

## **CHAPTER V**

### **CONCLUSION AND RECOMMENDATIONS**

#### **5.1. Conclusion**

From the analysis and discussion in this study, conclusion is derived to answer this study's objectives, as follows:

1. The first objective of this study is to identify causes of disputes in construction industry. To answer this objective, a literature study was conducted to find the existing causes of construction disputes. It has been confirmed by the researchers that there have been many factors that could trigger disputes in projects. Based on the study by Semple et al. (1994), in most cases dispute claims are because of scope changes, weather and access limit to site. Williamson (1979) also found that there are three main causes of disputes including behavioral problems, contract problems and technical problem due to lack of experience and uncertainty in projects. Another researcher, Kumaraswamy (1997) also identified causes of disputes in construction projects and divided them into two categories. The first is root causes which include unfair risk allocation, unrealistic targets by clients, adversarial industry culture, and inappropriate contracting type. The second category is proximate causes which include inaccurate design information, inadequate contract form and inadequate contract administrations. From all previous findings, a

study by Cakmak (2014) summarized common 28 causes of disputes and categorized them into seven broad categories which are owner related disputes, contractor related, design related, contract related, human behavior related, project related and external factors.

2. The second objective is to identify main causes of construction disputes using Analytical Network Process. From study analysis, it is found that variation by owner variable has received highest priority among other variables with value of 0.1633. Under variation of owner, there are change of scope with priority 0.1587 and late giving of possession with priority 0.0911. These are the top three variables as the main causes of disputes in Yogyakarta. All of these variables come from cluster owner related disputes. It can be concluded that the main source of construction disputes in Yogyakarta is the project owners. The result also shows that tendering has the lowest priority (0.0022), and this has put it as the less preferred dispute cause by respondents.

## **5.2. Recommendations**

From the analysis, there are some recommendations for practitioners in construction and as well as for future study, as follows:

1. For practitioners in construction, it is important to have a better understanding of dispute causes in projects and how disputes can

damage the project. If a better understanding of disputes can be established, it is possible for all project parties to reduce and avoid such thing to happen. Also based on this study findings, it is found that main source of disputes in projects is the owner of the project itself. In this condition, especially because variation initiated by owner is the main cause, contractor can try to communicate with the project owner how making changes frequently can affect the whole project. Contractor can try to communicate how changes made by owner can affect the schedule of the project which they really concern about. Even though it seems difficult for contractors to communicate essential issues, such as schedule to project owner as mentioned by Karna et al. (2009), but improving communications between the two parties can be an alternative to achieve a better understanding from both the contractor and the project owner.

2. In the future if a study is going to be conducted with similar concern, it can try to involve construction clients to see how their judgements can affect the weights of the variable priorities being examined in the study. It can be done to achieve a fair perspective from all type of parties in projects.

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# APPENDICES

## KUESIONER FASE I

### PENERAPAN *ANALYTIC NETWORK PROCESS* (ANP) UNTUK MENINJAU KEMBALI PENYEBAB PERSELISIHAN DI INDUSTRI KONSTRUKSI

- I. Tipe responden:
- Praktisi Konstruksi (Kontraktor atau Konsultan)
  - Akademisi / Pengajar
  - Lainnya
- II. Berapa tahun anda sudah terlibat dalam dunia konstruksi?
- 1 – 5 tahun
  - 5 – 10 tahun
  - > 10 tahun

#### A. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *OWNER RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [ - ] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI       |                          |                                  |                                 |                         |                          |
|-------------------|----------------------------------|------------------------|--------------------------|----------------------------------|---------------------------------|-------------------------|--------------------------|
|                   |                                  | Perubahan oleh pemilik | Perubahan lingkup proyek | Keterlambatan penanganan masalah | Permintaan percepatan pekerjaan | Harapan tidak realistis | Keterlambatan pembayaran |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           | X                      |                          |                                  |                                 |                         |                          |
|                   | Perubahan lingkup proyek         |                        | X                        |                                  |                                 |                         |                          |
|                   | Keterlambatan penanganan masalah |                        |                          | X                                |                                 |                         |                          |
|                   | Permintaan percepatan pekerjaan  |                        |                          |                                  | X                               |                         |                          |
|                   | Harapan tidak realistis          |                        |                          |                                  |                                 | X                       |                          |
|                   | Keterlambatan pembayaran         |                        |                          |                                  |                                 |                         | X                        |
|                   | Keterlambatan proyek             |                        |                          |                                  |                                 |                         |                          |
|                   | Perpanjangan durasi kerja        |                        |                          |                                  |                                 |                         |                          |

| SUB-KRITERIA      |                                       | YANG DIPENGARUHI       |                          |                                  |                                 |                          |
|-------------------|---------------------------------------|------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|
|                   |                                       | Perubahan oleh pemilik | Perubahan lingkup proyek | Keterlambatan penanganan masalah | Permintaan percepatan pekerjaan | Keterlambatan pembayaran |
| YANG MEMPENGARUHI | Kegagalan pendanaan kontraktor        |                        |                          |                                  |                                 |                          |
|                   | Ketidakmampuan teknis kontraktor      |                        |                          |                                  |                                 |                          |
|                   | Pelelangan/ <i>Tendering</i>          |                        |                          |                                  |                                 |                          |
|                   | Mutu hasil kerja                      |                        |                          |                                  |                                 |                          |
|                   | Kesalahan perencanaan                 |                        |                          |                                  |                                 |                          |
|                   | Spesifikasi tidak lengkap             |                        |                          |                                  |                                 |                          |
|                   | Mutu perencanaan                      |                        |                          |                                  |                                 |                          |
|                   | Ketersediaan informasi                |                        |                          |                                  |                                 |                          |
|                   | Makna ganda dalam kontrak             |                        |                          |                                  |                                 |                          |
|                   | Perbedaan pandangan thd kontrak       |                        |                          |                                  |                                 |                          |
|                   | Alokasi resiko kurang jelas           |                        |                          |                                  |                                 |                          |
|                   | Permasalahan kontrak lain-lain        |                        |                          |                                  |                                 |                          |
|                   | Perbedaan budaya                      |                        |                          |                                  |                                 |                          |
|                   | Kurangnya komunikasi                  |                        |                          |                                  |                                 |                          |
|                   | Kurangnya semangat kerja tim          |                        |                          |                                  |                                 |                          |
|                   | Kondisi lapangan                      |                        |                          |                                  |                                 |                          |
|                   | Perubahan dilapangan diluar kendali   |                        |                          |                                  |                                 |                          |
|                   | Cuaca                                 |                        |                          |                                  |                                 |                          |
|                   | Kondisi peraturan dan ekonomi         |                        |                          |                                  |                                 |                          |
|                   | Struktur industri yang terkotak-kotak |                        |                          |                                  |                                 |                          |

B. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *CONTRACTOR RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [-] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI     |                           |                                |                                  |                                 |                  |
|-------------------|----------------------------------|----------------------|---------------------------|--------------------------------|----------------------------------|---------------------------------|------------------|
|                   |                                  | Keterlambatan proyek | Perpanjangan durasi kerja | Kegagalan pendanaan kontraktor | Ketidakmampuan teknis kontraktor | Pelelangan/<br><i>Tendering</i> | Mutu hasil kerja |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           |                      |                           |                                |                                  |                                 |                  |
|                   | Perubahan lingkup proyek         |                      |                           |                                |                                  |                                 |                  |
|                   | Keterlambatan penanganan masalah |                      |                           |                                |                                  |                                 |                  |
|                   | Permintaan percepatan pekerjaan  |                      |                           |                                |                                  |                                 |                  |
|                   | Harapan tidak realistis          |                      |                           |                                |                                  |                                 |                  |
|                   | Keterlambatan pembayaran         |                      |                           |                                |                                  |                                 |                  |
|                   | Keterlambatan proyek             | X                    |                           |                                |                                  |                                 |                  |
|                   | Perpanjangan durasi kerja        |                      | X                         |                                |                                  |                                 |                  |
|                   | Kegagalan pendanaan kontraktor   |                      |                           | X                              |                                  |                                 |                  |
|                   | Ketidakmampuan teknis kontraktor |                      |                           |                                | X                                |                                 |                  |
|                   | Pelelangan/ <i>Tendering</i>     |                      |                           |                                |                                  | X                               |                  |
|                   | Mutu hasil kerja                 |                      |                           |                                |                                  |                                 | X                |
|                   | Kesalahan perencanaan            |                      |                           |                                |                                  |                                 |                  |
|                   | Spesifikasi tidak lengkap        |                      |                           |                                |                                  |                                 |                  |
|                   | Mutu perencanaan                 |                      |                           |                                |                                  |                                 |                  |
|                   | Ketersediaan informasi           |                      |                           |                                |                                  |                                 |                  |
|                   | Makna ganda dalam kontrak        |                      |                           |                                |                                  |                                 |                  |
|                   | Perbedaan pandangan thd kontrak  |                      |                           |                                |                                  |                                 |                  |
|                   | Alokasi resiko kurang jelas      |                      |                           |                                |                                  |                                 |                  |

| SUB-KRITERIA      |                                       | YANG DIPENGARUHI     |                           |                                |                                  |                                 |                  |
|-------------------|---------------------------------------|----------------------|---------------------------|--------------------------------|----------------------------------|---------------------------------|------------------|
|                   |                                       | Keterlambatan proyek | Perpanjangan durasi kerja | Kegagalan pendanaan kontraktor | Ketidakmampuan teknis kontraktor | Pelelangan/<br><i>Tendering</i> | Mutu hasil kerja |
| YANG MEMPENGARUHI | Permasalahan kontrak lain-lain        |                      |                           |                                |                                  |                                 |                  |
|                   | Perbedaan budaya                      |                      |                           |                                |                                  |                                 |                  |
|                   | Kurangnya komunikasi                  |                      |                           |                                |                                  |                                 |                  |
|                   | Kurangnya semangat kerja tim          |                      |                           |                                |                                  |                                 |                  |
|                   | Kondisi lapangan                      |                      |                           |                                |                                  |                                 |                  |
|                   | Perubahan dilapangan diluar kendali   |                      |                           |                                |                                  |                                 |                  |
|                   | Cuaca                                 |                      |                           |                                |                                  |                                 |                  |
|                   | Kondisi peraturan dan ekonomi         |                      |                           |                                |                                  |                                 |                  |
|                   | Struktur industri yang terkotak-kotak |                      |                           |                                |                                  |                                 |                  |

C. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *DESIGN RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [ - ] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI      |                           |                  |                        |
|-------------------|----------------------------------|-----------------------|---------------------------|------------------|------------------------|
|                   |                                  | Kesalahan perencanaan | Spesifikasi tidak lengkap | Mutu perencanaan | Ketersediaan informasi |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           |                       |                           |                  |                        |
|                   | Perubahan lingkup proyek         |                       |                           |                  |                        |
|                   | Keterlambatan penanganan masalah |                       |                           |                  |                        |
|                   | Permintaan percepatan pekerjaan  |                       |                           |                  |                        |
|                   | Harapan tidak realistis          |                       |                           |                  |                        |
|                   | Keterlambatan pembayaran         |                       |                           |                  |                        |
|                   | Keterlambatan proyek             |                       |                           |                  |                        |
|                   | Perpanjangan durasi kerja        |                       |                           |                  |                        |
|                   | Kegagalan pendanaan kontraktor   |                       |                           |                  |                        |
|                   | Ketidakmampuan teknis kontraktor |                       |                           |                  |                        |
|                   | Pelelangan/ <i>Tendering</i>     |                       |                           |                  |                        |
|                   | Mutu hasil kerja                 |                       |                           |                  |                        |
|                   | Kesalahan perencanaan            | X                     |                           |                  |                        |
|                   | Spesifikasi tidak lengkap        |                       | X                         |                  |                        |
|                   | Mutu perencanaan                 |                       |                           | X                |                        |
|                   | Ketersediaan informasi           |                       |                           |                  | X                      |
|                   | Makna ganda dalam kontrak        |                       |                           |                  |                        |
|                   | Perbedaan pandangan thd kontrak  |                       |                           |                  |                        |
|                   | Alokasi resiko kurang jelas      |                       |                           |                  |                        |

| SUB-KRITERIA      |                                       | YANG DIPENGARUHI      |                           |                  |                        |
|-------------------|---------------------------------------|-----------------------|---------------------------|------------------|------------------------|
|                   |                                       | Kesalahan perencanaan | Spesifikasi tidak lengkap | Mutu perencanaan | Ketersediaan informasi |
| YANG MEMPENGARUHI | Permasalahan kontrak lain-lain        |                       |                           |                  |                        |
|                   | Perbedaan budaya                      |                       |                           |                  |                        |
|                   | Kurangnya komunikasi                  |                       |                           |                  |                        |
|                   | Kurangnya semangat kerja tim          |                       |                           |                  |                        |
|                   | Kondisi lapangan                      |                       |                           |                  |                        |
|                   | Perubahan dilapangan diluar kendali   |                       |                           |                  |                        |
|                   | Cuaca                                 |                       |                           |                  |                        |
|                   | Kondisi peraturan dan ekonomi         |                       |                           |                  |                        |
|                   | Struktur industri yang terkotak-kotak |                       |                           |                  |                        |

D. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *CONTRACT RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [ - ] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI          |                                 |                             |                                |
|-------------------|----------------------------------|---------------------------|---------------------------------|-----------------------------|--------------------------------|
|                   |                                  | Makna ganda dalam kontrak | Perbedaan pandangan thd kontrak | Alokasi resiko kurang jelas | Permasalahan kontrak lain-lain |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           |                           |                                 |                             |                                |
|                   | Perubahan lingkup proyek         |                           |                                 |                             |                                |
|                   | Keterlambatan penanganan masalah |                           |                                 |                             |                                |
|                   | Permintaan percepatan pekerjaan  |                           |                                 |                             |                                |
|                   | Harapan tidak realistis          |                           |                                 |                             |                                |
|                   | Keterlambatan pembayaran         |                           |                                 |                             |                                |
|                   | Keterlambatan proyek             |                           |                                 |                             |                                |
|                   | Perpanjangan durasi kerja        |                           |                                 |                             |                                |
|                   | Kegagalan pendanaan kontraktor   |                           |                                 |                             |                                |
|                   | Ketidakmampuan teknis kontraktor |                           |                                 |                             |                                |
|                   | Pelelangan/ <i>Tendering</i>     |                           |                                 |                             |                                |
|                   | Mutu hasil kerja                 |                           |                                 |                             |                                |
|                   | Kesalahan perencanaan            |                           |                                 |                             |                                |
|                   | Spesifikasi tidak lengkap        |                           |                                 |                             |                                |
|                   | Mutu perencanaan                 |                           |                                 |                             |                                |
|                   | Ketersediaan informasi           |                           |                                 |                             |                                |
|                   | Makna ganda dalam kontrak        | X                         |                                 |                             |                                |
|                   | Perbedaan pandangan thd kontrak  |                           | X                               |                             |                                |
|                   | Alokasi resiko kurang jelas      |                           |                                 | X                           |                                |
|                   | Permasalahan kontrak lain-lain   |                           |                                 |                             | X                              |

| SUB-KRITERIA |                                       | YANG DIPENGARUHI          |                                 |                             |                                |
|--------------|---------------------------------------|---------------------------|---------------------------------|-----------------------------|--------------------------------|
|              |                                       | Makna ganda dalam kontrak | Perbedaan pandangan thd kontrak | Alokasi resiko kurang jelas | Permasalahan kontrak lain-lain |
|              | Perbedaan budaya                      |                           |                                 |                             |                                |
|              | Kurangnya komunikasi                  |                           |                                 |                             |                                |
|              | Kurangnya semangat kerja tim          |                           |                                 |                             |                                |
|              | Kondisi lapangan                      |                           |                                 |                             |                                |
|              | Perubahan dilapangan diluar kendali   |                           |                                 |                             |                                |
|              | Cuaca                                 |                           |                                 |                             |                                |
|              | Kondisi peraturan dan ekonomi         |                           |                                 |                             |                                |
|              | Struktur industri yang terkotak-kotak |                           |                                 |                             |                                |

E. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *HUMAN BEHAVIOR RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [ - ] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI |                      |                              |
|-------------------|----------------------------------|------------------|----------------------|------------------------------|
|                   |                                  | Perbedaan budaya | Kurangnya komunikasi | Kurangnya semangat kerja tim |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           |                  |                      |                              |
|                   | Perubahan lingkup proyek         |                  |                      |                              |
|                   | Keterlambatan penanganan masalah |                  |                      |                              |
|                   | Permintaan percepatan pekerjaan  |                  |                      |                              |
|                   | Harapan tidak realistis          |                  |                      |                              |
|                   | Keterlambatan pembayaran         |                  |                      |                              |
|                   | Keterlambatan proyek             |                  |                      |                              |
|                   | Perpanjangan durasi kerja        |                  |                      |                              |
|                   | Kegagalan pendanaan kontraktor   |                  |                      |                              |
|                   | Ketidakmampuan teknis kontraktor |                  |                      |                              |
|                   | Pelelangan/ <i>Tendering</i>     |                  |                      |                              |
|                   | Mutu hasil kerja                 |                  |                      |                              |
|                   | Kesalahan perencanaan            |                  |                      |                              |
|                   | Spesifikasi tidak lengkap        |                  |                      |                              |
|                   | Mutu perencanaan                 |                  |                      |                              |
|                   | Ketersediaan informasi           |                  |                      |                              |
|                   | Makna ganda dalam kontrak        |                  |                      |                              |
|                   | Perbedaan pandangan thd kontrak  |                  |                      |                              |
|                   | Alokasi resiko kurang jelas      |                  |                      |                              |
|                   | Permasalahan kontrak lain-lain   |                  |                      |                              |

| SUB-KRITERIA |                                       | YANG DIPENGARUHI |                      |                              |
|--------------|---------------------------------------|------------------|----------------------|------------------------------|
|              |                                       | Perbedaan budaya | Kurangnya komunikasi | Kurangnya semangat kerja tim |
|              | Perbedaan budaya                      | X                |                      |                              |
|              | Kurangnya komunikasi                  |                  | X                    |                              |
|              | Kurangnya semangat kerja tim          |                  |                      | X                            |
|              | Kondisi lapangan                      |                  |                      |                              |
|              | Perubahan dilapangan diluar kendali   |                  |                      |                              |
|              | Cuaca                                 |                  |                      |                              |
|              | Kondisi peraturan dan ekonomi         |                  |                      |                              |
|              | Struktur industri yang terkotak-kotak |                  |                      |                              |

F. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *PROJECT RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [ - ] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI |                      |
|-------------------|----------------------------------|------------------|----------------------|
|                   |                                  | Perbedaan budaya | Kurangnya komunikasi |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           |                  |                      |
|                   | Perubahan lingkup proyek         |                  |                      |
|                   | Keterlambatan penanganan masalah |                  |                      |
|                   | Permintaan percepatan pekerjaan  |                  |                      |
|                   | Harapan tidak realistis          |                  |                      |
|                   | Keterlambatan pembayaran         |                  |                      |
|                   | Keterlambatan proyek             |                  |                      |
|                   | Perpanjangan durasi kerja        |                  |                      |
|                   | Kegagalan pendanaan kontraktor   |                  |                      |
|                   | Ketidakmampuan teknis kontraktor |                  |                      |
|                   | Pelelangan/ <i>Tendering</i>     |                  |                      |
|                   | Mutu hasil kerja                 |                  |                      |
|                   | Kesalahan perencanaan            |                  |                      |
|                   | Spesifikasi tidak lengkap        |                  |                      |
|                   | Mutu perencanaan                 |                  |                      |
|                   | Ketersediaan informasi           |                  |                      |
|                   | Makna ganda dalam kontrak        |                  |                      |
|                   | Perbedaan pandangan thd kontrak  |                  |                      |
|                   | Alokasi resiko kurang jelas      |                  |                      |
|                   | Permasalahan kontrak lain-lain   |                  |                      |

| SUB-KRITERIA |                                       | YANG DIPENGARUHI |                      |
|--------------|---------------------------------------|------------------|----------------------|
|              |                                       | Perbedaan budaya | Kurangnya komunikasi |
|              | Perbedaan budaya                      |                  |                      |
|              | Kurangnya komunikasi                  |                  |                      |
|              | Kurangnya semangat kerja tim          |                  |                      |
|              | Kondisi lapangan                      | X                |                      |
|              | Perubahan dilapangan diluar kendali   |                  | X                    |
|              | Cuaca                                 |                  |                      |
|              | Kondisi peraturan dan ekonomi         |                  |                      |
|              | Struktur industri yang terkotak-kotak |                  |                      |

G. HUBUNGAN KETERGANTUNGAN ANTARA 28 VARIABEL PENYABAB PERSELISIHAN DI INDUSTRI KONSTRUKSI DENGAN VARIABEL *EXTERNAL FACTORS RELATED*

Centanglah kotak [✓] jika menurut anda variabel yang berada di kolom “YANG MEMPENGARUHI” memiliki hubungan dengan variabel yang berada di kolom “YANG DIPENGARUHI”. Berikan tanda strip [ - ] jika tidak memiliki hubungan.

| SUB-KRITERIA      |                                  | YANG DIPENGARUHI |                               |                                       |
|-------------------|----------------------------------|------------------|-------------------------------|---------------------------------------|
|                   |                                  | Cuaca            | Kondisi peraturan dan ekonomi | Struktur industri yang terkotak-kotak |
| YANG MEMPENGARUHI | Perubahan oleh pemilik           |                  |                               |                                       |
|                   | Perubahan lingkup proyek         |                  |                               |                                       |
|                   | Keterlambatan penanganan masalah |                  |                               |                                       |
|                   | Permintaan percepatan pekerjaan  |                  |                               |                                       |
|                   | Harapan tidak realistis          |                  |                               |                                       |
|                   | Keterlambatan pembayaran         |                  |                               |                                       |
|                   | Keterlambatan proyek             |                  |                               |                                       |
|                   | Perpanjangan durasi kerja        |                  |                               |                                       |
|                   | Kegagalan pendanaan kontraktor   |                  |                               |                                       |
|                   | Ketidakmampuan teknis kontraktor |                  |                               |                                       |
|                   | Pelelangan/ <i>Tendering</i>     |                  |                               |                                       |
|                   | Mutu hasil kerja                 |                  |                               |                                       |
|                   | Kesalahan perencanaan            |                  |                               |                                       |
|                   | Spesifikasi tidak lengkap        |                  |                               |                                       |
|                   | Mutu perencanaan                 |                  |                               |                                       |
|                   | Ketersediaan informasi           |                  |                               |                                       |
|                   | Makna ganda dalam kontrak        |                  |                               |                                       |
|                   | Perbedaan pandangan thd kontrak  |                  |                               |                                       |
|                   | Alokasi resiko kurang jelas      |                  |                               |                                       |
|                   | Permasalahan kontrak lain-lain   |                  |                               |                                       |

| SUB-KRITERIA |                                       | YANG DIPENGARUHI |                               |                                       |
|--------------|---------------------------------------|------------------|-------------------------------|---------------------------------------|
|              |                                       | Cuaca            | Kondisi peraturan dan ekonomi | Struktur industri yang terkotak-kotak |
|              | Perbedaan budaya                      |                  |                               |                                       |
|              | Kurangnya komunikasi                  |                  |                               |                                       |
|              | Kurangnya semangat kerja tim          |                  |                               |                                       |
|              | Kondisi lapangan                      |                  |                               |                                       |
|              | Perubahan dilapangan diluar kendali   |                  |                               |                                       |
|              | Cuaca                                 | X                |                               |                                       |
|              | Kondisi peraturan dan ekonomi         |                  | X                             |                                       |
|              | Struktur industri yang terkotak-kotak |                  |                               | X                                     |

## KUESIONER FASE II

### PENERAPAN *ANALYTIC NETWORK PROCESS* (ANP) UNTUK MENINJAU KEMBALI PENYEBAB PERSELISIHAN DI INDUSTRI KONSTRUKSI

- I. Tipe responden:
- Praktisi Konstruksi (Kontraktor atau Konsultan)
  - Akademisi / Pengajar
  - Lainnya
- II. Berapa tahun anda sudah terlibat dalam dunia konstruksi?
- 1 – 5 tahun
  - 5 – 10 tahun
  - > 10 tahun

### III. PETUNJUK KUESIONER

Bentuk kuesioner ini adalah kuesioner perbandingan berpasangan (*Pairwise comparison*). Terdapat skala dari 1 – 9 yang dapat anda gunakan untuk mengekspresikan pendapat anda. Skala yang digunakan pada kuesioner ini didasarkan pada skala perbandingan berpasangan yang dikenalkan oleh Thomas. L. Saaty. Skala tersebut dapat dilihat dibawah ini.

| Tingkat kepentingan | Definisi              | Keterangan                                                                     |
|---------------------|-----------------------|--------------------------------------------------------------------------------|
| 1                   | Sama penting          | Kedua elemen mempunyai pengaruh yang sama                                      |
| 3                   | Sedikit lebih penting | Pengalaman dan penilaian sedikit memihak satu elemen dibanding pasangannya     |
| 5                   | Lebih penting         | Pengalaman dan penilaian dengan kuat memihak satu elemen dibanding pasangannya |
| 7                   | Sangat penting        | Satu elemen sangat disukai dan secara praktis dominasinya terlihat             |
| 9                   | Mutlak sangat penting | Satu elemen mutlak sangat disukai dibandingkan dengan pasangannya              |
| 2, 4, 6, 8          | Nilai tengah          | Digunakan untuk mengkompromikan nilai - nilai diantara nilai diatas            |

Cara pengisian kuesioner dapat dilihat dibawah ini:

1. Seberapa penting Waktu pengerjaan dibandingkan dengan Biaya pengerjaan berkaitan dengan kepuasan Pemilik proyek?

|                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                  |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|
| Waktu pengerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Biaya pengerjaan |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|

Kesimpulan:

Waktu pengerjaan mutlak sangat penting atau mutlak sangat berpengaruh terhadap kepuasan pemilik proyek jika dibandingkan dengan biaya pengerjaan proyek.

2. Seberapa penting Kualitas pekerjaan dibandingkan dengan Biaya pengerjaan berkaitan dengan kepuasan Pemilik proyek?

|                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                  |
|--------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|
| Kualitas pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Biaya pengerjaan |
|--------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|

Kesimpulan:

Kualitas pekerjaan sedikit lebih penting / sedikit lebih berpengaruh terhadap kepuasan pemilik proyek jika dibandingkan dengan biaya pengerjaan proyek.

#### IV. KUESIONER PERBANDINGAN BERPASANGAN (PAIRWISE COMPARISON)

1. Seberapa berpengaruh faktor disebelah kiri dibandingkan dengan dengan faktor disebelah kanan berkaitan dengan perselisihan di proyek yang disebabkan oleh kontraktor?

|                             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|-----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Berkaitan dengan kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan desain  |
| Berkaitan dengan kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan pemilik |
| Berkaitan dengan desain     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan pemilik |

2. Seberapa berpengaruh faktor disebelah kiri dibandingkan dengan dengan faktor disebelah kanan berkaitan dengan perselisihan di proyek yang disebabkan oleh perencanaan?

|                             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|-----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Berkaitan dengan kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan desain  |
| Berkaitan dengan kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan pemilik |
| Berkaitan dengan desain     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan pemilik |

3. Seberapa berpengaruh faktor disebelah kiri dibandingkan dengan dengan faktor disebelah kanan berkaitan dengan perselisihan di proyek yang disebabkan oleh pemilik proyek?

|                             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|-----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Berkaitan dengan kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan desain  |
| Berkaitan dengan kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan pemilik |
| Berkaitan dengan desain     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Berkaitan dengan pemilik |

4. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan keterlambatan proyek? (Perbandingan didasarkan pada cluster “Berkaitan dengan kontraktor”)

|                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Ketidakmampuan teknis kontraktor |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja        |
| Ketidakmampuan teknis kontraktor    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja        |

5. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan keterlambatan proyek? (Perbandingan didasarkan pada cluster “Berkaitan dengan perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kesalahan perencanaan     |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

6. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan keterlambatan proyek? (Perbandingan didasarkan pada cluster “Berkaitan dengan pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran         |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran         |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Keterlambatan pembayaran         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |

7. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **kegagalan pendanaan oleh kontraktor**? (Perbandingan didasarkan pada cluster “Berkaitan dengan kontraktor”)

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja          |
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |
| Mutu hasil kerja     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |

8. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **kegagalan pendanaan oleh kontraktor**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|

9. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **kegagalan pendanaan oleh kontraktor**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|

10. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Mutu hasil kerja**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                         |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------|
| Permintaan percepatan pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------|

11. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Mutu hasil kerja**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kesalahan perencanaan     |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

12. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Mutu hasil kerja**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                     |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------------------|
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kegagalan pendanaan oleh kontraktor |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Ketidakkampuan teknis kontraktor    |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Terdering / Pelelangan              |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Ketidakkampuan teknis kontraktor    |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Terdering / Pelelangan              |
| Ketidakkampuan teknis kontraktor    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Terdering / Pelelangan              |

13. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Ketidakkampuan teknis kontraktor**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                     |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------------------|
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kegagalan pendanaan oleh kontraktor |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja                    |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja           |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja                    |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja           |
| Mutu hasil kerja                    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja           |

14. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Ketidakkampuan teknis kontraktor**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kesalahan perencanaan     |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

15. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Ketidakmampuan teknis kontraktor**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|

16. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Tendering / Pelelangan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Mutu hasil kerja | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Ketidakmampuan teknis kontraktor |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|

17. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perpanjangan durasi kerja**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Ketidakmampuan teknis kontraktor |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|

18. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perpanjangan durasi kerja**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

19. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perpanjangan durasi kerja**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan lingkup proyek         |
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran         |
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran         |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran         |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |

|                          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                        |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|
| Keterlambatan pembayaran | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|

20. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Ketersediaan informasi**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

21. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Kesalahan perencanaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Harapan tidak realistis          | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |

22. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Kesalahan perencanaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

23. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Kesalahan perencanaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja          |
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |
| Mutu hasil kerja     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |

24. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Spesifikasi tidak lengkap**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Keterlambatan proyek   | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja          |
| Keterlambatan proyek   | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Tendering / Pelelangan    |
| Keterlambatan proyek   | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |
| Mutu hasil kerja       | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Tendering / Pelelangan    |
| Mutu hasil kerja       | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |
| Tendering / Pelelangan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |

25. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Spesifikasi tidak lengkap**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                  |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|
| Kesalahan perencanaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|

26. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Spesifikasi tidak lengkap**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |

27. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Mutu perencanaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja          |
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |
| Mutu hasil kerja     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |

28. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Mutu perencanaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan lingkup proyek         |
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |
| Permintaan percepatan pekerjaan  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |
| Perubahan lingkup proyek         | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Harapan tidak realistis          |
| Keterlambatan penanganan masalah | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |
| Harapan tidak realistis          | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik           |

29. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Permintaan percepatan pekerjaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|

30. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Permintaan percepatan pekerjaan**? (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|
| Ketersediaan informasi | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|

31. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Permintaan percepatan pekerjaan?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                        |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|
| Perubahan lingkup proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|

32. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perubahan lingkup proyek?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Keterlambatan proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|

33. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perubahan lingkup proyek?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kesalahan perencanaan     |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

34. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perubahan lingkup proyek?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                        |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|
| Permintaan percepatan pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|

35. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Keterlambatan penanganan masalah?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Keterlambatan proyek             | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Ketidakmampuan teknis kontraktor |
| Keterlambatan proyek             | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja        |
| Ketidakmampuan teknis kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja        |

36. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Keterlambatan penanganan masalah?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

37. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Keterlambatan penanganan masalah?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Permintaan percepatan pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan lingkup proyek |
| Permintaan percepatan pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran |
| Permintaan percepatan pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik   |
| Perubahan lingkup proyek        | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran |
| Perubahan lingkup proyek        | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik   |
| Keterlambatan pembayaran        | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik   |

38. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Keterlambatan pembayaran?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                     |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------------------|
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kegagalan pendanaan oleh kontraktor |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja                    |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja                    |

39. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Keterlambatan pembayaran?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                  |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|

40. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Keterlambatan pembayaran?**  
(Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Permintaan percepatan pekerjaan | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|

41. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Harapan tidak realistis?** (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                     |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------------------|
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kegagalan pendanaan oleh kontraktor |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja           |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perpanjangan durasi kerja           |

42. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Harapan tidak realistis?** (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kesalahan perencanaan     |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

43. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Harapan tidak realistis?** (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| Perubahan lingkup proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan pembayaran |
| Perubahan lingkup proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik   |
| Keterlambatan pembayaran | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Perubahan oleh pemilik   |

44. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perubahan oleh pemilik?** (Perbandingan didasarkan pada cluster “Berkaitan dengan Kontraktor”)

|                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                     |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------------------------|
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kegagalan pendanaan oleh kontraktor |
| Keterlambatan proyek                | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja                    |
| Kegagalan pendanaan oleh kontraktor | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu hasil kerja                    |

45. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perubahan oleh pemilik?** (Perbandingan didasarkan pada cluster “Berkaitan dengan Perencanaan”)

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                           |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------------|
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Kesalahan perencanaan     |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Ketersediaan informasi    | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Spesifikasi tidak lengkap |
| Kesalahan perencanaan     | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |
| Spesifikasi tidak lengkap | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Mutu perencanaan          |

46. Seberapa berpengaruh variabel di sebelah kiri dibandingkan dengan variabel di sebelah kanan berkaitan dengan **Perubahan oleh pemilik?** (Perbandingan didasarkan pada cluster “Berkaitan dengan Pemilik”)

|                          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                                  |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|
| Perubahan lingkup proyek | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Keterlambatan penanganan masalah |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------------|

## APPENDICES OF RESULT OF QUESTIONNAIRE PHASE I

|                                        | VO | CS | LP | A | UE | PD | DW | TE | FF | TI | T | QW | DE | IS | QD | AI |
|----------------------------------------|----|----|----|---|----|----|----|----|----|----|---|----|----|----|----|----|
| Variation by owner VO                  | X  | 1  | 1  | 0 | 0  | 0  | 1  | 1  | 0  | 0  | 0 | 0  | 1  | 1  | 1  | 1  |
| Change of scope CS                     | 1  | X  | 1  | 0 | 0  | 0  | 1  | 1  | 0  | 0  | 0 | 0  | 1  | 1  | 1  | 1  |
| Late giving possession LP              | 1  | 1  | X  | 1 | 1  | 1  | 1  | 1  | 0  | 1  | 0 | 0  | 1  | 1  | 1  | 1  |
| Acceleration A                         | 1  | 0  | 0  | X | 0  | 0  | 1  | 0  | 0  | 0  | 0 | 1  | 0  | 0  | 0  | 1  |
| Unrealistic expectation UE             | 1  | 1  | 0  | 0 | X  | 0  | 0  | 0  | 1  | 1  | 0 | 0  | 1  | 1  | 0  | 1  |
| Payment delays PD                      | 0  | 0  | 1  | 0 | 0  | X  | 1  | 0  | 1  | 0  | 0 | 0  | 0  | 0  | 1  | 0  |
| Delays in work progress DW             | 0  | 1  | 1  | 0 | 0  | 1  | X  | 1  | 0  | 1  | 0 | 0  | 1  | 1  | 1  | 1  |
| Time extensions TE                     | 1  | 1  | 1  | 0 | 0  | 0  | 1  | X  | 0  | 1  | 0 | 0  | 1  | 1  | 1  | 0  |
| Financial failure of the contractor FF | 0  | 0  | 1  | 0 | 0  | 0  | 1  | 1  | X  | 0  | 0 | 0  | 0  | 0  | 0  | 0  |
| Technical inadequacy TI                | 0  | 0  | 1  | 0 | 1  | 0  | 1  | 1  | 0  | X  | 0 | 1  | 0  | 0  | 0  | 0  |
| Tendering T                            | 0  | 0  | 0  | 0 | 0  | 0  | 0  | 0  | 0  | 0  | X | 0  | 0  | 0  | 0  | 0  |
| Quality of works QW                    | 0  | 0  | 0  | 0 | 0  | 0  | 0  | 0  | 0  | 1  | 0 | X  | 1  | 1  | 1  | 1  |
| Design errors DE                       | 1  | 1  | 1  | 0 | 1  | 0  | 1  | 1  | 0  | 0  | 0 | 1  | X  | 0  | 1  | 1  |
| Inadequate specifications IS           | 0  | 1  | 1  | 0 | 1  | 0  | 1  | 1  | 0  | 0  | 1 | 1  | 0  | X  | 1  | 1  |
| Quality of design QD                   | 0  | 1  | 1  | 0 | 1  | 0  | 1  | 1  | 0  | 0  | 0 | 1  | 1  | 1  | X  | 0  |
| Availability of information AI         | 0  | 0  | 1  | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0  | 1  | 0  | 1  | X  |

Appendix 1. Questionnaire result of respondent 1 phase 1

|                                     |    | VO | CS | LP | A | UE | PD | DW | TE | FF | TI | T | QW | DE | IS | QD | AI |
|-------------------------------------|----|----|----|----|---|----|----|----|----|----|----|---|----|----|----|----|----|
| Variation by owner                  | VO | X  | 1  | 1  | 0 | 1  | 1  | 1  | 1  | 1  | 0  | 1 | 0  | 1  | 1  | 1  | 1  |
| Change of scope                     | CS | 1  | X  | 0  | 1 | 1  | 0  | 1  | 1  | 0  | 0  | 0 | 0  | 1  | 1  | 1  | 1  |
| Late giving possession              | LP | 1  | 1  | X  | 1 | 0  | 1  | 1  | 1  | 0  | 0  | 0 | 0  | 1  | 1  | 1  | 1  |
| Acceleration                        | A  | 1  | 1  | 1  | X | 1  | 1  | 1  | 0  | 0  | 0  | 0 | 1  | 0  | 0  | 1  | 1  |
| Unrealistic expectation             | UE | 1  | 1  | 0  | 1 | X  | 1  | 1  | 1  | 0  | 0  | 1 | 1  | 1  | 1  | 1  | 1  |
| Payment delays                      | PD | 1  | 1  | 1  | 1 | 1  | X  | 1  | 1  | 0  | 0  | 0 | 1  | 0  | 1  | 0  | 1  |
| Delays in work progress             | DW | 1  | 1  | 1  | 0 | 1  | 1  | X  | 1  | 1  | 0  | 0 | 0  | 1  | 1  | 1  | 1  |
| Time extensions                     | TE | 1  | 1  | 1  | 1 | 1  | 1  | 1  | X  | 0  | 0  | 0 | 0  | 1  | 1  | 1  | 0  |
| Financial failure of the contractor | FF | 1  | 1  | 0  | 0 | 1  | 1  | 1  | 1  | X  | 0  | 0 | 1  | 1  | 1  | 1  | 1  |
| Technical inadequacy                | TI | 0  | 1  | 1  | 0 | 1  | 1  | 1  | 1  | 1  | X  | 0 | 1  | 1  | 1  | 1  | 1  |
| Tendering                           | T  | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 0  | 1  | 1  | X | 1  | 1  | 1  | 1  | 0  |
| Quality of works                    | QW | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 1 | X  | 1  | 1  | 1  | 0  |
| Design errors                       | DE | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 1  | 0  | 0  | 0 | 1  | X  | 1  | 1  | 1  |
| Inadequate specifications           | IS | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 1  | 0  | 0  | 0 | 1  | 1  | X  | 1  | 0  |
| Quality of design                   | QD | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 1  | 0  | 0  | 0 | 1  | 1  | 1  | X  | 1  |
| Availability of information         | AI | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 1  | 0  | 0  | 0 | 1  | 1  | 1  | 1  | X  |

**Appendix 2.** Questionnaire result of respondent 2 phase 1

|                                     |    | VO | CS | LP | A | UE | PD | DW | TE | FF | TI | T | QW | DE | IS | QD | AI |
|-------------------------------------|----|----|----|----|---|----|----|----|----|----|----|---|----|----|----|----|----|
| Variation by owner                  | VO | X  | 1  | 1  | 0 | 0  | 0  | 1  | 1  | 1  | 1  | 0 | 1  | 1  | 1  | 1  | 1  |
| Change of scope                     | CS | 1  | X  | 0  | 1 | 0  | 0  | 1  | 0  | 0  | 0  | 0 | 0  | 0  | 1  | 0  | 1  |
| Late giving possession              | LP | 1  | 1  | X  | 1 | 0  | 1  | 1  | 0  | 0  | 1  | 0 | 0  | 0  | 1  | 0  | 1  |
| Acceleration                        | A  | 0  | 1  | 0  | X | 0  | 0  | 1  | 0  | 0  | 1  | 0 | 1  | 0  | 0  | 1  | 1  |
| Unrealistic expectation             | UE | 0  | 0  | 0  | 0 | X  | 1  | 1  | 1  | 1  | 0  | 0 | 0  | 1  | 0  | 1  | 0  |
| Payment delays                      | PD | 0  | 0  | 0  | 1 | 1  | X  | 1  | 0  | 1  | 1  | 0 | 1  | 1  | 1  | 1  | 0  |
| Delays in work progress             | DW | 1  | 0  | 0  | 1 | 0  | 0  | X  | 0  | 1  | 1  | 0 | 0  | 0  | 1  | 1  | 1  |
| Time extensions                     | TE | 1  | 0  | 1  | 0 | 0  | 0  | 1  | X  | 1  | 1  | 1 | 0  | 1  | 1  | 0  | 1  |
| Financial failure of the contractor | FF | 0  | 0  | 1  | 0 | 0  | 1  | 0  | 0  | X  | 1  | 1 | 1  | 0  | 1  | 0  | 1  |
| Technical inadequacy                | TI | 1  | 0  | 0  | 1 | 0  | 0  | 1  | 1  | 1  | X  | 0 | 1  | 1  | 1  | 1  | 1  |
| Tendering                           | T  | 0  | 0  | 0  | 0 | 0  | 0  | 0  | 0  | 0  | 1  | X | 1  | 0  | 1  | 0  | 1  |
| Quality of works                    | QW | 0  | 0  | 0  | 1 | 1  | 0  | 0  | 0  | 1  | 1  | 1 | X  | 1  | 1  | 1  | 1  |
| Design errors                       | DE | 0  | 0  | 0  | 0 | 0  | 0  | 0  | 0  | 0  | 1  | 0 | 0  | X  | 1  | 1  | 1  |
| Inadequate specifications           | IS | 0  | 0  | 1  | 0 | 0  | 0  | 1  | 0  | 0  | 0  | 1 | 0  | 1  | X  | 0  | 0  |
| Quality of design                   | QD | 1  | 0  | 0  | 1 | 0  | 0  | 1  | 0  | 0  | 1  | 0 | 1  | 0  | 1  | X  | 1  |
| Availability of information         | AI | 0  | 0  | 1  | 0 | 0  | 0  | 0  | 0  | 0  | 1  | 0 | 0  | 1  | 1  | 1  | X  |

**Appendix 3.** Questionnaire result of respondent 3 phase 1

|                                     |    | VO | CS | LP | A | UE | PD | DW | TE | FF | TI | T | QW | DE | IS | QD | AI |
|-------------------------------------|----|----|----|----|---|----|----|----|----|----|----|---|----|----|----|----|----|
| Variation by owner                  | VO | X  | 3  | 3  | 0 | 1  | 1  | 3  | 3  | 2  | 1  | 1 | 1  | 3  | 3  | 3  | 3  |
| Change of scope                     | CS | 3  | X  | 1  | 2 | 1  | 0  | 3  | 2  | 0  | 0  | 0 | 0  | 2  | 3  | 2  | 3  |
| Late giving possession              | LP | 3  | 3  | X  | 3 | 1  | 3  | 3  | 2  | 0  | 2  | 0 | 0  | 2  | 3  | 2  | 3  |
| Acceleration                        | A  | 2  | 2  | 1  | X | 1  | 1  | 3  | 0  | 0  | 1  | 0 | 3  | 0  | 0  | 2  | 3  |
| Unrealistic expectation             | UE | 2  | 2  | 0  | 1 | X  | 2  | 2  | 2  | 2  | 1  | 1 | 1  | 3  | 2  | 2  | 2  |
| Payment delays                      | PD | 1  | 1  | 2  | 2 | 2  | X  | 3  | 1  | 2  | 1  | 0 | 2  | 1  | 2  | 2  | 1  |
| Delays in work progress             | DW | 2  | 2  | 2  | 1 | 1  | 2  | X  | 2  | 2  | 2  | 0 | 0  | 2  | 3  | 3  | 3  |
| Time extensions                     | TE | 3  | 2  | 3  | 2 | 1  | 2  | 3  | X  | 1  | 2  | 1 | 0  | 3  | 3  | 2  | 1  |
| Financial failure of the contractor | FF | 1  | 1  | 2  | 0 | 1  | 2  | 2  | 2  | X  | 1  | 1 | 2  | 1  | 2  | 1  | 2  |
| Technical inadequacy                | TI | 1  | 1  | 2  | 1 | 2  | 1  | 3  | 3  | 2  | X  | 0 | 3  | 2  | 2  | 2  | 2  |
| Tendering                           | T  | 1  | 1  | 1  | 1 | 1  | 1  | 1  | 0  | 1  | 2  | X | 2  | 1  | 2  | 1  | 1  |
| Quality of works                    | QW | 1  | 1  | 1  | 2 | 2  | 1  | 2  | 1  | 2  | 3  | 2 | X  | 3  | 3  | 3  | 2  |
| Design errors                       | DE | 2  | 2  | 2  | 1 | 2  | 1  | 2  | 2  | 0  | 1  | 0 | 2  | X  | 2  | 3  | 3  |
| Inadequate specifications           | IS | 1  | 2  | 3  | 1 | 2  | 1  | 3  | 2  | 0  | 0  | 2 | 2  | 2  | X  | 2  | 1  |
| Quality of design                   | QD | 2  | 2  | 2  | 2 | 2  | 1  | 3  | 2  | 1  | 1  | 0 | 3  | 2  | 3  | X  | 2  |
| Availability of information         | AI | 1  | 1  | 3  | 1 | 1  | 1  | 1  | 1  | 0  | 1  | 0 | 1  | 3  | 2  | 3  | X  |

**Appendix 4.** Questionnaire result of phase 1 combined

## APPENDICES OF RESULT OF QUESTIONNAIRE PHASE II

### Appendix 5. Respondents' matrices with respect to element *Delays in work progress*

#### RESPONDENT 1

|    | FF | TI    | TE |
|----|----|-------|----|
| FF | 1  | 0.2   | 1  |
| TI | 5  | 1     | 3  |
| TE | 1  | 0.333 | 1  |

Matrix 1. Matrix comparisons in contractor related cluster

|    | AI | DE    | IS    | QD  |
|----|----|-------|-------|-----|
| AI | 1  | 0.333 | 0.111 | 0.2 |
| DE | 3  | 1     | 0.2   | 1   |
| IS | 9  | 5     | 1     | 9   |
| QD | 5  | 1     | 0.111 | 1   |

Matrix 2. Matrix comparisons in design related cluster

|    | CS | LP    | PD    | VO    |
|----|----|-------|-------|-------|
| CS | 1  | 0.143 | 0.111 | 0.111 |
| LP | 7  | 1     | 1     | 3     |
| PD | 9  | 1     | 1     | 1     |
| VO | 9  | 0.333 | 1     | 1     |

Matrix 3. Matrix comparisons in owner related cluster

#### RESPONDENT 2

|    | FF | TI  | TE    |
|----|----|-----|-------|
| FF | 1  | 0.2 | 0.167 |
| TI | 5  | 1   | 0.5   |
| TE | 6  | 2   | 1     |

Matrix 4. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.333     | 0.5       |
| <b>DE</b> | 5         | 1         | 0.5       | 2         |
| <b>IS</b> | 3         | 2         | 1         | 1         |
| <b>QD</b> | 2         | 0.5       | 1         | 1         |

Matrix 5. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 1         | 1         | 0.2       |
| <b>LP</b> | 1         | 1         | 1         | 0.333     |
| <b>PD</b> | 1         | 1         | 1         | 1         |
| <b>VO</b> | 5         | 3         | 1         | 1         |

Matrix 6. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 3         | 3         |
| <b>TI</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 7. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.2       | 3         |
| <b>DE</b> | 5         | 1         | 1         | 5         |
| <b>IS</b> | 5         | 1         | 1         | 3         |
| <b>QD</b> | 0.333     | 0.2       | 0.333     | 1         |

Matrix 8. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.2       | 0.333     | 0.143     |
| <b>LP</b> | 5         | 1         | 3         | 0.2       |
| <b>PD</b> | 3         | 0.333     | 1         | 0.2       |
| <b>VO</b> | 7         | 5         | 5         | 1         |

Matrix 9. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 1         | 1         |
| <b>TI</b> | 1         | 1         | 1         |
| <b>TE</b> | 1         | 1         | 1         |

Matrix 10. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 9         | 9         | 1         |
| <b>DE</b> | 0.111     | 1         | 1         | 0.333     |
| <b>IS</b> | 0.111     | 1         | 1         | 0.333     |
| <b>QD</b> | 1         | 3         | 3         | 1         |

Matrix 11. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 9         | 9         | 1         |
| <b>LP</b> | 0.111     | 1         | 1         | 3         |
| <b>PD</b> | 0.111     | 1         | 1         | 3         |
| <b>VO</b> | 1         | 0.333     | 0.333     | 1         |

Matrix 12. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 1         | 7         |
| <b>TI</b> | 1         | 1         | 6         |
| <b>TE</b> | 0.143     | 0.167     | 1         |

Matrix 13. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.333     | 9         |
| <b>DE</b> | 5         | 1         | 1         | 9         |
| <b>IS</b> | 3         | 1         | 1         | 9         |
| <b>QD</b> | 0.111     | 0.111     | 0.111     | 1         |

Matrix 14. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.2       | 0.333     | 1         |
| <b>LP</b> | 5         | 1         | 7         | 8         |
| <b>PD</b> | 3         | 0.143     | 1         | 1         |
| <b>VO</b> | 1         | 0.125     | 1         | 1         |

Matrix 15. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 9         | 3         |
| <b>TI</b> | 0.111     | 1         | 0.333     |
| <b>TE</b> | 0.333     | 3         | 1         |

Matrix 16. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.5       | 0.333     | 0.333     |
| <b>DE</b> | 2         | 1         | 3         | 2         |
| <b>IS</b> | 3         | 0.333     | 1         | 1         |
| <b>QD</b> | 3         | 0.5       | 1         | 1         |

Matrix 17. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.2       | 0.333     | 0.143     |
| <b>LP</b> | 5         | 1         | 1         | 1         |
| <b>PD</b> | 3         | 1         | 1         | 1         |
| <b>VO</b> | 7         | 1         | 1         | 1         |

Matrix 18. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 3         | 3         |
| <b>TI</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 19. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 0.167     | 1         |
| <b>DE</b> | 3         | 1         | 0.5       | 2         |
| <b>IS</b> | 6         | 2         | 1         | 3         |
| <b>QD</b> | 1         | 0.5       | 0.333     | 1         |

Matrix 20. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.2       | 0.111     | 1         |
| <b>LP</b> | 5         | 1         | 0.333     | 5         |
| <b>PD</b> | 9         | 3         | 1         | 9         |
| <b>VO</b> | 1         | 0.2       | 0.111     | 1         |

Matrix 21. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 2         | 4         |
| <b>TI</b> | 0.5       | 1         | 4         |
| <b>TE</b> | 0.25      | 0.25      | 1         |

Matrix 22. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.25      | 0.25      | 0.2       |
| <b>DE</b> | 4         | 1         | 1         | 1         |
| <b>IS</b> | 4         | 1         | 1         | 1         |
| <b>QD</b> | 5         | 1         | 1         | 1         |

Matrix 23. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.25      | 0.111     | 0.5       |
| <b>LP</b> | 4         | 1         | 1         | 1         |
| <b>PD</b> | 9         | 1         | 1         | 1         |
| <b>VO</b> | 2         | 1         | 1         | 1         |

Matrix 24. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 1         | 4         |
| <b>TI</b> | 1         | 1         | 4         |
| <b>TE</b> | 0.25      | 0.25      | 1         |

Matrix 25. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.25      | 0.167     | 1         |
| <b>DE</b> | 4         | 1         | 1         | 4         |
| <b>IS</b> | 6         | 1         | 1         | 4         |
| <b>QD</b> | 1         | 0.25      | 0.25      | 1         |

Matrix 26. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.2       | 0.111     | 0.2       |
| <b>LP</b> | 5         | 1         | 1         | 1         |
| <b>PD</b> | 9         | 1         | 1         | 1         |
| <b>VO</b> | 5         | 1         | 1         | 1         |

Matrix 27. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>FF</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>FF</b> | 1         | 2         | 2         |
| <b>TI</b> | 0.5       | 1         | 1         |
| <b>TE</b> | 0.5       | 1         | 1         |

Matrix 28. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 0.2       | 0.333     |
| <b>DE</b> | 3         | 1         | 1         | 1         |
| <b>IS</b> | 5         | 1         | 1         | 1         |
| <b>QD</b> | 3         | 1         | 1         | 1         |

Matrix 29. Matrix comparisons in design related cluster

|    | CS | LP   | PD    | VO  |
|----|----|------|-------|-----|
| CS | 1  | 0.25 | 0.111 | 0.5 |
| LP | 4  | 1    | 0.2   | 1   |
| PD | 9  | 5    | 1     | 5   |
| VO | 2  | 1    | 0.2   | 1   |

Matrix 30. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|    | FF | TI    | TE    |
|----|----|-------|-------|
| FF | 1  | 0.167 | 0.111 |
| TI | 6  | 1     | 1     |
| TE | 9  | 1     | 1     |

Matrix 31. Matrix comparisons in contractor related cluster

|    | AI    | DE  | IS | QD    |
|----|-------|-----|----|-------|
| AI | 1     | 0.2 | 3  | 1     |
| DE | 5     | 1   | 5  | 5     |
| IS | 0.333 | 0.2 | 1  | 0.333 |
| QD | 1     | 0.2 | 3  | 1     |

Matrix 32. Matrix comparisons in design related cluster

|    | CS | LP    | PD    | VO |
|----|----|-------|-------|----|
| CS | 1  | 0.333 | 0.333 | 1  |
| LP | 3  | 1     | 1     | 5  |
| PD | 3  | 1     | 1     | 1  |
| VO | 1  | 1     | 1     | 1  |

Matrix 33. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | FF    | TI    | TE    |
|----|-------|-------|-------|
| FF | 1     | 1.073 | 1.536 |
| TI | 0.932 | 1     | 1.422 |
| TE | 0.651 | 0.703 | 1     |

Matrix 34. Matrix comparisons combination in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.3678092 | 0.389     | 0.774     |
| <b>DE</b> | 2.719     | 1         | 0.974     | 2.029     |
| <b>IS</b> | 2.571     | 1.0264979 | 1         | 1.691     |
| <b>QD</b> | 1.291     | 0.4928424 | 0.591     | 1         |

Matrix 35. Matrix comparisons combination in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.346233  | 0.302     | 0.378     |
| <b>LP</b> | 2.888     | 1         | 1.031     | 1.545     |
| <b>PD</b> | 3.315     | 0.9698747 | 1         | 1.349     |
| <b>VO</b> | 2.644     | 0.7490766 | 0.741     | 1         |

Matrix 36. Matrix comparisons combination in owner related cluster

**Appendix 6.** Respondents' matrices with respect to element *financial failure of the contractor*

**RESPONDENT 1**

|    | DW   | QW | TE |
|----|------|----|----|
| DW | 1    | 4  | 4  |
| QW | 0.25 | 1  | 1  |
| TE | 0.25 | 1  | 1  |

Matrix 37. Matrix comparisons in contractor related cluster

|    | AI | IS    |
|----|----|-------|
| AI | 1  | 0.111 |
| IS | 9  | 1     |

Matrix 38. Matrix comparisons in design related cluster

|    | LP | PD |
|----|----|----|
| LP | 1  | 1  |
| PD | 1  | 1  |

Matrix 39. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW  | QW | TE |
|----|-----|----|----|
| DW | 1   | 5  | 2  |
| QW | 0.2 | 1  | 1  |
| TE | 0.5 | 1  | 1  |

Matrix 40. Matrix comparisons in contractor related cluster

|    | AI | IS    |
|----|----|-------|
| AI | 1  | 0.333 |
| IS | 3  | 1     |

Matrix 41. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 0.2       |
| <b>PD</b> | 5         | 1         |

Matrix 42. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         | 2         |
| <b>QW</b> | 0.2       | 1         | 1         |
| <b>TE</b> | 0.5       | 1         | 1         |

Matrix 43. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     |
| <b>IS</b> | 3         | 1         |

Matrix 44. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 2         |
| <b>PD</b> | 0.5       | 1         |

Matrix 45. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 9         |
| <b>QW</b> | 1         | 1         | 9         |
| <b>TE</b> | 0.111     | 0.111     | 1         |

Matrix 46. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         |
| <b>IS</b> | 1         | 1         |

Matrix 47. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 9         |
| <b>PD</b> | 0.111     | 1         |

Matrix 48. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 3         |
| <b>QW</b> | 1         | 1         | 7         |
| <b>TE</b> | 0.333     | 0.143     | 1         |

Matrix 49. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 9         |
| <b>IS</b> | 0.111     | 1         |

Matrix 50. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 0.111     |
| <b>PD</b> | 9         | 1         |

Matrix 51. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 1         |
| <b>QW</b> | 0.143     | 1         | 0.333     |
| <b>TE</b> | 1         | 3         | 1         |

Matrix 52. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         |
| <b>IS</b> | 1         | 1         |

Matrix 53. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 3         |
| <b>PD</b> | 0.333     | 1         |

Matrix 54. Matrix comparisons in design related cluster

**RESPONDENT 7**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 4         |
| <b>QW</b> | 1         | 1         | 4         |
| <b>TE</b> | 0.25      | 0.25      | 1         |

Matrix 55. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.5       |
| <b>IS</b> | 2         | 1         |

Matrix 56. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 4         |
| <b>PD</b> | 0.25      | 1         |

Matrix 57. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.5       | 5         |
| <b>QW</b> | 2         | 1         | 5         |
| <b>TE</b> | 0.2       | 0.2       | 1         |

Matrix 58. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 2         |
| <b>IS</b> | 0.5       | 1         |

Matrix 59. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 3         |
| <b>PD</b> | 0.333     | 1         |

Matrix 60. Matrix comparisons in owner related cluster

#### RESPONDENT 9

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 5         |
| <b>QW</b> | 1         | 1         | 5         |
| <b>TE</b> | 0.2       | 0.2       | 1         |

Matrix 61. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         |
| <b>IS</b> | 1         | 1         |

Matrix 62. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 4         |
| <b>PD</b> | 0.25      | 1         |

Matrix 63. Matrix comparisons in owner related cluster

#### RESPONDENT 10

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 5         |
| <b>QW</b> | 1         | 1         | 5         |
| <b>TE</b> | 0.2       | 0.2       | 1         |

Matrix 64. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         |
| <b>IS</b> | 1         | 1         |

Matrix 65. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 4         |
| <b>PD</b> | 0.25      | 1         |

Matrix 66. Matrix comparisons in owner related cluster

#### **RESPONDENT 11**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 7         |
| <b>QW</b> | 0.143     | 1         | 1         |
| <b>TE</b> | 0.143     | 1         | 1         |

Matrix 67. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 7         |
| <b>IS</b> | 0.143     | 1         |

Matrix 68. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>PD</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 1         |
| <b>PD</b> | 1         | 1         |

Matrix 69. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | DW    | QW    | TE    |
|----|-------|-------|-------|
| DW | 1     | 2.033 | 3.646 |
| QW | 0.492 | 1     | 2.32  |
| TE | 0.274 | 0.431 | 1     |

Matrix 70. Matrix comparisons combination in contractor related cluster

|    | AI    | IS    |
|----|-------|-------|
| AI | 1     | 0.977 |
| IS | 1.023 | 1     |

Matrix 71. Matrix comparisons combination in design related cluster

|    | LP   | PD   |
|----|------|------|
| LP | 1    | 1.64 |
| PD | 0.61 | 1    |

Matrix 72. Matrix comparisons combination in owner related cluster

## Appendix 7. Respondents' matrices with respect to element *Quality of work*

### RESPONDENT 1

|    | DW | FF    | TI    | T   |
|----|----|-------|-------|-----|
| DW | 1  | 0.333 | 0.2   | 0.2 |
| FF | 3  | 1     | 1     | 3   |
| TI | 5  | 1     | 1     | 3   |
| T  | 5  | 0.333 | 0.333 | 1   |

Matrix 73. Matrix comparisons in contractor related cluster

|    | AI | DE  | IS    | QD  |
|----|----|-----|-------|-----|
| AI | 1  | 0.2 | 0.111 | 0.2 |
| DE | 5  | 1   | 1     | 1   |
| IS | 9  | 1   | 1     | 1   |
| QD | 5  | 1   | 1     | 1   |

Matrix 74. Matrix comparisons in design related cluster

|    | A | UE |
|----|---|----|
| A  | 1 | 1  |
| UE | 1 | 1  |

Matrix 75. Matrix comparisons in owner related cluster

### RESPONDENT 2

|    | DW | FF | TI    | T |
|----|----|----|-------|---|
| DW | 1  | 1  | 0.2   | 1 |
| FF | 1  | 1  | 0.333 | 1 |
| TI | 5  | 3  | 1     | 1 |
| T  | 1  | 1  | 1     | 1 |

Matrix 76. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.333     | 0.2       |
| <b>DE</b> | 1         | 1         | 0.5       | 1         |
| <b>IS</b> | 3         | 2         | 1         | 1         |
| <b>QD</b> | 5         | 1         | 1         | 1         |

Matrix 77. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.2       |
| <b>UE</b> | 5        | 1         |

Matrix 78. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 0.5       | 0.2       | 0.5      |
| <b>FF</b> | 2         | 1         | 0.2       | 2        |
| <b>TI</b> | 5         | 5         | 1         | 3        |
| <b>T</b>  | 2         | 0.5       | 0.333     | 1        |

Matrix 79. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.2       | 0.2       |
| <b>DE</b> | 5         | 1         | 3         | 1         |
| <b>IS</b> | 5         | 0.333     | 1         | 0.333     |
| <b>QD</b> | 5         | 1         | 3         | 1         |

Matrix 80. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>UE</b> | 1        | 1         |

Matrix 81. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 0.111     | 0.111     | 0.5      |
| <b>FF</b> | 9         | 1         | 1         | 5        |
| <b>TI</b> | 9         | 1         | 1         | 9        |
| <b>T</b>  | 2         | 0.2       | 0.111     | 1        |

Matrix 82. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         | 1         |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         | 1         |
| <b>QD</b> | 1         | 1         | 1         | 1         |

Matrix 83. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>UE</b> | 1        | 1         |

Matrix 84. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 0.143     | 0.111     | 3        |
| <b>FF</b> | 7         | 1         | 1         | 7        |
| <b>TI</b> | 9         | 1         | 1         | 7        |
| <b>T</b>  | 0.333     | 0.143     | 0.143     | 1        |

Matrix 85. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 2         | 0.111     |
| <b>DE</b> | 0.333     | 1         | 1         | 0.143     |
| <b>IS</b> | 0.5       | 1         | 1         | 0.143     |
| <b>QD</b> | 9         | 7         | 7         | 1         |

Matrix 86. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.333     |
| <b>UE</b> | 3        | 1         |

Matrix 87. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 0.2       | 0.2       | 3        |
| <b>FF</b> | 5         | 1         | 1         | 5        |
| <b>TI</b> | 5         | 1         | 1         | 5        |
| <b>T</b>  | 0.333     | 0.2       | 0.2       | 1        |

Matrix 88. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         | 2         |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         | 3         |
| <b>QD</b> | 0.5       | 1         | 0.333     | 1         |

Matrix 89. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 2         |
| <b>UE</b> | 0.5      | 1         |

Matrix 90. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 1         | 1         | 4        |
| <b>FF</b> | 1         | 1         | 0.333     | 4        |
| <b>TI</b> | 1         | 3         | 1         | 4        |
| <b>T</b>  | 0.25      | 0.25      | 0.25      | 1        |

Matrix 91. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 4         | 3         | 4         |
| <b>DE</b> | 0.25      | 1         | 1         | 1         |
| <b>IS</b> | 0.333     | 1         | 1         | 2         |
| <b>QD</b> | 0.25      | 1         | 0.5       | 1         |

Matrix 92. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>UE</b> | 1        | 1         |

Matrix 93. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 0.5       | 1         | 3        |
| <b>FF</b> | 2         | 1         | 1         | 4        |
| <b>TI</b> | 1         | 1         | 1         | 4        |
| <b>T</b>  | 0.333     | 0.25      | 0.25      | 1        |

Matrix 94. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 4         | 4         |
| <b>DE</b> | 0.333     | 1         | 1         | 1         |
| <b>IS</b> | 0.25      | 1         | 1         | 1         |
| <b>QD</b> | 0.25      | 1         | 1         | 1         |

Matrix 95. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>UE</b> | 1        | 1         |

Matrix 96. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 1         | 1         | 4        |
| <b>FF</b> | 1         | 1         | 0.25      | 4        |
| <b>TI</b> | 1         | 4         | 1         | 4        |
| <b>T</b>  | 0.25      | 0.25      | 0.25      | 1        |

Matrix 97. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 4         | 4         | 4         |
| <b>DE</b> | 0.25      | 1         | 1         | 1         |
| <b>IS</b> | 0.25      | 1         | 1         | 1         |
| <b>QD</b> | 0.25      | 1         | 1         | 1         |

Matrix 98. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>UE</b> | 1        | 1         |

Matrix 99. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 1         | 1         | 4        |
| <b>FF</b> | 1         | 1         | 1         | 4        |
| <b>TI</b> | 1         | 1         | 1         | 4        |
| <b>T</b>  | 0.25      | 0.25      | 0.25      | 1        |

Matrix 100. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 4         | 3         | 3         |
| <b>DE</b> | 0.25      | 1         | 1         | 1         |
| <b>IS</b> | 0.333     | 1         | 1         | 0.5       |
| <b>QD</b> | 0.333     | 1         | 2         | 1         |

Matrix 101. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.5       |
| <b>UE</b> | 2        | 1         |

Matrix 102. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 3         | 1         | 5        |
| <b>FF</b> | 0.333     | 1         | 0.2       | 0.333    |
| <b>TI</b> | 1         | 5         | 1         | 5        |
| <b>T</b>  | 0.2       | 3         | 0.2       | 1        |

Matrix 103. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 0.333     | 5         |
| <b>DE</b> | 0.333     | 1         | 5         | 1         |
| <b>IS</b> | 3         | 0.2       | 1         | 0.333     |
| <b>QD</b> | 0.2       | 1         | 3         | 1         |

Matrix 104. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>UE</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>UE</b> | 1        | 1         |

Matrix 105. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|           | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> |
|-----------|-----------|-----------|-----------|----------|
| <b>DW</b> | 1         | 0.5225744 | 0.374     | 1.736    |
| <b>FF</b> | 1.914     | 1         | 0.539     | 2.82     |
| <b>TI</b> | 2.677     | 1.8559553 | 1         | 3.948    |
| <b>T</b>  | 0.576     | 0.354642  | 0.253     | 1        |

Matrix 106. Matrix comparisons combination in contractor related cluster

|    | AI    | DE        | IS    | QD    |
|----|-------|-----------|-------|-------|
| AI | 1     | 1.4697271 | 0.969 | 1.05  |
| DE | 0.68  | 1         | 1.201 | 0.838 |
| IS | 1.031 | 0.8326241 | 1     | 0.758 |
| QD | 0.953 | 1.1935128 | 1.319 | 1     |

Matrix 107. Matrix comparisons combination in design related cluster

|    | A     | UE    |
|----|-------|-------|
| A  | 1     | 0.782 |
| UE | 1.279 | 1     |

Matrix 108. Matrix comparisons combination in owner related cluster

**Appendix 8.** Respondents' matrices with respect to element *Technical inadequacy*

**RESPONDENT 1**

|    | DW | FF    | QW    | TE |
|----|----|-------|-------|----|
| DW | 1  | 0.2   | 1     | 1  |
| FF | 5  | 1     | 1     | 3  |
| QW | 1  | 1     | 1     | 3  |
| TE | 1  | 0.333 | 0.333 | 1  |

Matrix 109. Matrix comparisons in contractor related cluster

|    | AI | DE    | IS    | QD    |
|----|----|-------|-------|-------|
| AI | 1  | 0.111 | 0.111 | 0.167 |
| DE | 9  | 1     | 1     | 3     |
| IS | 9  | 1     | 1     | 7     |
| QD | 6  | 0.333 | 0.143 | 1     |

Matrix 110. Matrix comparisons in design related cluster

|    | LP | UE |
|----|----|----|
| LP | 1  | 1  |
| UE | 1  | 1  |

Matrix 111. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW  | FF | QW  | TE  |
|----|-----|----|-----|-----|
| DW | 1   | 5  | 0.2 | 2   |
| FF | 0.2 | 1  | 0.2 | 0.5 |
| QW | 5   | 5  | 1   | 5   |
| TE | 0.5 | 2  | 0.2 | 1   |

Matrix 112. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.333     | 0.333     |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 3         | 1         | 1         | 1         |
| <b>QD</b> | 3         | 1         | 1         | 1         |

Matrix 113. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 1         |
| <b>UE</b> | 1         | 1         |

Matrix 114. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 0.333     | 1         |
| <b>FF</b> | 0.333     | 1         | 0.333     | 0.333     |
| <b>QW</b> | 3         | 3         | 1         | 3         |
| <b>TE</b> | 1         | 3         | 0.333     | 1         |

Matrix 115. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 0.5       | 0.5       |
| <b>DE</b> | 0.333     | 1         | 0.333     | 0.333     |
| <b>IS</b> | 2         | 3         | 1         | 2         |
| <b>QD</b> | 2         | 3         | 0.5       | 1         |

Matrix 116. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 0.333     |
| <b>UE</b> | 3         | 1         |

Matrix 117. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         | 1         |
| <b>FF</b> | 1         | 1         | 1         | 1         |
| <b>QW</b> | 1         | 1         | 1         | 1         |
| <b>TE</b> | 1         | 1         | 1         | 1         |

Matrix 118. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         | 1         |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         | 1         |
| <b>QD</b> | 1         | 1         | 1         | 1         |

Matrix 119. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 9         |
| <b>UE</b> | 0.111     | 1         |

Matrix 120. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 9         | 7         |
| <b>FF</b> | 0.143     | 1         | 0.333     | 0.333     |
| <b>QW</b> | 0.111     | 3         | 1         | 1         |
| <b>TE</b> | 0.143     | 3         | 1         | 1         |

Matrix 121. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.143     | 1         | 0.333     |
| <b>DE</b> | 7         | 1         | 3         | 1         |
| <b>IS</b> | 1         | 0.333     | 1         | 1         |
| <b>QD</b> | 3         | 1         | 1         | 1         |

Matrix 122. Matrix comparisons in design related cluster

|    | LP    | UE |
|----|-------|----|
| LP | 1     | 9  |
| UE | 0.111 | 1  |

Matrix 123. Matrix comparisons in owner related cluster

#### RESPONDENT 6

|    | DW  | FF | QW    | TE |
|----|-----|----|-------|----|
| DW | 1   | 5  | 1     | 1  |
| FF | 0.2 | 1  | 0.333 | 1  |
| QW | 1   | 3  | 1     | 1  |
| TE | 1   | 1  | 1     | 1  |

Matrix 124. Matrix comparisons in contractor related cluster

|    | AI    | DE | IS | QD |
|----|-------|----|----|----|
| AI | 1     | 3  | 1  | 1  |
| DE | 0.333 | 1  | 1  | 1  |
| IS | 1     | 1  | 1  | 1  |
| QD | 1     | 1  | 1  | 1  |

Matrix 125. Matrix comparisons in design related cluster

|    | LP    | UE |
|----|-------|----|
| LP | 1     | 3  |
| UE | 0.333 | 1  |

Matrix 126. Matrix comparisons in owner related cluster

#### RESPONDENT 7

|    | DW    | FF | QW   | TE |
|----|-------|----|------|----|
| DW | 1     | 3  | 1    | 4  |
| FF | 0.333 | 1  | 0.25 | 1  |
| QW | 1     | 4  | 1    | 1  |
| TE | 0.25  | 1  | 1    | 1  |

Matrix 127. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 4         | 5         |
| <b>DE</b> | 1         | 1         | 1         | 4         |
| <b>IS</b> | 0.25      | 1         | 1         | 5         |
| <b>QD</b> | 0.2       | 0.25      | 0.2       | 1         |

Matrix 128. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 0.5       |
| <b>UE</b> | 2         | 1         |

Matrix 129. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 4         | 2         | 4         |
| <b>FF</b> | 0.25      | 1         | 1         | 1         |
| <b>QW</b> | 0.5       | 1         | 1         | 0.5       |
| <b>TE</b> | 0.25      | 1         | 2         | 1         |

Matrix 130. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 2         | 4         | 5         |
| <b>DE</b> | 0.5       | 1         | 1         | 5         |
| <b>IS</b> | 0.25      | 1         | 1         | 5         |
| <b>QD</b> | 0.2       | 0.2       | 0.2       | 1         |

Matrix 131. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 1         |
| <b>UE</b> | 1         | 1         |

Matrix 132. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 4         | 1         | 4         |
| <b>FF</b> | 0.25      | 1         | 0.2       | 1         |
| <b>QW</b> | 1         | 5         | 1         | 3         |
| <b>TE</b> | 0.25      | 1         | 0.333     | 1         |

Matrix 133. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 5         | 5         |
| <b>DE</b> | 1         | 1         | 3         | 3         |
| <b>IS</b> | 0.2       | 0.333     | 1         | 1         |
| <b>QD</b> | 0.2       | 0.333     | 1         | 1         |

Matrix 134. Matrix comparisons in design related cluster

|           | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|
| <b>LP</b> | 1         | 1         |
| <b>UE</b> | 1         | 1         |

Matrix 135. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 1         | 4         |
| <b>FF</b> | 0.333     | 1         | 0.2       | 1         |
| <b>QW</b> | 1         | 5         | 1         | 3         |
| <b>TE</b> | 0.25      | 1         | 0.333     | 1         |

Matrix 136. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 3         | 5         |
| <b>DE</b> | 1         | 1         | 2         | 5         |
| <b>IS</b> | 0.333     | 0.5       | 1         | 5         |
| <b>QD</b> | 0.2       | 0.2       | 0.2       | 1         |

Matrix 137. Matrix comparisons in design related cluster

|    | LP | UE |
|----|----|----|
| LP | 1  | 1  |
| UE | 1  | 1  |

Matrix 138. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|    | DW    | FF | QW    | TE    |
|----|-------|----|-------|-------|
| DW | 1     | 9  | 1     | 3     |
| FF | 0.111 | 1  | 0.333 | 0.333 |
| QW | 1     | 3  | 1     | 3     |
| TE | 0.333 | 3  | 0.333 | 1     |

Matrix 139. Matrix comparisons in contractor related cluster

|    | AI    | DE  | IS | QD    |
|----|-------|-----|----|-------|
| AI | 1     | 1   | 3  | 0.333 |
| DE | 1     | 1   | 5  | 1     |
| IS | 0.333 | 0.2 | 1  | 0.333 |
| QD | 3     | 1   | 3  | 1     |

Matrix 140. Matrix comparisons in design related cluster

|    | LP    | UE |
|----|-------|----|
| LP | 1     | 3  |
| UE | 0.333 | 1  |

Matrix 141. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | DW    | FF        | QW    | TE    |
|----|-------|-----------|-------|-------|
| DW | 1     | 2.9289272 | 1.017 | 2.325 |
| FF | 0.341 | 1         | 0.381 | 0.769 |
| QW | 0.984 | 2.62337   | 1     | 1.791 |
| TE | 0.43  | 1.3005159 | 0.558 | 1     |

Matrix 142. Matrix comparisons combination in contractor related cluster

|    | AI    | DE        | IS    | QD    |
|----|-------|-----------|-------|-------|
| AI | 1     | 0.8923583 | 1.266 | 1.062 |
| DE | 1.121 | 1         | 1.362 | 1.68  |
| IS | 0.79  | 0.7340341 | 1     | 1.784 |
| QD | 0.942 | 0.5953977 | 0.56  | 1     |

Matrix 143. Matrix comparisons combination in contractor related cluster

|    | LP    | UE    |
|----|-------|-------|
| LP | 1     | 1.547 |
| UE | 0.646 | 1     |

Matrix 144. Matrix comparisons combination in owner related cluster

**Appendix 9.** Respondents' matrices with respect to element *Tendering*

**RESPONDENT 1**

|    | QW | TI   |
|----|----|------|
| QW | 1  | 0.25 |
| TI | 4  | 1    |

Matrix 145. Matrix comparisons in contractor related cluster

**RESPONDENT 2**

|    | QW | TI |
|----|----|----|
| QW | 1  | 1  |
| TI | 1  | 1  |

Matrix 146. Matrix comparisons in contractor related cluster

**RESPONDENT 3**

|    | QW | TI  |
|----|----|-----|
| QW | 1  | 0.5 |
| TI | 2  | 1   |

Matrix 147. Matrix comparisons in contractor related cluster

**RESPONDENT 4**

|    | QW | TI |
|----|----|----|
| QW | 1  | 1  |
| TI | 1  | 1  |

Matrix 148. Matrix comparisons in contractor related cluster

**RESPONDENT 5**

|    | QW | TI    |
|----|----|-------|
| QW | 1  | 0.333 |
| TI | 3  | 1     |

Matrix 149. Matrix comparisons in contractor related cluster

**RESPONDENT 6**

|    | QW  | TI |
|----|-----|----|
| QW | 1   | 5  |
| TI | 0.2 | 1  |

Matrix 150. Matrix comparisons in contractor related cluster

**RESPONDENT 7**

|    | QW | TI   |
|----|----|------|
| QW | 1  | 0.25 |
| TI | 4  | 1    |

Matrix 151. Matrix comparisons in contractor related cluster

**RESPONDENT 8**

|    | QW | TI   |
|----|----|------|
| QW | 1  | 0.25 |
| TI | 4  | 1    |

Matrix 152. Matrix comparisons in contractor related cluster

**RESPONDENT 9**

|    | QW | TI   |
|----|----|------|
| QW | 1  | 0.25 |
| TI | 4  | 1    |

Matrix 153. Matrix comparisons in contractor related cluster

**RESPONDENT 10**

|    | QW | TI |
|----|----|----|
| QW | 1  | 1  |
| TI | 4  | 1  |

Matrix 154. Matrix comparisons in contractor related cluster

**RESPONDENT 11**

|    | QW | TI    |
|----|----|-------|
| QW | 1  | 0.111 |
| TI | 9  | 1     |

Matrix 155. Matrix comparisons in contractor related cluster

**COMBINED MATRIX**

|    | QW    | TI    |
|----|-------|-------|
| QW | 1     | 0.487 |
| TI | 2.331 | 1     |

Matrix 156. Matrix comparisons in contractor related cluster

**Appendix 10.** Respondents' matrices with respect to element *Time extensions*

**RESPONDENT 1**

|    | DW | TI  |
|----|----|-----|
| DW | 1  | 0.2 |
| TI | 5  | 1   |

Matrix 157. Matrix comparisons in contractor related cluster

|    | DE | IS | QD |
|----|----|----|----|
| DE | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 158. Matrix comparisons in design related cluster

|    | A | CS   | LP    | PD    | VO    |
|----|---|------|-------|-------|-------|
| A  | 1 | 0.25 | 0.143 | 0.111 | 0.167 |
| CS | 4 | 1    | 0.111 | 0.167 | 0.167 |
| LP | 7 | 9    | 1     | 1     | 1     |
| PD | 9 | 6    | 1     | 1     | 1     |
| VO | 6 | 6    | 1     | 1     | 1     |

Matrix 159. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW  | TI |
|----|-----|----|
| DW | 1   | 5  |
| TI | 0.2 | 1  |

Matrix 160. Matrix comparisons in contractor related cluster

|    | DE | IS | QD  |
|----|----|----|-----|
| DE | 1  | 1  | 0.2 |
| IS | 1  | 1  | 0.2 |
| QD | 5  | 5  | 1   |

Matrix 161. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.2       | 0.333     | 0.2       | 1         |
| <b>CS</b> | 5        | 1         | 0.333     | 1         | 1         |
| <b>LP</b> | 3        | 3         | 1         | 0.5       | 3         |
| <b>PD</b> | 5        | 1         | 2         | 1         | 5         |
| <b>VO</b> | 1        | 1         | 0.333     | 0.2       | 1         |

Matrix 162. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>TI</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         |
| <b>TI</b> | 0.333     | 1         |

Matrix 163. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>DE</b> | 1         | 5         | 3         |
| <b>IS</b> | 0.2       | 1         | 1         |
| <b>QD</b> | 0.333     | 1         | 1         |

Matrix 164. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 1         | 0.5       | 0.333     | 0.2       |
| <b>CS</b> | 1        | 1         | 3         | 1         | 1         |
| <b>LP</b> | 2        | 0.333     | 1         | 0.333     | 0.333     |
| <b>PD</b> | 3        | 1         | 3         | 1         | 0.333     |
| <b>VO</b> | 5        | 1         | 3         | 3         | 1         |

Matrix 165. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>TI</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>TI</b> | 1         | 1         |

Matrix 166. Matrix comparisons in contractor related cluster

|    | DE    | IS | QD    |
|----|-------|----|-------|
| DE | 1     | 9  | 1     |
| IS | 0.111 | 1  | 0.111 |
| QD | 1     | 9  | 1     |

Matrix 167. Matrix comparisons in design related cluster

|    | A | CS    | LP    | PD    | VO    |
|----|---|-------|-------|-------|-------|
| A  | 1 | 0.111 | 0.111 | 0.111 | 0.111 |
| CS | 9 | 1     | 3     | 3     | 1     |
| LP | 9 | 0.333 | 1     | 3     | 1     |
| PD | 9 | 0.333 | 0.333 | 1     | 0.333 |
| VO | 9 | 1     | 1     | 3     | 1     |

Matrix 168. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|    | DW    | TI |
|----|-------|----|
| DW | 1     | 7  |
| TI | 0.143 | 1  |

Matrix 169. Matrix comparisons in contractor related cluster

|    | DE    | IS | QD |
|----|-------|----|----|
| DE | 1     | 9  | 9  |
| IS | 0.111 | 1  | 1  |
| QD | 0.111 | 1  | 1  |

Matrix 170. Matrix comparisons in design related cluster

|    | A | CS    | LP  | PD    | VO    |
|----|---|-------|-----|-------|-------|
| A  | 1 | 0.143 | 0.2 | 0.111 | 0.111 |
| CS | 7 | 1     | 1   | 3     | 1     |
| LP | 5 | 1     | 1   | 1     | 0.333 |
| PD | 9 | 0.333 | 1   | 1     | 0.333 |
| VO | 9 | 1     | 3   | 3     | 1     |

Matrix 171. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|    | DW | TI |
|----|----|----|
| DW | 1  | 1  |
| TI | 1  | 1  |

Matrix 172. Matrix comparisons in contractor related cluster

|    | DE    | IS  | QD |
|----|-------|-----|----|
| DE | 1     | 7   | 7  |
| IS | 0.143 | 1   | 2  |
| QD | 0.143 | 0.5 | 1  |

Matrix 173. Matrix comparisons in design related cluster

|    | A   | CS | LP    | PD    | VO |
|----|-----|----|-------|-------|----|
| A  | 1   | 5  | 1     | 1     | 1  |
| CS | 0.2 | 1  | 0.333 | 0.333 | 1  |
| LP | 1   | 3  | 1     | 1     | 1  |
| PD | 1   | 3  | 1     | 1     | 1  |
| VO | 1   | 1  | 1     | 1     | 1  |

Matrix 174. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|    | DW | TI  |
|----|----|-----|
| DW | 1  | 0.5 |
| TI | 2  | 1   |

Matrix 175. Matrix comparisons in contractor related cluster

|    | DE | IS | QD |
|----|----|----|----|
| DE | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 176. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.5       | 0.2       | 0.25      | 0.111     |
| <b>CS</b> | 2        | 1         | 0.333     | 0.5       | 0.143     |
| <b>LP</b> | 5        | 3         | 1         | 0.333     | 0.333     |
| <b>PD</b> | 4        | 2         | 3         | 1         | 0.333     |
| <b>VO</b> | 9        | 7         | 3         | 3         | 1         |

Matrix 177. Matrix comparisons in owner related cluster

#### RESPONDENT 8

|           | <b>DW</b> | <b>TI</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>TI</b> | 1         | 1         |

Matrix 178. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>DE</b> | 1         | 1         | 0.5       |
| <b>IS</b> | 1         | 1         | 0.5       |
| <b>QD</b> | 2         | 2         | 1         |

Matrix 179. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 2         | 0.25      | 0.2       | 0.5       |
| <b>CS</b> | 0.5      | 1         | 0.25      | 0.2       | 1         |
| <b>LP</b> | 4        | 4         | 1         | 3         | 3         |
| <b>PD</b> | 5        | 5         | 0.333     | 1         | 5         |
| <b>VO</b> | 2        | 1         | 0.333     | 0.2       | 1         |

Matrix 180. Matrix comparisons in owner related cluster

#### RESPONDENT 9

|           | <b>DW</b> | <b>TI</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>TI</b> | 1         | 1         |

Matrix 181. Matrix comparisons in contractor related cluster

|    | DE | IS | QD |
|----|----|----|----|
| DE | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 182. Matrix comparisons in design related cluster

|    | A | CS | LP    | PD    | VO    |
|----|---|----|-------|-------|-------|
| A  | 1 | 1  | 0.25  | 0.2   | 0.111 |
| CS | 1 | 1  | 0.333 | 0.25  | 0.2   |
| LP | 4 | 3  | 1     | 0.143 | 0.333 |
| PD | 5 | 4  | 7     | 1     | 1     |
| VO | 9 | 5  | 3     | 1     | 1     |

Matrix 183. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|    | DW | TI |
|----|----|----|
| DW | 1  | 1  |
| TI | 1  | 1  |

Matrix 184. Matrix comparisons in contractor related cluster

|    | DE | IS | QD  |
|----|----|----|-----|
| DE | 1  | 1  | 0.5 |
| IS | 1  | 1  | 1   |
| QD | 2  | 1  | 1   |

Matrix 185. Matrix comparisons in design related cluster

|    | A | CS | LP   | PD  | VO |
|----|---|----|------|-----|----|
| A  | 1 | 1  | 0.25 | 0.2 | 1  |
| CS | 1 | 1  | 0.25 | 0.2 | 1  |
| LP | 4 | 4  | 1    | 1   | 4  |
| PD | 5 | 5  | 1    | 1   | 5  |
| VO | 1 | 1  | 0.25 | 0.2 | 1  |

Matrix 186. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|    | DW    | TI |
|----|-------|----|
| DW | 1     | 7  |
| TI | 0.143 | 1  |

Matrix 187. Matrix comparisons in contractor related cluster

|    | DE  | IS | QD |
|----|-----|----|----|
| DE | 1   | 5  | 5  |
| IS | 0.2 | 1  | 1  |
| QD | 0.2 | 1  | 1  |

Matrix 188. Matrix comparisons in design related cluster

|    | A | CS      | LP    | PD    | VO    |
|----|---|---------|-------|-------|-------|
| A  | 1 | 0.2     | 0.333 | 0.333 | 0.333 |
| CS | 5 | 1       | 1     | 3     | 1     |
| LP | 3 | 1       | 1     | 1     | 1     |
| PD | 3 | 0.33333 | 1     | 1     | 0.333 |
| VO | 3 | 1       | 1     | 3     | 1     |

Matrix 189. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | DW    | TI    |
|----|-------|-------|
| DW | 1     | 1.478 |
| TI | 0.677 | 1     |

Matrix 190. Matrix comparisons combination in contractor related cluster

|    | DE    | IS    | QD    |
|----|-------|-------|-------|
| DE | 1     | 2.385 | 1.42  |
| IS | 0.419 | 1     | 0.707 |
| QD | 0.704 | 1.413 | 1     |

Matrix 191. Matrix comparisons combination in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.523     | 0.27      | 0.221     | 0.281     |
| <b>CS</b> | 1.914    | 1         | 0.521     | 0.641     | 0.615     |
| <b>LP</b> | 3.707    | 1.919     | 1         | 0.787     | 0.929     |
| <b>PD</b> | 4.528    | 1.56      | 1.271     | 1         | 0.941     |
| <b>VO</b> | 3.565    | 1.626     | 1.077     | 1.062     | 1         |

Matrix 192. Matrix comparisons combination in owner related cluster



**Appendix 11.** Respondents' matrices with respect to element *Availability of information*

**RESPONDENT 1**

|    | DE | IS | QD |
|----|----|----|----|
| DE | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 193. Matrix comparisons in design related cluster

**RESPONDENT 2**

|    | DE    | IS    | QD |
|----|-------|-------|----|
| DE | 1     | 0.2   | 3  |
| IS | 5     | 1     | 7  |
| QD | 0.333 | 0.143 | 1  |

Matrix 194. Matrix comparisons in design related cluster

**RESPONDENT 3**

|    | DE    | IS  | QD |
|----|-------|-----|----|
| DE | 1     | 0.5 | 3  |
| IS | 2     | 1   | 5  |
| QD | 0.333 | 0.2 | 1  |

Matrix 195. Matrix comparisons in design related cluster

**RESPONDENT 4**

|    | DE | IS | QD |
|----|----|----|----|
| DE | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 196. Matrix comparisons in design related cluster

**RESPONDENT 5**

|    | DE    | IS    | QD |
|----|-------|-------|----|
| DE | 1     | 0.333 | 7  |
| IS | 3     | 1     | 9  |
| QD | 0.143 | 0.111 | 1  |

Matrix 196. Matrix comparisons in design related cluster

**RESPONDENT 6**

|    | DE | IS | QD |
|----|----|----|----|
| DE | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 197. Matrix comparisons in design related cluster

**RESPONDENT 7**

|    | DE  | IS | QD  |
|----|-----|----|-----|
| DE | 1   | 2  | 1   |
| IS | 0.5 | 1  | 0.5 |
| QD | 1   | 2  | 1   |

Matrix 198. Matrix comparisons in design related cluster

**RESPONDENT 8**

|    | DE | IS    | QD  |
|----|----|-------|-----|
| DE | 1  | 0.333 | 0.5 |
| IS | 3  | 1     | 1   |
| QD | 2  | 1     | 1   |

Matrix 199. Matrix comparisons in design related cluster

**RESPONDENT 9**

|    | DE | IS   | QD |
|----|----|------|----|
| DE | 1  | 0.25 | 1  |
| IS | 4  | 1    | 4  |
| QD | 1  | 0.25 | 1  |

Matrix 200. Matrix comparisons in design related cluster

**RESPONDENT 10**

|    | DE | IS  | QD |
|----|----|-----|----|
| DE | 1  | 0.5 | 1  |
| IS | 2  | 1   | 1  |
| QD | 1  | 1   | 1  |

Matrix 201. Matrix comparisons in design related cluster

**RESPONDENT 11**

|    | DE    | IS | QD    |
|----|-------|----|-------|
| DE | 1     | 3  | 1     |
| IS | 0.333 | 1  | 0.333 |
| QD | 1     | 3  | 1     |

Matrix 202. Matrix comparisons in design related cluster

**COMBINED MATRIX**

|    | DE    | IS    | QD    |
|----|-------|-------|-------|
| DE | 1     | 0.647 | 1.368 |
| IS | 1.545 | 1     | 1.626 |
| QD | 0.731 | 0.615 | 1     |

Matrix 203. Matrix comparisons combination in design related cluster

## Appendix 12. Respondents' matrices with respect to element *Design errors*

### RESPONDENT 1

|    | DW    | QW | TE |
|----|-------|----|----|
| DW | 1     | 6  | 6  |
| QW | 0.167 | 1  | 1  |
| TE | 0.167 | 1  | 1  |

Matrix 204. Matrix comparisons in contractor related cluster

|    | AI | IS | QD |
|----|----|----|----|
| AI | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 205. Matrix comparisons in design related cluster

|    | CS   | LP | UE    | VO |
|----|------|----|-------|----|
| CS | 1    | 4  | 0.333 | 1  |
| LP | 0.25 | 1  | 0.333 | 1  |
| UE | 3    | 3  | 1     | 1  |
| VO | 1    | 3  | 1     | 1  |

Matrix 206. Matrix comparisons in owner related cluster

### RESPONDENT 2

|    | DW    | QW    | TE |
|----|-------|-------|----|
| DW | 1     | 0.2   | 3  |
| QW | 5     | 1     | 7  |
| TE | 0.333 | 0.143 | 1  |

Matrix 207. Matrix comparisons in contractor related cluster

|    | AI | IS  | QD  |
|----|----|-----|-----|
| AI | 1  | 0.2 | 0.2 |
| IS | 5  | 1   | 1   |
| QD | 5  | 1   | 1   |

Matrix 208. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.2       | 0.333     | 1         |
| <b>LP</b> | 5         | 1         | 3         | 3         |
| <b>UE</b> | 3         | 0.333     | 1         | 1         |
| <b>VO</b> | 1         | 0.333     | 1         | 1         |

Matrix 209. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         |
| <b>QW</b> | 1         | 1         | 2         |
| <b>TE</b> | 1         | 0.5       | 1         |

Matrix 210. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 0.333     |
| <b>IS</b> | 3         | 1         | 1         |
| <b>QD</b> | 3         | 1         | 1         |

Matrix 211. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.333     | 0.2       | 0.2       |
| <b>LP</b> | 3         | 1         | 0.333     | 0.25      |
| <b>UE</b> | 5         | 3         | 1         | 1         |
| <b>VO</b> | 5         | 4         | 1         | 1         |

Matrix 212. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         |
| <b>QW</b> | 1         | 1         | 1         |
| <b>TE</b> | 1         | 1         | 1         |

Matrix 213. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         |
| <b>QD</b> | 1         | 1         | 1         |

Matrix 214. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 9         | 9         | 1         |
| <b>LP</b> | 0.111     | 1         | 1         | 0.111     |
| <b>UE</b> | 0.111     | 1         | 1         | 0.111     |
| <b>VO</b> | 1         | 9         | 9         | 1         |

Matrix 215. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 1         |
| <b>QW</b> | 0.143     | 1         | 0.143     |
| <b>TE</b> | 1         | 7         | 1         |

Matrix 216. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 9         | 7         |
| <b>IS</b> | 0.111     | 1         | 1         |
| <b>QD</b> | 0.143     | 1         | 1         |

Matrix 217. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 7         | 3         | 0.333     |
| <b>LP</b> | 0.143     | 1         | 0.333     | 0.143     |
| <b>UE</b> | 0.333     | 3         | 1         | 0.143     |
| <b>VO</b> | 3         | 7         | 7         | 1         |

Matrix 218. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|    | DW  | QW | TE    |
|----|-----|----|-------|
| DW | 1   | 5  | 1     |
| QW | 0.2 | 1  | 0.333 |
| TE | 1   | 3  | 1     |

Matrix 219. Matrix comparisons in contractor related cluster

|    | AI | IS    | QD |
|----|----|-------|----|
| AI | 1  | 0.333 | 1  |
| IS | 3  | 1     | 3  |
| QD | 1  | 0.333 | 1  |

Matrix 220. Matrix comparisons in design related cluster

|    | CS | LP    | UE | VO    |
|----|----|-------|----|-------|
| CS | 1  | 0.333 | 1  | 0.5   |
| LP | 3  | 1     | 2  | 1     |
| UE | 1  | 0.5   | 1  | 0.333 |
| VO | 2  | 1     | 3  | 1     |

Matrix 221. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|    | DW | QW   | TE  |
|----|----|------|-----|
| DW | 1  | 0.25 | 0.5 |
| QW | 4  | 1    | 1   |
| TE | 2  | 1    | 1   |

Matrix 222. Matrix comparisons in contractor related cluster

|    | AI | IS  | QD    |
|----|----|-----|-------|
| AI | 1  | 0.5 | 0.2   |
| IS | 2  | 1   | 0.167 |
| QD | 5  | 6   | 1     |

Matrix 223. Matrix comparisons in design related cluster

|    | CS  | LP | UE  | VO   |
|----|-----|----|-----|------|
| CS | 1   | 5  | 1   | 1    |
| LP | 0.2 | 1  | 0.2 | 0.25 |
| UE | 1   | 5  | 1   | 1    |
| VO | 1   | 4  | 1   | 1    |

Matrix 224. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|    | DW | QW    | TE |
|----|----|-------|----|
| DW | 1  | 0.333 | 1  |
| QW | 3  | 1     | 3  |
| TE | 1  | 0.333 | 1  |

Matrix 225. Matrix comparisons in contractor related cluster

|    | AI | IS  | QD    |
|----|----|-----|-------|
| AI | 1  | 0.5 | 0.167 |
| IS | 2  | 1   | 0.167 |
| QD | 6  | 6   | 1     |

Matrix 226. Matrix comparisons in design related cluster

|    | CS    | LP | UE  | VO  |
|----|-------|----|-----|-----|
| CS | 1     | 6  | 1   | 1   |
| LP | 0.167 | 1  | 0.2 | 0.2 |
| UE | 1     | 5  | 1   | 1   |
| VO | 1     | 5  | 1   | 1   |

Matrix 227. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|    | DW | QW   | TE |
|----|----|------|----|
| DW | 1  | 0.25 | 1  |
| QW | 4  | 1    | 4  |
| TE | 1  | 0.25 | 1  |

Matrix 228. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.167     |
| <b>IS</b> | 1         | 1         | 0.167     |
| <b>QD</b> | 6         | 6         | 1         |

Matrix 229. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         | 1         | 1         |
| <b>LP</b> | 0.167     | 1         | 0.2       | 0.2       |
| <b>UE</b> | 1         | 5         | 1         | 1         |
| <b>VO</b> | 1         | 5         | 1         | 1         |

Matrix 230. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.25      | 0.5       |
| <b>QW</b> | 4         | 1         | 1         |
| <b>TE</b> | 2         | 1         | 1         |

Matrix 231. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.167     |
| <b>IS</b> | 1         | 1         | 0.167     |
| <b>QD</b> | 6         | 6         | 1         |

Matrix 232. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         | 0.5       | 1         |
| <b>LP</b> | 0.167     | 1         | 0.2       | 0.2       |
| <b>UE</b> | 2         | 5         | 1         | 1         |
| <b>VO</b> | 1         | 5         | 1         | 1         |

Matrix 233. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|    | DW | QW    | TE |
|----|----|-------|----|
| DW | 1  | 0.333 | 1  |
| QW | 3  | 1     | 3  |
| TE | 1  | 0.333 | 1  |

Matrix 234. Matrix comparisons in contractor related cluster

|    | AI    | IS | QD    |
|----|-------|----|-------|
| AI | 1     | 3  | 1     |
| IS | 0.333 | 1  | 0.333 |
| QD | 1     | 3  | 1     |

Matrix 235. Matrix comparisons in design related cluster

|    | CS    | LP    | UE | VO    |
|----|-------|-------|----|-------|
| CS | 1     | 5     | 3  | 1     |
| LP | 0.2   | 1     | 3  | 0.333 |
| UE | 0.333 | 0.333 | 1  | 0.333 |
| VO | 1     | 3     | 3  | 1     |

Matrix 236. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | DW    | QW    | TE    |
|----|-------|-------|-------|
| DW | 1     | 0.788 | 1.147 |
| QW | 1.269 | 1     | 1.335 |
| TE | 0.872 | 0.749 | 1     |

Matrix 237. Matrix comparisons combination in contractor related cluster

|    | AI    | IS    | QD    |
|----|-------|-------|-------|
| AI | 1     | 0.842 | 0.494 |
| IS | 1.188 | 1     | 0.521 |
| QD | 2.022 | 1.919 | 1     |

Matrix 238. Matrix comparisons combination in design related cluster

|    | CS    | LP        | UE    | VO    |
|----|-------|-----------|-------|-------|
| CS | 1     | 2.5546159 | 0.99  | 0.734 |
| LP | 0.391 | 1         | 0.537 | 0.344 |
| UE | 1.01  | 1.8628557 | 1     | 0.562 |
| VO | 1.362 | 3.2139914 | 1.78  | 1     |

Matrix 239. Matrix comparisons combination in owner related cluster



**Appendix 13.** Respondents' matrices with respect to element *inadequate specification*

**RESPONDENT 1**

|    | DW  | QW   | T | TE   |
|----|-----|------|---|------|
| DW | 1   | 1    | 5 | 2    |
| QW | 1   | 1    | 4 | 1    |
| T  | 0.2 | 0.25 | 1 | 0.25 |
| TE | 0.5 | 1    | 4 | 1    |

Matrix 240. Matrix comparisons in contractor related cluster

|    | DE   | QD |
|----|------|----|
| DE | 1    | 4  |
| QD | 0.25 | 1  |

Matrix 241. Matrix comparisons in design related cluster

|    | CS | LP    | UE |
|----|----|-------|----|
| CS | 1  | 0.2   | 1  |
| LP | 5  | 1     | 3  |
| UE | 1  | 0.333 | 1  |

Matrix 242. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW    | QW | T | TE    |
|----|-------|----|---|-------|
| DW | 1     | 5  | 3 | 1     |
| QW | 0.2   | 1  | 1 | 0.333 |
| T  | 0.333 | 1  | 1 | 1     |
| TE | 1     | 3  | 1 | 1     |

Matrix 243. Matrix comparisons in contractor related cluster

|    | DE | QD  |
|----|----|-----|
| DE | 1  | 0.2 |
| QD | 5  | 1   |

Matrix 244. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.333     | 1         |
| <b>LP</b> | 3         | 1         | 3         |
| <b>UE</b> | 1         | 0.333     | 1         |

Matrix 245. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 0.333     | 2        | 1         |
| <b>QW</b> | 3         | 1         | 3        | 3         |
| <b>T</b>  | 0.5       | 0.333     | 1        | 1         |
| <b>TE</b> | 1         | 0.333     | 1        | 1         |

Matrix 246. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 247. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.333     | 0.333     |
| <b>LP</b> | 3         | 1         | 1         |
| <b>UE</b> | 3         | 1         | 1         |

Matrix 248. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 1         | 9        | 1         |
| <b>QW</b> | 1         | 1         | 9        | 1         |
| <b>T</b>  | 0.111     | 0.111     | 1        | 0.111     |
| <b>TE</b> | 1         | 1         | 9        | 1         |

Matrix 249. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 250. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 1         | 1         |
| <b>LP</b> | 1         | 1         | 1         |
| <b>UE</b> | 1         | 1         | 1         |

Matrix 251. Matrix comparisons in owner related cluster

#### RESPONDENT 5

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 0.143     | 0.333    | 5         |
| <b>QW</b> | 7         | 1         | 1        | 9         |
| <b>T</b>  | 3         | 1         | 1        | 9         |
| <b>TE</b> | 0.2       | 0.111     | 0.111    | 1         |

Matrix 252. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 0.111     |
| <b>QD</b> | 9         | 1         |

Matrix 253. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.143     | 3         |
| <b>LP</b> | 7         | 1         | 9         |
| <b>UE</b> | 0.333     | 0.111     | 1         |

Matrix 254. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 3         | 3        | 0.333     |
| <b>QW</b> | 0.333     | 1         | 2        | 0.333     |
| <b>T</b>  | 0.333     | 0.5       | 1        | 0.333     |
| <b>TE</b> | 3         | 3         | 3        | 1         |

Matrix 255. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 256. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.5       | 0.5       |
| <b>LP</b> | 2         | 1         | 1         |
| <b>UE</b> | 2         | 1         | 1         |

Matrix 257. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 2         | 5        | 5         |
| <b>QW</b> | 0.5       | 1         | 7        | 7         |
| <b>T</b>  | 0.2       | 0.143     | 1        | 0.5       |
| <b>TE</b> | 0.2       | 0.143     | 2        | 1         |

Matrix 258. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 0.5       |
| <b>QD</b> | 2         | 1         |

Matrix 259. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 4         | 4         |
| <b>LP</b> | 0.25      | 1         | 1         |
| <b>UE</b> | 0.25      | 1         | 1         |

Matrix 260. Matrix comparisons in owner related cluster

#### RESPONDENT 8

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 1         | 4        | 4         |
| <b>QW</b> | 1         | 1         | 6        | 7         |
| <b>T</b>  | 0.25      | 0.167     | 1        | 1         |
| <b>TE</b> | 0.25      | 0.143     | 1        | 1         |

Matrix 261. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 262. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 4         | 4         |
| <b>LP</b> | 0.25      | 1         | 1         |
| <b>UE</b> | 0.25      | 1         | 1         |

Matrix 263. Matrix comparisons in owner related cluster

#### RESPONDENT 9

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 1         | 5        | 5         |
| <b>QW</b> | 1         | 1         | 7        | 7         |
| <b>T</b>  | 0.2       | 0.143     | 1        | 1         |
| <b>TE</b> | 0.2       | 0.143     | 1        | 1         |

Matrix 264. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 265. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 5         | 5         |
| <b>LP</b> | 0.2       | 1         | 1         |
| <b>UE</b> | 0.2       | 1         | 1         |

Matrix 266. Matrix comparisons in owner related cluster

#### RESPONDENT 10

|           | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> |
|-----------|-----------|-----------|----------|-----------|
| <b>DW</b> | 1         | 1         | 5        | 4         |
| <b>QW</b> | 1         | 1         | 6        | 6         |
| <b>T</b>  | 0.2       | 0.167     | 1        | 1         |
| <b>TE</b> | 0.25      | 0.167     | 1        | 1         |

Matrix 267. Matrix comparisons in contractor related cluster

|           | <b>DE</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>DE</b> | 1         | 2         |
| <b>QD</b> | 0.5       | 1         |

Matrix 268. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> | <b>UE</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 4         | 5         |
| <b>LP</b> | 0.25      | 1         | 1         |
| <b>UE</b> | 0.2       | 1         | 1         |

Matrix 269. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|    | DW    | QW    | T | TE |
|----|-------|-------|---|----|
| DW | 1     | 0.2   | 3 | 1  |
| QW | 5     | 1     | 3 | 3  |
| T  | 0.333 | 0.333 | 1 | 1  |
| TE | 1     | 0.333 | 1 | 1  |

Matrix 270. Matrix comparisons in contractor related cluster

|    | DE | QD  |
|----|----|-----|
| DE | 1  | 0.2 |
| QD | 5  | 1   |

Matrix 271. Matrix comparisons in design related cluster

|    | CS    | LP | UE |
|----|-------|----|----|
| CS | 1     | 3  | 3  |
| LP | 0.333 | 1  | 1  |
| UE | 0.333 | 1  | 1  |

Matrix 272. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | DW    | QW        | T     | TE    |
|----|-------|-----------|-------|-------|
| DW | 1     | 0.8923583 | 3.234 | 1.923 |
| QW | 1.121 | 1         | 3.554 | 2.443 |
| T  | 0.309 | 0.2813624 | 1     | 0.749 |
| TE | 0.52  | 0.4092874 | 1.335 | 1     |

Matrix 273. Matrix comparisons combination in contractor related cluster

|    | DE    | QD    |
|----|-------|-------|
| DE | 1     | 0.693 |
| QD | 1.442 | 1     |

Matrix 274. Matrix comparisons combination in design related cluster

|    | CS    | LP    | UE    |
|----|-------|-------|-------|
| CS | 1     | 1.039 | 1.789 |
| LP | 0.962 | 1     | 1.491 |
| UE | 0.559 | 0.671 | 1     |

Matrix 275. Matrix comparisons combination in owner related cluster



**Appendix 14.** Respondents' matrices with respect to element *Quality of design*

**RESPONDENT 1**

|    | DW  | QW    | TE |
|----|-----|-------|----|
| DW | 1   | 1     | 5  |
| QW | 1   | 1     | 3  |
| TE | 0.2 | 0.333 | 1  |

Matrix 276. Matrix comparisons in contractor related cluster

|    | A    | CS | LP  | UE  | VO |
|----|------|----|-----|-----|----|
| A  | 1    | 4  | 1   | 1   | 1  |
| CS | 0.25 | 1  | 0.2 | 0.2 | 1  |
| LP | 1    | 5  | 1   | 1   | 1  |
| UE | 1    | 5  | 1   | 1   | 1  |
| VO | 1    | 1  | 1   | 1   | 1  |

Matrix 277. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW    | QW    | TE |
|----|-------|-------|----|
| DW | 1     | 0.2   | 3  |
| QW | 5     | 1     | 7  |
| TE | 0.333 | 0.143 | 1  |

Matrix 278. Matrix comparisons in contractor related cluster

|    | A   | CS | LP    | UE | VO    |
|----|-----|----|-------|----|-------|
| A  | 1   | 5  | 0.333 | 1  | 0.333 |
| CS | 0.2 | 1  | 0.333 | 1  | 0.2   |
| LP | 3   | 3  | 1     | 3  | 1     |
| UE | 1   | 1  | 0.333 | 1  | 0.5   |
| VO | 3   | 5  | 1     | 2  | 1     |

Matrix 279. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.2       | 1         |
| <b>QW</b> | 5         | 1         | 3         |
| <b>TE</b> | 1         | 0.333     | 1         |

Matrix 280. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 2         | 0.333     | 0.333     | 0.333     |
| <b>CS</b> | 0.5      | 1         | 0.333     | 0.333     | 0.333     |
| <b>LP</b> | 3        | 3         | 1         | 0.333     | 0.333     |
| <b>UE</b> | 3        | 3         | 3         | 1         | 0.333     |
| <b>VO</b> | 3        | 3         | 3         | 3         | 1         |

Matrix 281. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         |
| <b>QW</b> | 1         | 1         | 1         |
| <b>TE</b> | 1         | 1         | 1         |

Matrix 282. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.111     | 0.5       | 0.5       | 0.111     |
| <b>CS</b> | 9        | 1         | 9         | 9         | 1         |
| <b>LP</b> | 2        | 0.111     | 1         | 1         | 0.111     |
| <b>UE</b> | 2        | 0.111     | 1         | 1         | 0.111     |
| <b>VO</b> | 9        | 1         | 9         | 9         | 1         |

Matrix 283. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.143     | 0.2       |
| <b>QW</b> | 7         | 1         | 3         |
| <b>TE</b> | 5         | 0.333     | 1         |

Matrix 284. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.333     | 5         | 0.143     | 0.2       |
| <b>CS</b> | 3        | 1         | 7         | 0.333     | 0.2       |
| <b>LP</b> | 0.2      | 0.143     | 1         | 0.143     | 0.143     |
| <b>UE</b> | 7        | 3         | 7         | 1         | 1         |
| <b>VO</b> | 5        | 5         | 7         | 1         | 1         |

Matrix 285. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 1         |
| <b>QW</b> | 0.333     | 1         | 0.333     |
| <b>TE</b> | 1         | 3         | 1         |

Matrix 286. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.333     | 0.5       | 0.2       | 0.333     |
| <b>CS</b> | 3        | 1         | 0.333     | 0.333     | 0.2       |
| <b>LP</b> | 2        | 3         | 1         | 0.333     | 1         |
| <b>UE</b> | 5        | 3         | 3         | 1         | 1         |
| <b>VO</b> | 3        | 5         | 1         | 1         | 1         |

Matrix 287. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.25      | 0.2       |
| <b>QW</b> | 4         | 1         | 1         |
| <b>TE</b> | 5         | 1         | 1         |

Matrix 288. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.333     | 1         | 1         | 0.167     |
| <b>CS</b> | 3        | 1         | 3         | 3         | 0.2       |
| <b>LP</b> | 1        | 0.333     | 1         | 1         | 0.167     |
| <b>UE</b> | 1        | 0.333     | 1         | 1         | 0.167     |
| <b>VO</b> | 6        | 5         | 6         | 6         | 1         |

Matrix 289. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.2       | 0.25      |
| <b>QW</b> | 5         | 1         | 1         |
| <b>TE</b> | 4         | 1         | 1         |

Matrix 290. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.25      | 0.5       | 1         | 0.2       |
| <b>CS</b> | 4        | 1         | 2         | 4         | 1         |
| <b>LP</b> | 2        | 0.5       | 1         | 1         | 0.5       |
| <b>UE</b> | 1        | 0.25      | 1         | 1         | 1         |
| <b>VO</b> | 5        | 1         | 2         | 1         | 1         |

Matrix 291. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.2       | 0.2       |
| <b>QW</b> | 5         | 1         | 1         |
| <b>TE</b> | 5         | 1         | 1         |

Matrix 292. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.25      | 1         | 1         | 0.167     |
| <b>CS</b> | 4        | 1         | 4         | 4         | 4         |
| <b>LP</b> | 1        | 0.25      | 1         | 1         | 1         |
| <b>UE</b> | 1        | 0.25      | 1         | 1         | 0.167     |
| <b>VO</b> | 6        | 0.25      | 1         | 6         | 1         |

Matrix 293. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>QW</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.25      | 0.2       |
| <b>QW</b> | 4         | 1         | 0.5       |
| <b>TE</b> | 5         | 2         | 1         |

Matrix 294. Matrix comparisons in contractor related cluster

|           | <b>A</b> | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.25      | 1         | 1         | 0.167     |
| <b>CS</b> | 4        | 1         | 4         | 4         | 0.2       |
| <b>LP</b> | 1        | 0.25      | 1         | 1         | 0.167     |
| <b>UE</b> | 1        | 0.25      | 1         | 1         | 0.167     |
| <b>VO</b> | 6        | 5         | 6         | 6         | 1         |

Matrix 295. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|    | DW | QW  | TE |
|----|----|-----|----|
| DW | 1  | 0.2 | 1  |
| QW | 5  | 1   | 1  |
| TE | 1  | 1   | 1  |

Matrix 296. Matrix comparisons in contractor related cluster

|    | A | CS   | LP | UE    | VO    |
|----|---|------|----|-------|-------|
| A  | 1 | 0.33 | 1  | 1     | 0.333 |
| CS | 3 | 1    | 3  | 3     | 1     |
| LP | 1 | 0.33 | 1  | 0.333 | 0.2   |
| UE | 1 | 0.33 | 3  | 1     | 0.333 |
| VO | 3 | 1    | 5  | 3     | 1     |

Matrix 297. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|    | DW    | QW    | TE    |
|----|-------|-------|-------|
| DW | 1     | 0.346 | 0.628 |
| QW | 2.888 | 1     | 1.368 |
| TE | 1.592 | 0.731 | 1     |

Matrix 298. Matrix comparisons in contractor related cluster

|    | A     | CS    | LP    | UE    | VO    |
|----|-------|-------|-------|-------|-------|
| A  | 1     | 0.526 | 0.785 | 0.615 | 0.251 |
| CS | 1.9   | 1     | 1.561 | 1.393 | 0.494 |
| LP | 1.274 | 0.64  | 1     | 0.686 | 0.364 |
| UE | 1.626 | 0.718 | 1.457 | 1     | 0.386 |
| VO | 3.977 | 2.025 | 2.75  | 2.589 | 1     |

Matrix 299. Matrix comparisons in owner related cluster

# **Appendix 15.** Respondents' matrices with respect to element *Acceleration*

## **RESPONDENT 1**

|    | DW | QW |
|----|----|----|
| DW | 1  | 1  |
| QW | 1  | 1  |

Matrix 300. Matrix comparisons in contractor related cluster

|    | AI | QD   |
|----|----|------|
| AI | 1  | 0.25 |
| QD | 4  | 1    |

Matrix 301. Matrix comparisons in design related cluster

|    | CS | VO   |
|----|----|------|
| CS | 1  | 0.25 |
| VO | 4  | 1    |

Matrix 302. Matrix comparisons in owner related cluster

## **RESPONDENT 2**

|    | DW  | QW |
|----|-----|----|
| DW | 1   | 5  |
| QW | 0.2 | 1  |

Matrix 303. Matrix comparisons in contractor related cluster

|    | AI | QD  |
|----|----|-----|
| AI | 1  | 0.2 |
| QD | 5  | 1   |

Matrix 304. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 1         |
| <b>VO</b> | 1         | 1         |

Matrix 304. Matrix comparisons in owner related cluster

### RESPONDENT 3

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         |
| <b>QW</b> | 0.333     | 1         |

Matrix 305. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 2         |
| <b>QD</b> | 0.5       | 1         |

Matrix 306. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 0.333     |
| <b>VO</b> | 3         | 1         |

Matrix 307. Matrix comparisons in owner related cluster

### RESPONDENT 4

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.111     |
| <b>QW</b> | 9         | 1         |

Matrix 308. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 309. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 1         |
| <b>VO</b> | 1         | 1         |

Matrix 310. Matrix comparisons in owner related cluster

## RESPONDENT 5

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 9         |
| <b>QW</b> | 0.111     | 1         |

Matrix 311. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     |
| <b>QD</b> | 3         | 1         |

Matrix 312. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 1         |
| <b>VO</b> | 1         | 1         |

Matrix 313. Matrix comparisons in owner related cluster

## RESPONDENT 6

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         |
| <b>QW</b> | 0.333     | 1         |

Matrix 314. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         |
| <b>QD</b> | 0.333     | 1         |

Matrix 315. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 3         |
| <b>VO</b> | 0.333     | 1         |

Matrix 316. Matrix comparisons in owner related cluster

#### RESPONDENT 7

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>QW</b> | 1         | 1         |

Matrix 317. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 4         |
| <b>QD</b> | 0.25      | 1         |

Matrix 318. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 5         |
| <b>VO</b> | 0.2       | 1         |

Matrix 319. Matrix comparisons in owner related cluster

#### RESPONDENT 8

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>QW</b> | 1         | 1         |

Matrix 320. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 5         |
| <b>QD</b> | 0.2       | 1         |

Matrix 321. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         |
| <b>VO</b> | 0.167     | 1         |

Matrix 322. Matrix comparisons in owner related cluster

## RESPONDENT 9

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>QW</b> | 1         | 1         |

Matrix 323. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 5         |
| <b>QD</b> | 0.2       | 1         |

Matrix 324. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>VO</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         |
| <b>VO</b> | 0.167     | 1         |

Matrix 325. Matrix comparisons in owner related cluster

## RESPONDENT 10

|           | <b>DW</b> | <b>QW</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.5       |
| <b>QW</b> | 2         | 1         |

Matrix 326. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>AI</b> | 1         | 5         |
| <b>QD</b> | 0.2       | 1         |

Matrix 327. Matrix comparisons in design related cluster

|    | CS    | VO |
|----|-------|----|
| CS | 1     | 6  |
| VO | 0.167 | 1  |

Matrix 328. Matrix comparisons in owner related cluster

#### RESPONDENT 11

|    | DW    | QW |
|----|-------|----|
| DW | 1     | 9  |
| QW | 0.111 | 1  |

Matrix 329. Matrix comparisons in contractor related cluster

|    | AI | QD |
|----|----|----|
| AI | 1  | 1  |
| QD | 1  | 1  |

Matrix 330. Matrix comparisons in design related cluster

|    | CS | VO |
|----|----|----|
| CS | 1  | 1  |
| VO | 1  | 1  |

Matrix 331. Matrix comparisons in owner related cluster

#### CLUSTER MATRIX

|    | DW    | QW    |
|----|-------|-------|
| DW | 1     | 1.621 |
| QW | 0.617 | 1     |

Matrix 332. Matrix comparisons combination in contractor related cluster

|    | AI    | QD    |
|----|-------|-------|
| AI | 1     | 1.427 |
| QD | 0.701 | 1     |

Matrix 333. Matrix comparisons combination in design related cluster

|    | CS    | VO    |
|----|-------|-------|
| CS | 1     | 1.664 |
| VO | 0.601 | 1     |

Matrix 334. Matrix comparisons combination in owner related cluster



**Appendix 16.** Respondents' matrices with respect to element *Change of scope*

**RESPONDENT 1**

|    | DW   | TE |
|----|------|----|
| DW | 1    | 4  |
| TE | 0.25 | 1  |

Matrix 335. Matrix comparisons in contractor related cluster

|    | AI | DE  | IS    | QD |
|----|----|-----|-------|----|
| AI | 1  | 1   | 0.2   | 1  |
| DE | 1  | 1   | 0.333 | 5  |
| IS | 5  | 3   | 1     | 5  |
| QD | 1  | 0.2 | 0.2   | 1  |

Matrix 336. Matrix comparisons in design related cluster

|    | A | VO |
|----|---|----|
| A  | 1 | 1  |
| VO | 1 | 1  |

Matrix 337. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW | TE |
|----|----|----|
| DW | 1  | 1  |
| TE | 1  | 1  |

Matrix 338. Matrix comparisons in contractor related cluster

|    | AI    | DE  | IS | QD |
|----|-------|-----|----|----|
| AI | 1     | 0.2 | 3  | 1  |
| DE | 5     | 1   | 5  | 5  |
| IS | 0.333 | 0.2 | 1  | 1  |
| QD | 1     | 0.2 | 1  | 1  |

Matrix 339. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>VO</b> | 5        | 1         |

Matrix 340. Matrix comparisons in owner related cluster

### RESPONDENT 3

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.5       |
| <b>TE</b> | 2         | 1         |

Matrix 341. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 2         | 3         | 3         |
| <b>DE</b> | 0.5       | 1         | 2         | 2         |
| <b>IS</b> | 0.333     | 0.5       | 1         | 1         |
| <b>QD</b> | 0.333     | 0.5       | 1         | 1         |

Matrix 342. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.333     |
| <b>VO</b> | 3        | 1         |

Matrix 340. Matrix comparisons in owner related cluster

### RESPONDENT 4

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         |
| <b>TE</b> | 1         | 1         |

Matrix 341. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         | 1         |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         | 1         |
| <b>QD</b> | 1         | 1         | 1         | 1         |

Matrix 342. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>VO</b> | 1        | 1         |

Matrix 343. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.333     |
| <b>TE</b> | 3         | 1         |

Matrix 344. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 1         | 0.143     |
| <b>DE</b> | 3         | 1         | 7         | 0.333     |
| <b>IS</b> | 1         | 0.143     | 1         | 0.143     |
| <b>QD</b> | 7         | 3         | 7         | 1         |

Matrix 345. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.111     |
| <b>VO</b> | 9        | 1         |

Matrix 346. Matrix comparisons in owner related cluster

**RESPONDENT 6**

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.333     |
| <b>TE</b> | 3         | 1         |

Matrix 347. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 3         | 3         |
| <b>DE</b> | 3         | 1         | 3         | 3         |
| <b>IS</b> | 0.333     | 0.333     | 1         | 1         |
| <b>QD</b> | 0.333     | 0.333     | 1         | 1         |

Matrix 348. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.333     |
| <b>VO</b> | 3        | 1         |

Matrix 349. Matrix comparisons in owner related cluster

**RESPONDENT 7**

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         |
| <b>TE</b> | 0.2       | 1         |

Matrix 350. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.25      | 0.2       |
| <b>DE</b> | 5         | 1         | 1         | 1         |
| <b>IS</b> | 4         | 1         | 1         | 1         |
| <b>QD</b> | 5         | 1         | 1         | 1         |

Matrix 351. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.2       |
| <b>VO</b> | 5        | 1         |

Matrix 352. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 6         |
| <b>TE</b> | 0.167     | 1         |

Matrix 353. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.167     | 0.25      |
| <b>DE</b> | 5         | 1         | 1         | 2         |
| <b>IS</b> | 6         | 1         | 1         | 2         |
| <b>QD</b> | 4         | 0.5       | 0.5       | 1         |

Matrix 354. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.167     |
| <b>VO</b> | 6        | 1         |

Matrix 355. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 6         |
| <b>TE</b> | 0.167     | 1         |

Matrix 356. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.2       | 0.2       |
| <b>DE</b> | 5         | 1         | 1         | 1         |
| <b>IS</b> | 5         | 1         | 1         | 1         |
| <b>QD</b> | 5         | 1         | 1         | 1         |

Matrix 357. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.167     |
| <b>VO</b> | 6        | 1         |

Matrix 358. Matrix comparisons in owner related cluster

#### RESPONDENT 10

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         |
| <b>TE</b> | 0.2       | 1         |

Matrix 359. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.25      | 0.2       |
| <b>DE</b> | 5         | 1         | 1         | 1         |
| <b>IS</b> | 4         | 1         | 1         | 0.5       |
| <b>QD</b> | 5         | 1         | 2         | 1         |

Matrix 360. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.167     |
| <b>VO</b> | 6        | 1         |

Matrix 361. Matrix comparisons in owner related cluster

#### RESPONDENT 11

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.2       |
| <b>TE</b> | 5         | 1         |

Matrix 362. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 1         | 0.333     |
| <b>DE</b> | 5         | 1         | 3         | 1         |
| <b>IS</b> | 1         | 0.333     | 1         | 0.333     |
| <b>QD</b> | 3         | 1         | 3         | 1         |

Matrix 363. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.333     |
| <b>VO</b> | 3        | 1         |

Matrix 364. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|           | <b>DW</b> | <b>TE</b> |
|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1.398     |
| <b>TE</b> | 0.715     | 1         |

Matrix 365. Matrix comparisons combination in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.363     | 0.665     | 0.526     |
| <b>DE</b> | 2.758     | 1         | 1.626     | 1.52      |
| <b>IS</b> | 1.504     | 0.615     | 1         | 0.878     |
| <b>QD</b> | 1.9       | 0.658     | 1.139     | 1         |

Matrix 366. Matrix comparisons combination in design related cluster

|           | <b>A</b> | <b>VO</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.322     |
| <b>VO</b> | 3.599    | 1         |

Matrix 367. Matrix comparisons combination in owner related cluster

**Appendix 17.** Respondents' matrices with respect to element *Late giving of possession*

**RESPONDENT 1**

|    | DW | TI    | TE |
|----|----|-------|----|
| DW | 1  | 0.2   | 1  |
| TI | 5  | 1     | 3  |
| TE | 1  | 0.333 | 1  |

Matrix 368. Matrix comparisons in contractor related cluster

|    | AI | IS    | QD  |
|----|----|-------|-----|
| AI | 1  | 0.111 | 0.2 |
| IS | 9  | 1     | 1   |
| QD | 5  | 1     | 1   |

Matrix 369. Matrix comparisons in design related cluster

|    | A    | CS | PD  | VO    |
|----|------|----|-----|-------|
| A  | 1    | 4  | 1   | 1     |
| CS | 0.25 | 1  | 0.2 | 0.111 |
| PD | 1    | 5  | 1   | 1     |
| VO | 1    | 9  | 1   | 1     |

Matrix 370. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW    | TI    | TE |
|----|-------|-------|----|
| DW | 1     | 0.333 | 3  |
| TI | 3     | 1     | 5  |
| TE | 0.333 | 0.2   | 1  |

Matrix 371. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.333     |
| <b>IS</b> | 1         | 1         | 0.333     |
| <b>QD</b> | 3         | 3         | 1         |

Matrix 372. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.333     | 0.333     | 0.2       |
| <b>CS</b> | 3        | 1         | 3         | 1         |
| <b>PD</b> | 3        | 0.333     | 1         | 0.333     |
| <b>VO</b> | 5        | 1         | 3         | 1         |

Matrix 373. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 3         |
| <b>TI</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 374. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 2         | 1         |
| <b>IS</b> | 0.5       | 1         | 0.333     |
| <b>QD</b> | 1         | 3         | 1         |

Matrix 375. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 3         | 2         | 3         |
| <b>CS</b> | 0.333    | 1         | 0.5       | 1         |
| <b>PD</b> | 0.5      | 2         | 1         | 2         |
| <b>VO</b> | 0.333    | 1         | 0.5       | 1         |

Matrix 376. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|    | DW    | TI  | TE |
|----|-------|-----|----|
| DW | 1     | 1   | 9  |
| TI | 1     | 1   | 5  |
| TE | 0.111 | 0.2 | 1  |

Matrix 377. Matrix comparisons in contractor related cluster

|    | AI | IS | QD |
|----|----|----|----|
| AI | 1  | 1  | 1  |
| IS | 1  | 1  | 1  |
| QD | 1  | 1  | 1  |

Matrix 378. Matrix comparisons in design related cluster

|    | A | CS | PD | VO |
|----|---|----|----|----|
| A  | 1 | 1  | 1  | 1  |
| CS | 1 | 1  | 1  | 1  |
| PD | 1 | 1  | 1  | 1  |
| VO | 1 | 1  | 1  | 1  |

Matrix 379. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|    | DW    | TI    | TE |
|----|-------|-------|----|
| DW | 1     | 0.143 | 3  |
| TI | 7     | 1     | 9  |
| TE | 0.333 | 0.111 | 1  |

Matrix 380. Matrix comparisons in contractor related cluster

|    | AI    | IS | QD |
|----|-------|----|----|
| AI | 1     | 7  | 3  |
| IS | 0.143 | 1  | 1  |
| QD | 0.333 | 1  | 1  |

Matrix 381. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 1         | 1         | 0.2       |
| <b>CS</b> | 1        | 1         | 3         | 0.143     |
| <b>PD</b> | 1        | 0.333     | 1         | 0.143     |
| <b>VO</b> | 5        | 7         | 7         | 1         |

Matrix 379. Matrix comparisons in owner related cluster

#### RESPONDENT 6

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 5         |
| <b>TI</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.2       | 1         | 1         |

Matrix 380. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 3         |
| <b>IS</b> | 0.333     | 1         | 1         |
| <b>QD</b> | 0.333     | 1         | 1         |

Matrix 381. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 3         | 3         | 1         |
| <b>CS</b> | 0.333    | 1         | 3         | 1         |
| <b>PD</b> | 0.333    | 0.333     | 1         | 0.333     |
| <b>VO</b> | 1        | 1         | 3         | 1         |

Matrix 382. Matrix comparisons in owner related cluster

#### RESPONDENT 7

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.25      | 1         |
| <b>TI</b> | 4         | 1         | 4         |
| <b>TE</b> | 1         | 0.25      | 1         |

Matrix 383. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 6         | 6         |
| <b>IS</b> | 0.167     | 1         | 1         |
| <b>QD</b> | 0.167     | 1         | 1         |

Matrix 384. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 4         | 1         | 2         |
| <b>CS</b> | 0.25     | 1         | 1         | 1         |
| <b>PD</b> | 1        | 1         | 1         | 1         |
| <b>VO</b> | 0.5      | 1         | 1         | 1         |

Matrix 385. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.167     | 1         |
| <b>TI</b> | 6         | 1         | 6         |
| <b>TE</b> | 1         | 0.167     | 1         |

Matrix 386. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 6         | 6         |
| <b>IS</b> | 0.167     | 1         | 1         |
| <b>QD</b> | 0.167     | 1         | 1         |

Matrix 387. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 5         | 1         | 1         |
| <b>CS</b> | 0.2      | 1         | 0.5       | 0.5       |
| <b>PD</b> | 1        | 2         | 1         | 1         |
| <b>VO</b> | 1        | 2         | 1         | 1         |

Matrix 388. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.2       | 1         |
| <b>TI</b> | 5         | 1         | 5         |
| <b>TE</b> | 1         | 0.2       | 1         |

Matrix 389. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 6         | 6         |
| <b>IS</b> | 0.167     | 1         | 1         |
| <b>QD</b> | 0.167     | 1         | 1         |

Matrix 390. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 5         | 1         | 1         |
| <b>CS</b> | 0.2      | 1         | 0.2       | 0.2       |
| <b>PD</b> | 1        | 5         | 1         | 1         |
| <b>VO</b> | 1        | 5         | 1         | 1         |

Matrix 391. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.2       | 0.5       |
| <b>TI</b> | 5         | 1         | 3         |
| <b>TE</b> | 2         | 0.333     | 1         |

Matrix 392. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 5         | 6         |
| <b>IS</b> | 0.2       | 1         | 1         |
| <b>QD</b> | 0.167     | 1         | 1         |

Matrix 393. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 4         | 1         | 2         |
| <b>CS</b> | 0.25     | 1         | 1         | 0.5       |
| <b>PD</b> | 1        | 1         | 1         | 1         |
| <b>VO</b> | 0.5      | 2         | 1         | 1         |

Matrix 394. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         |
| <b>TI</b> | 1         | 1         | 1         |
| <b>TE</b> | 1         | 1         | 1         |

Matrix 395. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.333     |
| <b>IS</b> | 1         | 1         | 0.333     |
| <b>QD</b> | 3         | 3         | 1         |

Matrix 396. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 0.333     | 1         | 0.333     |
| <b>CS</b> | 3        | 1         | 1         | 1         |
| <b>PD</b> | 1        | 1         | 1         | 1         |
| <b>VO</b> | 3        | 1         | 1         | 1         |

Matrix 397. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|           | <b>DW</b> | <b>TI</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.447     | 1.791     |
| <b>TI</b> | 2.236     | 1         | 3.087     |
| <b>TE</b> | 0.558     | 0.324     | 1         |

Matrix 398. Matrix comparisons combination in contractor related cluster

|           | <b>AI</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 2.171     | 1.657     |
| <b>IS</b> | 0.461     | 1         | 0.741     |
| <b>QD</b> | 0.603     | 1.349     | 1         |

Matrix 399. Matrix comparisons combination in design related cluster

|           | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|----------|-----------|-----------|-----------|
| <b>A</b>  | 1        | 1.956     | 1.065     | 0.847     |
| <b>CS</b> | 0.511    | 1         | 0.888     | 0.523     |
| <b>PD</b> | 0.939    | 1.126     | 1         | 0.731     |
| <b>VO</b> | 1.181    | 1.914     | 1.368     | 1         |

Matrix 400. Matrix comparisons combination in owner related cluster

**Appendix 18.** Respondents' matrices with respect to element *Payment delays*

**RESPONDENT 1**

|    | DW  | FF  | QW |
|----|-----|-----|----|
| DW | 1   | 1   | 5  |
| FF | 1   | 1   | 5  |
| QW | 0.2 | 0.2 | 1  |

Matrix 401. Matrix comparisons in contractor related cluster

|    | IS | QD |
|----|----|----|
| IS | 1  | 1  |
| QD | 1  | 1  |

Matrix 402. Matrix comparisons in design related cluster

|    | A | LP |
|----|---|----|
| A  | 1 | 1  |
| LP | 1 | 1  |

Matrix 403. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW  | FF | QW |
|----|-----|----|----|
| DW | 1   | 5  | 5  |
| FF | 0.2 | 1  | 1  |
| QW | 0.2 | 1  | 1  |

Matrix 404. Matrix comparisons in contractor related cluster

|    | IS | QD |
|----|----|----|
| IS | 1  | 1  |
| QD | 1  | 1  |

Matrix 405. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>LP</b> | 1        | 1         |

Matrix 406. Matrix comparisons in owner related cluster

### RESPONDENT 3

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 3         |
| <b>FF</b> | 1         | 1         | 3         |
| <b>QW</b> | 0.333     | 0.333     | 1         |

Matrix 407. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 408. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 3         |
| <b>LP</b> | 0.333    | 1         |

Matrix 409. Matrix comparisons in owner related cluster

### RESPONDENT 4

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         |
| <b>FF</b> | 1         | 1         | 1         |
| <b>QW</b> | 1         | 1         | 1         |

Matrix 410. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 411. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.5       |
| <b>LP</b> | 2        | 1         |

Matrix 412. Matrix comparisons in owner related cluster

#### RESPONDENT 5

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 0.143     | 3         |
| <b>FF</b> | 7         | 1         | 9         |
| <b>QW</b> | 0.333     | 0.111     | 1         |

Matrix 413. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 1         |
| <b>QD</b> | 1         | 1         |

Matrix 414. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.143     |
| <b>LP</b> | 7        | 1         |

Matrix 415. Matrix comparisons in owner related cluster

#### RESPONDENT 6

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 1         |
| <b>FF</b> | 0.333     | 1         | 0.333     |
| <b>QW</b> | 1         | 3         | 1         |

Matrix 416. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.2       |
| <b>QD</b> | 5         | 1         |

Matrix 417. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.333     |
| <b>LP</b> | 3        | 1         |

Matrix 418. Matrix comparisons in owner related cluster

#### RESPONDENT 7

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 6         |
| <b>FF</b> | 0.143     | 1         | 1         |
| <b>QW</b> | 0.167     | 1         | 1         |

Matrix 419. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.25      |
| <b>QD</b> | 4         | 1         |

Matrix 420. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>LP</b> | 1        | 1         |

Matrix 421. Matrix comparisons in owner related cluster

#### RESPONDENT 8

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 6         | 6         |
| <b>FF</b> | 0.167     | 1         | 1         |
| <b>QW</b> | 0.167     | 1         | 1         |

Matrix 421. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.2       |
| <b>QD</b> | 5         | 1         |

Matrix 422. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>LP</b> | 1        | 1         |

Matrix 423. Matrix comparisons in owner related cluster

#### RESPONDENT 9

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 7         |
| <b>FF</b> | 0.143     | 1         | 1         |
| <b>QW</b> | 0.143     | 1         | 1         |

Matrix 424. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.2       |
| <b>QD</b> | 5         | 1         |

Matrix 425. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>LP</b> | 1        | 1         |

Matrix 426. Matrix comparisons in owner related cluster

#### RESPONDENT 10

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 7         |
| <b>FF</b> | 0.143     | 1         | 1         |
| <b>QW</b> | 0.143     | 1         | 1         |

Matrix 427. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.25      |
| <b>QD</b> | 4         | 1         |

Matrix 428. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 0.5       |
| <b>LP</b> | 2        | 1         |

Matrix 429. Matrix comparisons in owner related cluster

#### RESPONDENT 11

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         | 3         |
| <b>FF</b> | 0.2       | 1         | 0.333     |
| <b>QW</b> | 0.333     | 3         | 1         |

Matrix 430. Matrix comparisons in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.333     |
| <b>QD</b> | 3         | 1         |

Matrix 431. Matrix comparisons in design related cluster

|           | <b>A</b> | <b>LP</b> |
|-----------|----------|-----------|
| <b>A</b>  | 1        | 1         |
| <b>LP</b> | 1        | 1         |

Matrix 432. Matrix comparisons in owner related cluster

#### COMBINED MATRIX

|           | <b>DW</b> | <b>FF</b> | <b>QW</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 2.482     | 3.567     |
| <b>FF</b> | 0.403     | 1         | 1.279     |
| <b>QW</b> | 0.28      | 0.782     | 1         |

Matrix 433. Matrix comparisons combination in contractor related cluster

|           | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|
| <b>IS</b> | 1         | 0.453     |
| <b>QD</b> | 2.205     | 1         |

Matrix 434. Matrix comparisons combination in design related cluster

|    | A     | LP    |
|----|-------|-------|
| A  | 1     | 0.739 |
| LP | 1.354 | 1     |

Matrix 435. Matrix comparisons combination in owner related cluster



**Appendix 19.** Respondents' matrices with respect to element *Unrealistic expectations*

**RESPONDENT 1**

|    | DW | FF | TE |
|----|----|----|----|
| DW | 1  | 1  | 1  |
| FF | 1  | 1  | 1  |
| TE | 1  | 1  | 1  |

Matrix 436. Matrix comparisons in contractor related cluster

|    | AI | DE    | IS    | QD |
|----|----|-------|-------|----|
| AI | 1  | 0.111 | 0.111 | 1  |
| DE | 9  | 1     | 1     | 9  |
| IS | 9  | 1     | 1     | 9  |
| QD | 1  | 0.111 | 0.111 | 1  |

Matrix 437. Matrix comparisons in design related cluster

|    | CS | PD   | VO    |
|----|----|------|-------|
| CS | 1  | 0.25 | 0.167 |
| PD | 4  | 1    | 1     |
| VO | 6  | 1    | 1     |

Matrix 438. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW    | FF | TE    |
|----|-------|----|-------|
| DW | 1     | 3  | 0.2   |
| FF | 0.333 | 1  | 0.143 |
| TE | 5     | 7  | 1     |

Matrix 439. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 3         | 1         |
| <b>DE</b> | 0.333     | 1         | 1         | 0.5       |
| <b>IS</b> | 0.333     | 1         | 1         | 0.333     |
| <b>QD</b> | 1         | 2         | 3         | 1         |

Matrix 440. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 5         | 0.333     |
| <b>PD</b> | 0.2       | 1         | 0.143     |
| <b>VO</b> | 3         | 7         | 1         |

Matrix 441. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 3         |
| <b>FF</b> | 1         | 1         | 3         |
| <b>TE</b> | 0.333     | 0.333     | 1         |

Matrix 442. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 0.333     | 0.333     |
| <b>DE</b> | 3         | 1         | 3         | 3         |
| <b>IS</b> | 3         | 0.333     | 1         | 1         |
| <b>QD</b> | 3         | 0.333     | 1         | 1         |

Matrix 443. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 3         | 3         |
| <b>PD</b> | 0.333     | 1         | 1         |
| <b>VO</b> | 0.333     | 1         | 1         |

Matrix 444. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 9         |
| <b>FF</b> | 1         | 1         | 5         |
| <b>TE</b> | 0.111     | 0.2       | 1         |

Matrix 445. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         | 1         |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         | 1         |
| <b>QD</b> | 1         | 1         | 1         | 1         |

Matrix 446. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 7         | 0.333     |
| <b>PD</b> | 0.143     | 1         | 0.111     |
| <b>VO</b> | 3         | 9         | 1         |

Matrix 447. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 7         | 1         |
| <b>FF</b> | 0.143     | 1         | 0.333     |
| <b>TE</b> | 1         | 3         | 1         |

Matrix 448. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 5         | 0.333     | 3         |
| <b>DE</b> | 0.2       | 1         | 0.2       | 1         |
| <b>IS</b> | 3         | 5         | 1         | 5         |
| <b>QD</b> | 0.333     | 1         | 0.2       | 1         |

Matrix 449. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 7         | 9         |
| <b>PD</b> | 0.143     | 1         | 1         |
| <b>VO</b> | 0.111     | 1         | 1         |

Matrix 450. Matrix comparisons in owner related cluster

#### RESPONDENT 6

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 3         |
| <b>FF</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 451. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 3         | 3         |
| <b>DE</b> | 0.333     | 1         | 1         | 1         |
| <b>IS</b> | 0.333     | 1         | 1         | 1         |
| <b>QD</b> | 0.333     | 1         | 1         | 1         |

Matrix 452. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 3         | 1         |
| <b>PD</b> | 0.333     | 1         | 0.333     |
| <b>VO</b> | 1         | 3         | 1         |

Matrix 453. Matrix comparisons in owner related cluster

#### RESPONDENT 7

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         | 0.5       |
| <b>FF</b> | 0.2       | 1         | 0.2       |
| <b>TE</b> | 2         | 5         | 1         |

Matrix 454. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 5         | 0.25      | 0.111     |
| <b>DE</b> | 0.2       | 1         | 0.143     | 0.111     |
| <b>IS</b> | 4         | 7         | 1         | 0.5       |
| <b>QD</b> | 9         | 9         | 2         | 1         |

Matrix 455. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         | 1         |
| <b>PD</b> | 0.167     | 1         | 0.167     |
| <b>VO</b> | 1         | 6         | 1         |

Matrix 456. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         | 1         |
| <b>FF</b> | 0.2       | 1         | 0.167     |
| <b>TE</b> | 1         | 6         | 1         |

Matrix 457. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 0.25      | 0.125     |
| <b>DE</b> | 0.333     | 1         | 0.125     | 0.143     |
| <b>IS</b> | 4         | 8         | 1         | 0.5       |
| <b>QD</b> | 8         | 7         | 2         | 1         |

Matrix 458. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 5         | 1         |
| <b>PD</b> | 0.2       | 1         | 0.2       |
| <b>VO</b> | 1         | 5         | 1         |

Matrix 459. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 5         | 1         |
| <b>FF</b> | 0.2       | 1         | 0.2       |
| <b>TE</b> | 1         | 5         | 1         |

Matrix 460. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 3         | 0.25      | 0.2       |
| <b>DE</b> | 0.333     | 1         | 0.25      | 0.143     |
| <b>IS</b> | 4         | 4         | 1         | 1         |
| <b>QD</b> | 5         | 7         | 1         | 1         |

Matrix 461. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         | 1         |
| <b>PD</b> | 0.167     | 1         | 0.167     |
| <b>VO</b> | 1         | 6         | 1         |

Matrix 462. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 6         | 0.5       |
| <b>FF</b> | 0.167     | 1         | 0.167     |
| <b>TE</b> | 2         | 6         | 1         |

Matrix 463. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 0.333     | 0.143     |
| <b>DE</b> | 1         | 1         | 1         | 0.2       |
| <b>IS</b> | 3         | 1         | 1         | 0.333     |
| <b>QD</b> | 7         | 5         | 3         | 1         |

Matrix 464. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 5         | 1         |
| <b>PD</b> | 0.2       | 1         | 0.167     |
| <b>VO</b> | 1         | 6         | 1         |

Matrix 465. Matrix comparisons in owner related cluster

**RESPONDENT 11**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 1         |
| <b>FF</b> | 0.333     | 1         | 0.333     |
| <b>TE</b> | 1         | 3         | 1         |

Matrix 466. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 1         | 0.333     |
| <b>DE</b> | 3         | 1         | 3         | 1         |
| <b>IS</b> | 1         | 0.333     | 1         | 0.333     |
| <b>QD</b> | 3         | 1         | 3         | 1         |

Matrix 467. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>PD</b> | <b>VO</b> |
|-----------|-----------|-----------|-----------|
| <b>CS</b> | 1         | 3         | 1         |
| <b>PD</b> | 0.333     | 1         | 0.333     |
| <b>VO</b> | 1         | 3         | 1         |

Matrix 468. Matrix comparisons in owner related cluster

**COMBINED MATRIX**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 2.94      | 1.136     |
| <b>FF</b> | 0.34      | 1         | 0.473     |
| <b>TE</b> | 0.881     | 2.115     | 1         |

Matrix 469. Matrix comparisons combination in contractor related cluster

|    | AI    | DE    | IS    | QD    |
|----|-------|-------|-------|-------|
| AI | 1     | 1.34  | 0.508 | 0.491 |
| DE | 0.746 | 1     | 0.645 | 0.629 |
| IS | 1.969 | 1.55  | 1     | 0.923 |
| QD | 2.038 | 1.589 | 1.083 | 1     |

Matrix 470. Matrix comparisons combination in design related cluster

|    | CS    | PD    | VO    |
|----|-------|-------|-------|
| CS | 1     | 3.64  | 0.939 |
| PD | 0.275 | 1     | 0.298 |
| VO | 1.065 | 3.358 | 1     |

Matrix 471. Matrix comparisons combination in owner related cluster

**Appendix 20.** Respondents' matrices with respect to element *Variation by owner*

**RESPONDENT 1**

|    | DW | FF | TE |
|----|----|----|----|
| DW | 1  | 1  | 1  |
| FF | 1  | 1  | 1  |
| TE | 1  | 1  | 1  |

Matrix 472. Matrix comparisons in contractor related cluster

|    | AI | DE | IS | QD |
|----|----|----|----|----|
| AI | 1  | 1  | 1  | 1  |
| DE | 1  | 1  | 1  | 1  |
| IS | 1  | 1  | 1  | 1  |
| QD | 1  | 1  | 1  | 1  |

Matrix 473. Matrix comparisons in design related cluster

|    | CS | LP |
|----|----|----|
| CS | 1  | 1  |
| LP | 1  | 1  |

Matrix 474. Matrix comparisons in owner related cluster

**RESPONDENT 2**

|    | DW  | FF | TE |
|----|-----|----|----|
| DW | 1   | 5  | 5  |
| FF | 0.2 | 1  | 1  |
| TE | 0.2 | 1  | 1  |

Matrix 475. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 5         | 0.2       |
| <b>DE</b> | 5         | 1         | 5         | 1         |
| <b>IS</b> | 0.2       | 0.2       | 1         | 0.111     |
| <b>QD</b> | 5         | 1         | 9         | 1         |

Matrix 476. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 3         |
| <b>LP</b> | 0.333     | 1         |

Matrix 477. Matrix comparisons in owner related cluster

**RESPONDENT 3**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 3         |
| <b>FF</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 478. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 2         | 2         |
| <b>DE</b> | 1         | 1         | 2         | 2         |
| <b>IS</b> | 0.5       | 0.5       | 1         | 1         |
| <b>QD</b> | 0.5       | 0.5       | 1         | 1         |

Matrix 479. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 3         |
| <b>LP</b> | 0.333     | 1         |

Matrix 480. Matrix comparisons in owner related cluster

**RESPONDENT 4**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 1         | 1         |
| <b>FF</b> | 1         | 1         | 1         |
| <b>TE</b> | 1         | 1         | 1         |

Matrix 481. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 1         | 1         | 1         |
| <b>DE</b> | 1         | 1         | 1         | 1         |
| <b>IS</b> | 1         | 1         | 1         | 1         |
| <b>QD</b> | 1         | 1         | 1         | 1         |

Matrix 482. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 9         |
| <b>LP</b> | 0.111     | 1         |

Matrix 483. Matrix comparisons in owner related cluster

**RESPONDENT 5**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 9         | 7         |
| <b>FF</b> | 0.111     | 1         | 1         |
| <b>TE</b> | 0.143     | 1         | 1         |

Matrix 484. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 0.2       | 5         |
| <b>DE</b> | 3         | 1         | 1         | 5         |
| <b>IS</b> | 5         | 1         | 1         | 5         |
| <b>QD</b> | 0.2       | 0.2       | 0.2       | 1         |

Matrix 485. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 9         |
| <b>LP</b> | 0.111     | 1         |

Matrix 486. Matrix comparisons in owner related cluster

#### RESPONDENT 6

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 1         |
| <b>FF</b> | 0.333     | 1         | 0.333     |
| <b>TE</b> | 1         | 3         | 1         |

Matrix 487. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.333     | 0.2       | 1         |
| <b>DE</b> | 3         | 1         | 0.333     | 1         |
| <b>IS</b> | 5         | 3         | 1         | 3         |
| <b>QD</b> | 1         | 1         | 0.333     | 1         |

Matrix 488. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 1         |
| <b>LP</b> | 1         | 1         |

Matrix 489. Matrix comparisons in owner related cluster

#### RESPONDENT 7

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 4         |
| <b>FF</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.25      | 1         | 1         |

Matrix 490. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 0.5       | 0.2       |
| <b>DE</b> | 5         | 1         | 5         | 5         |
| <b>IS</b> | 2         | 0.2       | 1         | 2         |
| <b>QD</b> | 5         | 0.2       | 0.5       | 1         |

Matrix 491. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         |
| <b>LP</b> | 0.167     | 1         |

Matrix 492. Matrix comparisons in owner related cluster

**RESPONDENT 8**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 4         | 3         |
| <b>FF</b> | 0.25      | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 493. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 1         | 0.25      |
| <b>DE</b> | 5         | 1         | 4         | 1         |
| <b>IS</b> | 1         | 0.25      | 1         | 0.333     |
| <b>QD</b> | 4         | 1         | 3         | 1         |

Matrix 494. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 5         |
| <b>LP</b> | 0.2       | 1         |

Matrix 495. Matrix comparisons in owner related cluster

**RESPONDENT 9**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 4         | 4         |
| <b>FF</b> | 0.25      | 1         | 1         |
| <b>TE</b> | 0.25      | 1         | 1         |

Matrix 496. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.2       | 1         | 0.2       |
| <b>DE</b> | 5         | 1         | 5         | 1         |
| <b>IS</b> | 1         | 0.2       | 1         | 0.2       |
| <b>QD</b> | 5         | 1         | 5         | 1         |

Matrix 497. Matrix comparisons in design related cluster

|           | <b>CS</b> | <b>LP</b> |
|-----------|-----------|-----------|
| <b>CS</b> | 1         | 6         |
| <b>LP</b> | 0.167     | 1         |

Matrix 498. Matrix comparisons in owner related cluster

**RESPONDENT 10**

|           | <b>DW</b> | <b>FF</b> | <b>TE</b> |
|-----------|-----------|-----------|-----------|
| <b>DW</b> | 1         | 3         | 3         |
| <b>FF</b> | 0.333     | 1         | 1         |
| <b>TE</b> | 0.333     | 1         | 1         |

Matrix 499. Matrix comparisons in contractor related cluster

|           | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> |
|-----------|-----------|-----------|-----------|-----------|
| <b>AI</b> | 1         | 0.25      | 1         | 0.2       |
| <b>DE</b> | 4         | 1         | 4         | 1         |
| <b>IS</b> | 1         | 0.25      | 1         | 0.25      |
| <b>QD</b> | 5         | 1         | 4         | 1         |

Matrix 500. Matrix comparisons in design related cluster

|    | CS   | LP |
|----|------|----|
| CS | 1    | 4  |
| LP | 0.25 | 1  |

Matrix 501. Matrix comparisons in owner related cluster

### RESPONDENT 11

|    | DW    | FF | TE    |
|----|-------|----|-------|
| DW | 1     | 3  | 1     |
| FF | 0.333 | 1  | 0.333 |
| TE | 1     | 3  | 1     |

Matrix 502. Matrix comparisons in contractor related cluster

|    | AI | DE    | IS | QD    |
|----|----|-------|----|-------|
| AI | 1  | 0.333 | 1  | 0.333 |
| DE | 3  | 1     | 3  | 1     |
| IS | 1  | 0.333 | 1  | 0.333 |
| QD | 3  | 1     | 3  | 1     |

Matrix 503. Matrix comparisons in design related cluster

|    | CS  | LP |
|----|-----|----|
| CS | 1   | 5  |
| LP | 0.2 | 1  |

Matrix 504. Matrix comparisons in owner related cluster

### COMBINED MATRIX

|    | DW    | FF    | TE    |
|----|-------|-------|-------|
| DW | 1     | 2.997 | 2.399 |
| FF | 0.334 | 1     | 0.819 |
| TE | 0.417 | 1.221 | 1     |

Matrix 505. Matrix comparisons combination in contractor related cluster

|    | AI    | DE    | IS    | QD    |
|----|-------|-------|-------|-------|
| AI | 1     | 0.364 | 0.864 | 0.548 |
| DE | 2.748 | 1     | 2.125 | 1.427 |
| IS | 1.158 | 0.47  | 1     | 0.696 |
| QD | 1.825 | 0.701 | 1.437 | 1     |

Matrix 506. Matrix comparisons combination in design related cluster

|    | CS    | LP    |
|----|-------|-------|
| CS | 1     | 3.833 |
| LP | 0.261 | 1     |

Matrix 507. Matrix comparisons combination in owner related cluster

## Appendix 21. Respondents' cluster matrices

### RESPONDENT 1

|    | CR  | DR | OR    |
|----|-----|----|-------|
| CR | 1   | 5  | 0.333 |
| DR | 0.2 | 1  | 0.143 |
| OR | 3   | 7  | 1     |

Matrix 508. Matrix comparisons with respect to contractor related cluster

|    | CR | DR  | OR  |
|----|----|-----|-----|
| CR | 1  | 0.2 | 0.2 |
| DR | 5  | 1   | 1   |
| OR | 5  | 1   | 1   |

Matrix 509. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR    |
|----|----|----|-------|
| CR | 1  | 1  | 0.111 |
| DR | 1  | 1  | 0.111 |
| OR | 9  | 9  | 1     |

Matrix 510. Matrix comparisons with respect to owner related cluster

### RESPONDENT 2

|    | CR    | DR | OR    |
|----|-------|----|-------|
| CR | 1     | 3  | 0.2   |
| DR | 0.333 | 1  | 0.143 |
| OR | 5     | 7  | 1     |

Matrix 511. Matrix comparisons with respect to contractor related cluster

|    | CR | DR    | OR |
|----|----|-------|----|
| CR | 1  | 0.111 | 1  |
| DR | 9  | 1     | 7  |
| OR | 1  | 0.143 | 1  |

Matrix 512. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 513. Matrix comparisons with respect to owner related cluster

### RESPONDENT 3

|    | CR | DR | OR |
|----|----|----|----|
| CR | 1  | 1  | 1  |
| DR | 1  | 1  | 1  |
| OR | 1  | 1  | 1  |

Matrix 514. Matrix comparisons with respect to contractor related cluster

|    | CR | DR | OR |
|----|----|----|----|
| CR | 1  | 1  | 1  |
| DR | 1  | 1  | 1  |
| OR | 1  | 1  | 1  |

Matrix 515. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR |
|----|----|----|----|
| CR | 1  | 1  | 1  |
| DR | 1  | 1  | 1  |
| OR | 1  | 1  | 1  |

Matrix 516. Matrix comparisons with respect to owner related cluster

### RESPONDENT 4

|    | CR    | DR | OR |
|----|-------|----|----|
| CR | 1     | 3  | 3  |
| DR | 0.333 | 1  | 1  |
| OR | 0.333 | 1  | 1  |

Matrix 517. Matrix comparisons with respect to contractor related cluster

|    | CR | DR    | OR    |
|----|----|-------|-------|
| CR | 1  | 0.333 | 0.333 |
| DR | 3  | 1     | 1     |
| OR | 3  | 1     | 1     |

Matrix 518. Matrix comparisons with respect to design related cluster

|    | CR    | DR | OR    |
|----|-------|----|-------|
| CR | 1     | 3  | 1     |
| DR | 0.333 | 1  | 0.333 |
| OR | 1     | 3  | 1     |

Matrix 519. Matrix comparisons with respect to owner related cluster

#### RESPONDENT 5

|    | CR  | DR  | OR |
|----|-----|-----|----|
| CR | 1   | 1   | 5  |
| DR | 1   | 1   | 5  |
| OR | 0.2 | 0.2 | 1  |

Matrix 520. Matrix comparisons with respect to contractor related cluster

|    | CR | DR  | OR  |
|----|----|-----|-----|
| CR | 1  | 0.2 | 0.2 |
| DR | 5  | 1   | 1   |
| OR | 5  | 1   | 1   |

Matrix 521. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 522. Matrix comparisons with respect to owner related cluster

**RESPONDENT 6**

|    | CR    | DR  | OR |
|----|-------|-----|----|
| CR | 1     | 0.2 | 3  |
| DR | 5     | 1   | 5  |
| OR | 0.333 | 0.2 | 1  |

Matrix 523. Matrix comparisons with respect to contractor related cluster

|    | CR    | DR    | OR |
|----|-------|-------|----|
| CR | 1     | 0.2   | 3  |
| DR | 5     | 1     | 7  |
| OR | 0.333 | 0.143 | 1  |

Matrix 524. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 525. Matrix comparisons with respect to owner related cluster

**RESPONDENT 7**

|    | CR    | DR    | OR |
|----|-------|-------|----|
| CR | 1     | 0.2   | 3  |
| DR | 5     | 1     | 9  |
| OR | 0.333 | 0.111 | 1  |

Matrix 526. Matrix comparisons with respect to contractor related cluster

|    | CR | DR  | OR |
|----|----|-----|----|
| CR | 1  | 0.2 | 1  |
| DR | 5  | 1   | 5  |
| OR | 1  | 0.2 | 1  |

Matrix 527. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 528. Matrix comparisons with respect to owner related cluster

#### RESPONDENT 8

|    | CR | DR    | OR    |
|----|----|-------|-------|
| CR | 1  | 0.333 | 0.333 |
| DR | 3  | 1     | 1     |
| OR | 3  | 1     | 1     |

Matrix 529. Matrix comparisons with respect to contractor related cluster

|    | CR | DR  | OR  |
|----|----|-----|-----|
| CR | 1  | 0.2 | 0.2 |
| DR | 5  | 1   | 1   |
| OR | 5  | 1   | 1   |

Matrix 530. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 531. Matrix comparisons with respect to owner related cluster

#### RESPONDENT 9

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 532. Matrix comparisons with respect to contractor related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 533. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 534. Matrix comparisons with respect to owner related cluster

#### RESPONDENT 10

|    | CR  | DR  | OR |
|----|-----|-----|----|
| CR | 1   | 1   | 5  |
| DR | 1   | 1   | 5  |
| OR | 0.2 | 0.2 | 1  |

Matrix 535. Matrix comparisons with respect to contractor related cluster

|    | CR | DR  | OR  |
|----|----|-----|-----|
| CR | 1  | 0.2 | 0.2 |
| DR | 5  | 1   | 1   |
| OR | 5  | 1   | 1   |

Matrix 536. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 537. Matrix comparisons with respect to owner related cluster

**RESPONDENT 11**

|    | CR  | DR | OR |
|----|-----|----|----|
| CR | 1   | 5  | 5  |
| DR | 0.2 | 1  | 1  |
| OR | 0.2 | 1  | 1  |

Matrix 538. Matrix comparisons with respect to contractor related cluster

|    | CR | DR  | OR |
|----|----|-----|----|
| CR | 1  | 0.2 | 1  |
| DR | 5  | 1   | 5  |
| OR | 1  | 0.2 | 1  |

Matrix 539. Matrix comparisons with respect to design related cluster

|    | CR | DR | OR  |
|----|----|----|-----|
| CR | 1  | 1  | 0.2 |
| DR | 1  | 1  | 0.2 |
| OR | 5  | 5  | 1   |

Matrix 540. Matrix comparisons with respect to owner related cluster

**COMBINED CLUSTER MATRIX**

|    | CR      | DR      | OR      |
|----|---------|---------|---------|
| CR | 1       | 1.10503 | 1.27914 |
| DR | 0.90495 | 1       | 1.14863 |
| OR | 0.78178 | 0.8706  | 1       |

Matrix 541. Matrix comparisons combination with respect to contractor related cluster

|    | CR      | DR      | OR      |
|----|---------|---------|---------|
| CR | 1       | 0.26612 | 0.48116 |
| DR | 3.75771 | 1       | 1.64891 |
| OR | 2.07833 | 0.60646 | 1       |

Matrix 542. Matrix comparisons combination with respect to design related cluster

|    | CR      | DR      | OR      |
|----|---------|---------|---------|
| CR | 1       | 1.10503 | 0.25404 |
| DR | 0.90495 | 1       | 0.2299  |
| OR | 3.93633 | 4.34977 | 1       |

Matrix 543. Matrix comparisons combination with respect to owner related cluster



## Appendix 22. Respondents' normalized matrices

### 1. Normalized Matrix with respect to *Delays in work progress*

|            | <b>FF</b> | <b>TI</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>FF</b>  | 0.158     | 0.149     | 0.273     | 0.193186          |
| <b>TI</b>  | 0.789     | 0.745     | 0.636     | 0.723506          |
| <b>TE</b>  | 0.053     | 0.106     | 0.091     | 0.083308          |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

#### Matrix 544. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> | <b>Prioroties</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.132     | 0.127     | 0.132     | 0.141     | 0.1329734         |
| <b>DE</b>  | 0.359     | 0.346     | 0.33      | 0.369     | 0.3510021         |
| <b>IS</b>  | 0.339     | 0.356     | 0.338     | 0.308     | 0.3352316         |
| <b>QD</b>  | 0.17      | 0.171     | 0.2       | 0.182     | 0.1807929         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

#### Matrix 545. Matrix comparisons in design related cluster

|            | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> | <b>Prioroties</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>CS</b>  | 0.102     | 0.113     | 0.098     | 0.089     | 0.100292          |
| <b>LP</b>  | 0.293     | 0.326     | 0.335     | 0.362     | 0.3291601         |
| <b>PD</b>  | 0.337     | 0.316     | 0.325     | 0.316     | 0.3235486         |
| <b>VO</b>  | 0.268     | 0.244     | 0.241     | 0.234     | 0.2469993         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

#### Matrix 546. Matrix comparisons in owner related cluster

### 2. Normalized Matrix with respect to *Financial failure of the contractor*

|            | <b>DW</b> | <b>QW</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.566     | 0.587     | 0.523     | 0.5588038         |
| <b>QW</b>  | 0.279     | 0.289     | 0.333     | 0.300105          |
| <b>TE</b>  | 0.155     | 0.124     | 0.144     | 0.1410911         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

#### 547. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>IS</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.494     | 0.494     | 0.4942886         |
| <b>IS</b>  | 0.506     | 0.506     | 0.5057114         |
| <b>TOT</b> | 1         | 1         | 1                 |

548. Matrix comparisons in design related cluster

|            | <b>LP</b> | <b>PD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>LP</b>  | 0.621     | 0.621     | 0.6211727         |
| <b>PD</b>  | 0.379     | 0.379     | 0.3788273         |
| <b>TOT</b> | 1         | 1         | 1                 |

549. Matrix comparisons in owner related cluster

3. Normalized Matrix with respect to *Quality of work*

|            | <b>DW</b> | <b>FF</b> | <b>TI</b> | <b>T</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|----------|-------------------|
| <b>DW</b>  | 0.162     | 0.14      | 0.172     | 0.183    | 0.164327          |
| <b>FF</b>  | 0.31      | 0.268     | 0.249     | 0.297    | 0.2809199         |
| <b>TI</b>  | 0.434     | 0.497     | 0.462     | 0.415    | 0.4521053         |
| <b>T</b>   | 0.093     | 0.095     | 0.117     | 0.105    | 0.1026479         |
| <b>TOT</b> | 1         | 1         | 1         | 1        | 1                 |

550. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.273     | 0.327     | 0.216     | 0.288     | 0.2759223         |
| <b>DE</b>  | 0.186     | 0.222     | 0.268     | 0.23      | 0.2263597         |
| <b>IS</b>  | 0.281     | 0.185     | 0.223     | 0.208     | 0.2243491         |
| <b>QD</b>  | 0.26      | 0.265     | 0.294     | 0.274     | 0.2733689         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

551. Matrix comparisons in design related cluster

|            | <b>A</b> | <b>UE</b> | <b>Priorities</b> |
|------------|----------|-----------|-------------------|
| <b>A</b>   | 0.439    | 0.439     | 0.4387624         |
| <b>UE</b>  | 0.561    | 0.561     | 0.5612376         |
| <b>TOT</b> | 1        | 1         | 1                 |

552. Matrix comparisons in owner related cluster

4. Normalized Matrix with respect to *Technical inadequacy*

|     | DW    | FF    | QW    | TE    | Priorities |
|-----|-------|-------|-------|-------|------------|
| DW  | 0.363 | 0.373 | 0.344 | 0.395 | 0.3687493  |
| FF  | 0.124 | 0.127 | 0.129 | 0.131 | 0.1277166  |
| QW  | 0.357 | 0.334 | 0.338 | 0.304 | 0.3334071  |
| TE  | 0.156 | 0.166 | 0.189 | 0.17  | 0.170127   |
| TOT | 1     | 1     | 1     | 1     | 1          |

553. Matrix comparisons in contractor related cluster

|     | AI    | DE    | IS    | QD    | Priorities |
|-----|-------|-------|-------|-------|------------|
| AI  | 0.26  | 0.277 | 0.302 | 0.192 | 0.2577006  |
| DE  | 0.291 | 0.31  | 0.325 | 0.304 | 0.3076218  |
| IS  | 0.205 | 0.228 | 0.239 | 0.323 | 0.2486509  |
| QD  | 0.245 | 0.185 | 0.134 | 0.181 | 0.1860267  |
| TOT | 1     | 1     | 1     | 1     | 1          |

554. Matrix comparisons in design related cluster

|     | LP    | UE    | Priorities |
|-----|-------|-------|------------|
| LP  | 0.607 | 0.607 | 0.6073904  |
| UE  | 0.393 | 0.393 | 0.3926096  |
| TOT | 1     | 1     | 1          |

555. Matrix comparisons in owner related cluster

5. Normalized Matrix with respect to *Tendering*

|     | QW  | TI    | Priorities |
|-----|-----|-------|------------|
| QW  | 0.3 | 0.327 | 0.3137376  |
| TI  | 0.7 | 0.673 | 0.6862624  |
| TOT | 1   | 1     | 1          |

556. Matrix comparisons in contractor related cluster

6. Normalized Matrix with respect to *Time extensions*

|     | DW    | TI    | Priorities |
|-----|-------|-------|------------|
| DW  | 0.596 | 0.596 | 0.5964421  |
| TI  | 0.404 | 0.404 | 0.4035579  |
| TOT | 1     | 1     | 1          |

557. Matrix comparisons in contractor related cluster

|     | DE    | IS    | QD    | Priorities |
|-----|-------|-------|-------|------------|
| DE  | 0.471 | 0.497 | 0.454 | 0.4739548  |
| IS  | 0.197 | 0.208 | 0.226 | 0.2107043  |
| QD  | 0.332 | 0.295 | 0.32  | 0.3153408  |
| TOT | 1     | 1     | 1     | 1          |

558. Matrix comparisons in design related cluster

|     | A         | CS    | LP    | PD    | VO    | Priorities |
|-----|-----------|-------|-------|-------|-------|------------|
| A   | 0.0679679 | 0.079 | 0.065 | 0.06  | 0.074 | 0.0692033  |
| CS  | 0.1300635 | 0.151 | 0.126 | 0.173 | 0.163 | 0.1485881  |
| LP  | 0.2519296 | 0.289 | 0.242 | 0.212 | 0.247 | 0.2483434  |
| PD  | 0.3077545 | 0.235 | 0.307 | 0.269 | 0.25  | 0.2739539  |
| VO  | 0.2422845 | 0.245 | 0.26  | 0.286 | 0.266 | 0.2599113  |
| TOT | 1         | 1     | 1     | 1     | 1     | 1          |

559. Matrix comparisons in owner related cluster

7. Normalized Matrix with respect to *Availability of information*

|     | DE    | IS    | QD    | Priorities |
|-----|-------|-------|-------|------------|
| DE  | 0.305 | 0.286 | 0.343 | 0.3112957  |
| IS  | 0.472 | 0.442 | 0.407 | 0.4402728  |
| QD  | 0.223 | 0.272 | 0.25  | 0.2484316  |
| TOT | 1     | 1     | 1     | 1          |

560. Matrix comparisons in design related cluster

8. Normalized Matrix with respect to *Design errors*

|     | DW    | QW    | TE    | Priorities |
|-----|-------|-------|-------|------------|
| DW  | 0.318 | 0.311 | 0.329 | 0.3194443  |
| QW  | 0.404 | 0.394 | 0.383 | 0.3938388  |
| TE  | 0.278 | 0.295 | 0.287 | 0.2867169  |
| TOT | 1     | 1     | 1     | 1          |

561. Matrix comparisons in contractor related cluster

|     | AI    | IS    | QD    | Priorities |
|-----|-------|-------|-------|------------|
| AI  | 0.237 | 0.224 | 0.245 | 0.2355426  |
| IS  | 0.282 | 0.266 | 0.259 | 0.2689131  |
| QD  | 0.48  | 0.51  | 0.496 | 0.4955444  |
| TOT | 1     | 1     | 1     | 1          |

562. Matrix comparisons in design related cluster

|            | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>VO</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>CS</b>  | 0.266     | 0.296     | 0.23      | 0.278     | 0.2674305         |
| <b>LP</b>  | 0.104     | 0.116     | 0.125     | 0.13      | 0.1186888         |
| <b>UE</b>  | 0.268     | 0.216     | 0.232     | 0.213     | 0.2322871         |
| <b>VO</b>  | 0.362     | 0.372     | 0.413     | 0.379     | 0.3815936         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

563. Matrix comparisons in owner related cluster

9. Normalized Matrix with respect to *Inadequate specifications*

|            | <b>DW</b> | <b>QW</b> | <b>T</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|----------|-----------|-------------------|
| <b>DW</b>  | 0.339     | 0.345     | 0.354    | 0.315     | 0.3383738         |
| <b>QW</b>  | 0.38      | 0.387     | 0.39     | 0.4       | 0.3890304         |
| <b>T</b>   | 0.105     | 0.109     | 0.11     | 0.122     | 0.1114602         |
| <b>TE</b>  | 0.176     | 0.158     | 0.146    | 0.164     | 0.1611355         |
| <b>TOT</b> | 1         | 1         | 1        | 1         | 1                 |

564. Matrix comparisons in contractor related cluster

|            | <b>DE</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>DE</b>  | 0.409     | 0.409     | 0.4094243         |
| <b>QD</b>  | 0.591     | 0.591     | 0.5905757         |
| <b>TOT</b> | 1         | 1         | 1                 |

565. Matrix comparisons in design related cluster

|            | <b>CS</b> | <b>LP</b> | <b>UE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>CS</b>  | 0.397     | 0.383     | 0.418     | 0.3993334         |
| <b>LP</b>  | 0.382     | 0.369     | 0.348     | 0.3663776         |
| <b>UE</b>  | 0.222     | 0.248     | 0.234     | 0.2342889         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

566. Matrix comparisons in owner related cluster

10. Normalized Matrix with respect to *Quality of design*

|            | <b>DW</b> | <b>QW</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.182     | 0.167     | 0.21      | 0.1862574         |
| <b>QW</b>  | 0.527     | 0.481     | 0.457     | 0.4883796         |
| <b>TE</b>  | 0.291     | 0.352     | 0.334     | 0.325363          |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

567. Matrix comparisons in contractor related cluster

|            | <b>A</b>  | <b>CS</b> | <b>LP</b> | <b>PD</b> | <b>VO</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-----------|-----------|-------------------|
| <b>A</b>   | 0.1022747 | 0.107     | 0.104     | 0.098     | 0.101     | 0.1024019         |
| <b>CS</b>  | 0.1943445 | 0.204     | 0.207     | 0.222     | 0.198     | 0.2048857         |
| <b>LP</b>  | 0.1303388 | 0.13      | 0.132     | 0.109     | 0.146     | 0.1296257         |
| <b>PD</b>  | 0.1662949 | 0.146     | 0.193     | 0.159     | 0.155     | 0.1638815         |
| <b>VO</b>  | 0.4067471 | 0.412     | 0.364     | 0.412     | 0.401     | 0.3992051         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1         | 1                 |

568. Matrix comparisons in owner related cluster

11. Normalized Matrix with respect to *Acceleration*

|            | <b>DW</b> | <b>QW</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.618     | 0.618     | 0.6184075         |
| <b>QW</b>  | 0.382     | 0.382     | 0.3815925         |
| <b>TOT</b> | 1         | 1         | 1                 |

569. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.588     | 0.588     | 0.5879842         |
| <b>QD</b>  | 0.412     | 0.412     | 0.4120158         |
| <b>TOT</b> | 1         | 1         | 1                 |

570. Matrix comparisons in design related cluster

|            | <b>CS</b> | <b>VO</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>CS</b>  | 0.625     | 0.625     | 0.6245597         |
| <b>VO</b>  | 0.375     | 0.375     | 0.3754403         |
| <b>TOT</b> | 1         | 1         | 1                 |

571. Matrix comparisons in owner related cluster

12. Normalized Matrix with respect to *Change of scope*

|            | <b>DW</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.583     | 0.583     | 0.5830612         |
| <b>TE</b>  | 0.417     | 0.417     | 0.4169388         |
| <b>TOT</b> | 1         | 1         | 1                 |

572. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.14      | 0.138     | 0.15      | 0.134     | 0.1403504         |
| <b>DE</b>  | 0.385     | 0.379     | 0.367     | 0.387     | 0.379727          |
| <b>IS</b>  | 0.21      | 0.233     | 0.226     | 0.224     | 0.2231771         |
| <b>QD</b>  | 0.265     | 0.25      | 0.257     | 0.255     | 0.2567455         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

573. Matrix comparisons in design related cluster

|            | <b>A</b> | <b>VO</b> | <b>Priorities</b> |
|------------|----------|-----------|-------------------|
| <b>A</b>   | 0.217    | 0.243     | 0.2303995         |
| <b>VO</b>  | 0.783    | 0.757     | 0.7696005         |
| <b>TOT</b> | 1        | 1         | 1                 |

574. Matrix comparisons in owner related cluster

13. Normalized Matrix with respect to *Late giving of possessions*

|            | <b>DW</b> | <b>TI</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.264     | 0.252     | 0.305     | 0.273547          |
| <b>TI</b>  | 0.589     | 0.565     | 0.525     | 0.5597363         |
| <b>TE</b>  | 0.147     | 0.183     | 0.17      | 0.1667167         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

575. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>IS</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.484     | 0.48      | 0.488     | 0.4841314         |
| <b>IS</b>  | 0.223     | 0.221     | 0.218     | 0.2208359         |
| <b>QD</b>  | 0.292     | 0.299     | 0.294     | 0.2950327         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

576. Matrix comparisons in design related cluster

|            | <b>A</b> | <b>CS</b> | <b>PD</b> | <b>VO</b> | <b>Priorities</b> |
|------------|----------|-----------|-----------|-----------|-------------------|
| <b>A</b>   | 0.275    | 0.326     | 0.246     | 0.273     | 0.280273          |
| <b>CS</b>  | 0.141    | 0.167     | 0.205     | 0.169     | 0.170405          |
| <b>PD</b>  | 0.259    | 0.188     | 0.231     | 0.236     | 0.228395          |
| <b>VO</b>  | 0.325    | 0.319     | 0.317     | 0.323     | 0.3209269         |
| <b>TOT</b> | 1        | 1         | 1         | 1         | 1                 |

577. Matrix comparisons in owner related cluster

14. Normalized Matrix with respect to *Payment Delays*

|            | <b>DW</b> | <b>FF</b> | <b>QW</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.594     | 0.582     | 0.61      | 0.5954764         |
| <b>FF</b>  | 0.239     | 0.235     | 0.219     | 0.2308817         |
| <b>QW</b>  | 0.167     | 0.183     | 0.171     | 0.1736419         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

578. Matrix comparisons in contractor related cluster

|            | <b>IS</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>IS</b>  | 0.312     | 0.312     | 0.311983          |
| <b>QD</b>  | 0.688     | 0.688     | 0.688017          |
| <b>TOT</b> | 1         | 1         | 1                 |

579. Matrix comparisons in design related cluster

|            | <b>A</b> | <b>LP</b> | <b>Priorities</b> |
|------------|----------|-----------|-------------------|
| <b>A</b>   | 0.425    | 0.425     | 0.4248419         |
| <b>LP</b>  | 0.575    | 0.575     | 0.5751581         |
| <b>TOT</b> | 1        | 1         | 1                 |

580. Matrix comparisons in owner related cluster

15. Normalized Matrix with respect to *Unrealistic expectations*

|            | <b>DW</b> | <b>FF</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.45      | 0.486     | 0.435     | 0.4570693         |
| <b>FF</b>  | 0.153     | 0.165     | 0.181     | 0.1665449         |
| <b>TE</b>  | 0.397     | 0.349     | 0.383     | 0.3763858         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

578. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.174     | 0.245     | 0.157     | 0.161     | 0.1841227         |
| <b>DE</b>  | 0.13      | 0.182     | 0.199     | 0.207     | 0.1795739         |
| <b>IS</b>  | 0.342     | 0.283     | 0.309     | 0.303     | 0.309431          |
| <b>QD</b>  | 0.354     | 0.29      | 0.335     | 0.329     | 0.3268725         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

579. Matrix comparisons in design related cluster

|            | <b>CS</b> | <b>PD</b> | <b>VO</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>CS</b>  | 0.427     | 0.455     | 0.42      | 0.4341066         |
| <b>PD</b>  | 0.117     | 0.125     | 0.133     | 0.1251873         |
| <b>VO</b>  | 0.455     | 0.42      | 0.447     | 0.4407061         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

580. Matrix comparisons in owner related cluster

16. Normalized Matrix with respect to *Variation initiated by owner*

|            | <b>DW</b> | <b>FF</b> | <b>TE</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-------------------|
| <b>DW</b>  | 0.571     | 0.574     | 0.569     | 0.5714214         |
| <b>FF</b>  | 0.191     | 0.192     | 0.194     | 0.192151          |
| <b>TE</b>  | 0.238     | 0.234     | 0.237     | 0.2364276         |
| <b>TOT</b> | 1         | 1         | 1         | 1                 |

581. Matrix comparisons in contractor related cluster

|            | <b>AI</b> | <b>DE</b> | <b>IS</b> | <b>QD</b> | <b>Priorities</b> |
|------------|-----------|-----------|-----------|-----------|-------------------|
| <b>AI</b>  | 0.149     | 0.144     | 0.159     | 0.149     | 0.1501354         |
| <b>DE</b>  | 0.408     | 0.394     | 0.392     | 0.389     | 0.3957978         |
| <b>IS</b>  | 0.172     | 0.186     | 0.184     | 0.19      | 0.1828508         |
| <b>QD</b>  | 0.271     | 0.276     | 0.265     | 0.272     | 0.2712159         |
| <b>TOT</b> | 1         | 1         | 1         | 1         | 1                 |

582. Matrix comparisons in design related cluster

|            | <b>CS</b> | <b>LP</b> | <b>Priorities</b> |
|------------|-----------|-----------|-------------------|
| <b>CS</b>  | 0.793     | 0.793     | 0.7930927         |
| <b>LP</b>  | 0.207     | 0.207     | 0.2069073         |
| <b>TOT</b> | 1         | 1         | 1                 |

583. Matrix comparisons in owner related cluster



