 | 9 | 7 | 5 | 6 | 6 | 9 | 5 | 6 | 5 | 6 |
| 15 | 25792 | | | | | 01/07/09 | 31/03/10 | 8 | 6 | 6 | 8 | 8 | 8 | 6 | 7 | 7 | 8 | 6 | 5 | 6 | 5 |
| 16 | 24371 | | | | | 04/09/06 | 31/05/07 | 10 | 7 | 8 | 9 | 6 | 8 | 9 | 6 | 8 | 7 | 9 | 5 | 9 | 10 |
| 17 | 26410 | | | 6`000`000.00 | | 01/05/10 | 31/07/11 | 10 | 6 | 6 | 8 | 6 | 7 | 7 | 7 | 9 | 8 | 8 | 7 | 8 | 8 |
| 18 | 26333 | | | 1`000`000.00 | | 12/04/10 | 31/12/10 | 10 | 8 | 6 | 10 | 6 | 7 | 7 | 7 | 9 | 8 | 8 | 7 | 8 | 8 |
| 19 | 24315 | | | 37`757.00 | | 01/08/07 | | 9 | 9 | 8 | 10 | 7 | 8 | 4 | 9 | 9 | 10 | 2 | 3 | 6 | 8 |
| 20 | 24424 | | | | | 01/10/07 | | 8 | 8 | 7 | 9 | 8 | 7 | 3 | 8 | 8 | 9 | 4 | 4 | 4 | 6 |
| 21 | 24423 | | | | | 01/11/07 | | 9 | 8 | 8 | 9 | 6 | 8 | 4 | 7 | 8 | 10 | 2 | 8 | 6 | 3 |
| 22 | 26868 | | | 50`000`000.00 | 47`000 | 08/11/10 | 30/04/13 | 5 | 9 | 7 | 10 | 7 | 8 | 7 | 9 | 9 | 9 | 6 | 5 | 8 | 10 |
| 23 | 23597 | | | 18`000`000.00 | 7`050 | 05/09/06 | 26/02/10 | 5 | 9 | 8 | 10 | 6 | 9 | 6 | 9 | 6 | 8 | 9 | 4 | 7 | 10 |
| 24 | 25106 | | | 59`193`183.00 | 30`000 | 01/07/08 | 01/07/15 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 7 | 6 | 8 | 7 |
| 25 | 25577 | | | | | | | 9 | 7 | 8 | 8 | 8 | 7 | 7 | 8 | 8 | 7 | 7 | 7 | 8 | 8 |
| 26 | 26422 | | | 1`700`000.00 | 600 | 01/05/10 | 31/07/12 | 7 | 9 | 7 | 7 | 7 | 8 | 8 | 7 | 7 | 8 | 8 | 6 | 7 | 7 |
| 27 | 25057 | | | 321`285.00 | | 19/07/08 | 31/08/10 | 10 | 10 | 10 | 8 | 5 | 6 | 7 | 10 | 10 | 6 | 7 | 5 | 5 | 6 |
| 28 | 26713 | | | 3`840`000.00 | 5`000 | 10/09/10 | 31/07/11 | 10 | 10 | 10 | 7 | 5 | 5 | 7 | 10 | 10 | 6 | 6 | 0 | 5 | 5 |
| 29 | 26114 | | | 260721481 | 30000 | 04/12/09 | 31/01/12 | 6 | 8 | 9 | 10 | 6 | 9 | 8 | 10 | 9 | 9 | 6 | 6 | 4 | 5 |
| 30 | 27175 | | | 7`400`000.00 | 3210 | 04/01/11 | 26/10/12 | 6 | 8 | 10 | 10 | 7 | 8 | 7 | 9 | 9 | 9 | 4 | 2 | 3 | 6 |
| 31 | 24303 | | | | | 01/09/07 | | 6 | 7 | 4 | 32 | 6 | 5 | 8 | 6 | 9 | 10 | 3 | 2 | 0 | 6 |

| No | Project No | Project Name | Project Manager | Project Value | Area | Start date | End data | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs, and environmental | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract/admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 24820 | | | 80`000`000.00 | 26`500 | 01/06/08 | 01/12/13 | 8 | 8 | 9 | 6 | 6 | 8 | 9 | 9 | 10 | 8 | 8 | 6 | 8 | 10 |
| 33 | 25110 | | | 600`000`000.00 | | 22/08/08 | 28/01/15 | 9 | 9 | 10 | 8 | 9 | 10 | 8 | 5 | 9 | 9 | 7 | 7 | 9 | 10 |
| 34 | 25702 | | | 70`000`000.00 | 28`000 | 06/07/09 | 23/12/11 | 9 | 8 | 9 | 8 | 9 | 9 | 8 | 10 | 10 | 9 | 7 | 7 | 9 | 8 |
| 35 | 23137 | | | 318867999 | | 20/11/2005 | 30/09/2011 | 8 | 8 | 9 | 6 | 6 | 8 | 9 | 9 | 10 | 8 | 8 | 6 | 8 | 10 |
| 36 | 26150 | | | 10`000`000.00 | | 01/01/10 | 31/11/10 | 6 | 6 | 8 | 4 | 9 | 9 | 3 | 8 | 9 | 7 | 7 | 4 | 7 | 9 |
| 37 | 24377 | | | 9`400`000.00 | | 30/11/07 | 24/12/10 | 6 | 6 | 5 | 3 | 9 | 8 | 3 | 6 | 9 | 8 | 7 | 3 | 7 | 8 |
| 38 | 22994 | | | | | 01/07/05 | 30/09/11 | 7 | 9 | 10 | 5 | 8 | 9 | 9 | 6 | 10 | 7 | 9 | 6 | 7 | 9 |
| 39 | 26171 | | | 12`000`000.00 | | 08/03/10 | 31/12/11 | 10 | 8 | 6 | 10 | 6 | 7 | 7 | 7 | 9 | 8 | 8 | 7 | 8 | 8 |
| 40 | 23945 | | | 25`300`000.00 | | 01/03/07 | 01/08/10 | 10 | 9 | 7 | 10 | 7 | 8 | 7 | 7 | 9 | 7 | 8 | 8 | 8 | 7 |
| 41 | 26670 | | | 1`000`000.00 | | 11/08/10 | 31/03/11 | 10 | 7 | 7 | 10 | 5 | 7 | 8 | 8 | 9 | 8 | 7 | 7 | 7 | 8 |
| 42 | 24876 | | | | | 01/01/04 | 31/10/10 | 2 | 9 | 6 | 8 | 2 | 10 | 8 | 2 | 9 | 5 | 9 | 6 | 3 | 2 |
| 43 | 25684 | | | 33`000`000.00 | | 01/07/09 | 27/07/12 | 10 | 5 | 8 | 8 | 2 | 8 | 10 | 7 | 10 | 7 | 6 | 6 | 8 | 10 |
| 44 | 26397 | | | | | 01/05/10 | 31/03/11 | 7 | 5 | 7 | 9 | 2 | 9 | 7 | 9 | 9 | 8 | 6 | 5 | 7 | 7 |
| 45 | 22724 | | | 240`000`000.00 | 66`000 | 01/03/05 | 14/02/11 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 10 | 10 | 9 | 9 | 10 | 10 |
| 46 | 21814 | | | | | | | 8 | 7 | 8 | 6 | 5 | 7 | 8 | 8 | 8 | 7 | 5 | 5 | 4 | 6 |
| 47 | 26042 | | | 25`500`000.00 | | 19/05/09 | 31/12/11 | 7 | 9 | 9 | 6 | 5 | 6 | 8 | 10 | 9 | 5 | 5 | 3 | 4 | 5 |
| 48 | 23886 | | | 13`500`000.00 | | 01/04/07 | 31/03/09 | 8 | 7 | 8 | 6 | 4 | 8 | 4 | 10 | 9 | 6 | 6 | 3 | 2 | 4 |
| 49 | 26806 | | | 10`000`000.00 | | 18/10/10 | 28/02/11 | 6 | 7 | 5 | 6 | 6 | 8 | 4 | 9 | 9 | 6 | 6 | 0 | 3 | 6 |
| 50 | 22898 | | | 40`000`000.00 | | 24/06/05 | 01/12/10 | 8 | 8 | 4 | 6 | 5 | 8 | 2 | 10 | 5 | 6 | 7 | 3 | 0 | 10 |
| 51 | 26788 | | | 61`000`000.00 | | 04/10/10 | 01/10/12 | 8 | 7 | 5 | 7 | 5 | 7 | 4 | 9 | 8 | 6 | 8 | 3 | 5 | 5 |
| 52 | 23483 | | | 356`381`881.00 | | 11/05/06 | 31/05/11 | 6 | 8 | 3 | 5 | 5 | 2 | 8 | 9 | 7 | 2 | 5 | 4 | 6 | 4 |
| 53 | 25346 | | | | | | | 8 | 7 | 9 | 9 | 8 | 7 | 8 | 8 | 8 | 7 | 7 | 6 | 8 | 8 |
| 54 | 24554 | | | 13`200`000.00 | | 12/12/07 | | 6 | 9 | 9 | 7 | 5 | 6 | 8 | 9 | 8 | 4 | 6 | 3 | 2 | 6 |
| 55 | 24529 | | | 82`100`000.00 | | 01/03/08 | | 6 | 8 | 9 | 4 | 5 | 6 | 7 | 7 | 4 | 8 | 6 | 6 | 2 | 5 |
| 56 | 24412 | | | | 7`415 | 03/10/07 | | 4 | 8 | 7 | 4 | 7 | 6 | 8 | 6 | 4 | 9 | 6 | 9 | 2 | 4 |
| 57 | 24414 | | | | 43`000 | 03/10/07 | | 4 | 9 | 8 | 4 | 6 | 7 | 5 | 8 | 8 | 5 | 3 | 3 | 2 | 2 |
| 58 | 24741 | | | 525`194`351.00 | | 15/02/08 | 31/01/11 | 9 | 8 | 10 | 8 | 7 | 6 | 9 | 9 | 10 | 8 | 6 | 7 | 7 | 6 |
| 59 | 26285 | | | | | 30/03/10 | | 9 | 8 | 9 | 6 | 6 | 6 | 7 | 9 | 8 | 8 | 6 | 6 | 5 | 6 |
| 60 | 22940 | | | 243`840`234.00 | 180`000 | 15/05/05 | 31/10/11 | 9 | 9 | 10 | 8 | 7 | 9 | 9 | 10 | 10 | 7 | 8 | 7 | 8 | 8 |
| 61 | 24045 | | | 844`062`349.00 | | 09/05/10 | 31/07/12 | 9 | 9 | 10 | 9 | 8 | 10 | 9 | 10 | 10 | 10 | 8 | 8 | 8 | 9 |

| No | Project No | Project Name | Project Manager | Project Value | Area | Start date | End data | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs, and environmental | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract/admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 62 | 24301 | | | 300`000`000.00 | | 01/08/07 | | 8 | 8 | 9 | 8 | 7 | 8 | 8 | 9 | 10 | 9 | 5 | 7 | 5 | 7 |
| 63 | 26097 | | | 130`000`000.00 | 47`000 | 01/02/10 | 23/05/13 | 8 | 9 | 9 | 8 | 7 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 10 |
| 64 | 22649 | | | 10`000`000.00 | | 01/01/2005 | | 6 | 8 | 8 | 7 | 8 | 8 | 8 | 9 | 10 | 8 | 9 | 8 | 9 | 8 |
| 65 | 24267 | | | 91`578.00 | | 01/08/2007 | | 6 | 9 | 10 | 5 | 7 | 5 | 4 | 10 | 8 | 9 | 6 | 7 | 3 | 5 |
| 66 | 21790 | | | 10`500`000.00 | | | | 10 | 10 | 10 | 9 | 6 | 7 | 9 | 9 | 10 | 9 | 10 | 7 | 7 | 9 |
| 67 | 23813 | | | 57`000`000.00 | 11`608 | 01/12/06 | 16/07/10 | 10 | 10 | 10 | 8 | 10 | 8 | 9 | 10 | 10 | 8 | 10 | 7 | 10 | 10 |
| 68 | 22635 | | | | | 17/12/04 | | 9 | 7 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 69 | 25231 | | | 24`000`000.00 | 11`700 | 01/12/08 | 30/11/13 | 3 | 9 | 9 | 5 | 4 | 7 | 8 | 8 | 8 | 8 | 10 | 6 | 8 | 9 |
| 70 | 25232 | | | 30`000`000.00 | | 01/01/2009 | 15/10/2013 | 3 | 9 | 9 | 5 | 4 | 7 | 8 | 8 | 8 | 8 | 10 | 6 | 8 | 9 |
| 71 | 22806 | | | | | | | 10 | 9 | 9 | 10 | 9 | 7 | 10 | 8 | 9 | 8 | 8 | 7 | 7 | 9 |
| 72 | 22219 | | | 17`000`000.00 | | 24/05/2004 | 11/02/2005 | 10 | 10 | 5 | 7 | 4 | 6 | 10 | 10 | 5 | 7 | 8 | 8 | 10 | 9 |
| 73 | 21256 | | | 16`000`000.00 | | 03/09/2001 | | 10 | 10 | 9 | 9 | 6 | 7 | 10 | 9 | 9 | 10 | 8 | 8 | 8 | 9 |
| 74 | 23865 | | | | | 01/06/2007 | | 10 | 8 | 7 | 7 | 7 | 10 | 10 | 10 | 7 | 10 | 9 | 9 | 10 | 10 |
| 75 | 23379 | | | 171`000.00 | | 16/06/2006 | 01/09/2006 | 10 | 10 | 10 | 7 | 7 | 8 | 10 | 10 | 10 | 8 | 7 | 7 | 7 | 10 |
| 76 | 23358 | | | 3`000`000.00 | 1`080 | 14/03/06 | 30/04/2006 | 10 | 10 | 8 | 8 | 10 | 10 | 10 | 8 | 7 | 10 | 7 | 7 | 7 | 10 |
| 77 | 23304 | | | 609`000`000.00 | 80`000 | 04/01/2006 | 14/09/2009 | 10 | 6 | 9 | 6 | 7 | 8 | 7 | 7 | 9 | 6 | 7 | 5 | 5 | 7 |
| 78 | 23194 | | | 33`000`000.00 | 22`000 | 04/11/2006 | 28/12/2007 | 10 | 8 | 9 | 6 | 5 | 7 | 7 | 9 | 10 | 6 | 6 | 5 | 5 | 10 |
| 79 | 22686 | | | 12`200`000.00 | | 05/09/2005 | 23/06/2006 | 10 | 9 | 9 | 7 | 5 | 9 | 8 | 10 | 8 | 7 | 7 | 7 | 6 | 10 |
| 80 | 22655 | | | | | 01/01/2005 | | 10 | 5 | 9 | 5 | 5 | 6 | 10 | 10 | 10 | 5 | 5 | 5 | 5 | 9 |
| 81 | 21414 | | | 335`000`000.00 | 85`000 | 11/01/2002 | 30/09/2005 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 8 | 10 | 9 | 9 | 7 | 10 |
| 82 | 23596 | | | 15`249`899.00 | 8`738 | 05/07/2006 | 20/08/2010 | 5 | 9 | 8 | 10 | 4 | 9 | 6 | 9 | 8 | 7 | 9 | 4 | 7 | 10 |
| 83 | 22299 | | | | | 05/07/2004 | | 7 | 9 | 5 | 9 | 3 | 5 | 8 | 9 | 6 | 9 | 5 | 6 | 9 | 10 |
| 84 | | | | | | | | 7 | 8 | 6 | 8 | 5 | 7 | 8 | 9 | 6 | 8 | 5 | 6 | 7 | 6 |
| 85 | | | | | | | | 8 | 8 | 9 | 8 | 5 | 8 | 8 | 8 | 9 | 9 | 5 | 6 | 7 | 6 |
| 86 | | | | | | | | 9 | 7 | 9 | 5 | 9 | 5 | 7 | 5 | 9 | 8 | 5 | 7 | 8 | 7 |
| 87 | | | | | | | | 7 | 8 | 7 | 6 | 10 | 8 | 8 | 9 | 9 | 10 | 4 | 6 | 8 | 8 |
| 88 | | | | | | | | 9 | 7 | 9 | 7 | 7 | 7 | 8 | 8 | 9 | 7 | 6 | 7 | 6 | 7 |
| 89 | | | | | | | | 9 | 8 | 9 | 7 | 8 | 7 | 8 | 7 | 9 | 9 | 6 | 6 | 7 | 6 |
| 90 | | | | | | | | 8 | 7 | 8 | 9 | 10 | 8 | 8 | 8 | 8 | 8 | 7 | 6 | 7 | 6 |
| 91 | | | | | | | | 7 | 8 | 6 | 8 | 6 | 7 | 8 | 9 | 8 | 8 | 5 | 7 | 7 | 8 |

| No | Project No | Project Name | Project Manager | Project Value | Area | Start date | End data | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs, and environmental | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract/admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 92 | | | | | | | | 8 | 8 | 8 | 8 | 7 | 7 | 8 | 7 | 8 | 7 | 5 | 6 | 7 | 6 |
| 93 | 26632 | | | | | | | 9 | 8 | 6 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 94 | 26624 | | | | | | | 8 | 9 | 7 | 8 | 5 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 95 | 26623 | | | | | | | 9 | 7 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 96 | 26577 | | | | | | | 8 | 8 | 5 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 97 | 26424 | | | | | | | 9 | 9 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 98 | 26298 | | | | | | | 8 | 7 | 7 | 8 | 5 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 99 | 26028 | | | | | | | 9 | 8 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 100 | 25709 | | | | | | | 8 | 9 | 5 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 101 | 25527 | | | | | | | 9 | 7 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 102 | 24490 | | | | | | | 8 | 8 | 6 | 8 | 5 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 103 | 24369 | | | | | | | 9 | 9 | 7 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 104 | 24340 | | | | | | | 8 | 7 | 6 | 8 | 6 | 7 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 105 | 24264 | | | | | | | 9 | 8 | 6 | 8 | 6 | 7 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 106 | 24237 | | | | | 01/06/2007 | | 8 | 9 | 5 | 7 | 7 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 107 | 24204 | | | | | | | 9 | 8 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 108 | 24044 | | | 6`600`000.00 | | 01/03/2007 | 01/02/08 | 8 | 7 | 7 | 8 | 7 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 109 | 24032 | | | | | 01/03/2007 | | 9 | 8 | 6 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 110 | 24016 | | | | | | | 8 | 9 | 5 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 111 | 23960 | | | | | | | 9 | 7 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 112 | 23870 | | | | | 07/01/2007 | 07/07/2007 | 8 | 7 | 7 | 8 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 113 | 23869 | | | | | 07/01/2007 | 07/04/2007 | 9 | 8 | 6 | 7 | 7 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 114 | 23822 | | | | | | | 8 | 9 | 5 | 8 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 115 | 23789 | | | 25`000`000.00 | | 06/10/2006 | 01/01/2007 | 9 | 8 | 6 | 7 | 5 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 116 | 23713 | | | 1`000`000.00 | | 01/10/2006 | 01/10/2006 | 8 | 9 | 7 | 7 | 5 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 117 | 23711 | | | | | | | 9 | 7 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 118 | 23701 | | | | | | | 8 | 7 | 5 | 8 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 119 | 23660 | | | | | | | 9 | 8 | 6 | 9 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 120 | 23638 | | | | | | | 8 | 7 | 7 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 121 | 23486 | | | | | | | 9 | 9 | 6 | 8 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |

| No | Project No | Project Name | Project Manager | Project Value | Area | Start date | End data | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs, and environmental | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract/admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 122 | 23485 | | | | | 01/06/2006 | | 8 | 8 | 5 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 123 | 23449 | | | | | | | 9 | 7 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 124 | 23437 | | | | | 06/05/2006 | 06/12/2006 | 8 | 9 | 7 | 7 | 5 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 125 | 23436 | | | | | 06/05/2006 | 06/12/2006 | 9 | 8 | 6 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 126 | 23435 | | | | | 06/05/2006 | 06/12/2006 | 8 | 7 | 5 | 8 | 6 | 7 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 127 | 23408 | | | | | 01/05/2006 | 01/06/2006 | 9 | 9 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 128 | 23331 | | | | | | | 8 | 7 | 7 | 7 | 5 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 129 | 23302 | | | 15`000`000.00 | 6`000 | 01/03/2006 | | 9 | 8 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 130 | 23270 | | | | | 06/02/06 | | 8 | 7 | 5 | 7 | 6 | 7 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 131 | 23254 | | | | | | | 9 | 9 | 6 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 132 | 23172 | | | 19`000`000.00 | | | | 8 | 7 | 7 | 7 | 5 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 133 | 23095 | | | | | 01/11/2005 | 01/12/2006 | 9 | 8 | 6 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 134 | 23071 | | | | | | | 8 | 7 | 5 | 8 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 135 | 23039 | | | | | 05/09/2005 | 01/12/07 | 9 | 9 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 136 | 22998 | | | 18`000`000.00 | | 11/08/2005 | | 8 | 7 | 7 | 7 | 7 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 137 | 22899 | | | 62`164.00 | | | 01/12/06 | 9 | 8 | 6 | 8 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 138 | 22826 | | | 15`000`000.00 | | | 01/12/05 | 8 | 7 | 5 | 8 | 6 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 139 | 22752 | | | 19`000`000.00 | | 17/02/2005 | 31/05/2005 | 9 | 9 | 6 | 7 | 6 | 5 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 140 | 22714 | | | 15`000`000.00 | | 03/02/2005 | 17/02/2005 | 8 | 7 | 7 | 8 | 7 | 6 | 8 | 9 | 7 | 9 | 7 | 6 | 8 | 10 |
| 141 | 25106 | | | 59`193`183.00 | 30`000 | 01/07/2008 | 01/07/2015 | 5 | 8 | 6 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 7 | 6 | 7 | 7 |
| 142 | 25577 | | | | | | | 5 | 8 | 7 | 7 | 8 | 7 | 7 | 7 | 8 | 8 | 7 | 6 | 7 | 7 |
| 143 | 26542 | | | 158`370.00 | | 01/06/2010 | 31/07/2012 | 8 | 8 | 7 | 7 | 8 | 7 | 7 | 7 | 8 | 8 | 7 | 6 | 7 | 7 |
| | **Average** | | | | | | | 8 | 8 | 7 | 8 | 6 | 7 | 8 | 8 | 8 | 8 | 7 | 6 | 7 | 8 |

# Appendix 9.1 - CBR Results - printouts CBR-II

## Results of EFTE exercise for Value Parameters and Critical Success Factors

| Project | Project No 1 | Project No 2 | Project No 3 | Project No 4 | Project No 5 | Project No 6 | Project No 7 | Project No 8 | Project No 9 | Project No 10 | Project No 11 | Project No 12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 8 | 8 | 7 | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 9 | 10 | **9.00** |
| 2. Ensure effective project management and delivery | 7 | 6 | 4 | 7 | 5 | 3 | 5 | 6 | 6 | 6 | 3 | 9 | **5.58** |
| 3. Achieve the required financial performance | 8 | 8 | 8 | 7 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | **6.83** |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 6 | 6 | 3 | 5 | 4 | 6 | 5 | 6 | 5 | 4 | 4 | **4.92** |
| 5. Impact positively on the location of the facility | 8 | 9 | 10 | 3 | 10 | 7 | 8 | 10 | 10 | 9 | 5 | 5 | **7.83** |
| 6. Comply with third party requirements | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 1 | 1 | 5 | **3.00** |
| 1. Scope | 7 | 10 | 7 | 8 | 6 | 7 | 4 | 8 | 7 | 7 | 2 | 6 | **6.58** |
| 2. Time | 8 | 10 | 8 | 7 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | **8.83** |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 9 | **9.75** |
| 4. Quality | 8 | 6 | 9 | 7 | 9 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | **8.17** |
| 5. Contract-admin | 6 | 2 | 4 | 4 | 4 | 3 | 5 | 2 | 1 | 2 | 5 | 5 | **3.58** |
| 6. Human resource | 4 | 2 | 4 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **3.67** |
| 7. Risk | 5 | 5 | 5 | 8 | 7 | 5 | 5 | 4 | 4 | 10 | 5 | 4 | **5.58** |
| 8. Health and safety | 5 | 6 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 3 | 5 | **4.17** |

| Project | 1. Maximize business effectiveness | 2. Ensure effective project management and delivery | 3. Achieve the required financial performance | 4. Minimize building operation and maintenance costs & environmental impact | 5. Impact positively on the location of the facility | 6. Comply with third party requirements | 1. Scope | 2. Time | 3. Cost | 4. Quality | 5. Contract-admin | 6. Human resource | 7. Risk | 8. Health and safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project No 1 | 8 | 7 | 8 | 5 | 8 | 3 | 7 | 8 | 10 | 8 | 6 | 4 | 5 | 5 |
| Project No 2 | 8 | 6 | 8 | 6 | 9 | 3 | 10 | 10 | 10 | 6 | 2 | 2 | 5 | 6 |
| Project No 3 | 7 | 4 | 8 | 6 | 10 | 4 | 7 | 8 | 10 | 9 | 4 | 4 | 5 | 4 |
| Project No 4 | 10 | 7 | 7 | 3 | 3 | 2 | 8 | 7 | 10 | 7 | 4 | 3 | 8 | 4 |
| Project No 5 | 8 | 5 | 5 | 5 | 10 | 4 | 6 | 8 | 10 | 9 | 4 | 5 | 7 | 5 |
| Project No 6 | 10 | 3 | 6 | 4 | 7 | 3 | 7 | 8 | 10 | 9 | 3 | 3 | 5 | 3 |
| Project No 7 | 10 | 5 | 10 | 6 | 8 | 4 | 4 | 10 | 9 | 8 | 5 | 4 | 5 | 4 |
| Project No 8 | 9 | 6 | 5 | 5 | 10 | 3 | 8 | 9 | 10 | 9 | 2 | 3 | 4 | 4 |
| Project No 9 | 9 | 6 | 5 | 6 | 10 | 3 | 7 | 9 | 10 | 9 | 1 | 4 | 4 | 2 |
| Project No 10 | 10 | 6 | 4 | 5 | 9 | 1 | 7 | 10 | 9 | 8 | 2 | 4 | 10 | 5 |
| Project No 11 | 9 | 3 | 8 | 4 | 5 | 1 | 2 | 9 | 10 | 6 | 5 | 4 | 5 | 3 |
| Project No 12 | 10 | 9 | 8 | 4 | 5 | 5 | 6 | 10 | 9 | 10 | 5 | 4 | 4 | 5 |
| Average | **9** | **5.58** | **6.83** | **4.92** | **7.83** | **3** | **6.58** | **8.83** | **9.75** | **8.17** | **3.58** | **3.67** | **5.58** | **4.17** |

```
C:\Users\surlan\Downloads\dist\dist>emvc.exe cmp 25 100 0.5 11111 5
Ucitavanje podataka.
Alokacija memorije.
Alocirano.
Inicijalizacija.
Pravljenje fold-ova
Postinicijalizacija.
EM problem dimension = 149
Ulazak u glavnju petlju.
gen=0 val=2.237063  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=2
gen=1 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=5
gen=2 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=7
gen=3 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=10
gen=4 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=15
gen=5 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=10
gen=6 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=15
gen=7 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=20
gen=8 val=1.960769  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=25
gen=9 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=20
gen=10 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=75
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gen=12 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=25
gen=13 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=50
gen=14 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=75
gen=15 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=00
gen=16 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=25
gen=17 val=1.909580  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=50
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gen=20 val=1.905699  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=25
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gen=22 val=1.868706  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=75
gen=23 val=1.868706  Cache=0.00%  SSpace=0.00%  LS_Iter=0  LS_impr=0.00%  Eval=00
```

gen=24 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=25
gen=25 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=50
gen=26 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=75
gen=27 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=00
gen=28 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=25
gen=29 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=50
gen=30 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=75
gen=31 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=00
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gen=33 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=50
gen=34 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=75
gen=35 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=00
gen=36 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=25
gen=37 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=50
gen=38 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=75
gen=39 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=000
gen=40 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=025
gen=41 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=050
gen=42 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=075
gen=43 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=100
gen=44 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=125
gen=45 val=1.866958 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=150
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gen=53 val=1.859755 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=350
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gen=61 val=1.845280 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=550
gen=62 val=1.842308 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=575
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gen=70 val=1.812762 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=775
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gen=99 val=1.808147 Cache=0.00% SSpace=0.00% LS_Iter=0 LS_impr=0.00% Eval=697

---

Koeficijenti: 0.53 0.43 0.56 0.53 0.46 0.55

---

**Project 1**

---

Unesite VP: 8 7 8 5 8 3

Unesite CSF: 7 8 10 8 6 4 5 5

---

Srodni projekti:

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 1.93

Slicnost: 89%

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 2.31

Slicnost: 87%

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 2.82

Slicnost: 84%

---

P108.

VP: 8.0 7.0 7.0 8.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 2.83

Slicnost: 84%

---

P65.

VP: 6.0 9.0 10.0 5.0 7.0 5.0

CSF: 4.0 10.0 8.0 9.0 6.0 7.0 3.0 5.0

Udaljenost: 2.95

Slicnost: 83%

---

Ocekivani CSF: 7.00 8.40 7.60 8.80 6.40 6.40 7.00 8.40

Vas CSF: 7.00 8.00 10.00 8.00 6.00 4.00 5.00 5.00

Korekcija CSF: 0.00 0.40 -2.40 0.80 0.40 2.40 2.00 3.40

---

**Project 2**

---

Unesite VP: 8 6 8 6 9 3

Unesite CSF: 10 10 10 6 2 2 5 6

---

Srodni projekti:

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 2.06

Slicnost: 88%

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 2.35

Slicnost: 87%

---

P2.

VP: 9.0 8.0 9.0 8.0 9.0 5.0

CSF: 6.0 7.0 8.0 9.0 6.0 7.0 8.0 9.0

Udaljenost: 2.67

Slicnost: 85%

---

P108.

VP: 8.0 7.0 7.0 8.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 2.67

Slicnost: 85%

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.01

Slicnost: 83%

---

Ocekivani CSF: 7.40 7.80 7.60 8.80 6.40 6.40 8.00 9.20

Vas CSF: 10.00 10.00 10.00 6.00 2.00 2.00 5.00 6.00

Korekcija CSF: -2.60 -2.20 -2.40 2.80 4.40 4.40 3.00 3.20

---

**Project 3**

---

Unesite VP: 7 4 8 6 10 4

Unesite CSF: 7 8 10 9 4 4 5 4

---

Srodni projekti:

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 2.84

Slicnost: 84%

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.18

Slicnost: 82%

---

P7.

VP: 9.0 7.0 8.0 6.0 9.0 7.0

CSF: 8.0 5.0 8.0 9.0 7.0 6.0 7.0 6.0

Udaljenost: 3.37

Slicnost: 81%

---

P108.

VP: 8.0 7.0 7.0 8.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.43

Slicnost: 80%

---

P13.

VP: 8.0 7.0 7.0 8.0 9.0 7.0

CSF: 5.0 7.0 6.0 8.0 5.0 5.0 5.0 5.0

Udaljenost: 3.53

Slicnost: 80%

---

Ocekivani CSF: 7.20 7.00 7.40 8.60 6.20 6.00 7.20 7.60

Vas CSF: 7.00 8.00 10.00 9.00 4.00 4.00 5.00 4.00

Korekcija CSF: 0.20 -1.00 -2.60 -0.40 2.20 2.00 2.20 3.60

---

**Project 4**

---

Unesite VP: 10 7 7 3 3 2

Unesite CSF: 8 7 10 7 4 3 8 4

---

Srodni projekti:

---

P1.

VP: 8.0 5.0 8.0 3.0 0.0 2.0

CSF: 7.0 8.0 7.0 3.0 5.0 0.0 3.0 3.0

Udaljenost: 2.92

Slicnost: 83%

---

P3.

VP: 10.0 8.0 9.0 5.0 4.0 5.0

CSF: 8.0 5.0 8.0 8.0 9.0 6.0 5.0 5.0

Udaljenost: 3.19

Slicnost: 82%

---

P80.

VP: 10.0 5.0 9.0 5.0 5.0 6.0

CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 4.08

Slicnost: 77%

---

P128.

VP: 8.0 7.0 7.0 7.0 5.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.17

Slicnost: 76%

---

P132.

VP: 8.0 7.0 7.0 7.0 5.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.17

Slicnost: 76%

---

Ocekivani CSF: 8.20 8.20 7.80 6.80 6.60 4.60 5.80 7.40

Vas CSF: 8.00 7.00 10.00 7.00 4.00 3.00 8.00 4.00

Korekcija CSF: 0.20 1.20 -2.20 -0.20 2.60 1.60 -2.20 3.40

---

**Project 5**

---

Unesite VP: 8 5 5 5 10 4

Unesite CSF: 6 8 10 9 4 5 7 5

---

Srodni projekti:

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.28

Slicnost: 81%

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.43

Slicnost: 80%

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 3.49

Slicnost: 80%

---

P7.

VP: 9.0 7.0 8.0 6.0 9.0 7.0

CSF: 8.0 5.0 8.0 9.0 7.0 6.0 7.0 6.0

Udaljenost: 3.63

Slicnost: 79%

---

P108.

VP: 8.0 7.0 7.0 8.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66

Slicnost: 79%

---

Ocekivani CSF: 7.80 7.40 7.60 8.80 6.60 6.20 7.80 8.60

Vas CSF: 6.00 8.00 10.00 9.00 4.00 5.00 7.00 5.00

Korekcija CSF: 1.80 -0.60 -2.40 -0.20 2.60 1.20 0.80 3.60

---

**Project 6**

---

Unesite VP: 10 3 6 4 7 3

Unesite CSF: 7 8 10 9 3 3 5 3

---

Srodni projekti:

---

P80.

VP: 10.0 5.0 9.0 5.0 5.0 6.0

CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 3.75

Slicnost: 79%

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.06

Slicnost: 77%

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 4.12

Slicnost: 76%

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.27

Slicnost: 76%

---

P128.

VP: 8.0 7.0 7.0 7.0 5.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.28

Slicnost: 76%

---

Ocekivani CSF: 8.20 8.40 8.00 8.00 6.20 6.00 7.40 9.20

Vas CSF: 7.00 8.00 10.00 9.00 3.00 3.00 5.00 3.00

Korekcija CSF: 1.20 0.40 -2.00 -1.00 3.20 3.00 2.40 6.20

---

**Project 7**

---

Unesite VP: 10 5 10 6 8 4

Unesite CSF: 4 10 9 8 5 4 5 4

---

Srodni projekti:

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 2.08

Slicnost: 88%

---

P80.

VP: 10.0 5.0 9.0 5.0 5.0 6.0

CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 2.72

Slicnost: 84%

---

P2.

VP: 9.0 8.0 9.0 8.0 9.0 5.0

CSF: 6.0 7.0 8.0 9.0 6.0 7.0 8.0 9.0

Udaljenost: 2.84

Slicnost: 84%

---

P88.

VP: 9.0 7.0 9.0 7.0 7.0 7.0

CSF: 8.0 8.0 9.0 7.0 6.0 7.0 6.0 7.0

Udaljenost: 2.95

Slicnost: 83%

---

P59.

VP: 9.0 8.0 9.0 6.0 6.0 6.0

CSF: 7.0 9.0 8.0 8.0 6.0 6.0 5.0 6.0

Udaljenost: 2.99

Slicnost: 83%

---

Ocekivani CSF: 7.60 7.80 8.80 7.40 5.60 6.40 6.40 7.60

Vas CSF: 4.00 10.00 9.00 8.00 5.00 4.00 5.00 4.00

Korekcija CSF: 3.60 -2.20 -0.20 -0.60 0.60 2.40 1.40 3.60

---

**Project 8**

---

Unesite VP: 9 6 5 5 10 3

Unesite CSF: 8 9 10 9 2 3 4 4

---

Srodni projekti:

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.27

Slicnost: 81%

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.41

Slicnost: 80%

---

P86.

VP: 9.0 7.0 9.0 5.0 9.0 5.0

CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 3.47

Slicnost: 80%

---

P106.

VP: 8.0 9.0 5.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.58

Slicnost: 80%

---

P96.

VP: 8.0 8.0 5.0 7.0 6.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.73

Slicnost: 79%

---

Ocekivani CSF: 7.80 8.20 7.40 8.80 6.60 6.20 8.00 9.40

Vas CSF: 8.00 9.00 10.00 9.00 2.00 3.00 4.00 4.00

Korekcija CSF: -0.20 -0.80 -2.60 -0.20 4.60 3.20 4.00 5.40

---

**Project 9**

---

Unesite VP: 9 6 5 6 10 3

Unesite CSF: 7 9 10 9 1 4 4 2

---

Srodni projekti:

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.02

Slicnost: 83%

---

P136.

VP: 8.0 7.0 7.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.17

Slicnost: 82%

---

P106.

VP: 8.0 9.0 5.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.35

Slicnost: 81%

---

P108.

VP: 8.0 7.0 7.0 8.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.41

Slicnost: 80%

---

P96.

VP: 8.0 8.0 5.0 7.0 6.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.51

Slicnost: 80%

---

Ocekivani CSF: 8.00 9.00 7.00 9.00 7.00 6.00 8.00 10.00

Vas CSF: 7.00 9.00 10.00 9.00 1.00 4.00 4.00 2.00

Korekcija CSF: 1.00 0.00 -3.00 0.00 6.00 2.00 4.00 8.00

---

**Project 10**

---

Unesite VP: 10 6 4 5 9 1

Unesite CSF: 7 10 9 8 2 4 10 5

---

Srodni projekti:

---

P113.

VP: 9.0 8.0 6.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.15

Slicnost: 76%

---

P52.

VP: 6.0 8.0 3.0 5.0 5.0 2.0

CSF: 8.0 9.0 7.0 2.0 5.0 4.0 6.0 4.0

Udaljenost: 4.32

Slicnost: 75%

---

P106.

VP: 8.0 9.0 5.0 7.0 7.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.39

Slicnost: 75%

---

P96.

VP: 8.0 8.0 5.0 7.0 6.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.41

Slicnost: 75%

---

P93.

VP: 9.0 8.0 6.0 7.0 6.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.42

Slicnost: 75%

---

Ocekivani CSF: 8.00 9.00 7.00 7.60 6.60 5.60 7.60 8.80

Vas CSF: 7.00 10.00 9.00 8.00 2.00 4.00 10.00 5.00

Korekcija CSF: 1.00 -1.00 -2.00 -0.40 4.60 1.60 -2.40 3.80

---

**Project 11**

---

Unesite VP: 9 3 8 4 5 1

Unesite CSF: 2 9 10 6 5 4 5 3

---

Srodni projekti:

---

P1.

VP: 8.0 5.0 8.0 3.0 0.0 2.0

CSF: 7.0 8.0 7.0 3.0 5.0 0.0 3.0 3.0

Udaljenost: 3.84

Slicnost: 78%

---

P80.

VP: 10.0 5.0 9.0 5.0 5.0 6.0

CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 4.13

Slicnost: 76%

---

P128.

VP: 8.0 7.0 7.0 7.0 5.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.64

Slicnost: 73%

---

P132.

VP: 8.0 7.0 7.0 7.0 5.0 5.0

CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.64

Slicnost: 73%

---

P3.

VP: 10.0 8.0 9.0 5.0 4.0 5.0

CSF: 8.0 5.0 8.0 8.0 9.0 6.0 5.0 5.0

Udaljenost: 4.64

Slicnost: 73%

---

Ocekivani CSF: 8.20 8.20 7.80 6.80 6.60 4.60 5.80 7.40

Vas CSF: 2.00 9.00 10.00 6.00 5.00 4.00 5.00 3.00

Korekcija CSF: 6.20 -0.80 -2.20 0.80 1.60 0.60 0.80 4.40

---

**Project 12**

---

Unesite VP: 10 9 8 4 5 5

Unesite CSF: 6 10 9 10 5 4 4 5

---

Srodni projekti:

---

P3.

VP: 10.0 8.0 9.0 5.0 4.0 5.0

CSF: 8.0 5.0 8.0 8.0 9.0 6.0 5.0 5.0

Udaljenost: 1.41

Slicnost: 92%

---

P4.

VP: 10.0 8.0 9.0 5.0 6.0 7.0

CSF: 8.0 6.0 7.0 8.0 9.0 6.0 7.0 9.0

Udaljenost: 2.04

Slicnost: 88%

---

P59.

VP: 9.0 8.0 9.0 6.0 6.0 6.0

CSF: 7.0 9.0 8.0 8.0 6.0 6.0 5.0 6.0

Udaljenost: 2.16

Slicnost: 88%

---

P78.

VP: 10.0 8.0 9.0 6.0 5.0 7.0

CSF: 7.0 9.0 10.0 6.0 6.0 5.0 5.0 10.0

Udaljenost: 2.30

Slicnost: 87%

---

P8.

VP: 8.0 8.0 9.0 5.0 6.0 7.0

CSF: 8.0 9.0 8.0 10.0 6.0 5.0 9.0 7.0

Udaljenost: 2.51

Slicnost: 86%

---

Ocekivani CSF: 7.60 7.60 8.20 8.00 7.20 5.60 6.20 7.40

Vas CSF: 6.00 10.00 9.00 10.00 5.00 4.00 4.00 5.00

Korekcija CSF: 1.60 -2.40 -0.80 -2.00 2.20 1.60 2.20 2.40

---

## Appendix 9.2 - CBR Results in tables CBR-II

**Test Projects Value Parameters and Critical Success Factors**

| Project | Project No 1 | Project No 2 | Project No 3 | Project No 4 | Project No 5 | Project No 6 | Project No 7 | Project No 8 | Project No 9 | Project No 10 | Project No 11 | Project No 12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 8 | 8 | 7 | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 9 | 10 | **9.00** |
| 2. Ensure effective project management and delivery | 7 | 6 | 4 | 7 | 5 | 3 | 5 | 6 | 6 | 6 | 3 | 9 | **5.58** |
| 3. Achieve the required financial performance | 8 | 8 | 8 | 7 | 5 | 6 | 10 | 5 | 5 | 4 | 8 | 8 | **6.83** |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 6 | 6 | 3 | 5 | 4 | 6 | 5 | 6 | 5 | 4 | 4 | **4.92** |
| 5. Impact positively on the location of the facility | 8 | 9 | 10 | 3 | 10 | 7 | 8 | 10 | 10 | 9 | 5 | 5 | **7.83** |
| 6. Comply with third party requirements | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 1 | 1 | 5 | **3.00** |
| 1. Scope | 7 | 10 | 7 | 8 | 6 | 7 | 4 | 8 | 7 | 7 | 2 | 6 | **6.58** |
| 2. Time | 8 | 10 | 8 | 7 | 8 | 8 | 10 | 9 | 9 | 10 | 9 | 10 | **8.83** |
| 3. Cost | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 10 | 9 | **9.75** |
| 4. Quality | 8 | 6 | 9 | 7 | 9 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | **8.17** |
| 5. Contract-admin | 6 | 2 | 4 | 4 | 4 | 3 | 5 | 2 | 1 | 2 | 5 | 5 | **3.58** |
| 6. Human resource | 4 | 2 | 4 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **3.67** |
| 7. Risk | 5 | 5 | 5 | 8 | 7 | 5 | 5 | 4 | 4 | 10 | 5 | 4 | **5.58** |
| 8. Health and safety | 5 | 6 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 3 | 5 | **4.17** |

**Test Project No. 1**

| Project | Project No 1 | Project No 86 | Project No 136 | Project No 113 | Project No 108 | Project No 65 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 8 | 6 | | |
| 2. Ensure effective project management and delivery | 7 | 7 | 7 | 8 | 7 | 9 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 6 | 7 | 10 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 7 | 8 | 5 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 7 | 7 | 7 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 7 | 8 | 8 | 8 | 4 | 7,00 | 0,00 |
| 2. Time | 8 | 5 | 9 | 9 | 9 | 10 | 8,40 | 0,40 |
| 3. Cost | 10 | 9 | 7 | 7 | 7 | 8 | 7,60 | -2,40 |
| 4. Quality | 8 | 8 | 9 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 6 | 5 | 7 | 7 | 7 | 6 | 6,40 | 0,40 |
| 6. Human resource | 4 | 7 | 6 | 6 | 6 | 7 | 6,40 | 2,40 |
| 7. Risk | 5 | 8 | 8 | 8 | 8 | 3 | 7,00 | 2,00 |
| 8. Health and safety | 5 | 7 | 10 | 10 | 10 | 5 | 8,40 | 3,40 |
| Distance: | | 1,93 | 2,31 | 2,82 | 2,83 | 2,95 | | |
| Similarity: | | 89% | 87% | 84% | 84% | 83% | | |

| Project | Project No 2 | Project No 86 | Project No 136 | Project No 2 | Project No 108 | Project No 113 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 8 | 9 | | |
| 2. Ensure effective project management and delivery | 6 | 7 | 7 | 8 | 7 | 8 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 9 | 7 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 5 | 7 | 8 | 8 | 7 | | |
| 5. Impact positively on the location of the facility | 9 | 9 | 7 | 9 | 7 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 10 | 7 | 8 | 6 | 8 | 8 | 7,40 | -2,60 |
| 2. Time | 10 | 5 | 9 | 7 | 9 | 9 | 7,80 | -2,20 |
| 3. Cost | 10 | 9 | 7 | 8 | 7 | 7 | 7,60 | -2,40 |
| 4. Quality | 6 | 8 | 9 | 9 | 9 | 9 | 8,80 | 2,80 |
| 5. Contract-admin | 2 | 5 | 7 | 6 | 7 | 7 | 6,40 | 4,40 |
| 6. Human resource | 2 | 7 | 6 | 7 | 6 | 6 | 6,40 | 4,40 |
| 7. Risk | 5 | 8 | 8 | 8 | 8 | 8 | 8,00 | 3,00 |
| 8. Health and safety | 6 | 7 | 10 | 9 | 10 | 10 | 9,20 | 3,20 |
| Distance: | | 2,06 | 2,35 | 2,67 | 2,67 | 3,01 | | |
| Similarity: | | 88% | 87% | 85% | 85% | 83% | | |

| Project | Project No 3 | Project No 86 | Project No 136 | Project No 7 | Project No 108 | Project No 13 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 7 | 9 | 8 | 9 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 4 | 7 | 7 | 7 | 7 | 7 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 7 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 5 | 7 | 6 | 8 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 7 | 9 | | |
| 6. Comply with third party requirements | 4 | 5 | 5 | 7 | 5 | 7 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 7 | 8 | 8 | 8 | 5 | 7,20 | 0,20 |
| 2. Time | 8 | 5 | 9 | 5 | 9 | 7 | 7,00 | -1,00 |
| 3. Cost | 10 | 9 | 7 | 8 | 7 | 6 | 7,40 | -2,60 |
| 4. Quality | 9 | 8 | 9 | 9 | 9 | 8 | 8,60 | -0,40 |
| 5. Contract-admin | 4 | 5 | 7 | 7 | 7 | 5 | 6,20 | 2,20 |
| 6. Human resource | 4 | 7 | 6 | 6 | 6 | 5 | 6,00 | 2,00 |
| 7. Risk | 5 | 8 | 8 | 7 | 8 | 5 | 7,20 | 2,20 |
| 8. Health and safety | 4 | 7 | 10 | 6 | 10 | 5 | 7,60 | 3,60 |
| Distance: | | 2,84 | 3,18 | 3,37 | 3,43 | 3,53 | | |
| Similarity: | | 84% | 82% | 81% | 80% | 80% | | |

| Project | Project No 4 | Project No 1 | Project No 3 | Project No 80 | Project No 128 | Project No 132 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 8 | 10 | 10 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 7 | 5 | 8 | 5 | 7 | 7 | | |
| 3. Achieve the required financial performance | 7 | 8 | 9 | 9 | 7 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 3 | 3 | 5 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 3 | 0 | 4 | 5 | 5 | 5 | | |
| 6. Comply with third party requirements | 2 | 2 | 5 | 6 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 8 | 7 | 8 | 10 | 8 | 8 | 8,20 | 0,20 |
| 2. Time | 7 | 8 | 5 | 10 | 9 | 9 | 8,20 | 1,20 |
| 3. Cost | 10 | 7 | 8 | 10 | 7 | 7 | 7,80 | -2,20 |
| 4. Quality | 7 | 3 | 8 | 5 | 9 | 9 | 6,80 | -0,20 |
| 5. Contract-admin | 4 | 5 | 9 | 5 | 7 | 7 | 6,60 | 2,60 |
| 6. Human resource | 3 | 0 | 6 | 5 | 6 | 6 | 4,60 | 1,60 |
| 7. Risk | 8 | 3 | 5 | 5 | 8 | 8 | 5,80 | -2,20 |
| 8. Health and safety | 4 | 3 | 5 | 9 | 10 | 10 | 7,40 | 3,40 |
| Distance: | | 2,92 | 3,19 | 4,08 | 4,17 | 4,17 | | |
| Similarity: | | 83% | 82% | 77% | 76% | 76% | | |

| Project | Project No 5 | Project No 136 | Project No 113 | Project No 86 | Project No 7 | Project No 108 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 8 | 9 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 8 | 7 | 7 | 7 | | |
| 3. Achieve the required financial performance | 5 | 7 | 6 | 9 | 8 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 7 | 5 | 6 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 7 | 9 | 9 | 7 | | |
| 6. Comply with third party requirements | 4 | 5 | 5 | 5 | 7 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 8 | 7 | 8 | 8 | 7,80 | 1,80 |
| 2. Time | 8 | 9 | 9 | 5 | 5 | 9 | 7,40 | -0,60 |
| 3. Cost | 10 | 7 | 7 | 9 | 8 | 7 | 7,60 | -2,40 |
| 4. Quality | 9 | 9 | 9 | 8 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 4 | 7 | 7 | 5 | 7 | 7 | 6,60 | 2,60 |
| 6. Human resource | 5 | 6 | 6 | 7 | 6 | 6 | 6,20 | 1,20 |
| 7. Risk | 7 | 8 | 8 | 8 | 7 | 8 | 7,80 | 0,80 |
| 8. Health and safety | 5 | 10 | 10 | 7 | 6 | 10 | 8,60 | 3,60 |
| Distance: | | 3,28 | 3,43 | 3,49 | 3,63 | 3,66 | | |
| Similarity: | | 81% | 80% | 80% | 79% | 79% | | |

| Project | Project No 6 | Project No 80 | Project No 136 | Project No 86 | Project No 113 | Project No 128 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 8 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 3 | 5 | 7 | 7 | 8 | 7 | | |
| 3. Achieve the required financial performance | 6 | 9 | 7 | 9 | 6 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 7 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 7 | 5 | 7 | 9 | 7 | 5 | | |
| 6. Comply with third party requirements | 3 | 6 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 10 | 8 | 7 | 8 | 8 | 8,20 | 1,20 |
| 2. Time | 8 | 10 | 9 | 5 | 9 | 9 | 8,40 | 0,40 |
| 3. Cost | 10 | 10 | 7 | 9 | 7 | 7 | 8,00 | -2,00 |
| 4. Quality | 9 | 5 | 9 | 8 | 9 | 9 | 8,00 | -1,00 |
| 5. Contract-admin | 3 | 5 | 7 | 5 | 7 | 7 | 6,20 | 3,20 |
| 6. Human resource | 3 | 5 | 6 | 7 | 6 | 6 | 6,00 | 3,00 |
| 7. Risk | 5 | 5 | 8 | 8 | 8 | 8 | 7,40 | 2,40 |
| 8. Health and safety | 3 | 9 | 10 | 7 | 10 | 10 | 9,20 | 6,20 |
| Distance: | | 3,75 | 4,06 | 4,12 | 4,27 | 4,28 | | |
| Similarity: | | 79% | 77% | 76% | 76% | 76% | | |

| Project | Project No 7 | Project No 86 | Project No 80 | Project No 2 | Project No 88 | Project No 59 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 10 | 9 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 5 | 8 | 7 | 8 | | |
| 3. Achieve the required financial performance | 10 | 9 | 9 | 9 | 9 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 5 | 5 | 8 | 7 | 6 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 5 | 9 | 7 | 6 | | |
| 6. Comply with third party requirements | 4 | 5 | 6 | 5 | 7 | 6 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 4 | 7 | 10 | 6 | 8 | 7 | 7,60 | 3,60 |
| 2. Time | 10 | 5 | 10 | 7 | 8 | 9 | 7,80 | -2,20 |
| 3. Cost | 9 | 9 | 10 | 8 | 9 | 8 | 8,80 | -0,20 |
| 4. Quality | 8 | 8 | 5 | 9 | 7 | 8 | 7,40 | -0,60 |
| 5. Contract-admin | 5 | 5 | 5 | 6 | 6 | 6 | 5,60 | 0,60 |
| 6. Human resource | 4 | 7 | 5 | 7 | 7 | 6 | 6,40 | 2,40 |
| 7. Risk | 5 | 8 | 5 | 8 | 6 | 5 | 6,40 | 1,40 |
| 8. Health and safety | 4 | 7 | 9 | 9 | 7 | 6 | 7,60 | 3,60 |
| Distance: | | 2,08 | 2,72 | 2,84 | 2,95 | 2,99 | | |
| Similarity: | | 88% | 84% | 84% | 83% | 83% | | |

| Project | Project No 8 | Project No 113 | Project No 136 | Project No 86 | Project No 106 | Project No 96 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 9 | 9 | 8 | 9 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 6 | 8 | 7 | 7 | 9 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 7 | 9 | 5 | 5 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 7 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 7 | 9 | 7 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 8 | 8 | 8 | 7 | 8 | 8 | 7,80 | -0,20 |
| 2. Time | 9 | 9 | 9 | 5 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 7 | 9 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 9 | 9 | 9 | 8 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 2 | 7 | 7 | 5 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 3 | 6 | 6 | 7 | 6 | 6 | 6,20 | 3,20 |
| 7. Risk | 4 | 8 | 8 | 8 | 8 | 8 | 8,00 | 4,00 |
| 8. Health and safety | 4 | 10 | 10 | 7 | 10 | 10 | 9,40 | 5,40 |
| Distance: | | 3,27 | 3,41 | 3,47 | 3,58 | 3,73 | | |
| Similarity: | | 81% | 80% | 80% | 80% | 79% | | |

| Project | Project No 9 | Project No 113 | Project No 136 | Project No 106 | Project No 108 | Project No 96 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 9 | 9 | 8 | 8 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 6 | 8 | 7 | 9 | 7 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 7 | 5 | 7 | 5 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 7 | 7 | 7 | 8 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 7 | 7 | 7 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 8 | 8 | 8 | 8 | 8 | 8,00 | 1,00 |
| 2. Time | 9 | 9 | 9 | 9 | 9 | 9 | 9,00 | 0,00 |
| 3. Cost | 10 | 7 | 7 | 7 | 7 | 7 | 7,00 | -3,00 |
| 4. Quality | 9 | 9 | 9 | 9 | 9 | 9 | 9,00 | 0,00 |
| 5. Contract-admin | 1 | 7 | 7 | 7 | 7 | 7 | 7,00 | 6,00 |
| 6. Human resource | 4 | 6 | 6 | 6 | 6 | 6 | 6,00 | 2,00 |
| 7. Risk | 4 | 8 | 8 | 8 | 8 | 8 | 8,00 | 4,00 |
| 8. Health and safety | 2 | 10 | 10 | 10 | 10 | 10 | 10,00 | 8,00 |
| Distance:<br>Similarity: | | 3,02<br>83% | 3,17<br>82% | 3,35<br>81% | 3,41<br>80% | 3,51<br>80% | | |

| Project | Project No 10 | Project No 113 | Project No 52 | Project No 106 | Project No 96 | Project No 93 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 6 | 8 | 8 | 9 | | |
| 2. Ensure effective project management and delivery | 6 | 8 | 8 | 9 | 8 | 8 | | |
| 3. Achieve the required financial performance | 4 | 6 | 3 | 5 | 5 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 9 | 7 | 5 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 1 | 5 | 2 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 8 | 8 | 8 | 8 | 8 | 8,00 | 1,00 |
| 2. Time | 10 | 9 | 9 | 9 | 9 | 9 | 9,00 | -1,00 |
| 3. Cost | 9 | 7 | 7 | 7 | 7 | 7 | 7,00 | -2,00 |
| 4. Quality | 8 | 9 | 2 | 9 | 9 | 9 | 7,60 | -0,40 |
| 5. Contract-admin | 2 | 7 | 5 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 4 | 6 | 4 | 6 | 6 | 6 | 5,60 | 1,60 |
| 7. Risk | 10 | 8 | 6 | 8 | 8 | 8 | 7,60 | -2,40 |
| 8. Health and safety | 5 | 10 | 4 | 10 | 10 | 10 | 8,80 | 3,80 |
| Distance: | | 4,15 | 4,32 | 4,39 | 4,41 | 4,42 | | |
| Similarity: | | 76% | 75% | 75% | 75% | 75% | | |

| Project | Project No 11 | Project No 1 | Project No 80 | Project No 128 | Project No 132 | Project No 3 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 9 | 8 | 10 | 8 | 8 | 10 | | |
| 2. Ensure effective project management and delivery | 3 | 5 | 5 | 7 | 7 | 8 | | |
| 3. Achieve the required financial performance | 8 | 8 | 9 | 7 | 7 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 3 | 5 | 7 | 7 | 5 | | |
| 5. Impact positively on the location of the facility | 5 | 0 | 5 | 5 | 5 | 4 | | |
| 6. Comply with third party requirements | 1 | 2 | 6 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 2 | 7 | 10 | 8 | 8 | 8 | 8,20 | 6,20 |
| 2. Time | 9 | 8 | 10 | 9 | 9 | 5 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 10 | 7 | 7 | 8 | 7,80 | -2,20 |
| 4. Quality | 6 | 3 | 5 | 9 | 9 | 8 | 6,80 | 0,80 |
| 5. Contract-admin | 5 | 5 | 5 | 7 | 7 | 9 | 6,60 | 1,60 |
| 6. Human resource | 4 | 0 | 5 | 6 | 6 | 6 | 4,60 | 0,60 |
| 7. Risk | 5 | 3 | 5 | 8 | 8 | 5 | 5,80 | 0,80 |
| 8. Health and safety | 3 | 3 | 9 | 10 | 10 | 5 | 7,40 | 4,40 |
| Distance: | | 3,84 | 4,13 | 4,64 | 4,64 | 4,64 | | |
| Similarity: | | 78% | 76% | 73% | 73% | 73% | | |

| Project | Project No 12 | Project No 3 | Project No 4 | Project No 59 | Project No 78 | Project No 8 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 10 | 9 | 18 | 8 | | |
| 2. Ensure effective project management and delivery | 9 | 8 | 8 | 8 | 8 | 8 | | |
| 3. Achieve the required financial performance | 8 | 9 | 9 | 9 | 9 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 5 | 6 | 6 | 5 | | |
| 5. Impact positively on the location of the facility | 5 | 4 | 6 | 6 | 5 | 6 | | |
| 6. Comply with third party requirements | 5 | 5 | 7 | 6 | 7 | 7 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 8 | 7 | 7 | 8 | 7,60 | 1,60 |
| 2. Time | 10 | 5 | 6 | 9 | 9 | 9 | 7,60 | -2,40 |
| 3. Cost | 9 | 8 | 7 | 8 | 10 | 8 | 8,20 | -0,80 |
| 4. Quality | 10 | 8 | 8 | 8 | 6 | 10 | 8,00 | -2,00 |
| 5. Contract-admin | 5 | 9 | 9 | 6 | 6 | 6 | 7,20 | 2,20 |
| 6. Human resource | 4 | 6 | 6 | 6 | 5 | 5 | 5,60 | 1,60 |
| 7. Risk | 4 | 5 | 7 | 5 | 5 | 9 | 6,20 | 2,20 |
| 8. Health and safety | 5 | 5 | 9 | 6 | 10 | 7 | 7,40 | 2,40 |
| Distance: | | 1,41 | 2,04 | 2,16 | 2,30 | 2,51 | | |
| Similarity: | | 92% | 88% | 88% | 87% | 86% | | |

**Appendix 9.3 - CBR Results - printouts CBR-I**

**Koeficijenti: 0.53 0.43 0.56 0.53 0.46 0.55**

---

Unesite VP: 8 5 8 5 10 3
Unesite CSF: 6 8 10 9 2 2 3 3

---

Srodni projekti:

---

P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 2.34
Slicnost: 87%

---

P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.27
Slicnost: 81%

---

P7.
VP: 9.0 7.0 8.0 6.0 9.0 7.0
CSF: 8.0 5.0 8.0 9.0 7.0 6.0 7.0 6.0

Udaljenost: 3.47
Slicnost: 80%

---

P2.
VP: 9.0 8.0 9.0 8.0 9.0 5.0
CSF: 6.0 7.0 8.0 9.0 6.0 7.0 8.0 9.0

Udaljenost: 3.52
Slicnost: 80%

---

P108.
VP: 8.0 7.0 7.0 8.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66
Slicnost: 79%

---

Ocekivani CSF: 7.40 7.00 7.80 8.80 6.40 6.40 7.80 8.40

Vas CSF: 6.00 8.00 10.00 9.00 2.00 2.00 3.00 3.00

Korekcija CSF: 1.40 -1.00 -2.20 -0.20 4.40 4.40 4.80 5.40

---

Unesite VP: 8 5 8 5 10 3
Unesite CSF: 10 10 10 4 2 2 5 5
---
Srodni projekti:
---
P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 2.34
Slicnost: 87%
---
P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.27
Slicnost: 81%
---
P7.
VP: 9.0 7.0 8.0 6.0 9.0 7.0
CSF: 8.0 5.0 8.0 9.0 7.0 6.0 7.0 6.0

Udaljenost: 3.47
Slicnost: 80%
---
P2.
VP: 9.0 8.0 9.0 8.0 9.0 5.0
CSF: 6.0 7.0 8.0 9.0 6.0 7.0 8.0 9.0

Udaljenost: 3.52
Slicnost: 80%
---
P108.
VP: 8.0 7.0 7.0 8.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66
Slicnost: 79%
---
Ocekivani CSF: 7.40 7.00 7.80 8.80 6.40 6.40 7.80 8.40

Vas CSF: 10.00 10.00 10.00 4.00 2.00 2.00 5.00 5.00

Korekcija CSF: -2.60 -3.00 -2.20 4.80 4.40 4.40 2.80 3.40

---

Unesite VP: 8 5 8 5 10 3
Unesite CSF: 6 8 10 9 0 2 5 3

---

Srodni projekti:

---

P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 2.34
Slicnost: 87%

---

P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.27
Slicnost: 81%

---

P7.
VP: 9.0 7.0 8.0 6.0 9.0 7.0
CSF: 8.0 5.0 8.0 9.0 7.0 6.0 7.0 6.0

Udaljenost: 3.47
Slicnost: 80%

---

P2.
VP: 9.0 8.0 9.0 8.0 9.0 5.0
CSF: 6.0 7.0 8.0 9.0 6.0 7.0 8.0 9.0

Udaljenost: 3.52
Slicnost: 80%

---

P108.
VP: 8.0 7.0 7.0 8.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66
Slicnost: 79%

---

Ocekivani CSF: 7.40 7.00 7.80 8.80 6.40 6.40 7.80 8.40

Vas CSF: 6.00 8.00 10.00 9.00 0.00 2.00 5.00 3.00

Korekcija CSF: 1.40 -1.00 -2.20 -0.20 6.40 4.40 2.80 5.40

---

Unesite VP:  10 8 6 2 2  2
Unesite CSF:  8 6 10 6 0 2 8 3

---

Srodni projekti:

---

P1.
VP:  8.0  5.0  8.0  3.0  0.0  2.0
CSF:  7.0  8.0  7.0  3.0  5.0  0.0  3.0  3.0

Udaljenost:  3.25
Slicnost:  81%

---

P3.
VP:  10.0  8.0  9.0  5.0  4.0  5.0
CSF:  8.0  5.0  8.0  8.0  9.0  6.0  5.0  5.0

Udaljenost:  4.07
Slicnost:  77%

---

P52.
VP:  6.0  8.0  3.0  5.0  5.0  2.0
CSF:  8.0  9.0  7.0  2.0  5.0  4.0  6.0  4.0

Udaljenost:  4.74
Slicnost:  73%

---

P31.
VP:  6.0  7.0  4.0  3.0  6.0  5.0
CSF:  8.0  6.0  9.0  10.0  3.0  2.0  0.0  6.0

Udaljenost:  4.90
Slicnost:  72%

---

P116.
VP:  8.0  9.0  7.0  7.0  5.0  5.0
CSF:  8.0  9.0  7.0  9.0  7.0  6.0  8.0  10.0

Udaljenost:  5.05
Slicnost:  71%

---

Ocekivani CSF:  7.80  7.40  7.60  6.40  5.80  3.60  4.40  5.60

Vas CSF:  8.00  6.00  10.00  6.00  0.00  2.00  8.00  3.00

Korekcija CSF:  -0.20  1.40  -2.40  0.40  5.80  1.60  -3.60  2.60

---

Unesite VP: 10 5 5 5 10 3
Unesite CSF: 5 8 10 9 0 2 6 3

---

Srodni projekti:

---

P113.
VP: 9.0 8.0 6.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66
Slicnost: 79%

---

P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 3.72
Slicnost: 79%

---

P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.81
Slicnost: 78%

---

P93.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.07
Slicnost: 77%

---

P109.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.07
Slicnost: 77%

---

Ocekivani CSF: 7.80 8.20 7.40 8.80 6.60 6.20 8.00 9.40

Vas CSF: 5.00 8.00 10.00 9.00 0.00 2.00 6.00 3.00

Korekcija CSF: 2.80 0.20 -2.60 -0.20 6.60 4.20 2.00 6.40

---

Unesite VP: 10 2 6 4 6 2
Unesite CSF: 6 8 10 9 2 0 5 3

---

Srodni projekti:

---

P80.
VP: 10.0 5.0 9.0 5.0 5.0 6.0
CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 4.32
Slicnost: 75%

---

P128.
VP: 8.0 7.0 7.0 7.0 5.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.86
Slicnost: 72%

---

P132.
VP: 8.0 7.0 7.0 7.0 5.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.86
Slicnost: 72%

---

P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.86
Slicnost: 72%

---

P68.
VP: 9.0 7.0 6.0 8.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.97
Slicnost: 72%

---

Ocekivani CSF: 8.40 9.20 7.60 8.20 6.60 5.80 7.40 9.80

Vas CSF: 6.00 8.00 10.00 9.00 2.00 0.00 5.00 3.00

Korekcija CSF: 2.40 1.20 -2.40 -0.80 4.60 5.80 2.40 6.80

---

---
Unesite VP: 10 3 10 5 8 3
Unesite CSF: 2 10 9 8 3 3 5 3
---
Srodni projekti:
---
P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 3.25
Slicnost: 81%
---
P80.
VP: 10.0 5.0 9.0 5.0 5.0 6.0
CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 3.36
Slicnost: 81%
---
P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.34
Slicnost: 75%
---
P59.
VP: 9.0 8.0 9.0 6.0 6.0 6.0
CSF: 7.0 9.0 8.0 8.0 6.0 6.0 5.0 6.0

Udaljenost: 4.37
Slicnost: 75%
---
P77.
VP: 10.0 6.0 9.0 6.0 7.0 8.0
CSF: 7.0 7.0 9.0 6.0 7.0 5.0 5.0 7.0

Udaljenost: 4.37
Slicnost: 75%
---
Ocekivani CSF: 7.80 8.00 8.60 7.20 6.00 5.80 6.20 7.80

Vas CSF: 2.00 10.00 9.00 8.00 3.00 3.00 5.00 3.00

Korekcija CSF: 5.80 -2.00 -0.40 -0.80 3.00 2.80 1.20 4.80

---

Unesite VP: 10 5 5 5 10 3
Unesite CSF: 6 9 10 8 2 2 3 3

---

Srodni projekti:

---

P113.
VP: 9.0 8.0 6.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66
Slicnost: 79%

---

P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 3.72
Slicnost: 79%

---

P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.81
Slicnost: 78%

---

P93.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.07
Slicnost: 77%

---

P109.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.07
Slicnost: 77%

---

Ocekivani CSF: 7.80 8.20 7.40 8.80 6.60 6.20 8.00 9.40

Vas CSF: 6.00 9.00 10.00 8.00 2.00 2.00 3.00 3.00

Korekcija CSF: 1.80 -0.80 -2.60 0.80 4.60 4.20 5.00 6.40

---

Unesite VP: 10 5 5 5 10 3
Unesite CSF: 6 9 10 8 2 2 3 3

---

Srodni projekti:

---

P113.
VP: 9.0 8.0 6.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.66
Slicnost: 79%

---

P86.
VP: 9.0 7.0 9.0 5.0 9.0 5.0
CSF: 7.0 5.0 9.0 8.0 5.0 7.0 8.0 7.0

Udaljenost: 3.72
Slicnost: 79%

---

P136.
VP: 8.0 7.0 7.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 3.81
Slicnost: 78%

---

P93.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.07
Slicnost: 77%

---

P109.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.07
Slicnost: 77%

---

Ocekivani CSF: 7.80 8.20 7.40 8.80 6.60 6.20 8.00 9.40

Vas CSF: 6.00 9.00 10.00 8.00 2.00 2.00 3.00 3.00

Korekcija CSF: 1.80 -0.80 -2.60 0.80 4.60 4.20 5.00 6.40

---

Unesite VP: 10 4 4 4 8 0
Unesite CSF: 4 10 10 7 0 2 10 5

---

Srodni projekti:

---

P52.
VP: 6.0 8.0 3.0 5.0 5.0 2.0
CSF: 8.0 9.0 7.0 2.0 5.0 4.0 6.0 4.0

Udaljenost: 4.77
Slicnost: 73%

---

P31.
VP: 6.0 7.0 4.0 3.0 6.0 5.0
CSF: 8.0 6.0 9.0 10.0 3.0 2.0 0.0 6.0

Udaljenost: 5.33
Slicnost: 70%

---

P113.
VP: 9.0 8.0 6.0 7.0 7.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 5.35
Slicnost: 69%

---

P96.
VP: 8.0 8.0 5.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 5.47
Slicnost: 69%

---

P93.
VP: 9.0 8.0 6.0 7.0 6.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 5.47
Slicnost: 69%

---

Ocekivani CSF: 8.00 8.40 7.40 7.80 5.80 4.80 6.00 8.00

Vas CSF: 4.00 10.00 10.00 7.00 0.00 2.00 10.00 5.00

Korekcija CSF: 4.00 -1.60 -2.60 0.80 5.80 2.80 -4.00 3.00

---

Unesite VP: 10 2 8 4 4 2
Unesite CSF: 2 9 10 6 5 3 5 3

---

Srodni projekti:

---

P1.
VP: 8.0 5.0 8.0 3.0 0.0 2.0
CSF: 7.0 8.0 7.0 3.0 5.0 0.0 3.0 3.0

Udaljenost: 3.72
Slicnost: 79%

---

P80.
VP: 10.0 5.0 9.0 5.0 5.0 6.0
CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 3.76
Slicnost: 78%

---

P3.
VP: 10.0 8.0 9.0 5.0 4.0 5.0
CSF: 8.0 5.0 8.0 8.0 9.0 6.0 5.0 5.0

Udaljenost: 4.63
Slicnost: 74%

---

P128.
VP: 8.0 7.0 7.0 7.0 5.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.86
Slicnost: 72%

---

P132.
VP: 8.0 7.0 7.0 7.0 5.0 5.0
CSF: 8.0 9.0 7.0 9.0 7.0 6.0 8.0 10.0

Udaljenost: 4.86
Slicnost: 72%

---

Ocekivani CSF: 8.20 8.20 7.80 6.80 6.60 4.60 5.80 7.40

Vas CSF: 2.00 9.00 10.00 6.00 5.00 3.00 5.00 3.00

Korekcija CSF: 6.20 -0.80 -2.20 0.80 1.60 1.60 0.80 4.40

---

Unesite VP: 10 8 8 3 5 5
Unesite CSF: 5 10 9 10 5 2 4 4

---

Srodni projekti:

---

P3.
VP: 10.0 8.0 9.0 5.0 4.0 5.0
CSF: 8.0 5.0 8.0 8.0 9.0 6.0 5.0 5.0

Udaljenost: 1.77
Slicnost: 90%

---

P4.
VP: 10.0 8.0 9.0 5.0 6.0 7.0
CSF: 8.0 6.0 7.0 8.0 9.0 6.0 7.0 9.0

Udaljenost: 2.31
Slicnost: 87%

---

P59.
VP: 9.0 8.0 9.0 6.0 6.0 6.0
CSF: 7.0 9.0 8.0 8.0 6.0 6.0 5.0 6.0

Udaljenost: 2.63
Slicnost: 85%

---

P80.
VP: 10.0 5.0 9.0 5.0 5.0 6.0
CSF: 10.0 10.0 10.0 5.0 5.0 5.0 5.0 9.0

Udaljenost: 2.66
Slicnost: 85%

---

P8.
VP: 8.0 8.0 9.0 5.0 6.0 7.0
CSF: 8.0 9.0 8.0 10.0 6.0 5.0 9.0 7.0

Udaljenost: 2.73
Slicnost: 84%

---

Ocekivani CSF: 8.20 7.80 8.20 7.80 7.00 5.60 6.20 7.20

Vas CSF: 5.00 10.00 9.00 10.00 5.00 2.00 4.00 4.00

Korekcija CSF: 3.20 -2.20 -0.80 -2.20 2.00 3.60 2.20 3.20

---

## Appendix 9.4 - CBR Results in tables CBR-I

**Test Project No. 1**

| Project | Project No 1 | Project No 86 | Project No 136 | Project No 7 | Project No 2 | Project No 108 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 7 | 7 | 8 | 7 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 9 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 6 | 8 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 9 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 7 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 7 | 8 | 8 | 6 | 8 | 7,40 | 1,40 |
| 2. Time | 8 | 5 | 9 | 5 | 7 | 9 | 7,00 | -1,00 |
| 3. Cost | 10 | 9 | 7 | 8 | 8 | 7 | 7,80 | -2,20 |
| 4. Quality | 9 | 8 | 9 | 9 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 2 | 5 | 7 | 7 | 6 | 7 | 6,40 | 4,40 |
| 6. Human resource | 2 | 7 | 6 | 6 | 7 | 6 | 6,40 | 4,40 |
| 7. Risk | 3 | 8 | 8 | 7 | 8 | 8 | 7,80 | 4,80 |
| 8. Health and safety | 3 | 7 | 10 | 6 | 9 | 10 | 8,40 | 5,40 |
| Distance:<br>Similarity: | | 2,34<br>87 % | 3,27<br>81 % | 3,47<br>80 % | 3,52<br>80 % | 2,95<br>83 % | | 82% |

Test Project No.2

| Project | Project No 2 | Project No 86 | Project No 136 | Project No 7 | Project No 2 | Project No 108 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 7 | 7 | 8 | 7 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 9 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 6 | 8 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 9 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 7 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 10 | 7 | 8 | 8 | 6 | 8 | 7,40 | -2,60 |
| 2. Time | 10 | 5 | 9 | 5 | 7 | 9 | 7,00 | -3,00 |
| 3. Cost | 10 | 9 | 7 | 8 | 8 | 7 | 7,80 | -2,20 |
| 4. Quality | 4 | 8 | 9 | 9 | 9 | 9 | 8,80 | 4,80 |
| 5. Contract-admin | 2 | 5 | 7 | 7 | 6 | 7 | 6,40 | 4,40 |
| 6. Human resource | 2 | 7 | 6 | 6 | 7 | 6 | 6,40 | 4,40 |
| 7. Risk | 5 | 8 | 8 | 7 | 8 | 8 | 7,80 | 2,80 |
| 8. Health and safety | 5 | 7 | 10 | 6 | 9 | 10 | 8,40 | 3,40 |
| Distance: | | 2,3487 | 3,2781 | 3,4780 | 3,5280 | 3,6679 | | |
| Similarity: | | % | % | % | % | % | | 81% |

Test Project No.3

| Project | Project No 3 | Project No 86 | Project No 136 | Project No 7 | Project No 2 | Project No 108 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 7 | 7 | 8 | 7 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 9 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 6 | 8 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 9 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 7 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 7 | 8 | 8 | 6 | 8 | 7,40 | 1,40 |
| 2. Time | 8 | 5 | 9 | 5 | 7 | 9 | 7,00 | -1,00 |
| 3. Cost | 10 | 9 | 7 | 8 | 8 | 7 | 7,80 | -2,20 |
| 4. Quality | 9 | 8 | 9 | 9 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 0 | 5 | 7 | 7 | 6 | 7 | 6,40 | 6,40 |
| 6. Human resource | 2 | 7 | 6 | 6 | 7 | 6 | 6,40 | 4,40 |
| 7. Risk | 5 | 8 | 8 | 7 | 8 | 8 | 7,80 | 2,80 |
| 8. Health and safety | 3 | 7 | 10 | 6 | 9 | 10 | 8,40 | 5,40 |
| Distance: | | 2,3487 | 3,27 | 3,47 | 3,52 | 3,66 | | |
| Similarity: | | % | 81% | 80% | 80% | 79% | | 81% |

Test Project No.4

| Project | Project No 4 | Project No 1 | Project No 3 | Project No 52 | Project No 31 | Project No 116 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 8 | 10 | 6 | 6 | 8 | | |
| 2. Ensure effective project management and delivery | 8 | 5 | 8 | 8 | 7 | 9 | | |
| 3. Achieve the required financial performance | 6 | 8 | 9 | 3 | 4 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 2 | 3 | 5 | 5 | 3 | 7 | | |
| 5. Impact positively on the location of the facility | 2 | 0 | 4 | 5 | 6 | 5 | | |
| 6. Comply with third party requirements | 2 | 2 | 5 | 2 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 8 | 7 | 8 | 8 | 8 | 8 | 7,80 | -0,20 |
| 2. Time | 6 | 8 | 5 | 9 | 6 | 9 | 7,40 | 1,40 |
| 3. Cost | 10 | 7 | 8 | 7 | 9 | 7 | 7,60 | -2,40 |
| 4. Quality | 6 | 3 | 8 | 2 | 10 | 9 | 6,40 | 0,40 |
| 5. Contract-admin | 0 | 5 | 9 | 5 | 3 | 7 | 5,80 | 5,80 |
| 6. Human resource | 2 | 0 | 6 | 4 | 2 | 6 | 3,60 | 1,60 |
| 7. Risk | 8 | 3 | 5 | 6 | 0 | 8 | 4,40 | -3,60 |
| 8. Health and safety | 3 | 3 | 5 | 4 | 6 | 10 | 5,60 | 2,60 |
| Distance: | | 3,25 | 4,07 | 4,74 | 4,90 | 5,05 | | |
| Similarity: | | 81% | 77% | 73% | 72% | 71% | | 75% |

Test Project No.5

| Project | Project No 5 | Project No 113 | Project No 86 | Project No 136 | Project No 93 | Project No 109 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 9 | 8 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 8 | 7 | 7 | 8 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 9 | 7 | 6 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 9 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 5 | 8 | 7 | 8 | 8 | 8 | 7,80 | 2,80 |
| 2. Time | 8 | 9 | 5 | 9 | 9 | 9 | 8,20 | 0,20 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 9 | 9 | 8 | 9 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 0 | 7 | 5 | 7 | 7 | 7 | 6,60 | 6,60 |
| 6. Human resource | 2 | 6 | 7 | 6 | 6 | 6 | 6,20 | 4,20 |
| 7. Risk | 6 | 8 | 8 | 8 | 8 | 8 | 8,00 | 2,00 |
| 8. Health and safety | 3 | 10 | 7 | 10 | 10 | 10 | 9,40 | 6,40 |
| Distance: | | 3,66 | 3,72 | 3,81 | 4,07 | 4,07 | | |
| Similarity: | | 79% | 79% | 78% | 77% | 77% | | 78% |

Test Project No.6

| Project | Project No 6 | Project No 80 | Project No 128 | Project No 132 | Project No 136 | Project No 68 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 8 | 8 | 8 | 9 |
| 2. Ensure effective project management and delivery | 2 | 5 | 7 | 7 | 7 | 7 |
| 3. Achieve the required financial performance | 6 | 9 | 7 | 7 | 7 | 6 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 7 | 7 | 7 | 8 | | |
| 5. Impact positively on the location of the facility | 6 | 5 | 5 | 5 | 7 | 6 | | |
| 6. Comply with third party requirements | 2 | 6 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 10 | 8 | 8 | 8 | 8 | 8,40 | 2,40 |
| 2. Time | 8 | 10 | 9 | 9 | 9 | 9 | 9,20 | 1,20 |
| 3. Cost | 10 | 10 | 7 | 7 | 7 | 7 | 7,60 | -2,40 |
| 4. Quality | 9 | 5 | 9 | 9 | 9 | 9 | 8,20 | -0,80 |
| 5. Contract-admin | 2 | 5 | 7 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 0 | 5 | 6 | 6 | 6 | 6 | 5,80 | 5,80 |
| 7. Risk | 5 | 5 | 8 | 8 | 8 | 8 | 7,40 | 2,40 |
| 8. Health and safety | 3 | 9 | 10 | 10 | 10 | 10 | 9,80 | 6,80 |
| Distance: | | 4,32 | 4,86 | 4,86 | 4,86 | 4,97 | | |
| Similarity: | | 75% | 72% | 72% | 72% | 72% | | 73% |

Test Project No.7

| Project | Project No 7 | Project No 86 | Project No 80 | Project No 136 | Project No 59 | Project No 77 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 10 | 8 | 9 | 10 | | |
| 2. Ensure effective project management and delivery | 3 | 7 | 5 | 7 | 8 | 6 | | |
| 3. Achieve the required financial performance | 10 | 9 | 9 | 7 | 9 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 5 | 7 | 6 | 6 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 5 | 7 | 6 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 6 | 5 | 6 | 8 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 2 | 7 | 10 | 8 | 7 | 7 | 7,80 | 5,80 |
| 2. Time | 10 | 5 | 10 | 9 | 9 | 7 | 8,00 | -2,00 |
| 3. Cost | 9 | 9 | 10 | 7 | 8 | 9 | 8,60 | -0,40 |
| 4. Quality | 8 | 8 | 5 | 9 | 8 | 6 | 7,20 | -0,80 |
| 5. Contract-admin | 3 | 5 | 5 | 7 | 6 | 7 | 6,00 | 3,00 |
| 6. Human resource | 3 | 7 | 5 | 6 | 6 | 5 | 5,80 | 2,80 |
| 7. Risk | 5 | 8 | 5 | 8 | 5 | 5 | 6,20 | 1,20 |
| 8. Health and safety | 3 | 7 | 9 | 10 | 6 | 7 | 7,80 | 4,80 |
| Distance: | | 3,25 | 3,36 | 4,34 | 4,37 | 4,37 | | |
| Similarity: | | 81% | 81% | 75% | 75% | 75% | | 77% |

Test Project No.8

| Project | Project No 8 | Project No 113 | Project No 86 | Project No 136 | Project No 93 | Project No 109 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 9 | 8 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 8 | 7 | 7 | 8 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 9 | 7 | 6 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 9 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 7 | 8 | 8 | 8 | 7,80 | 1,80 |
| 2. Time | 9 | 9 | 5 | 9 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 8 | 9 | 8 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 2 | 7 | 5 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 2 | 6 | 7 | 6 | 6 | 6 | 6,20 | 4,20 |
| 7. Risk | 3 | 8 | 8 | 8 | 8 | 8 | 8,00 | 5,00 |
| 8. Health and safety | 3 | 10 | 7 | 10 | 10 | 10 | 9,40 | 6,40 |
| Distance: | | 3,66 | 3,72 | 3,81 | 4,07 | 4,07 | | |
| Similarity: | | 79% | 79% | 78% | 77% | 77% | | 78% |

Test Project No.9

| Project | Project No 9 | Project No 113 | Project No 86 | Project No 136 | Project No 93 | Project No 109 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 9 | 8 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 8 | 7 | 7 | 8 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 9 | 7 | 6 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 9 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 7 | 8 | 8 | 8 | 7,80 | 1,80 |
| 2. Time | 9 | 9 | 5 | 9 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 8 | 9 | 8 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 2 | 7 | 5 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 2 | 6 | 7 | 6 | 6 | 6 | 6,20 | 4,20 |
| 7. Risk | 3 | 8 | 8 | 8 | 8 | 8 | 8,00 | 5,00 |
| 8. Health and safety | 3 | 10 | 7 | 10 | 10 | 10 | 9,40 | 6,40 |
| Distance: | | 3,66 | 3,72 | 3,81 | 4,07 | 4,07 | | |
| Similarity: | | 79% | 79% | 78% | 77% | 77% | | 78% |

Test Project No.10

| Project | Project No 10 | Project No 52 | Project No 31 | Project No 113 | Project No 96 | Project No 93 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 6 | 6 | 9 | 8 | 9 | | |
| 2. Ensure effective project management and delivery | 4 | 8 | 7 | 8 | 8 | 8 | | |
| 3. Achieve the required financial performance | 4 | 3 | 4 | 6 | 5 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 3 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 8 | 5 | 6 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 0 | 2 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 4 | 8 | 8 | 8 | 8 | 8 | 8,00 | 4,00 |
| 2. Time | 10 | 9 | 6 | 9 | 9 | 9 | 8,40 | -1,60 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 7 | 2 | 10 | 9 | 9 | 9 | 7,80 | 0,80 |
| 5. Contract-admin | 0 | 5 | 3 | 7 | 7 | 7 | 5,80 | 5,80 |
| 6. Human resource | 2 | 4 | 2 | 6 | 6 | 6 | 4,80 | 2,80 |
| 7. Risk | 10 | 6 | 0 | 8 | 8 | 8 | 6,00 | -4,00 |
| 8. Health and safety | 5 | 4 | 6 | 10 | 10 | 10 | 8,00 | 3,00 |
| Distance: | | 4,77 | 5,33 | 5,35 | 5,47 | 5,47 | | |
| Similarity: | | 73% | 70% | 69% | 69% | 69% | | 70% |

Test Project No.11

| Project | Project No 11 | Project No 1 | Project No 80 | Project No 3 | Project No 128 | Project No 132 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 8 | 10 | 10 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 2 | 5 | 5 | 8 | 7 | 7 | | |
| 3. Achieve the required financial performance | 8 | 8 | 9 | 9 | 7 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 3 | 5 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 4 | 0 | 5 | 4 | 5 | 5 | | |
| 6. Comply with third party requirements | 2 | 2 | 6 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 2 | 7 | 10 | 8 | 8 | 8 | 8,20 | 6,20 |
| 2. Time | 9 | 8 | 10 | 5 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 10 | 8 | 7 | 7 | 7,80 | -2,20 |
| 4. Quality | 6 | 3 | 5 | 8 | 9 | 9 | 6,80 | 0,80 |
| 5. Contract-admin | 5 | 5 | 5 | 9 | 7 | 7 | 6,60 | 1,60 |
| 6. Human resource | 3 | 0 | 5 | 6 | 6 | 6 | 4,60 | 1,60 |
| 7. Risk | 5 | 3 | 5 | 5 | 8 | 8 | 5,80 | 0,80 |
| 8. Health and safety | 3 | 3 | 9 | 5 | 10 | 10 | 7,40 | 4,40 |
| Distance: | | 3,72 | 3,76 | 4,63 | 4,86 | 4,86 | | |
| Similarity: | | 78% | 76% | 73% | 73% | 73% | | 75% |

Test Project No.12

| Project | Project No 12 | Project No 3 | Project No 4 | Project No 59 | Project No 80 | Project No 8 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 10 | 9 | 10 | 8 | | |
| 2. Ensure effective project management and delivery | 8 | 8 | 8 | 8 | 5 | 8 | | |
| 3. Achieve the required financial performance | 8 | 9 | 9 | 9 | 9 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 3 | 5 | 5 | 6 | 5 | 5 | | |
| 5. Impact positively on the location of the facility | 5 | 4 | 6 | 6 | 5 | 6 | | |
| 6. Comply with third party requirements | 5 | 5 | 7 | 6 | 6 | 7 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 5 | 8 | 8 | 7 | 10 | 8 | 8,20 | 3,20 |
| 2. Time | 10 | 5 | 6 | 9 | 10 | 9 | 7,80 | -2,20 |
| 3. Cost | 9 | 8 | 7 | 8 | 10 | 8 | 8,20 | -0,80 |
| 4. Quality | 10 | 8 | 8 | 8 | 5 | 10 | 7,80 | -2,20 |
| 5. Contract-admin | 5 | 9 | 9 | 6 | 5 | 6 | 7,00 | 2,00 |
| 6. Human resource | 2 | 6 | 6 | 6 | 5 | 5 | 5,60 | 3,60 |
| 7. Risk | 4 | 5 | 7 | 5 | 5 | 9 | 6,20 | 2,20 |
| 8. Health and safety | 4 | 5 | 9 | 6 | 9 | 7 | 7,20 | 3,20 |
| Distance: | | 1,77 | 2,31 | 2,63 | 2,66 | 2,73 | | |
| Similarity: | | 90% | 87% | 85% | 85% | 84% | | 86% |

# Appendix 9.5 - CBR Results - proposed changes to CBR-II and CBR-I

Local experience applied

| Project | Project No 1 | Project No 86 | Project No 136 | Project No 113 | Project No 108 | Project No 65 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 8 | 6 | | |
| 2. Ensure effective project management and delivery | 7 | 7 | 7 | 8 | 7 | 9 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 6 | 7 | 10 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 7 | 8 | 5 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 7 | 7 | 7 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 7 | 8 | 8 | 8 | 4 | 7,00 | 0,00 |
| 2. Time | 8 | 5 | 9 | 9 | 9 | 10 | 8,40 | 0,40 |
| 3. Cost | 10 | 9 | 7 | 7 | 7 | 8 | 7,60 | -2,40 |
| 4. Quality | 8 | 8 | 9 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 6 | 5 | 7 | 7 | 7 | 6 | 6,40 | 0,40 |
| 6. Human resource | 4 | 7 | 6 | 6 | 6 | 7 | 6,40 | 2,40 |
| 7. Risk | 5 | 8 | 8 | 8 | 8 | 3 | 7,00 | 2,00 |
| 8. Health and safety | 5 | 7 | 10 | 10 | 10 | 5 | 8,40 | 3,40 |
| Distance: | | 1,93 | 2,31 | 2,82 | 2,83 | 2,95 | | |
| Similarity: | | 89% | 87% | 84% | 84% | 83% | | 85% |

Local experience not applied

| Project | Project No 1 | Project No 86 | Project No 136 | Project No 7 | Project No 2 | Project No 108 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 7 | 7 | 8 | 7 | | |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 9 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 6 | 8 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 9 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 7 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 7 | 8 | 8 | 6 | 8 | 7,40 | 1,40 |
| 2. Time | 8 | 5 | 9 | 5 | 7 | 9 | 7,00 | -1,00 |
| 3. Cost | 10 | 9 | 7 | 8 | 8 | 7 | 7,80 | -2,20 |
| 4. Quality | 9 | 8 | 9 | 9 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 2 | 5 | 7 | 7 | 6 | 7 | 6,40 | 4,40 |
| 6. Human resource | 2 | 7 | 6 | 6 | 7 | 6 | 6,40 | 4,40 |
| 7. Risk | 3 | 8 | 8 | 7 | 8 | 8 | 7,80 | 4,80 |
| 8. Health and safety | 3 | 7 | 10 | 6 | 9 | 10 | 8,40 | 5,40 |
| Distance: | | 2,34 | 3,27 | 3,47 | 3,52 | 2,95 | | |
| Similarity: | | 87% | 81% | 80% | 80% | 83% | | 82% |

| Project | Project No 2 | Project No 86 | Project No 136 | Project No 2 | Project No 108 | Project No 113 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 8 | 9 |
| 2. Ensure effective project management and delivery | 6 | 7 | 7 | 8 | 7 | 8 |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 9 | 7 | 6 |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 5 | 7 | 8 | 8 | 7 |
| 5. Impact positively on the location of the facility | 9 | 9 | 7 | 9 | 7 | 7 |

| Project | Project No 2 | Project No 86 | Project No 136 | Project No 7 | Project No 2 | Project No 108 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 9 | 8 |
| 2. Ensure effective project management and delivery | 5 | 7 | 7 | 7 | 8 | 7 |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 9 | 7 |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 6 | 8 | 8 |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 9 | 7 |

| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
|---|---|---|---|---|---|---|---|---|
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 10 | 7 | 8 | 6 | 8 | 8 | 7,40 | -2,60 |
| 2. Time | 10 | 5 | 9 | 7 | 9 | 9 | 7,80 | -2,20 |
| 3. Cost | 10 | 9 | 7 | 8 | 7 | 7 | 7,60 | -2,40 |
| 4. Quality | 6 | 8 | 9 | 9 | 9 | 9 | 8,80 | 2,80 |
| 5. Contract-admin | 2 | 5 | 7 | 6 | 7 | 7 | 6,40 | 4,40 |
| 6. Human resource | 2 | 7 | 6 | 7 | 6 | 6 | 6,40 | 4,40 |
| 7. Risk | 5 | 8 | 8 | 8 | 8 | 8 | 8,00 | 3,00 |
| 8. Health and safety | 6 | 7 | 10 | 9 | 10 | 10 | 9,20 | 3,20 |
| Distance: | | 2,06 | 2,35 | 2,67 | 2,67 | 3,01 | | |
| Similarity: | | 88% | 87% | 85% | 85% | 83% | | 86% |

| **Project** | Project No 3 | Project No 86 | Project No 136 | Project No 7 | Project No 108 | Project No 13 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 7 | 9 | 8 | 9 | 8 | 8 |
| 2. Ensure effective project management and delivery | 4 | 7 | 7 | 7 | 7 | 7 |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 7 | 7 |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 5 | 7 | 6 | 8 | 8 |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 7 | 9 |
| 6. Comply with third party requirements | 4 | 5 | 5 | 7 | 5 | 7 |
| **CSF** | | | | | | |
| 1. Scope | 7 | 7 | 8 | 8 | 8 | 5 |
| 2. Time | 8 | 5 | 9 | 5 | 9 | 7 |
| 3. Cost | 10 | 9 | 7 | 8 | 7 | 6 |
| 4. Quality | 9 | 8 | 9 | 9 | 9 | 8 |
| 5. Contract-admin | 4 | 5 | 7 | 7 | 7 | 5 |
| 6. Human resource | 4 | 7 | 6 | 6 | 6 | 5 |
| 7. Risk | 5 | 8 | 8 | 7 | 8 | 5 |
| 8. Health and safety | 4 | 7 | 10 | 6 | 10 | 5 |
| Distance: | | 2,84 | 3,18 | 3,37 | 3,43 | 3,53 |
| Similarity: | | 84% | 82% | 81% | 80% | 80% |

| **Project** | Project No 4 | Project No 1 | Project No 3 | Project No 80 | Project No 128 | Project No 132 |
|---|---|---|---|---|---|---|

| 6. Comply with third party requirements | 3 | 5 | 5 | 7 | 5 | 5 | | |
|---|---|---|---|---|---|---|---|---|
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 10 | 7 | 8 | 8 | 6 | 8 | 7,40 | -2,60 |
| 2. Time | 10 | 5 | 9 | 5 | 7 | 9 | 7,00 | -3,00 |
| 3. Cost | 10 | 9 | 7 | 8 | 8 | 7 | 7,80 | -2,20 |
| 4. Quality | 4 | 8 | 9 | 9 | 9 | 9 | 8,80 | 4,80 |
| 5. Contract-admin | 2 | 5 | 7 | 7 | 6 | 7 | 6,40 | 4,40 |
| 6. Human resource | 2 | 7 | 6 | 6 | 7 | 6 | 6,40 | 4,40 |
| 7. Risk | 5 | 8 | 8 | 7 | 8 | 8 | 7,80 | 2,80 |
| 8. Health and safety | 5 | 7 | 10 | 6 | 9 | 10 | 8,40 | 3,40 |
| Distance: | | 2,34 | 3,27 | 3,47 | 3,52 | 3,66 | | |
| Similarity: | | 87% | 81% | 80% | 80% | 79% | | 81% |

| **Project** | Project No 3 | Project No 86 | Project No 136 | Project No 7 | Project No 2 | Project No 108 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 8 | 9 | 8 | 9 | 9 | 8 |
| 2. Ensure effective project management and delivery | 5 | 7 | 7 | 7 | 8 | 7 |
| 3. Achieve the required financial performance | 8 | 9 | 7 | 8 | 9 | 7 |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 7 | 6 | 8 | 8 |
| 5. Impact positively on the location of the facility | 10 | 9 | 7 | 9 | 9 | 7 |
| 6. Comply with third party requirements | 3 | 5 | 5 | 7 | 5 | 5 |
| **CSF** | | | | | | |
| 1. Scope | 6 | 7 | 8 | 8 | 6 | 8 |
| 2. Time | 8 | 5 | 9 | 5 | 7 | 9 |
| 3. Cost | 10 | 9 | 7 | 8 | 8 | 7 |
| 4. Quality | 9 | 8 | 9 | 9 | 9 | 9 |
| 5. Contract-admin | 0 | 5 | 7 | 7 | 6 | 7 |
| 6. Human resource | 2 | 7 | 6 | 6 | 7 | 6 |
| 7. Risk | 5 | 8 | 8 | 7 | 8 | 8 |
| 8. Health and safety | 3 | 7 | 10 | 6 | 9 | 10 |
| Distance: | | 2,34 | 3,27 | 3,47 | 3,52 | 3,66 |
| Similarity: | | 87% | 81% | 80% | 80% | 79% |

| **Project** | Project No 4 | Project No 1 | Project No 3 | Project No 52 | Project No 31 | Project No 116 |
|---|---|---|---|---|---|---|

| VP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 10 | 8 | 10 | 10 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 7 | 5 | 8 | 5 | 7 | 7 | | |
| 3. Achieve the required financial performance | 7 | 8 | 9 | 9 | 7 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 3 | 3 | 5 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 3 | 0 | 4 | 5 | 5 | 5 | | |
| 6. Comply with third party requirements | 2 | 2 | 5 | 6 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 8 | 7 | 8 | 10 | 8 | 8 | 8,20 | 0,20 |
| 2. Time | 7 | 8 | 5 | 10 | 9 | 9 | 8,20 | 1,20 |
| 3. Cost | 10 | 7 | 8 | 10 | 7 | 7 | 7,80 | -2,20 |
| 4. Quality | 7 | 3 | 8 | 5 | 9 | 9 | 6,80 | -0,20 |
| 5. Contract-admin | 4 | 5 | 9 | 5 | 7 | 7 | 6,60 | 2,60 |
| 6. Human resource | 3 | 0 | 6 | 5 | 6 | 6 | 4,60 | 1,60 |
| 7. Risk | 8 | 3 | 5 | 5 | 8 | 8 | 5,80 | -2,20 |
| 8. Health and safety | 4 | 3 | 5 | 9 | 10 | 10 | 7,40 | 3,40 |
| Distance: | | 2,92 | 3,19 | 4,08 | 4,17 | 4,17 | | |
| Similarity: | | 83% | 82% | 77% | 76% | 76% | | 79% |

| VP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Maximize business effectiveness | 10 | 8 | 10 | 6 | 6 | 8 | | |
| 2. Ensure effective project management and delivery | 8 | 5 | 8 | 8 | 7 | 9 | | |
| 3. Achieve the required financial performance | 6 | 8 | 9 | 3 | 4 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 2 | 3 | 5 | 5 | 3 | 7 | | |
| 5. Impact positively on the location of the facility | 2 | 0 | 4 | 5 | 6 | 5 | | |
| 6. Comply with third party requirements | 2 | 2 | 5 | 2 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 8 | 7 | 8 | 8 | 8 | 8 | 7,80 | -0,20 |
| 2. Time | 6 | 8 | 5 | 9 | 6 | 9 | 7,40 | 1,40 |
| 3. Cost | 10 | 7 | 8 | 7 | 9 | 7 | 7,60 | -2,40 |
| 4. Quality | 6 | 3 | 8 | 2 | 10 | 9 | 6,40 | 0,40 |
| 5. Contract-admin | 0 | 5 | 9 | 5 | 3 | 7 | 5,80 | 5,80 |
| 6. Human resource | 2 | 0 | 6 | 4 | 2 | 6 | 3,60 | 1,60 |
| 7. Risk | 8 | 3 | 5 | 6 | 0 | 8 | 4,40 | -3,60 |
| 8. Health and safety | 3 | 3 | 5 | 4 | 6 | 10 | 5,60 | 2,60 |
| Distance: | | 3,25 | 4,07 | 4,74 | 4,90 | 5,05 | | |
| Similarity: | | 81% | 77% | 73% | 72% | 71% | | 75% |

| Project | Project No 5 | Project No 136 | Project No 113 | Project No 86 | Project No 7 | Project No 108 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 8 | 8 | 9 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 5 | 7 | 8 | 7 | 7 | 7 | | |
| 3. Achieve the required financial performance | 5 | 7 | 6 | 9 | 8 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 7 | 5 | 6 | 8 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 7 | 9 | 9 | 7 | | |
| 6. Comply with third party requirements | 4 | 5 | 5 | 5 | 7 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 8 | 7 | 8 | 8 | 7,80 | 1,80 |
| 2. Time | 8 | 9 | 9 | 5 | 5 | 9 | 7,40 | -0,60 |
| 3. Cost | 10 | 7 | 7 | 9 | 8 | 7 | 7,60 | -2,40 |
| 4. Quality | 9 | 9 | 9 | 8 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 4 | 7 | 7 | 5 | 7 | 7 | 6,60 | 2,60 |
| 6. Human resource | 5 | 6 | 6 | 7 | 6 | 6 | 6,20 | 1,20 |

| Project | Project No 5 | Project No 113 | Project No 86 | Project No 136 | Project No 93 | Project No 109 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 9 | 8 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 8 | 7 | 7 | 8 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 9 | 7 | 6 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 9 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 5 | 8 | 7 | 8 | 8 | 8 | 7,80 | 2,80 |
| 2. Time | 8 | 9 | 5 | 9 | 9 | 9 | 8,20 | 0,20 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 9 | 9 | 8 | 9 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 0 | 7 | 5 | 7 | 7 | 7 | 6,60 | 6,60 |
| 6. Human resource | 2 | 6 | 7 | 6 | 6 | 6 | 6,20 | 4,20 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7. Risk | 7 | 8 | 8 | 8 | 7 | 8 | 7,80 | 0,80 |
| 8. Health and safety | 5 | 10 | 10 | 7 | 6 | 10 | 8,60 | 3,60 |
| Distance: | | 3,28 | 3,43 | 3,49 | 3,63 | 3,66 | | |
| Similarity: | | 81% | 80% | 80% | 79% | 79% | | 80% |

| Project | Project No 6 | Project No 80 | Project No 136 | Project No 86 | Project No 113 | Project No 128 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 8 | 9 | 9 | 8 | | |
| 2. Ensure effective project management and delivery | 3 | 5 | 7 | 7 | 8 | 7 | | |
| 3. Achieve the required financial performance | 6 | 9 | 7 | 9 | 6 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 7 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 7 | 5 | 7 | 9 | 7 | 5 | | |
| 6. Comply with third party requirements | 3 | 6 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 10 | 8 | 7 | 8 | 8 | 8,20 | 1,20 |
| 2. Time | 8 | 10 | 9 | 5 | 9 | 9 | 8,40 | 0,40 |
| 3. Cost | 10 | 10 | 7 | 9 | 7 | 7 | 8,00 | -2,00 |
| 4. Quality | 9 | 5 | 9 | 8 | 9 | 9 | 8,00 | -1,00 |
| 5. Contract-admin | 3 | 5 | 7 | 5 | 7 | 7 | 6,20 | 3,20 |
| 6. Human resource | 3 | 5 | 6 | 7 | 6 | 6 | 6,00 | 3,00 |
| 7. Risk | 5 | 5 | 8 | 8 | 8 | 8 | 7,40 | 2,40 |
| 8. Health and safety | 3 | 9 | 10 | 7 | 10 | 10 | 9,20 | 6,20 |
| Distance: | | 3,75 | 4,06 | 4,12 | 4,27 | 4,28 | | |
| Similarity: | | 79% | 77% | 76% | 76% | 76% | | 77% |

| Project | Project No 7 | Project No 86 | Project No 80 | Project No 2 | Project No 88 | Project No 59 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 10 | 9 | 9 | 9 |
| 2. Ensure effective project management and delivery | 5 | 7 | 5 | 8 | 7 | 8 |
| 3. Achieve the required financial performance | 10 | 9 | 9 | 9 | 9 | 9 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7. Risk | 6 | 8 | 8 | 8 | 8 | 8 | 8,00 | 2,00 |
| 8. Health and safety | 3 | 10 | 7 | 10 | 10 | 10 | 9,40 | 6,40 |
| Distance: | | 3,66 | 3,72 | 3,81 | 4,07 | 4,07 | | |
| Similarity: | | 79% | 79% | 78% | 77% | 77% | | 78% |

| Project | Project No 6 | Project No 80 | Project No 128 | Project No 132 | Project No 136 | Project No 68 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 8 | 8 | 8 | 9 | | |
| 2. Ensure effective project management and delivery | 2 | 5 | 7 | 7 | 7 | 7 | | |
| 3. Achieve the required financial performance | 6 | 9 | 7 | 7 | 7 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 7 | 7 | 7 | 8 | | |
| 5. Impact positively on the location of the facility | 6 | 5 | 5 | 5 | 7 | 6 | | |
| 6. Comply with third party requirements | 2 | 6 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 10 | 8 | 8 | 8 | 8 | 8,40 | 2,40 |
| 2. Time | 8 | 10 | 9 | 9 | 9 | 9 | 9,20 | 1,20 |
| 3. Cost | 10 | 10 | 7 | 7 | 7 | 7 | 7,60 | -2,40 |
| 4. Quality | 9 | 5 | 9 | 9 | 9 | 9 | 8,20 | -0,80 |
| 5. Contract-admin | 2 | 5 | 7 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 0 | 5 | 6 | 6 | 6 | 6 | 5,80 | 5,80 |
| 7. Risk | 5 | 5 | 8 | 8 | 8 | 8 | 7,40 | 2,40 |
| 8. Health and safety | 3 | 9 | 10 | 10 | 10 | 10 | 9,80 | 6,80 |
| Distance: | | 4,32 | 4,86 | 4,86 | 4,86 | 4,97 | | |
| Similarity: | | 75% | 72% | 72% | 72% | 72% | | 73% |

| Project | Project No 7 | Project No 86 | Project No 80 | Project No 136 | Project No 59 | Project No 77 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 10 | 8 | 9 | 10 |
| 2. Ensure effective project management and delivery | 3 | 7 | 5 | 7 | 8 | 6 |
| 3. Achieve the required financial performance | 10 | 9 | 9 | 7 | 9 | 9 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 5 | 5 | 8 | 7 | 6 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 5 | 9 | 7 | 6 | | |
| 6. Comply with third party requirements | 4 | 5 | 6 | 5 | 7 | 6 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 4 | 7 | 10 | 6 | 8 | 7 | 7,60 | 3,60 |
| 2. Time | 10 | 5 | 10 | 7 | 8 | 9 | 7,80 | -2,20 |
| 3. Cost | 9 | 9 | 10 | 8 | 9 | 8 | 8,80 | -0,20 |
| 4. Quality | 8 | 8 | 5 | 9 | 7 | 8 | 7,40 | -0,60 |
| 5. Contract-admin | 5 | 5 | 5 | 6 | 6 | 6 | 5,60 | 0,60 |
| 6. Human resource | 4 | 7 | 5 | 7 | 7 | 6 | 6,40 | 2,40 |
| 7. Risk | 5 | 8 | 5 | 8 | 6 | 5 | 6,40 | 1,40 |
| 8. Health and safety | 4 | 7 | 9 | 9 | 7 | 6 | 7,60 | 3,60 |
| Distance: | | 2,08 | 2,72 | 2,84 | 2,95 | 2,99 | | |
| Similarity: | | 88% | 84% | 84% | 83% | 83% | | 84% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 5 | 5 | 7 | 6 | 6 | | |
| 5. Impact positively on the location of the facility | 8 | 9 | 5 | 7 | 6 | 7 | | |
| 6. Comply with third party requirements | 3 | 5 | 6 | 5 | 6 | 8 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 2 | 7 | 10 | 8 | 7 | 7 | 7,80 | 5,80 |
| 2. Time | 10 | 5 | 10 | 9 | 9 | 7 | 8,00 | -2,00 |
| 3. Cost | 9 | 9 | 10 | 7 | 8 | 9 | 8,60 | -0,40 |
| 4. Quality | 8 | 8 | 5 | 9 | 8 | 6 | 7,20 | -0,80 |
| 5. Contract-admin | 3 | 5 | 5 | 7 | 6 | 7 | 6,00 | 3,00 |
| 6. Human resource | 3 | 7 | 5 | 6 | 6 | 5 | 5,80 | 2,80 |
| 7. Risk | 5 | 8 | 5 | 8 | 5 | 5 | 6,20 | 1,20 |
| 8. Health and safety | 3 | 7 | 9 | 10 | 6 | 7 | 7,80 | 4,80 |
| Distance: | | 3,25 | 3,36 | 4,34 | 4,37 | 4,37 | | |
| Similarity: | | 81% | 81% | 75% | 75% | 75% | | 77% |

| **Project** | Project No 8 | Project No 113 | Project No 136 | Project No 86 | Project No 106 | Project No 96 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 9 | 9 | 8 | 9 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 6 | 8 | 7 | 7 | 9 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 7 | 9 | 5 | 5 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 7 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 7 | 9 | 7 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 8 | 8 | 8 | 7 | 8 | 8 | 7,80 | -0,20 |
| 2. Time | 9 | 9 | 9 | 5 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 7 | 9 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 9 | 9 | 9 | 8 | 9 | 9 | 8,80 | -0,20 |
| 5. Contract-admin | 2 | 7 | 7 | 5 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 3 | 6 | 6 | 7 | 6 | 6 | 6,20 | 3,20 |
| 7. Risk | 4 | 8 | 8 | 8 | 8 | 8 | 8,00 | 4,00 |
| 8. Health and safety | 4 | 10 | 10 | 7 | 10 | 10 | 9,40 | 5,40 |
| Distance: | | 3,27 | 3,41 | 3,47 | 3,58 | 3,73 | | |
| Similarity: | | 81% | 80% | 80% | 80% | 79% | | 80% |

| **Project** | Project No 8 | Project No 113 | Project No 86 | Project No 136 | Project No 93 | Project No 109 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 9 | 8 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 8 | 7 | 7 | 8 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 9 | 7 | 6 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 9 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 7 | 8 | 8 | 8 | 7,80 | 1,80 |
| 2. Time | 9 | 9 | 5 | 9 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 8 | 9 | 8 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 2 | 7 | 5 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 2 | 6 | 7 | 6 | 6 | 6 | 6,20 | 4,20 |
| 7. Risk | 3 | 8 | 8 | 8 | 8 | 8 | 8,00 | 5,00 |
| 8. Health and safety | 3 | 10 | 7 | 10 | 10 | 10 | 9,40 | 6,40 |
| Distance: | | 3,66 | 3,72 | 3,81 | 4,07 | 4,07 | | |
| Similarity: | | 79% | 79% | 78% | 77% | 77% | | 78% |

| Project | Project No 9 | Project No 113 | Project No 136 | Project No 106 | Project No 108 | Project No 96 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 9 | 9 | 8 | 8 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 6 | 8 | 7 | 9 | 7 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 7 | 5 | 7 | 5 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | 7 | 7 | 7 | 8 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 7 | 7 | 7 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 7 | 8 | 8 | 8 | 8 | 8 | 8,00 | 1,00 |
| 2. Time | 9 | 9 | 9 | 9 | 9 | 9 | 9,00 | 0,00 |
| 3. Cost | 10 | 7 | 7 | 7 | 7 | 7 | 7,00 | -3,00 |
| 4. Quality | 9 | 9 | 9 | 9 | 9 | 9 | 9,00 | 0,00 |
| 5. Contract-admin | 1 | 7 | 7 | 7 | 7 | 7 | 7,00 | 6,00 |
| 6. Human resource | 4 | 6 | 6 | 6 | 6 | 6 | 6,00 | 2,00 |
| 7. Risk | 4 | 8 | 8 | 8 | 8 | 8 | 8,00 | 4,00 |
| 8. Health and safety | 2 | 10 | 10 | 10 | 10 | 10 | 10,00 | 8,00 |
| Distance: | | 3,02 | 3,17 | 3,35 | 3,41 | 3,51 | | |
| Similarity: | | 83% | 82% | 81% | 80% | 80% | | 81% |

| Project | Project No 9 | Project No 113 | Project No 86 | Project No 136 | Project No 93 | Project No 109 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 9 | 8 | 9 | 9 | | |
| 2. Ensure effective project management and delivery | 5 | 8 | 7 | 7 | 8 | 8 | | |
| 3. Achieve the required financial performance | 5 | 6 | 9 | 7 | 6 | 6 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 10 | 7 | 9 | 7 | 6 | 6 | | |
| 6. Comply with third party requirements | 3 | 5 | 5 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 7 | 8 | 8 | 8 | 7,80 | 1,80 |
| 2. Time | 9 | 9 | 5 | 9 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 8 | 9 | 8 | 9 | 9 | 9 | 8,80 | 0,80 |
| 5. Contract-admin | 2 | 7 | 5 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 2 | 6 | 7 | 6 | 6 | 6 | 6,20 | 4,20 |
| 7. Risk | 3 | 8 | 8 | 8 | 8 | 8 | 8,00 | 5,00 |
| 8. Health and safety | 3 | 10 | 7 | 10 | 10 | 10 | 9,40 | 6,40 |
| Distance: | | 3,66 | 3,72 | 3,81 | 4,07 | 4,07 | | |
| Similarity: | | 79% | 79% | 78% | 77% | 77% | | 78% |

| Project | Project No 10 | Project No 113 | Project No 52 | Project No 106 | Project No 96 | Project No 93 | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 10 | 9 | 6 | 8 | 8 | 9 | |
| 2. Ensure effective project management and delivery | 6 | 8 | 8 | 9 | 8 | 8 | |
| 3. Achieve the required financial performance | 4 | 6 | 3 | 5 | 5 | 6 | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | 7 | 5 | 7 | 7 | 7 | |
| 5. Impact positively on the location of the facility | 9 | 7 | 5 | 7 | 6 | 6 | |
| 6. Comply with third party requirements | 1 | 5 | 2 | 5 | 5 | 5 | |
| **CSF** | | | | | | | **CSF change** |

| Project | Project No 10 | Project No 52 | Project No 31 | Project No 113 | Project No 96 | Project No 93 | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 10 | 6 | 6 | 9 | 8 | 9 | |
| 2. Ensure effective project management and delivery | 4 | 8 | 7 | 8 | 8 | 8 | |
| 3. Achieve the required financial performance | 4 | 3 | 4 | 6 | 5 | 6 | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 3 | 7 | 7 | 7 | |
| 5. Impact positively on the location of the facility | 8 | 5 | 6 | 7 | 6 | 6 | |
| 6. Comply with third party requirements | 0 | 2 | 5 | 5 | 5 | 5 | |
| **CSF** | | | | | | | **CSF change** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Scope | 7 | 8 | 8 | 8 | 8 | 8 | 8,00 | 1,00 |
| 2. Time | 10 | 9 | 9 | 9 | 9 | 9 | 9,00 | -1,00 |
| 3. Cost | 9 | 7 | 7 | 7 | 7 | 7 | 7,00 | -2,00 |
| 4. Quality | 8 | 9 | 2 | 9 | 9 | 9 | 7,60 | -0,40 |
| 5. Contract-admin | 2 | 7 | 5 | 7 | 7 | 7 | 6,60 | 4,60 |
| 6. Human resource | 4 | 6 | 4 | 6 | 6 | 6 | 5,60 | 1,60 |
| 7. Risk | 10 | 8 | 6 | 8 | 8 | 8 | 7,60 | -2,40 |
| 8. Health and safety | 5 | 10 | 4 | 10 | 10 | 10 | 8,80 | 3,80 |
| Distance: | | 4,15 | 4,32 | 4,39 | 4,41 | 4,42 | | |
| Similarity: | | 76% | 75% | 75% | 75% | 75% | | 75% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Scope | 4 | 8 | 8 | 8 | 8 | 8 | 8,00 | 4,00 |
| 2. Time | 10 | 9 | 6 | 9 | 9 | 9 | 8,40 | -1,60 |
| 3. Cost | 10 | 7 | 9 | 7 | 7 | 7 | 7,40 | -2,60 |
| 4. Quality | 7 | 2 | 10 | 9 | 9 | 9 | 7,80 | 0,80 |
| 5. Contract-admin | 0 | 5 | 3 | 7 | 7 | 7 | 5,80 | 5,80 |
| 6. Human resource | 2 | 4 | 2 | 6 | 6 | 6 | 4,80 | 2,80 |
| 7. Risk | 10 | 6 | 0 | 8 | 8 | 8 | 6,00 | -4,00 |
| 8. Health and safety | 5 | 4 | 6 | 10 | 10 | 10 | 8,00 | 3,00 |
| Distance: | | 4,77 | 5,33 | 5,35 | 5,47 | 5,47 | | |
| Similarity: | | 73% | 70% | 69% | 69% | 69% | | 70% |

| Project | Project No 11 | Project No 1 | Project No 80 | Project No 128 | Project No 132 | Project No 3 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 9 | 8 | 10 | 8 | 8 | 10 | | |
| 2. Ensure effective project management and delivery | 3 | 5 | 5 | 7 | 7 | 8 | | |
| 3. Achieve the required financial performance | 8 | 8 | 9 | 7 | 7 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 3 | 5 | 7 | 7 | 5 | | |
| 5. Impact positively on the location of the facility | 5 | 0 | 5 | 5 | 5 | 4 | | |
| 6. Comply with third party requirements | 1 | 2 | 6 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 2 | 7 | 10 | 8 | 8 | 8 | 8,20 | 6,20 |
| 2. Time | 9 | 8 | 10 | 9 | 9 | 5 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 10 | 7 | 7 | 8 | 7,80 | -2,20 |
| 4. Quality | 6 | 3 | 5 | 9 | 9 | 8 | 6,80 | 0,80 |
| 5. Contract-admin | 5 | 5 | 5 | 7 | 7 | 9 | 6,60 | 1,60 |
| 6. Human resource | 4 | 0 | 5 | 6 | 6 | 6 | 4,60 | 0,60 |
| 7. Risk | 5 | 3 | 5 | 8 | 8 | 5 | 5,80 | 0,80 |
| 8. Health and safety | 3 | 3 | 9 | 10 | 10 | 5 | 7,40 | 4,40 |
| Distance: | | 3,84 | 4,13 | 4,64 | 4,64 | 4,64 | | |
| Similarity: | | 78% | 76% | 73% | 73% | 73% | | 75% |

| Project | Project No 11 | Project No 1 | Project No 80 | Project No 3 | Project No 128 | Project No 132 | | |
|---|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | | |
| 1. Maximize business effectiveness | 10 | 8 | 10 | 10 | 8 | 8 | | |
| 2. Ensure effective project management and delivery | 2 | 5 | 5 | 8 | 7 | 7 | | |
| 3. Achieve the required financial performance | 8 | 8 | 9 | 9 | 7 | 7 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 3 | 5 | 5 | 7 | 7 | | |
| 5. Impact positively on the location of the facility | 4 | 0 | 5 | 4 | 5 | 5 | | |
| 6. Comply with third party requirements | 2 | 2 | 6 | 5 | 5 | 5 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 2 | 7 | 10 | 8 | 8 | 8 | 8,20 | 6,20 |
| 2. Time | 9 | 8 | 10 | 5 | 9 | 9 | 8,20 | -0,80 |
| 3. Cost | 10 | 7 | 10 | 8 | 7 | 7 | 7,80 | -2,20 |
| 4. Quality | 6 | 3 | 5 | 8 | 9 | 9 | 6,80 | 0,80 |
| 5. Contract-admin | 5 | 5 | 5 | 9 | 7 | 7 | 6,60 | 1,60 |
| 6. Human resource | 3 | 0 | 5 | 6 | 6 | 6 | 4,60 | 1,60 |
| 7. Risk | 5 | 3 | 5 | 5 | 8 | 8 | 5,80 | 0,80 |
| 8. Health and safety | 3 | 3 | 9 | 5 | 10 | 10 | 7,40 | 4,40 |
| Distance: | | 3,72 | 3,76 | 4,63 | 4,86 | 4,86 | | |
| Similarity: | | 78% | 76% | 73% | 73% | 73% | | 75% |

| Project | Project No 12 | Project No 3 | Project No 4 | Project No 59 | Project No 78 | Project No 8 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 10 | 9 | 18 | 8 |

| Project | Project No 12 | Project No 3 | Project No 4 | Project No 59 | Project No 80 | Project No 8 |
|---|---|---|---|---|---|---|
| **VP** | | | | | | |
| 1. Maximize business effectiveness | 10 | 10 | 10 | 9 | 10 | 8 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2. Ensure effective project management and delivery | 9 | 8 | 8 | 8 | 8 | 8 | | |
| 3. Achieve the required financial performance | 8 | 9 | 9 | 9 | 9 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | 5 | 5 | 6 | 6 | 5 | | |
| 5. Impact positively on the location of the facility | 5 | 4 | 6 | 6 | 5 | 6 | | |
| 6. Comply with third party requirements | 5 | 5 | 7 | 6 | 7 | 7 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 6 | 8 | 8 | 7 | 7 | 8 | 7,60 | 1,60 |
| 2. Time | 10 | 5 | 6 | 9 | 9 | 9 | 7,60 | -2,40 |
| 3. Cost | 9 | 8 | 7 | 8 | 10 | 8 | 8,20 | -0,80 |
| 4. Quality | 10 | 8 | 8 | 8 | 6 | 10 | 8,00 | -2,00 |
| 5. Contract-admin | 5 | 9 | 9 | 6 | 6 | 6 | 7,20 | 2,20 |
| 6. Human resource | 4 | 6 | 6 | 6 | 5 | 5 | 5,60 | 1,60 |
| 7. Risk | 4 | 5 | 7 | 5 | 5 | 9 | 6,20 | 2,20 |
| 8. Health and safety | 5 | 5 | 9 | 6 | 10 | 7 | 7,40 | 2,40 |
| Distance: | | 1,41 | 2,04 | 2,16 | 2,30 | 2,51 | | |
| Similarity: | | 92% | 88% | 88% | 87% | 86% | | 88% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2. Ensure effective project management and delivery | 8 | 8 | 8 | 8 | 5 | 8 | | |
| 3. Achieve the required financial performance | 8 | 9 | 9 | 9 | 9 | 9 | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 3 | 5 | 5 | 6 | 5 | 5 | | |
| 5. Impact positively on the location of the facility | 5 | 4 | 6 | 6 | 5 | 6 | | |
| 6. Comply with third party requirements | 5 | 5 | 7 | 6 | 6 | 7 | | |
| **CSF** | | | | | | | **CSF change** | |
| 1. Scope | 5 | 8 | 8 | 7 | 10 | 8 | 8,20 | 3,20 |
| 2. Time | 10 | 5 | 6 | 9 | 10 | 9 | 7,80 | -2,20 |
| 3. Cost | 9 | 8 | 7 | 8 | 10 | 8 | 8,20 | -0,80 |
| 4. Quality | 10 | 8 | 8 | 8 | 5 | 10 | 7,80 | -2,20 |
| 5. Contract-admin | 5 | 9 | 9 | 6 | 5 | 6 | 7,00 | 2,00 |
| 6. Human resource | 2 | 6 | 6 | 6 | 5 | 5 | 5,60 | 3,60 |
| 7. Risk | 4 | 5 | 7 | 5 | 5 | 9 | 6,20 | 2,20 |
| 8. Health and safety | 4 | 5 | 9 | 6 | 9 | 7 | 7,20 | 3,20 |
| Distance: | | 1,77 | 2,31 | 2,63 | 2,66 | 2,73 | | |
| Similarity: | | 90% | 87% | 85% | 85% | 84% | | 86% |

| | | Local experience applied | | | Local experience not applied | | |
|---|---|---|---|---|---|---|---|
| **Project** | Project No 1 | | | | | | |
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 8 | | | 8 | | | |
| 2. Ensure effective project management and delivery | 7 | | | 5 | | | |
| 3. Achieve the required financial performance | 8 | | | 8 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | | | 5 | | | |
| 5. Impact positively on the location of the facility | 8 | | | 10 | | | |
| 6. Comply with third party requirements | 3 | | | 3 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 7 | 7,00 | 0,00 | 6 | 7,40 | 1,40 | 1,4 |
| 2. Time | 8 | 8,40 | 0,40 | 8 | 7,00 | -1,00 | 0,6 |
| 3. Cost | 10 | 7,60 | -2,40 | 10 | 7,80 | -2,20 | -0,2 |
| 4. Quality | 8 | 8,80 | 0,80 | 9 | 8,80 | -0,20 | -0,6 |
| 5. Contract-admin | 6 | 6,40 | 0,40 | 2 | 6,40 | 4,40 | 4,0 |
| 6. Human resource | 4 | 6,40 | 2,40 | 2 | 6,40 | 4,40 | 2,0 |
| 7. Risk | 5 | 7,00 | 2,00 | 3 | 7,80 | 4,80 | 2,8 |
| 8. Health and safety | 5 | 8,40 | 3,40 | 3 | 8,40 | 5,40 | 2,0 |
| Sum of changes | | | | | | | 12,0 |
| Sum of absolute changes | | 60 | 12 | | 60 | 24 | 12 |
| | | | 20% | | | 40% | 20% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project** | Project No 2 | | | | | | |
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 8 | | | 8 | | | |
| 2. Ensure effective project management and delivery | 6 | | | 5 | | | |
| 3. Achieve the required financial performance | 8 | | | 8 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | | | 5 | | | |
| 5. Impact positively on the location of the facility | 9 | | | 10 | | | |
| 6. Comply with third party requirements | 3 | | | 3 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 10 | 7,40 | -2,60 | 10 | 7,40 | -2,60 | 0,0 |
| 2. Time | 10 | 7,80 | -2,20 | 10 | 7,00 | -3,00 | 0,8 |
| 3. Cost | 10 | 7,60 | -2,40 | 10 | 7,80 | -2,20 | -0,2 |

| | | Local experience applied | | | Local experience not applied | | |
|---|---|---|---|---|---|---|---|
| 4. Quality | 6 | 8,80 | 2,80 | 4 | 8,80 | 4,80 | 2,0 |
| 5. Contract-admin | 2 | 6,40 | 4,40 | 2 | 6,40 | 4,40 | 0,0 |
| 6. Human resource | 2 | 6,40 | 4,40 | 2 | 6,40 | 4,40 | 0,0 |
| 7. Risk | 5 | 8,00 | 3,00 | 5 | 7,80 | 2,80 | -0,2 |
| 8. Health and safety | 6 | 9,20 | 3,20 | 5 | 8,40 | 3,40 | 0,2 |
| Sum of changes | | | | | | | 2,6 |
| Sum of absolute changes | | 62 | 25 | | 60 | 28 | 3 |
| | | | 41% | | | 46% | 4% |

| Project | Project No 3 | | | | | | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 7 | | | 8 | | | |
| 2. Ensure effective project management and delivery | 4 | | | 5 | | | |
| 3. Achieve the required financial performance | 8 | | | 8 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | | | 5 | | | |
| 5. Impact positively on the location of the facility | 10 | | | 10 | | | |
| 6. Comply with third party requirements | 4 | | | 3 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 7 | 7,20 | 0,20 | 6 | 7,40 | 1,40 | 1,2 |
| 2. Time | 8 | 7,00 | -1,00 | 8 | 7,00 | -1,00 | 0,0 |
| 3. Cost | 10 | 7,40 | -2,60 | 10 | 7,80 | -2,20 | -0,4 |
| 4. Quality | 9 | 8,60 | -0,40 | 9 | 8,80 | -0,20 | -0,2 |
| 5. Contract-admin | 4 | 6,20 | 2,20 | 0 | 6,40 | 6,40 | 4,2 |
| 6. Human resource | 4 | 6,00 | 2,00 | 2 | 6,40 | 4,40 | 2,4 |
| 7. Risk | 5 | 7,20 | 2,20 | 5 | 7,80 | 2,80 | 0,6 |
| 8. Health and safety | 4 | 7,60 | 3,60 | 3 | 8,40 | 5,40 | 1,8 |
| Sum of changes | | | | | | | 9,6 |
| Sum of absolute changes | | 57 | 14 | | 60 | 24 | 10 |
| | | | 25% | | | 40% | 16% |

| Project | Project No 4 | | | | | | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 10 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 7 | | | 8 | | | |
| 3. Achieve the required financial performance | 7 | | | 6 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 3 | | | 2 | | | |

| | | Local experience applied | | | Local experience not applied | | |
|---|---|---|---|---|---|---|---|
| 5. Impact positively on the location of the facility | 3 | | | 2 | | | |
| 6. Comply with third party requirements | 2 | | | 2 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 8 | 8,20 | 0,20 | 8 | 7,80 | -0,20 | 0,0 |
| 2. Time | 7 | 8,20 | 1,20 | 6 | 7,40 | 1,40 | 0,2 |
| 3. Cost | 10 | 7,80 | -2,20 | 10 | 7,60 | -2,40 | 0,2 |
| 4. Quality | 7 | 6,80 | -0,20 | 6 | 6,40 | 0,40 | 0,2 |
| 5. Contract-admin | 4 | 6,60 | 2,60 | 0 | 5,80 | 5,80 | 3,2 |
| 6. Human resource | 3 | 4,60 | 1,60 | 2 | 3,60 | 1,60 | 0,0 |
| 7. Risk | 8 | 5,80 | -2,20 | 8 | 4,40 | -3,60 | 1,4 |
| 8. Health and safety | 4 | 7,40 | 3,40 | 3 | 5,60 | 2,60 | -0,8 |
| Sum of changes | | | | | | | 4,4 |
| Sum of absolute changes | | 55 | 14 | | 49 | 18 | 4 |
| | | | 25% | | | 37% | 9% |

| **Project** | Project No 5 |
|---|---|
| **VP** | |
| 1. Maximize business effectiveness | 8 |
| 2. Ensure effective project management and delivery | 5 |
| 3. Achieve the required financial performance | 5 |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 |
| 5. Impact positively on the location of the facility | 10 |
| 6. Comply with third party requirements | 4 |

| **CSF** | | **CSF change** | | | **CSF change** | | |
|---|---|---|---|---|---|---|---|
| 1. Scope | 6 | 7,80 | 1,80 | 5 | 7,80 | 2,80 | 1,0 |
| 2. Time | 8 | 7,40 | -0,60 | 8 | 8,20 | 0,20 | -0,4 |
| 3. Cost | 10 | 7,60 | -2,40 | 10 | 7,40 | -2,60 | 0,2 |
| 4. Quality | 9 | 8,80 | -0,20 | 9 | 8,80 | -0,20 | 0,0 |
| 5. Contract-admin | 4 | 6,60 | 2,60 | 0 | 6,60 | 6,60 | 4,0 |
| 6. Human resource | 5 | 6,20 | 1,20 | 2 | 6,20 | 4,20 | 3,0 |
| 7. Risk | 7 | 7,80 | 0,80 | 6 | 8,00 | 2,00 | 1,2 |
| 8. Health and safety | 5 | 8,60 | 3,60 | 3 | 9,40 | 6,40 | 2,8 |
| Sum of changes | | | | | | | 11,8 |
| Sum of absolute changes | | 61 | 13 | | 62 | 25 | 12 |
| | | | 22% | | | 40% | 19% |

| **Project** | Project No 6 |
|---|---|
| **VP** | |
| 1. Maximize business effectiveness | 10 |

| | Local experience applied | | | Local experience not applied | | | |
|---|---|---|---|---|---|---|---|
| 2. Ensure effective project management and delivery | 3 | | | 2 | | | |
| 3. Achieve the required financial performance | 6 | | | 6 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | | | 4 | | | |
| 5. Impact positively on the location of the facility | 7 | | | 6 | | | |
| 6. Comply with third party requirements | 3 | | | 2 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 7 | 8,20 | 1,20 | 6 | 8,40 | 2,40 | 1,2 |
| 2. Time | 8 | 8,40 | 0,40 | 8 | 9,20 | 1,20 | 0,8 |
| 3. Cost | 10 | 8,00 | -2,00 | 10 | 7,60 | -2,40 | 0,4 |
| 4. Quality | 9 | 8,00 | -1,00 | 9 | 8,20 | -0,80 | -0,2 |
| 5. Contract-admin | 3 | 6,20 | 3,20 | 2 | 6,60 | 4,60 | 1,4 |
| 6. Human resource | 3 | 6,00 | 3,00 | 0 | 5,80 | 5,80 | 2,8 |
| 7. Risk | 5 | 7,40 | 2,40 | 5 | 7,40 | 2,40 | 0,0 |
| 8. Health and safety | 3 | 9,20 | 6,20 | 3 | 9,80 | 6,80 | 0,6 |
| Sum of changes | | | | | | | 7,0 |
| Sum of absolute changes | | 61 | 19 | | 63 | 26 | 7 |
| | | | 32% | | | 42% | 11% |

| **Project** | Project No 7 | | | | | | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 10 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 5 | | | 3 | | | |
| 3. Achieve the required financial performance | 10 | | | 10 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | | | 5 | | | |
| 5. Impact positively on the location of the facility | 8 | | | 8 | | | |
| 6. Comply with third party requirements | 4 | | | 3 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 4 | 7,60 | 3,60 | 2 | 7,80 | 5,80 | 2,2 |
| 2. Time | 10 | 7,80 | -2,20 | 10 | 8,00 | -2,00 | -0,2 |
| 3. Cost | 9 | 8,80 | -0,20 | 9 | 8,60 | -0,40 | 0,2 |
| 4. Quality | 8 | 7,40 | -0,60 | 8 | 7,20 | -0,80 | 0,2 |
| 5. Contract-admin | 5 | 5,60 | 0,60 | 3 | 6,00 | 3,00 | 2,4 |
| 6. Human resource | 4 | 6,40 | 2,40 | 3 | 5,80 | 2,80 | 0,4 |
| 7. Risk | 5 | 6,40 | 1,40 | 5 | 6,20 | 1,20 | -0,2 |
| 8. Health and safety | 4 | 7,60 | 3,60 | 3 | 7,80 | 4,80 | 1,2 |
| Sum of changes | | | | | | | 6,2 |
| Sum of absolute changes | | 58 | 15 | | 57 | 21 | 6 |
| | | | 25% | | | 36% | 11% |

| | | Local experience applied | | | Local experience not applied | | |
|---|---|---|---|---|---|---|---|
| **Project** | Project No 8 | | | | | | |
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 9 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 6 | | | 5 | | | |
| 3. Achieve the required financial performance | 5 | | | 5 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | | | 5 | | | |
| 5. Impact positively on the location of the facility | 10 | | | 10 | | | |
| 6. Comply with third party requirements | 3 | | | 3 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 8 | 7,80 | -0,20 | 6 | 7,80 | 1,80 | 1,6 |
| 2. Time | 9 | 8,20 | -0,80 | 9 | 8,20 | -0,80 | 0,0 |
| 3. Cost | 10 | 7,40 | -2,60 | 10 | 7,40 | -2,60 | 0,0 |
| 4. Quality | 9 | 8,80 | -0,20 | 8 | 8,80 | 0,80 | 0,6 |
| 5. Contract-admin | 2 | 6,60 | 4,60 | 2 | 6,60 | 4,60 | 0,0 |
| 6. Human resource | 3 | 6,20 | 3,20 | 2 | 6,20 | 4,20 | 1,0 |
| 7. Risk | 4 | 8,00 | 4,00 | 3 | 8,00 | 5,00 | 1,0 |
| 8. Health and safety | 4 | 9,40 | 5,40 | 3 | 9,40 | 6,40 | 1,0 |
| Sum of changes | | | | | | | 5,2 |
| Sum of absolute changes | | 62 | 21 | | 62 | 26 | 5 |
| | | | 34% | | | 42% | 8% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project** | Project No 9 | | | | | | |
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 9 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 6 | | | 5 | | | |
| 3. Achieve the required financial performance | 5 | | | 5 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 6 | | | 5 | | | |
| 5. Impact positively on the location of the facility | 10 | | | 10 | | | |
| 6. Comply with third party requirements | 3 | | | 3 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 7 | 8,00 | 1,00 | 6 | 7,80 | 1,80 | 0,8 |
| 2. Time | 9 | 9,00 | 0,00 | 9 | 8,20 | -0,80 | 0,8 |
| 3. Cost | 10 | 7,00 | -3,00 | 10 | 7,40 | -2,60 | -0,4 |
| 4. Quality | 9 | 9,00 | 0,00 | 8 | 8,80 | 0,80 | 0,8 |

| | | Local experience applied | | | Local experience not applied | | |
|---|---|---|---|---|---|---|---|
| 5. Contract-admin | 1 | 7,00 | 6,00 | 2 | 6,60 | 4,60 | -1,4 |
| 6. Human resource | 4 | 6,00 | 2,00 | 2 | 6,20 | 4,20 | 2,2 |
| 7. Risk | 4 | 8,00 | 4,00 | 3 | 8,00 | 5,00 | 1,0 |
| 8. Health and safety | 2 | 10,00 | 8,00 | 3 | 9,40 | 6,40 | -1,6 |
| Sum of changes | | | | | | | 2,2 |
| Sum of absolute changes | | 64 | 24 | | 62 | 26 | 2 |
| | | | 38% | | | 42% | 4% |

| Project | Project No 10 | | | | | | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 10 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 6 | | | 4 | | | |
| 3. Achieve the required financial performance | 4 | | | 4 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 5 | | | 4 | | | |
| 5. Impact positively on the location of the facility | 9 | | | 8 | | | |
| 6. Comply with third party requirements | 1 | | | 0 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 7 | 8,00 | 1,00 | 4 | 8,00 | 4,00 | 3,0 |
| 2. Time | 10 | 9,00 | -1,00 | 10 | 8,40 | -1,60 | 0,6 |
| 3. Cost | 9 | 7,00 | -2,00 | 10 | 7,40 | -2,60 | 0,6 |
| 4. Quality | 8 | 7,60 | -0,40 | 7 | 7,80 | 0,80 | 0,4 |
| 5. Contract-admin | 2 | 6,60 | 4,60 | 0 | 5,80 | 5,80 | 1,2 |
| 6. Human resource | 4 | 5,60 | 1,60 | 2 | 4,80 | 2,80 | 1,2 |
| 7. Risk | 10 | 7,60 | -2,40 | 10 | 6,00 | -4,00 | 1,6 |
| 8. Health and safety | 5 | 8,80 | 3,80 | 5 | 8,00 | 3,00 | -0,8 |
| Sum of changes | | | | | | | 7,8 |
| Sum of absolute changes | | 60 | 17 | | 56 | 25 | 8 |
| | | | 28% | | | 44% | 14% |

| Project | Project No 11 | | | | | | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 9 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 3 | | | 2 | | | |
| 3. Achieve the required financial performance | 8 | | | 8 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | | | 4 | | | |

| | | Local experience applied | | | Local experience not applied | | |
|---|---|---|---|---|---|---|---|
| 5. Impact positively on the location of the facility | 5 | | | 4 | | | |
| 6. Comply with third party requirements | 1 | | | 2 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 2 | 8,20 | 6,20 | 2 | 8,20 | 6,20 | 0,0 |
| 2. Time | 9 | 8,20 | -0,80 | 9 | 8,20 | -0,80 | 0,0 |
| 3. Cost | 10 | 7,80 | -2,20 | 10 | 7,80 | -2,20 | 0,0 |
| 4. Quality | 6 | 6,80 | 0,80 | 6 | 6,80 | 0,80 | 0,0 |
| 5. Contract-admin | 5 | 6,60 | 1,60 | 5 | 6,60 | 1,60 | 0,0 |
| 6. Human resource | 4 | 4,60 | 0,60 | 3 | 4,60 | 1,60 | 1,0 |
| 7. Risk | 5 | 5,80 | 0,80 | 5 | 5,80 | 0,80 | 0,0 |
| 8. Health and safety | 3 | 7,40 | 4,40 | 3 | 7,40 | 4,40 | 0,0 |
| Sum of changes | | | | | | | 1,0 |
| Sum of absolute changes | | 55 | 17 | | 55 | 18 | 1 |
| | | | 31% | | | 33% | 2% |

| **Project** | Project No 12 | | | | | | |
|---|---|---|---|---|---|---|---|
| **VP** | | | | | | | |
| 1. Maximize business effectiveness | 10 | | | 10 | | | |
| 2. Ensure effective project management and delivery | 9 | | | 8 | | | |
| 3. Achieve the required financial performance | 8 | | | 8 | | | |
| 4. Minimize building operation and maintenance costs & environmental impact | 4 | | | 3 | | | |
| 5. Impact positively on the location of the facility | 5 | | | 5 | | | |
| 6. Comply with third party requirements | 5 | | | 5 | | | |
| **CSF** | | **CSF change** | | | **CSF change** | | |
| 1. Scope | 6 | 7,60 | 1,60 | 5 | 8,20 | 3,20 | 1,6 |
| 2. Time | 10 | 7,60 | -2,40 | 10 | 7,80 | -2,20 | -0,2 |
| 3. Cost | 9 | 8,20 | -0,80 | 9 | 8,20 | -0,80 | 0,0 |
| 4. Quality | 10 | 8,00 | -2,00 | 10 | 7,80 | -2,20 | 0,2 |
| 5. Contract-admin | 5 | 7,20 | 2,20 | 5 | 7,00 | 2,00 | -0,2 |
| 6. Human resource | 4 | 5,60 | 1,60 | 2 | 5,60 | 3,60 | 2,0 |
| 7. Risk | 4 | 6,20 | 2,20 | 4 | 6,20 | 2,20 | 0,0 |
| 8. Health and safety | 5 | 7,40 | 2,40 | 4 | 7,20 | 3,20 | 0,8 |
| Sum of changes | | | | | | | 4,2 |
| Sum of absolute changes | | 58 | 15 | | 58 | 19 | 4 |
| | | | 26% | | | 33% | 7% |

Average of the average 10%

**Прилог 10.1**

# Изјава о ауторству

Потписани-а Небојша Шурлан

број уписа 2-10/Д

**Изјављујем**

да је докторска дисертација под насловом

Управљање вредностима, примена локалних знања и Учење избором случајева (Case Based Reasoning) као подршка доношењу одлука на међународним пројектима

- резултат сопственог истраживачког рада,
- да предложена дисертација у целини ни у деловима није била предложена за добијање било које дипломе према студијским програмима других високошколских установа,
- да су резултати коректно наведени и
- да нисам кршио/ла ауторска права и користио интелектуалну својину других лица.

**Потпис докторанда**

У Београду, _____

_____

Небојша Шурлан

**Прилог 10.2**

# Изјава о истоветности штампане и електронске верзије докторског рада

Име и презиме аутора _____ Небојша Шурлан _____

Број уписа _____2/2010-Д _____

Студијски програм __МЕНАЏМЕНТ ОДРЖИВОГ РАЗВОЈА У ГРАДИТЕЉСТВУ __

Наслов рада _____ **Управљање вредностима, примена локалних знања и Учење избором случајева (Case Based Reasoning) као подршка доношењу одлука на међународним пројектима**_____

Ментор _____Проф. Зоран Цекић_____

Ко-ментор: _____Проф. Жељко Торбица_____

Потписани _____

изјављујем да је штампана верзија мог докторског рада истоветна електронској верзији коју сам предао/ла Универзитетској библиотеци **Универзитета „Унион-Никоа Тесла“ у Београду.**

Дозвољавам да се објаве моји лични подаци везани за добијање академског звања доктора наука, као што су име и презиме, година и место рођења и датум одбране рада.

Ови лични подаци могу се објавити у електронском каталогу и у публикацијама Универзитета „Унион- Никола Тесла“у Београду.

**Потпис докторанда**

У Београду, _____

_____

Небојша Шурлан

**Прилог 10.3**

# Изјава о коришћењу

Овлашћујем Универзитетску библиотеку Универзитет „Унион-Никола Тесла“ да у Дигитални репозиторијум Универзитета унесе моју докторску дисертацију под насловом:

Управљање вредностима, примена локалних знања и Учење избором случајева (Case Based Reasoning) као подршка доношењу одлука на међународним пројектима

која је моје ауторско дело.

Дисертацију са свим прилозима предао/ла сам у електронском формату погодном за трајно архивирање.

Моју докторску дисертацију похрањену у Дигитални репозиторијум Универзитета „Унион-Никола Тесла“ могу да користе  сви који поштују одредбе садржане у одабраном типу лиценце Креативне заједнице (Creative Commons) за коју сам се одлучио/ла.

1. Ауторство
2. Ауторство - некомерцијално
3. Ауторство – некомерцијално – без прераде
4. Ауторство – некомерцијално – делити под истим условима
5. Ауторство –  без прераде
6. Ауторство –  делити под истим условима

(Молимо да заокружите само једну од шест понуђених лиценци, кратак опис лиценци дат је на полеђини листа).

**Потпис докторанда**

У Београду, _____

_____

Небојша Шурлан

**Прилог 10.4**

# Биографија

Небојша Шурлан је рођен 20.02.1972.г у Београду, где је завршио основну школу. Средњу школу завршио је у Багдаду, Ирак. Уписао је Машински Факултет Универзитета у Београду 1990/1991 године. Дипломски рад је одбранио 15.12.1997.г и издата му је Диплома о стеченом високом образовању и стручном називу дипломирани машински инжењер. Према потврди Машинског факултета-Београд VII-1 степен стручне спреме (дипломирани инжењер машинства) изједначен са академским називом master (M.Sc.), па се у том статусу квалификовао за доторске студије на Факултету за градитељски менаџмент Универзитета Унион-Никола Тесла 2010 године. У 2010 години положио је и међународну сертификацију за Пројектни Менаџмент (Project Management Professional) у организацији Института за Пројектни менаџмент (Project Management Institute) из САД.

Своју професионалну каријеру Небојша Шурлан је започео 1998. године у извођачком предузећу Инсталација инжењеринг на пројекту реконструкције машинских инсталација Hayatt Regency Hotela у Београду на позицији инжењера на градилишту. Небојша је 2000. године прешао у ПМЦ инжењеринг (зависно предузеће Југоимпорт СДПР-а) као машински инжењер и менаџер пројекта на различитим пројектима широм Србије, што је укључивало рад са владиним институцијама и војно - пословним објектима, стамбеним и пословним зградама, хотелима, фабрикама и инфраструктурним пројектима. Био је одговоран за надзор извођења радова, као и за пројектовање. У овом периоду почиње интересовање и примена знања из управљања пројектима у пракси.

Небојша Шурлан се запослио међународној компанији Масе 2004. године на пословима управљања машинским радовима на Пројекту надоградње и реконструкције у Фабрици дувана ДИН инвеститора "Filip Moris". Ово је било комплексна реконструкција, с обзиром на то да је фабрика морала да остане оперативна током извођења радова, без прекида процеса производње. Небојша је брзо напредовао на позицију Пројект Менаџера и био је одговоран за комплетне радове реновирања и рад 18 запослених. Након успешног завршетка овог пројекта, наставио је рад у Масе-у на пројектима Тржни центар Делта сити (80.000м2) и Белвил- Универзијада-Блок 67 (200.000м2). Након тога, 2008. године, Небојша се придружио тиму Масе-а на пројекту Порто Монтенегро у Црној Гори, супер-луксузна Марина за јахте (800 везова, 200 везова за супер-јахте) и стамбено-комерцијални пројекат (300,000 м2) који укључује и Хотел са 5 звездица (25.000м2). Након тога, од 2010. године био је ангажован на координацији и надгледању свих послова Масе у Црној Гори, како на пројектима изградње тако и на пројектима у фази пре изградње. У овом периоду Небојша је учествовао у управљању изградњом Atlas Capital Centra у Подгорици, управљао активностима пред-извођења са оператором Wyndham у Будви на пројекту Adriatic – хотел са

пет звездица, као и припремним фазама постављања планова пројеката Plavi Horizonti и Luštica Bay Development (вредност пројекта 1.115 милиона евра) у Тивту. Небојша је радио у Масе-у до 2012. године.

Небојша Шурлан је тренутно директор Грађевинске Дирекције Србије (ГДС), компаније коју је основала Република Србија за спровођење сопствених пројеката у вискоградњи, као и спровођење управљања пројектима који су од интереса за Републику Србију. ГДС је као Инвеститор почетком 2014. године завршила изградњу 44 стамбено-пословна објекта површине преко 400.000 м2 (укупно 4.616 станова), што представља један од највећих пројеката у грађевинарству у региону у последњих 30 година. Тренутно се у насељу Степа Степановић изводе радови на пословној парцели на којој је Урбанистичким пројектом планирано да се налазе разни комерцијални садржаји неопходни за функционисање овог великог насеља. Крајем фебруара 2014. године завршен је пројекат изградње насеља Др. Ивана Рибара са 707 станова укупне површине 37.000 м2.

Небојша има добре организационе способности, поседује вештине из техничких и из практичних знања о системима инсталација у зградама као и основе свих осталих процеса у зградарству. Одликују га добре менаџерске способности и активан приступ у управљању пројектовањем и изгрдањом, као и у комуникацији са клијентима и осталим учесницима градње. Поред практичног рада и искуства исказао је интересовање за континуално образовање и усавршавање практично стечених знања, па се и његов рад на докторској дисертацији може тумачити као потврда постојећих и проширење новим сазнањима из најбоље грађевинске праксе у области за коју се специјализује – менаџмент грађевинским пројектима.

**Чланство у стручним телима:**

- Инжењерска комора Србије;

- Инжењерска комора Црне Горе;

- Асоцијацаија Инжењера консултанта Црне Горе (ACEM) - Члан управног одбора;

- PMI сертификовани Пројект Менаџмент Професионалац (PMP)

**Потпис докторанда**

У Београду, _____

_____

Небојша Шурлан