



The University of Southampton

Academic Year 2015/2016

Faculty of Business & Law

Southampton Management School

MSc. Dissertation

Business Process Reengineering (BPR) Implementation in Turkish

Construction Sector

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ERGO ID: 21261

This project is entirely the original work of student registration number ERGO ID. Where material obtained from published or unpublished works, this has been fully acknowledged by citation in the main text and inclusion in the list of references.

Word Count:14345

Abstract

Nowadays, organizations have been seeking out innovative solutions in order to increase their capacity to compete in the market due to rapid change and technologic advancement. Moreover, technological advancement, increase in customer expectations and unstable economy require changes for the organizations. In addition to this, internal and external environmental factors change over time. Therefore, to keep up with recent conditions becomes necessity in order to compete in challenging market environment. At this point Business Process Reengineering (BPR) provides necessary redesign of processes for the organizations in order to achieve better results in terms of cost, time and quality. However, many challenges may occur during the BPR implementation. Especially when it comes to complex activity flows in a dynamic environment such as construction sector, success and failure factors should be identified carefully and to what extent outcomes of BPR differ in dynamic environment should be investigated.

Acknowledgements

I would first like to thank my dissertation advisor Dr. Tarila Zuofa of the Business School at University of Southampton. Whenever I ran into trouble or had a question about my research, Dr. Tarila Zuofa always supported and helped me.

I must also express my very sincere gratitude to my parents for providing me with unfailing support and encouragement throughout the process of writing this dissertation. This accomplishment would not have been possible without them.

Yetkin PEKER



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1. Introduction

1.1. Problem Statement

Business Process Reengineering can be considered business management strategy which assumes radical changes regarding business processes within the organizations in order to obtain better results in terms of cost, time and quality (Hammer and Champy, 1993). In recent years, this business management strategy has been successfully applied to many organizations. However, the success rate of BPR is around 15% in terms of meeting expectations (Rock and Yu, 1994). Therefore, success and failure factors of BPR should be identified carefully in order to achieve better results. Especially in a dynamic environment with complex activity flow, those success and failure factors, as well as outcomes of BPR implementation may vary. Hence, the construction sector is a suitable area to investigate mentioned points in the context of BPR.

1.2. Aim and Objectives of the Study

The aim of this research is to explore BPR implementation in construction sector in terms of success factors and challenges. In this context, the research objectives are:

1. To identify the success factors of BPR implementation in construction sector
2. To identify the challenges of BPR implementation in construction sector
3. To explore to what extent the outcomes of BPR differ in construction sector

In this sense, the research questions are:

1. What are the success factors and challenges of BPR implementations in the construction sector?
2. To what extent do the outcomes of BPR differ in the construction sector?

1.3. Research Methodology

In this research, quantitative approach will be chosen to collect data. Furthermore, online survey questionnaires will be conducted with the participants who experienced BPR projects in the construction sector. The detailed research methodology will be explained in Methodology part of the research.

1.4. Significance of the Research

This study is based on construction sector in terms of BPR implementation. Due to the fact that construction projects include complex activity flows in dynamic environment (Demir *et al.*, 2011); the findings may fill the gap of academic knowledge on BPR implementation within dynamic environment. In addition to this, importance of information flow among stakeholders and communication with stakeholders may provide sufficient knowledge in order to increase success rate of BPR in the construction sector.

1.5. Structure of the Research

This study consists of seven chapters. Chapter 1 gives general information regarding the study. Chapter 2 is based on theoretical foundation about BPR that includes previous studies on the relevant content. Chapter 3 shows the methodology of the research including research design, data collection and ethical consideration. Chapter 4 is about analysing the collected data includes descriptive statistics and a set of data analysis methods in SPSS. Chapter 5 provides information regarding research findings and results. Chapter 6 is a comprehensive discussion of the results that were obtained by SPSS and showed in previous chapters. The last chapter, Chapter 7 is allocated to conclusion of the research including limitation, implications, ideas for future studies. Lastly, references and appendices are attached at the end.

2. Literature Review

2.1. Overview

Business Process Reengineering (BPR) can be defined as a redesign of processes and workflows in the organization (Hammer and Champy, 1993). Thus, substantial progress can be obtained in the context of cost, time and quality variables (which is known as iron triangle in the project management literature). In other words, BPR changes the way how goals and objectives are accomplished in the organization. For example, one of the organizations which implemented BPR project at the beginning was Ford, for account payable system; as a result of BPR implementation in Ford Corporation, 75% of employee reduction has been obtained in the account payable department workforce (Jackson, 1994). However, it can be said that BPR can cause undesired results as well, that is directly associated with the project success and failure. For instance, according to Arthur D. Little consulting firm's survey, 85% of the BPR projects have not met the executives' expectations (Rock and Yu, 1994).

In the construction industry, complexity becomes one of the main challenges that should be addressed by contemporary methods (Barlow, 2000). As customer satisfaction is the common concern in the construction projects, BPR may offer desired changes to address frequently encountered problems in the sector (Newel *et al.*, 2000). That is to say, when it is about regular project environment, experimented solutions would be enough to implement construction projects as a success in terms of time, cost and quality. But the main issue in the construction industry is that projects are affected by predictable elements, as well as unpredictable environmental factors (Demir *et al.*, 2014). Therefore, the necessity of BPR becomes visible at this point. In other words, construction industry needs a method that is feasible when the circumstances are predictable, as well as unpredictable. Because, success rate of construction projects is considerably low due to various factors (Hjelmbrekke *et al.*, 2015). In short,

although a large number of research has been done so far in the literature, the success rate of the construction projects are below the mark.

2.2. Origin of BPR

Hammer (1990) and Davenport & Short (1990) were the first people who introduced BPR to the world. Right after this, it was used the first time as a corresponding approach for total quality management (TQM) in the American business sector in the early 1990s. (Hammer and Stanton, 1995). Davenport & Short (1990) defined BPR as a redesign of workflow and its analyse. When BPR has been gaining in popularity in the 1990s, many researches regarding BPR have been made one after another. Hammer and Champy (1993) stated that BPR is an overall process to obtain overall firm level performance in terms of cost, quality, speed and service variables. Conversely, Talwar (1993) highlighted workflow and value change in the context of BPR. Different definitions and statements about BPR led to ambiguity and academic community found BPR lack of sustainable theoretical basis and the first generation of BPR was unable to corroborate its claims due to lack of accurate researches (Deakins and Makgill, 1997). It can be said that at the beginning, BPR literature, which asserted fundamental changes in the overall organization, has changed into moderate process due to the learnings from successes and failures in BPR implementations (Ozcelik, 2010). That is to say, up-to-date definition of BPR suggests radical changes as well as moderate changes depending on the circumstances of the case.

In the early 1990s, the definition of BPR has not been single and commonly agreed in the context of the BPR literature. In this respect, many researchers, such as van Meel et al. (1994) and Peltu et al. (1996) argued the definition of BPR in order to find common ground. In this way, undesired ambiguity regarding BPR success and failure concepts would be avoided. For this reason, Hammer and Champy (1993) published 'A Manifesto for Business Revolution' book which was based on previous references in the BPR literature.

Moreover, a precise definition of BPR has been a necessity in order to make further proposals regarding BPR framework, techniques and tools. The researchers' main point is the focusing on process concerning radical redesign of the organizational activities. At this point, although the definition of 'process' does not strictly differ; according to Hammer and Champy (1993), there are small-scale differences such as its value to customer. Since the process to be reengineered is about business set of activities, the definition of business process is described as structured activities to obtain desired output for particular market (Davenport, 1993); where Riemer (1998) underlines objects such as customers and inventory which constitute a basis for business events. According to these definitions, BPR aims to achieve organizational objectives, as well as high customer satisfaction. In other words, it can be said that customer is one of the key stakeholders of the whole process.

2.3. Underlying reasons for redesigning the organizational processes

Grint (1997) referred to radical change as fashion which differs and a new one emerges every year. Moreover, Archer and Bowker (1995) argued that in order to obtain high-level services as well as adjust organization to current market and global needs, traditional approaches have to change according to demands in production, advancing technology and brand-new innovations. On the other hand, as Zinser *et al.* (1998) stated that the main reason for the necessity of change is the high customer satisfaction aim in order to meet their attractions and expectations. Furthermore, according to Sadiq *et al.* (2000), firms live in a competitive and rapidly changing world; thus they have to modify the way to do business in order to have a corner on the market. In addition to this, Coulson-Thomas (1995) argued that learning organization is the type of firm which is based on constant learning and openness to changes as well as adopting changes with every passing day due to customer diversity, global competition and technological changes.

The organizational change may focus on organizational structure, policies or process, thus according to the relevant focus different parts of the organization are affected such as employees, organizational culture, system or whole organization depending upon the scope of the change, besides those changes may occur during the merger and acquisition and any type of business expansion (Smith, 2002). Furthermore, radical changes can be categorized as structural, strategic, process as well as people-oriented changes depending on what kind of change concerned organization requires and to what extent (Habib and Shah, 2013).

2.4. Approaches to BPR

Muthu et al. (1999) found out a consolidated methodology (Integration Definition for Function Modelling, IDEF0) for BPR which covers previous studies. IDEF0 is a methodology that identifies the goal and objectives regarding customer requirements as well as analysing the existing process, thus according to this data, a suitable reengineered process is designed and implemented (Furey, 1993). Constitutively, IDEF0 has five main steps which are preparation phase, identification and its findings analysing phase, designing phase, lastly implementation and continuous improvement phase (Stoica *et al.*, 2004). On the other hand, IDEF0 just combines previous studies and related models. Therefore, there is neither breakthrough information nor new ground in the context of BPR. Moreover, Muthu et al. (1999) stated that the study did not offer any validation or success ratio of IDEF0. In other words, since the BPR requirements differ for each organization, it is hard to provide such a model applicable for each requirement (Habib and Shah, 2013).

Coulson-Thomas (1995) examined 80 BPR cases in private, public and voluntary sectors, and divided BPR into two different methods which are process simplification approach and process reengineering that are based on Davenport's process improvement approach and Hammers' reengineering study. Furthermore, Macdonald (1995) stated that in spite of the fact that radical changes comprise more significant risks than others

methods do such as TQM, substantial outcomes may obtain that no other method can do in terms of decreased delivery time up to 60%, cost reduction up to %80, reduced product development cycle up to 50%.

Motwani et al. (1998) suggested a framework for BPR which consists of six different stages which are understanding the top management's demands, identifying goal and objectives based on top management's vision, determining the current situation of processes and activities, doing pilot study to decide the scope of change and resource allocation, and lastly monitoring the entire process as well as evaluating the consequences. According to Motwani et al. (1998), top management support, informing the employees about the before implementation, during implementation and after implementation by middle managers and communication play a vital role to avoid resistance to BPR because of the risks involved in radical changes. As Luo and Tung (1999) stated that the range of information availability which BPR requires, the way to choose the right tools which differ for each case, and most importantly selecting the appropriate BPR modelling are directly associated with the BPR success rate. The findings show that current situation of the organization and expectations from BPR have to be taken into consideration, thus participants set a course for BPR depending upon those factors with the most suitable tool and framework selection.

2.5. Concepts of BPR

According to Galliers and Baets (1998), original concept of the BPR is based on the strategic thinking in the 1960s which can be considered a follow-up. In other words, when companies ran into difficulties, they changed the way to handle the current process in order to obtain better profit. Massive challenges in the economy such as great recession in the late 1980s made the researchers investigate further solutions which ended up with the concept of BPR (Butler, 1994). Moreover, according to Butler (1994), technological reengineering came after the financial engineering due to economic crisis in the 1990s. Concurrently, Hammer and Champy

(1993) stated that BPR is a way to come out of the crisis stronger under favour of adaption to current market conditions with effective and customer-oriented solutions.

When it comes to the fundamental concepts of BPR, identifying the target business process, analysing and reengineering that process according to goal orientation and information technology are the underlying steps of BPR (Vidgen et al., 1994). As Hammer and Champy (1993) point out three factors known as 'the three Cs' that consists of customer, competition and change, determine the project success or failure in today's business environment. At this point, BPR aims those points with an approach that requires more than incremental change. The reason it requires radical changes rather than incremental one is that business corporations break a process down into many simpler steps which lead to existing structure becoming stratified in order to handle all of those separate actions, and existing approaches which assume only incremental change do not yield existing interdependence (Davenport, 1993). In addition to this, radical change prevents to repeat the existing way to handle process which may be the primary source of failure (Vidgen et al., 1994). That is to say, incremental change may not prevent being trapped by existing procedure leads to failure. Moreover, BPR assumes changes which are not only related to shape of the organization, but also existing structures, and BPR can be considered a mixture of 'conceptual thinking' and 'practical experience' obtained by the past trials (Vidgen et al., 1994).

2.6. Differences and Similarities Between BPR and other Approaches

When it comes to TQM (Total Quality Management) and DSS (Decision Support Systems), it can be said that BPR has lots of in common with TQM and DSS in terms of the business process standing point (Arnott and O'Donnell, 1994). DSS and BPR both focus on radical change in order to obtain desirable results in an organization, but on the other hand, DSS put individual decision in the center where BPR deal with an organization

entirely (Arnott and O'Donnell, 1994). In other words, scope of the analysis is the main difference between DSS and BPR. As it was said before, BPR requires radical change where changes of TQM can be considered smaller-scaled in the context of organizational improvements; moreover, BPR includes more risks than TQM does, thereby BPR is not a 'quick fix' solution (Butler, 1994).

2.7. Change in Performance during Implementation

BPR, by its very nature, is based on significant changes within the organization, and consequently there may be environment of uncertainty due to inconstancy. Thus, organizational performance is affected adversely by that kind of negative environment. According to Barua *et al.* (1996), adverse outcomes of the BPR projects are mainly associated with lack of detailed cost-benefit analysis, lack of experience on similar BPR project activities and lack of communication between information technology (IT) and other organizational departments. In this context, BPR effects may vary between implementation phase and after implementation in terms of corporate performance. According to Ozcelik (2010), in spite of the fact that substantial changes occur during the implementation of BPR in an organization, organizational performance remains constant during implementation phase in terms of firm-level performance; moreover, functionally focused BPR projects deliver better results than cross-functional scope BPR projects in terms of performance.

According to Sia and Neo (1996), structural alterations play an important role in the context of BPR projects. Moreover, Hunter *et al.* (2001) emphasized BPR from the workplace restructuring and business strategy standing points. Besides, Bertschek and Kaiser (2004) stated that workplace restructuring is positively associated with the labour productivity. When it comes to Information Technology (IT), which is one of the key point of successful BPR project, Devaraj and Kohli (2000) stated how to increase revenue with the harmony of BPR project and IT department with investments. In addition to structural alterations and IT department,

Bresnahan *et al.* (2002) filled the gap in the literature with the focus on skilled labour variable.

2.8. Role of Information System in BPR

The BPR implementation consists of a different kind of system analysis and modelling, and that's why software systems and information systems play an important role in BPR (Kawalek and Leonard, 1996). According to Torres and Parets (1996), information systems show the entire activities in an organization in the context of organizational structure; however, software system is not able to model the current situations up to the hilt, since the real world is unpredictable and software system is based on predictable events. On the other hand, as the technology advances day by day, new software systems can be used to predict the basic structure of the organization (Warboys *et al.*, 1999). Moreover, software systems are based on dynamic organizational context as well as uncertain outcomes of system operation (Kawalek and Leonard, 1996). In other words, software system is supposed to be used in evolving environment which includes new objectives, goals and developing organizational process in terms of BPR. Because there is a high-level interaction between BPR and software system as a supporting element, besides BPR environment can be considered dynamic and inevitable due to radical changes in the organization. Furthermore, every step in the BPR implementation may cause iterations due to its nature; thus it can be said that every step of the whole process is based on dependent elements. In addition to this, Ulrich (1995) argued that one of the main reason of BPR failure is associated with usage of outdated or insufficient existing information system to assist process redesign.

Furthermore, system development methods and methodologies affect the relation between stakeholders in an organization during the BPR implementation on a large scale (Crowe *et al.*, 1997). According to Harrington (1991), machines, organisms and processes are the main three metaphors of an organization, and the first wave says organization is seen

as machine where IT is the tool for management; the second wave says organization is perceived as an organism where IT is less controllable; third wave says organization is seen as a process where IT is a behavioural phenomenon. Moreover, conventional system development methods consider organization as a machine and ignores the perceptual side of IT due to high difficulty level of handling perception (Harrington, 1991). Due to essential role of human aspect for BPR, this kind of reductionist approach is not appropriate to analyse BPR implementation. According to *Crowe et al.* (1997), those kind of methodologies fail to deal with issues in a dynamic environment.

According to BPR literature, BPR implementation is directly associated with information system which is more than replacing out-dated system with computer system (*Warboys et al.*, 1999). Since the conventional methods focus on technical side of the process as well as issues arise from that aspect, also organization consists of different components more than technical side such as knowledge of people and interaction between employees, there is a need of system approach that can analyse every possible outcome of the impact of IT on BPR implementation (Harrington, 1991). That is to say, BPR requires radical changes which affect entire organization, and those changes interact each other; therefore, total impact analyse is a necessity in order to form an estimate of BPR implementation. At this point, conventional methods remain incapable in the context of BPR implementation. Moreover, since the IT plays an important role in interaction between managers and employer as well as positive organizational environment sustainability, any effect over IT may end up changing the organizational structure due to the domino effect (Harrington, 1991). Because of these reasons, *Humphreys and Cao* (2002) argued an integrated conceptual framework to include different views as well as different organizational aspects in order to consider various aspects of the BPR implementation.

2.9. Causes of success and failure in BPR

As Cao et al. (2001) stated there is more than one source of failure that causes to 70% failure rate of BPR implementation due to four different dimension which are organizational process, structure, culture as well as politics. Since radical change may occur in different organizational dimensions and those changes include various internal and external stakeholders, besides relevant dimensions are interdependent; only one possible change in any dimension affects the other dimensions whether any change occurs in other dimensions or not. According to Belmiro et al. (2000), BPR studies in the UK show that focusing on short-term objectives rather than long-term orientation decrease the BPR implementation success rate, also lack of awareness and understanding the fundamentals of BPR lead to barriers for redesigning phase. Furthermore, Luo and Tung (1999) argued that training and education for BPR process play a vital role because BPR participants have to realize the current circumstances as well as adapting themselves to new organizational environmental. As a matter of course, arranging training for participants by those who are experienced in terms of BPR process means significant increase in training budget, hence especially when it comes to small or medium enterprises, top management may not be willing to do so.

In the organizational structure, definition of jobs and their responsibility areas may change as well during the BPR implementation. Thus, participants should be aware of the changes in terms of taking full account of definition of job and its responsibility areas. Moreover, according to Ranganathan and Dhaliwal (2001), most important challenges during the BPR implementation are financial and human capital inadequacy, lack of IT expert in the organization lack of support for BPR within the organization, communication issues between cross-functional teams and lastly lack of appropriate IT infrastructure in the organization respectively. That is to say, collaborative working, openness to radical change, top management commitment, attractive changes in management systems for employees

and proper use of IT are directly associated with successful BPR implementation.

As it was stated before, BPR is a process related implementation, thereby may experience difficulty due to hierarchical structures. That is to say, since BPR aims to change the existing organizational structure which includes the relationship between employers and employees (both white-collar and blue-collar) and restores them by progressive solutions, traditional business approaches may be faced with an obstacle. As MacIntosh and Francis (1997) stated, BPR features inefficiencies that exist in organizational roles, and functional structure as a vertical structure contain barriers when it comes to separate the functions in an organization. Moreover, Stewart (1993) described organizational boundaries as a 'wave dashing against a sea wall' in the context of BPR.

Lack of detailed BPR guidance can be considered one of the reasons for the limited success of BPR (Gerrits, 1994). For instance, resistance to change by employees decreases the BPR success rate since they may see BPR as a threat to their current job situation (Galliers and Baets, 1998). At this point, IT department which is responsible for implementing the proposed business strategy and planned business structures and processes play a major role, especially when it comes to filling the gap related to human factors which affect the way BPR goes. It can be said that IT department is supposed to support the tasks in terms of BPR implementation, and that's why that department can be seen as central enabler of BPR. Davenport and Short (1990) stated that IT has been used to quicken to perform the tasks in traditional business strategy, but it can be utilized as transformer of the organizational works which is a step of BPR implementation. Furthermore, Information Systems provides fastening the process, but may narrow down the flexibility of employee communication (Galliers and Baets 1995). Thus, IT might have both negative and positive effect depending on the appropriate deployment of it in the context of BPR implementation.

BPR literature has been mainly focused on variables in terms of IT and process redesign techniques so far. But there are also other elements that affect the BPR implementation such as cultural, political, organizational and human-related topics (Corrigan, 1996). That's why, BPR implementations' success vary depending on the different countries' cultural dimensions (for example Hofstede's cultural dimensions), the type of the industry to which the organization belongs (for instance construction sector due to its unique nature), environmental factors that are associated with the implementation (PESTEL variables; Political, Environmental, Social, Technological, Economic and Legal). As Corrigan (1996) stated that researchers have mainly highlighted the deficient focus on human dimensions rather than processes to be reengineered in order to implement the system effectively. Because of these reasons, it can be said that successful BPR implementation is based on the harmony between effective organizational and human resource change (Davenport, 1993). At this point, Corrigan (1996) and Peltu et al. (1996) showed interviews that show the resistance to change by employees in different organizations as a major barrier to BPR. Moreover, Peltu et al. (1996) highlighted the employees' perception regarding BPR as a threat to their jobs due to downsizing, and described that as the 'dark side of BPR.'

In addition to those, BPR designers create and control the BPR process according to their experience, knowledge and frameworks of the literature which may vary from person to person; thus, BPR designers and its participants have difficulties to find a common ground about BPR implementation (Kutschker, 1995). That is to say, participants of organizations have their perception and own individual context based on theories and beliefs, thus designers' radical changes may not fit their old context and that may end up with a conflict which is negatively associated with BPR success. In a sense, the participants of the organization can be considered the main drivers of the process, although the BPR is eased by IT. Because human aspect of the process can be either blocker of BPR or main driver of the success. According to Kutschker (1995), it is important to sustain the support of participants throughout the BPR.

As Peltu *et al.* (1996) stated stakeholder management plays an important role to find a common ground due to various tasks of everyone involved in BPR process in terms of current situation and future needs. In order to understand the current situation as well as responsibilities which BPR process requires making successful radical alterations, participants' learning and their adaptation is directly proportionate to BPR success rate (Scarborough, 1996). Moreover, according to Sherwood-Smith (1994), BPR can be considered purposeful process and it is subject to human behaviour. In addition to this, Caudle (1994) stated that BPR process has various inputs and outputs as such in each business process, and in this case people preconditions become the inputs where BPR is based on interaction of the stakeholders; therefore, this whole process can be considered people-oriented which is driven by organizational needs. Furthermore, BPR is supposed to encourage every level of participant such as top level manager and workers with the innovative use of IT in order to take different insights of staff to the consideration in the context of participative approach to BPR which is similar to TQM's employee involvement in this matter (Sherwood-Smith, 1994). As Gerrits (1994) stated that awareness of the knowledge that comes from different standing points of various stakeholders with understanding the consequences of current work situation clear the way from obstacles of present situation as well as challenges may arise from future demands in the context of BPR implementation.

2.10. Chapter Conclusion

To sum up, this chapter provides academic information in a wide range regarding how BPR has changed over time, different approaches to BPR, underlying reasons of BPR demand as well as success & failure factors of BPR. Moreover, literature shows that tools and framework for BPR implementation vary depending upon the type of case. Therefore, participants should decide the most suitable tools and techniques for BPR according to the current situation such as organizational needs, type of

sector etc. In the next chapter, the methodology of the research is stated to provide information regarding how the research will be done.

3. Methodology

3.1. Research Design

The research methodology was decided according to research aim and objectives which are based on literature review content. The research will be designed to understand the BPR implementation in Turkish construction sector. Furthermore, the purpose of research design will be evaluative study to find out how this process works, and quantitative method will be used since no qualitative data will be required in order to complete this research successfully. Besides, survey strategy is suitable in order to collect necessary data in an economical and effective way. Besides, survey research strategy is usually used to answer 'what', 'how many' questions (Saunders et al., 2016); which shows parallelism with my research questions. Furthermore, survey research strategy allows researchers to collect quantitative data (Saunders et al., 2016) and the quantitative method was chosen for this research. That's why survey research strategy is the most appropriate one for my research.

Questionnaires will be conducted to collect primary data which is the most common way in survey strategy, and they will be self-completed online questionnaires. Survey questionnaire can be found in Appendix A. The horizon of the research will be cross-sectional to investigate BPR at a particular time. Cross-sectional studies are often associated with the survey strategy due in order to investigate factors and their outcomes or to explore the impact area of a phenomenon (Saunders et al., 2016). Since the mentioned information regarding cross-sectional studies show parallelism with this research, and the study focuses on factors at a particular time within the organizations; cross-sectional time horizon is part of the research design.

Organisations' databases will be necessary as a part of survey research strategy in order to understand their current social, technological, economic, political and legal status which are directly associated with BPR success and failure factors. To be more precise, there are substantial data that can be collected more accurately through organizational databases such as social environmental factors such as cultural trends of the organization, economic indicators of the organization, political effects on the organization such as tax policies or fiscal policy, implementation of technological innovations in the organization, external legal factors such as labour laws. In this way, the selection of organizations for the online questionnaire can be more representative.

3.2. Data Collection

First of all, probability sampling was chosen for this research. The sampling frame is the construction companies whose headquarters are in Istanbul and Ankara in Turkey. High response rate will be aimed in order to represent the target population. The typical case purposive study is suitable for this research since data can be collected from target group, research does not require face to face contact.

Probability sampling is not appropriate to answer this research questions, since the business research is based on a small number of cases and it was selected for a particular reason. Non-probability sampling addresses the needs of this research in order to answer research questions. In other words, in this research, data cannot be collected from the target population, therefore sampling is required with regard to this research, besides it is not necessary to make statistical inferences from the sample. Furthermore, sample has to proportionally represent the population; on the other hand, quota variables are not available which means that quota sampling is not appropriate sampling method. In addition to this, since the access to data is not difficult, self-selection sampling is not an appropriate method for this research either. It can be said that there is a clear focus regarding this

research which eliminates convenience sampling (Saunders et al., 2016). Since the focus of this study is illustrative, typical case purposive sampling is the most appropriate sampling method for this research in order to explore research questions as well as gaining theoretical aspects.

Every sampling technique has its own advantages and disadvantages. That's why selecting the most appropriate sampling technique plays an important role in the context of research. Typical case purposive sampling was chosen as a sampling technique, and it has various pros and cons like any other sampling techniques. Saunders et al. (2016) stated the impacts of selected sampling methods in terms of four various factors, and typical case purposive sampling technique's impacts have been given below:

Sampling Technique	Likelihood of sample being representative	Technique's most useful research type	Cost	Control in terms of sample contents
Typical case purposive sampling	Low, however it changes based on researcher's choices	Illustrative	Acceptable	Specifies selection criteria

Table 1: Impacts of typical case purposive sampling technique (Saunders et al., 2016)

One of the aims regarding sample was to make it representative in order to make sure the data represents population's thoughts in the context of this research, in this way results can be trustworthy. According to Table 1, in spite of the fact that typical case purposive sampling technique's representative likelihood ratio is considered low, it changes depending on researcher's choices. In this sense, Turkish construction organizations have been searched delicately and construction firms which implemented BPR has chosen according to their political, environmental, social, technological and most importantly economic indicators. Thus, sample is based on organizations which have different economic status, various

employee numbers and unique organizational culture, hence selected organizations became representative in the context of Turkish construction firms which implemented BPR. Technique's most useful research type shows parallelism with the research questions of the research. Cost is another factor that sets the tone of the research. Since the relative cost level is acceptable, it can be considered one of the positive sides of the mentioned sampling technique.

Confidence Level	Confidence Interval	Sample Size Needed
%95	6	267

Table 2: Determining the sample size

The sample size was determined according to confidence level, confidence interval and population variables. The result is given in Table 2.

As it was mentioned in Chapter 3.1, questionnaire method was chosen in order to collect data. Questionnaire is not a good way to collect data when the research requires many numbers of open-ended questions (Saunders et al., 2016). There are only two open-ended questions in the current questionnaire which are the first question and the second question. Those questions have been asked to the participants to clarify their current working situation which are required to collect necessary information, and those two questions require very short answers like one word or two words. Because of these reasons, questionnaire is the most appropriate way to collect data for this research. Self-completed internet (web) questionnaire was chosen as type of the questionnaire because that makes it easier to access to information, besides this type of questionnaire does not require trips to collect data, since the participants live in Turkey.

After deciding what data need to be collected which is based on literature review and discussion with the research tutor, questionnaire has been designed in order to collect primary data. For this purpose, each research

question subdivided into more detailed questions in order to ensure that all the required data were collected. In the sequel, required level of data has been determined for each variable. After designing the questionnaire, it was pilot tested with the respondents who were willing to complete it with their knowledge regarding research topic in order to ensure that participants will face no issues in answering each question in the questionnaire and there will be no issues in recording the data comes from participants' answers.

'Isurvey' has been preferred to prepare the questionnaire and make it online which is a research tool of University of Southampton. The questionnaire consists of four sections which include 51 questions in total. First section aims to collect data regarding participants' current status such as the type of sector they work in, also their organizations' current status such as employee numbers. Second section was generated to explore participants' current working environment dynamics and to identify what factors are more important in order to sustain positive working environment from their standing points. Moreover, second section plays a critical role in order to understand the motives behind BPR, before implementation process and during implementation process in the construction firms. Third section aims to better explore the human aspect of the BPR process in the construction sector. For this purpose, participants have been asked to answer questions regarding incentive awards and resistance to change. Last section was generated to investigate the outcomes of BPR implementation in the construction organizations. Accordingly, participants have been posed questions in the context of overall assessment, performance-related indicators and economic indicators after BPR implementation. Each question in every section was prepared delicately to collect only required data. Therefore, it can be said that the questionnaire does not include any redundant question.

When it comes to selection of the question types in the questionnaire; open-ended questions, list questions, ranking questions, rating questions and matrix questions have been used properly. When the participants' responses were unpredictable and/or their responses may vary in a large

scale, open questions have been preferred like the first and the second questions in the questionnaire. In this way, listing all possible answers have been avoided which would have been very long list. In addition to this, the expectation from the response of the open-ended questions was only a few words. In addition to this, list questions, mostly 'yes/no' questions, have been preferred where the responses have been predictable. Moreover, 'other' response has been added for the unforeseen responses, in this way participants were able to choose the most appropriate answer for them. Category questions have been designed in order to collect data about participants' attributes such as their old, besides all the possible responses have been added to those questions and responses have been arranged in a logical order. Ranking questions have been preferred when exploring the relative importance of various factors to the participants has been crucial. For this purpose, participants were asked to place factors in rank order. Rating questions have been used to collect data about participants' opinion regarding workplace environment and BPR implementation process. In this context, several statements have been given, and participants have been asked to respond to those statements via using 'Likert-style rating'.

Under favour of internship periods of the researcher, there are existing connections with the several construction companies whose headquarters are in Istanbul and Ankara, therefore the study will be conducted in Ankara and Istanbul. The selected sample must have enough knowledge of BPR process in order to complete given questionnaire. For this reason, construction companies' background regarding BPR implementation has been searched, and suitable ones for the research have been chosen. As it was stated in the literature review part, BPR' human aspect covers all level of employees such as managers, engineers, architects, technicians in the construction organizations. Thus, the selected sample includes employees from top-level management to technicians in the selected construction companies. Since it is hard to get in touch with a large number of employees from various working titles in an organization through face to face contact, Human Resources (HR) department has been contacted, and

HR department of each selected organizations have sent mail which includes the link of questionnaire to the employees in the organization. In this way, a large number of employees from different departments have been contacted for their consent to take a part in the research. The full list of organizations that participated in online questionnaire can be found in Appendix E.

The data which came from questionnaires entered in Excel as a matrix after each respond are received from questionnaires. In the sequel, the data was analysed via SPSS.

3.3. Ethical Consideration

Ethical consideration has been priority in every stage of the research which are clarifying research topic, designing the research, gaining access to participants, collecting the data, storing the data, analysing the data and lastly reporting the findings. The Ethics and Research Governance guideline of the University of Southampton has been used to maintain the desired ethical level in the research. Before the data collection part of the research, ERGO (Ethics and Research Governance Online) approval has been obtained. Thus, potential ethical issues have been taken into consideration throughout the research.

Participants have been contacted to give information regarding the research, and the researcher before making the questionnaire. Consent form covers that there is no obligation to participate in the online survey questionnaire. Participants have been assured that their answers would only use for the research. Participants' names and/or any personal information which may expose them have not been asked and/or used for the questionnaires. Moreover, collected data has not been shared with the third person. Furthermore, personal information included only necessary and relevant ones (for example, participants' working title, participants' age). When it comes to data storing, all the data, which came from the completed questionnaires, have been stored in a protected folder which can

be accessed only by the researcher. If necessary, relevant data may be shared with the supervisor of the research which is stated in the consent form.

Moreover, the researcher is responsible for every step of the research including preparing the questionnaire, keeping in touch with the organizations, and analysing the data. Therefore, the researcher has full responsibility for the online survey questionnaire, and analysing it.

3.4. Chapter Conclusion

To sum up, this chapter provides detailed information regarding how the research is designed and the way to collect data in the context of research methodology. In this sense, quantitative method strategy is adopted and online survey questionnaire is conducted to collect data. Moreover, Chapter 3 shows that the ethical issues are taken into account in the research. In the next chapter, distributions regarding online questionnaire, descriptive statistics and analysis methods are given.

4. Data Analysis

4.1. Summary of Respondent Statistics

645 participants from selected organizations have been contacted and they have attempted to fill out the questionnaire. 364 people have abandoned the survey without saving which means that those people have not attempted to fill in the questionnaire again. Furthermore, five people have saved the survey to finish it later. Fortunately, 275 participants have completed the survey which is more than enough since the required sample size is 267 with the 95% confidence level and 6 confidence interval.

Having participants from as many departments as possible with the different job titles play an important role in this research in order to analyse the data comes from different perceptions. Participants from 59 different

departments with 81 different job titles have completed the survey (Appendix B and Appendix C). Therefore, it can be said that the survey results represent various standing points in the selected organizations.

Figure 1: Sector Distribution

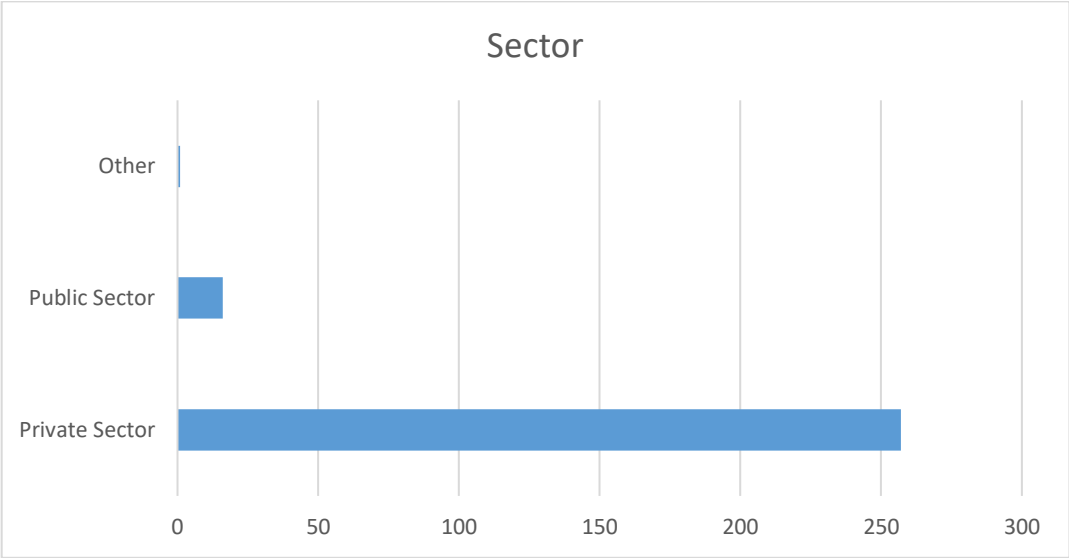


Figure 1 shows the distribution of what sector participants work in. As can be seen in Figure 1, 93% of the participants currently work in private sector where only 6% of the participants work in public sector. Furthermore, 1 participant stated the answer as other sector (Figure 1). Since the selected organizations consist of mostly private sector, Figure 1 fulfill the expectations. Moreover, researcher has not chosen any balance ratio between public sector and private sector in the context of BPR implementation; therefore, sector distribution does not affect the reliability of the later findings.

Figure 2: Age Distribution

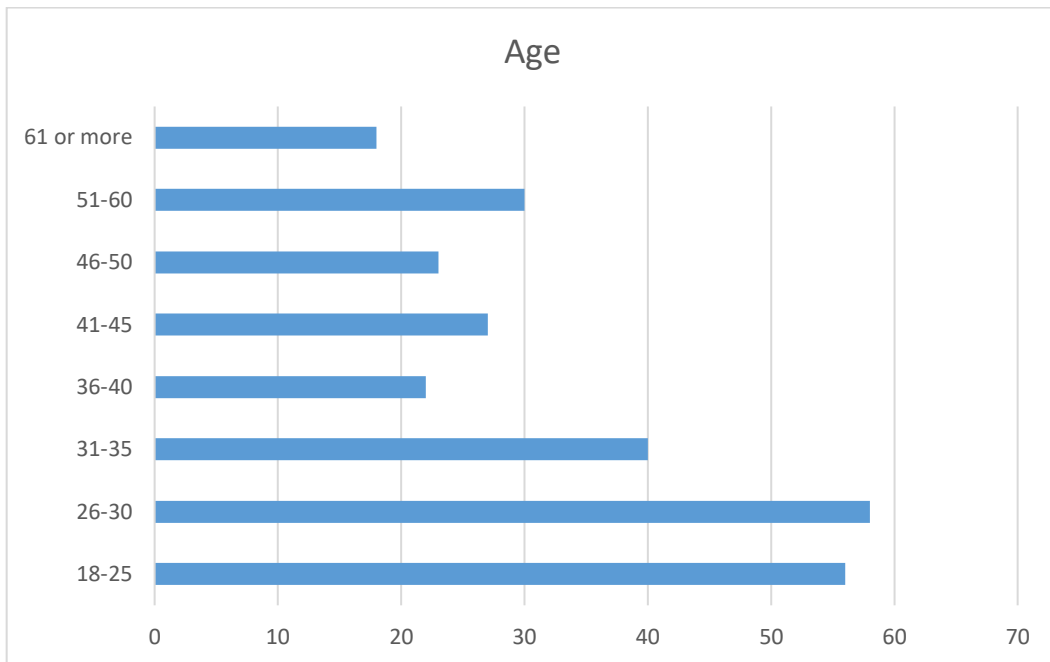


Figure 2 provides information regarding participants' age distribution. As can be seen from Figure 2, participants' age distribution differs in a wide range and it can be said that the survey covers various age ranges. According to Figure 2, participants within 26-30 age range are the biggest group which is followed by participants within 18-25 age range. Those who are 61 years old or older than that are the smallest group of the participants. A more detailed look at the Figure 2 reveals that 56% of the participants are younger than 40 years old where 44% of the participants are older than 40 years old. Since the participants' age whose are older than 61 years old are not known exactly, average age cannot be calculated. Age distribution provides partial information regarding participants' experience in the construction sector as well. Participants within 18-25 years old can be considered less experienced employees rather than those in other age ranges.

Figure 3: Employee Number of Department Distribution

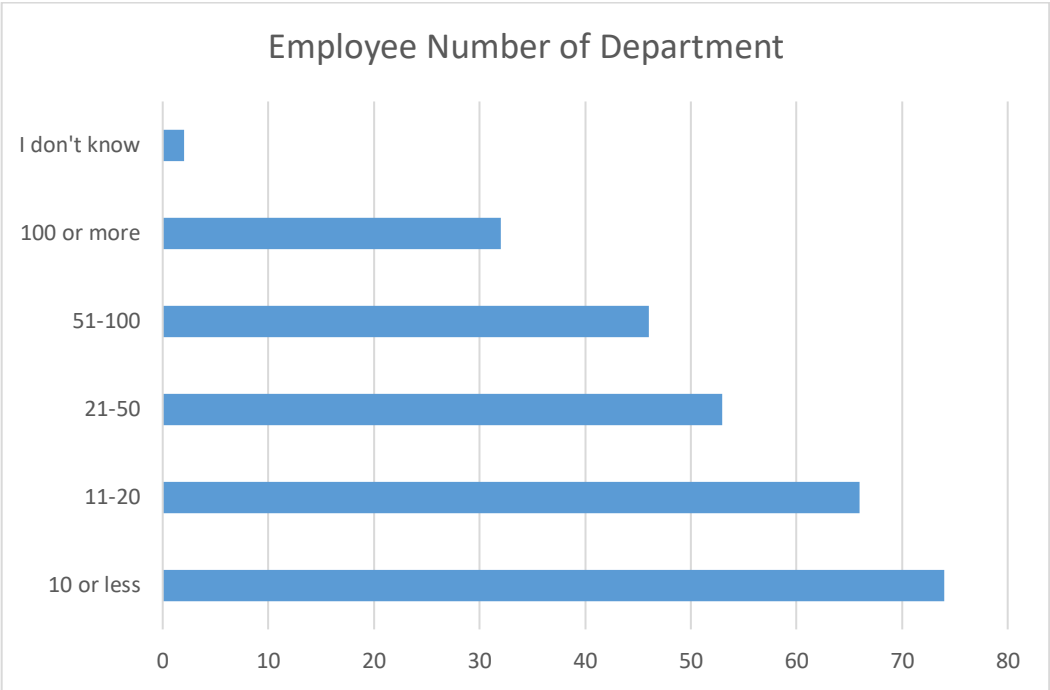


Figure 3 shows the distribution regarding employee numbers in participants' current working department. As can be seen from the Figure 3, departments which have 10 or less employees are the biggest parts of the distribution with 26.9 percent which is followed by those have 11-20 employees with 24 percent. 2 participants declared that they do not have enough information regarding their departments' employee numbers. According to the information, 11.6% of the departments have 100 or more employees which is the lowest percentage of the relevant distribution. A more detailed look at the graph reveals that 50.9 percent of the departments have less than 21 employees where 49.1 of the departments have more than 20 employees. It can be said that as the departments' employee numbers increase, the percentage of those departments decrease. As can be seen from the Figure 3, departments with various numbers of employees have been represented in the research which is crucial for the research reliability.

Figure 4: Employee Number of Organization Distribution

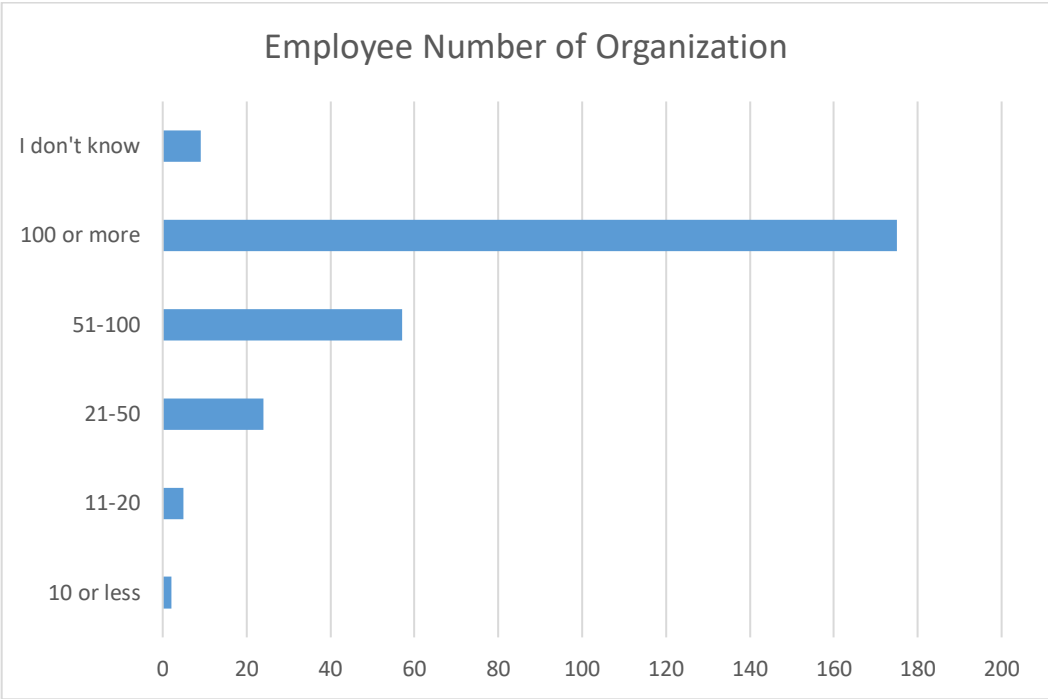


Figure 4 provides information regarding employee numbers in participants' organizations distribution. As can be seen from Figure 4, 64.3% of the participants' organizations have 100 or more employees where 20.7% of the organizations have employees between 51 and 100. Besides, only 0.7% of the participants' organizations have 10 or less employees where those with number of employees between 11-20 is higher with 1.8%. Furthermore, 9 participants do not have enough information regarding employee numbers in their current organizations. A more detailed look reveals that 85% of the participants' organizations have more than 50 employees where only 11.7% organizations have less than 51 employees. It can be said that in the research, as the number of employees in organizations increases, percentage of the organizations decreases significantly. As can be seen from Figure 4, organizations with various number of employees are represented in the research which is important for the research reliability.

Figure 5: Training for Job Role Distribution

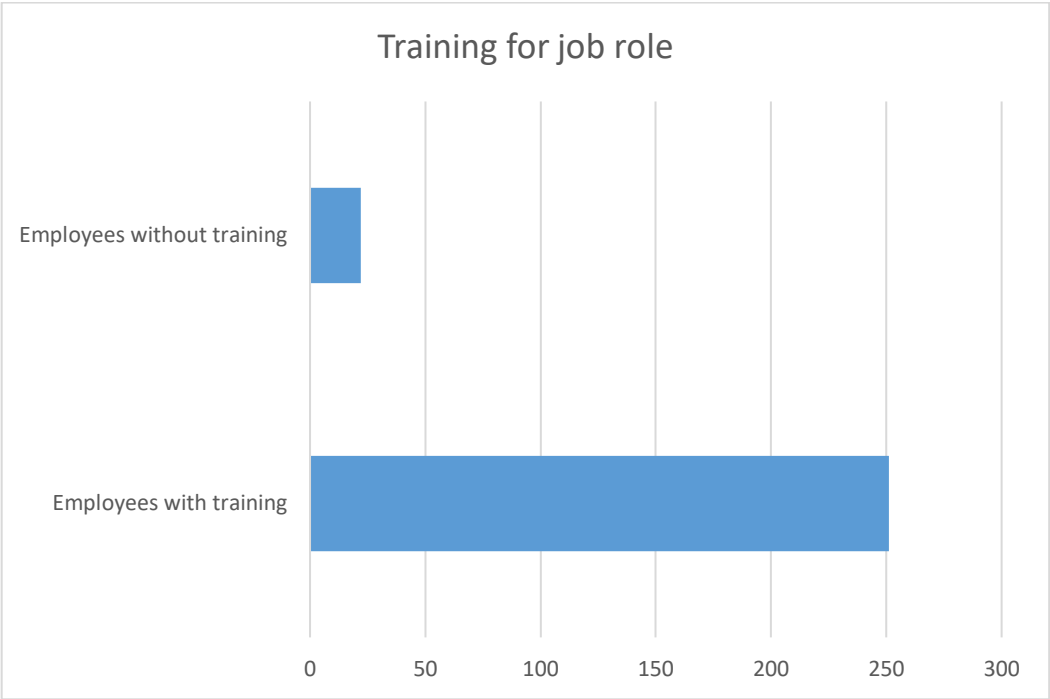


Figure 5 shows whether or not the participants had training for their official job roles, as well as responsibilities. As can be seen from the Figure 5, 91.3% of the participants had training regarding their job role where 8% of them did not have any training for their job title. 2 participants did not answer this question. As it is expected the great majority of the participants are aware of the duties and responsibilities of their job titles which is associated with BPR implementation.

Figure 6: Awareness Regarding Department Goal and Objectives Distribution

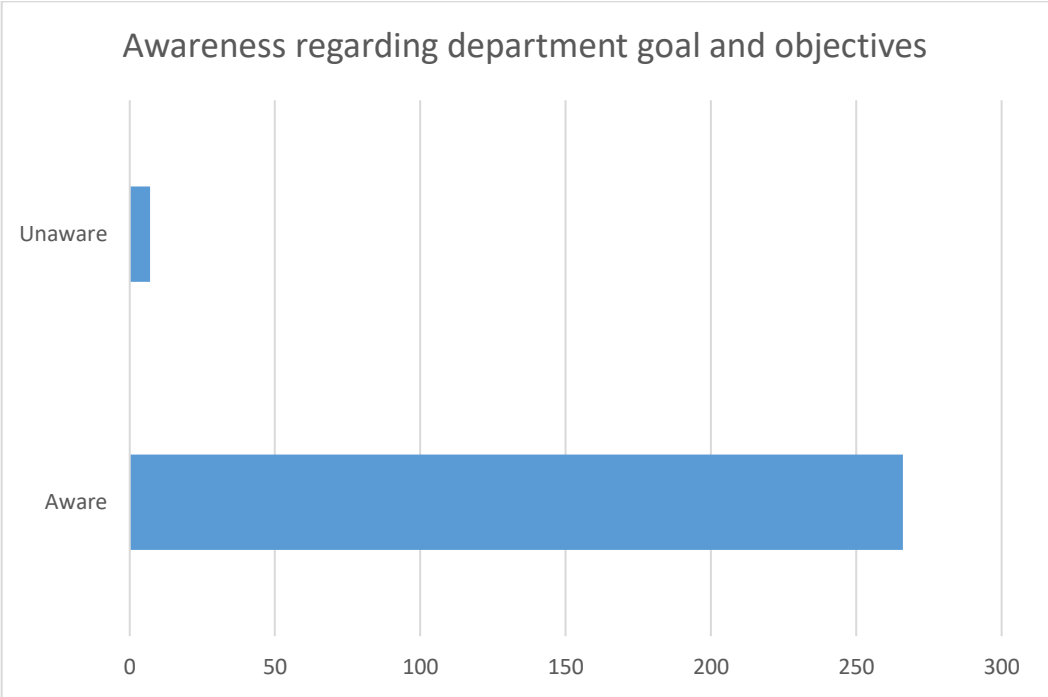


Figure 6 provides information regarding participants' awareness in the context of their departments' goal and objectives. As can be seen from the Figure 6, 96.7% of the participants are aware of their department goal and objectives where 2.5% of them are not aware of department goal and objectives. 2 participants did not respond to this question. As it is expected, vast majority of the participants are aware of what the department goal and objectives are. Figure 6 plays an important role for the research. That is to say, since the participants are expected to evaluate the results of the BPR implementation in their organizations, evaluation questions with regard to BPR have been asked participants. As BPR implementation aims better results regarding department goal and objectives, participants can make better judgement if they are aware of what the department goal and objectives are. In this way, reliability of the research has been assured.

Figure 7: Role of IT (Information Technology) in BPR Distribution

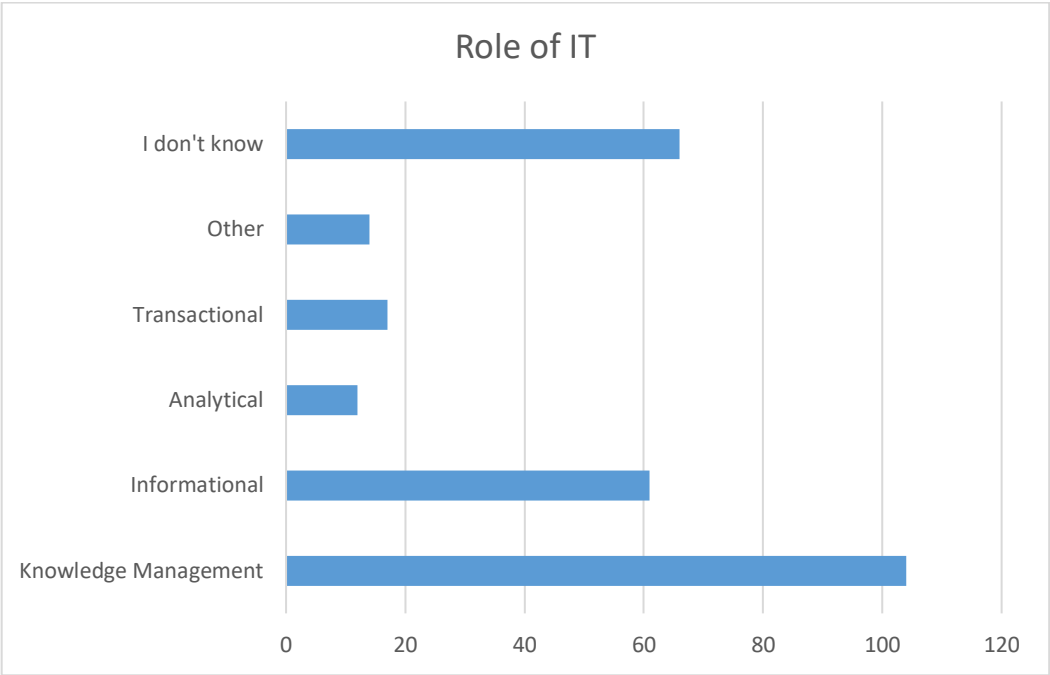


Figure 7 shows what role IT played in BPR implementation process. As can be seen from the Figure 7, knowledge management role and responsibility has the highest percentage with 37.8%. 1 participant did not respond to this question. Another remarkable result is the one about employees' lack of information regarding IT's role in BPR. That is to say, 24% of the respondents do not have any clue regarding IT department's role and responsibility. Informational role has the second highest percentage with 22.3%. In contrast, transactional and analytical roles have the lowest scores with 6.2% and 4.4% respectively. Due to the fact that IT plays an important role in BPR success, the results is discussed in Discussion chapter.

Figure 8: External Consultant Involvement in BPR Distribution

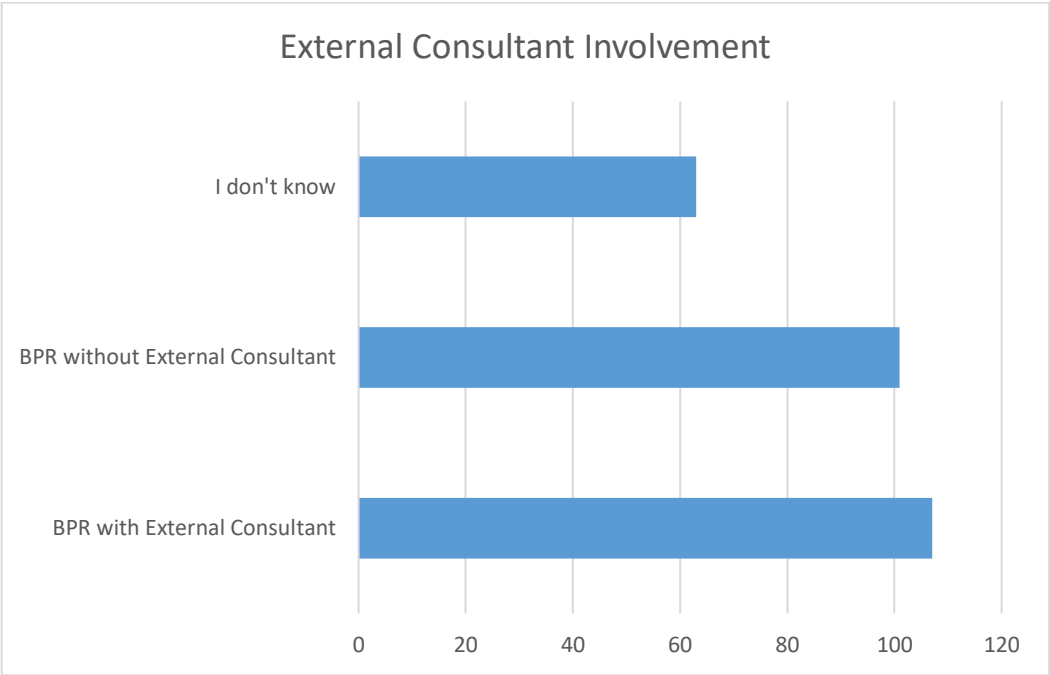


Figure 8 provides information regarding external consultant involvement in BPR. As can be seen from Figure 8, 39.5% of the BPR projects include external consultant where 37.3% of those do not include external consultant. 4 participants did not answer this question. As can be seen from the Figure 8, 23.2% of the participants do not have enough information regarding external consultant involvement which is a relatively high percentage. Overall, it can be said that the percentages are too close to each other, therefore it is hard to deduce from given figure.

Figure 9: Rating of Motivational Incentives After Implementation Distribution

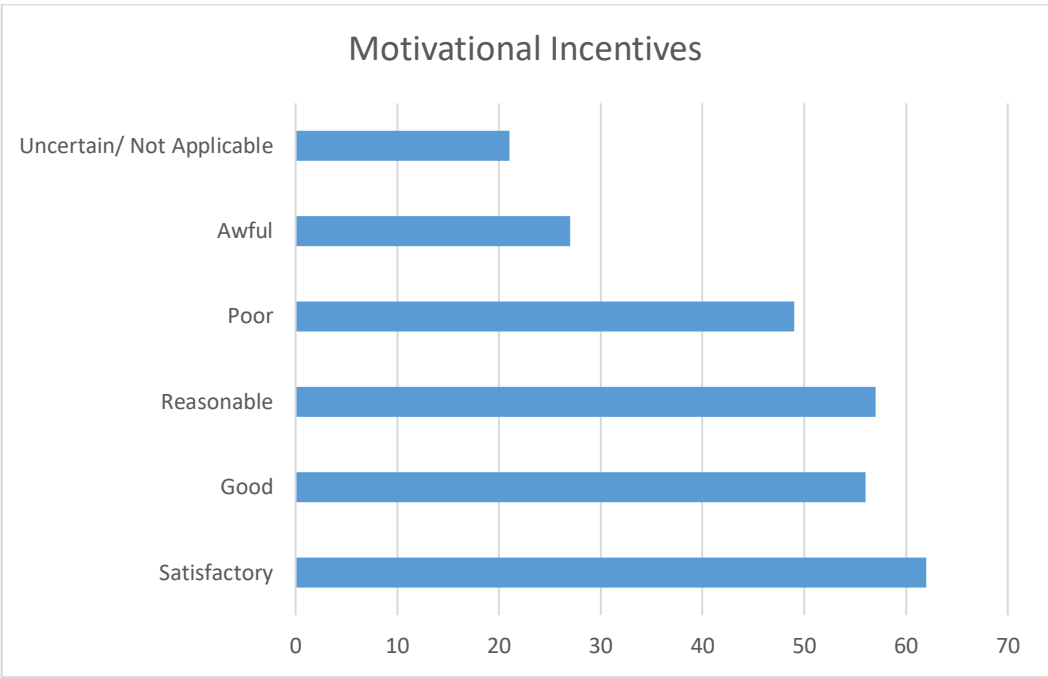


Figure 9 shows the rating of motivational incentives after BPR implementation. Due to the fact that employee involvement is an important factor in BPR success and motivational incentives can ensure satisfactory employee involvement in BPR implementation, rating of motivational incentives is substantial for the research. 3 participants did not answer this question. As can be seen from Figure 9, 22.8% of the respondents consider motivational incentives after implementation satisfactory where only 9.9% of the respondents think motivational incentives are awful. A more detailed look reveals that 64.3% of the participants do not have issues regarding motivational incentives (includes reasonable and better rating) where only 27.9% of the participants find motivational incentives not enough (includes awful and poor). The results of Figure 9 are discussed in Discussion section.

Figure 10: Drop in Performance During Implementation Distribution

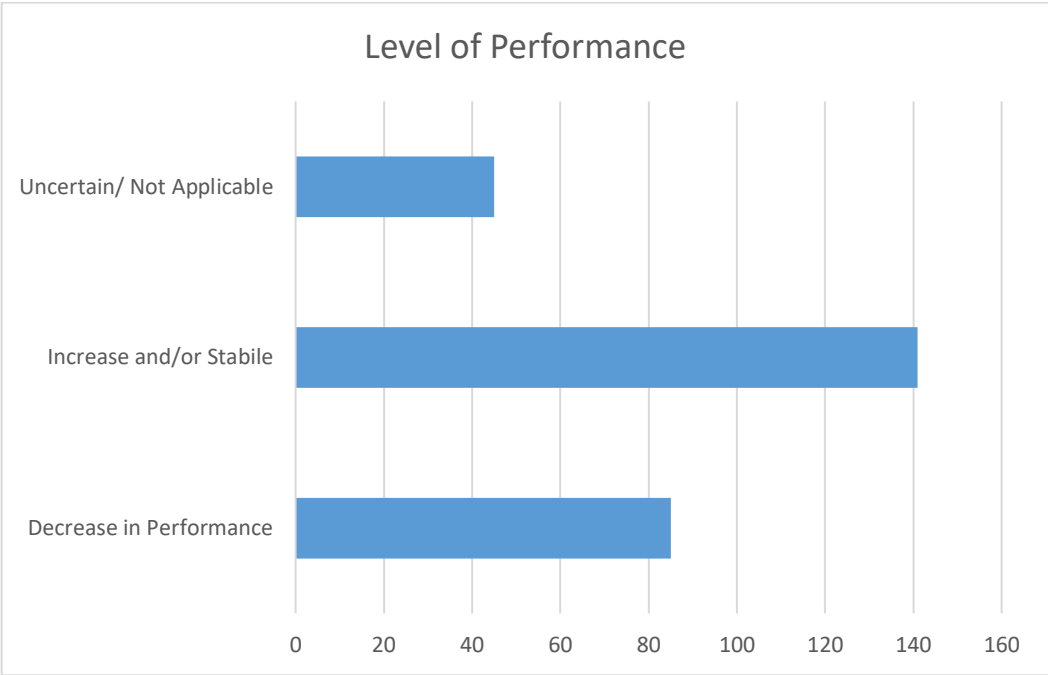
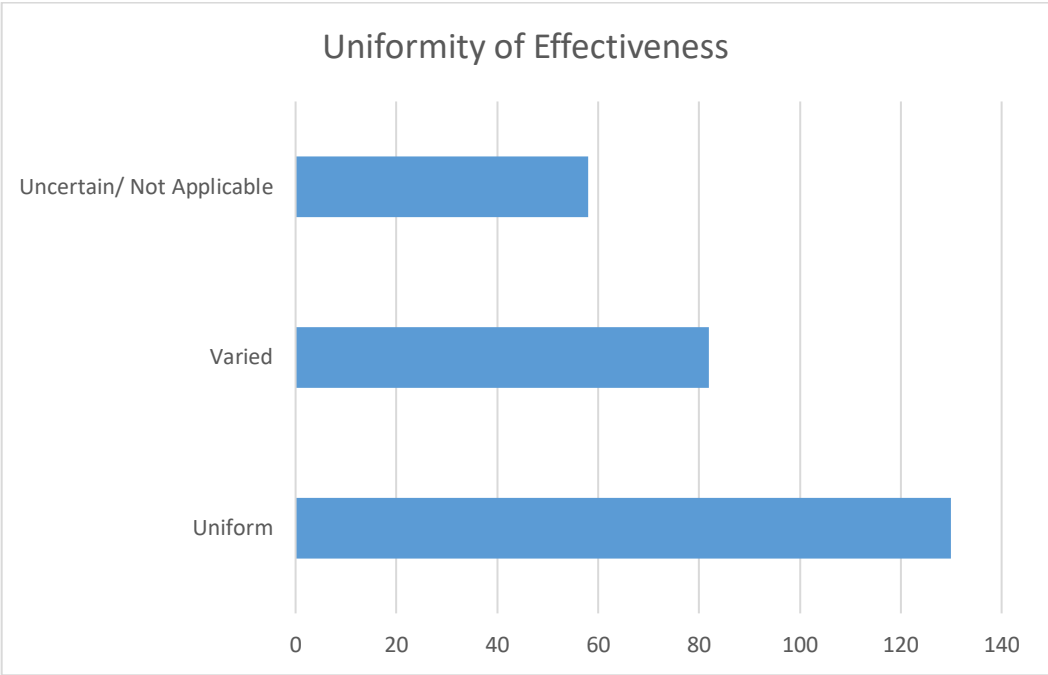


Figure 10 provides information regarding decrease in performance during BPR implementation. When radical changes happen in a workplace, decrease in performance is estimated. However, Figure 10 shows opposite percentages regarding drop in performance. First of all, 4 participants did not answer this question. Secondly, 16.6% of the respondents are not sure about whether they experienced decrease in performance during BPR implementation. As can be seen from the Figure 10, 31.4% of the respondents did not experience decrease in performance during BPR implementation where only 10, 52% of the respondents experienced drop in performance during mentioned process.

Figure 11: Uniformity of Implementation Effectiveness Distribution



Outcomes of BPR implementation may not be uniform within an organization. Figure 11 shows the uniformity of BPR implementation effectiveness among organizational activities. First of all, 5 participants did not answer this question. Secondly, 21.5% of the respondents do not have enough information regarding uniformity of implementation effectiveness. As can be seen from the Figure 11, 48.1% of the respondents believe that BPR implementation effectiveness was uniform within the organizational activities where only 30.4% of respondents define uniformity of effectiveness as varied.

4.2. Analyse of Measures

4.2.1. Descriptive Statistics

Kurtosis

Kurtosis quantifies whether the data distribution is flat and it is used to examine the level of flat of the data distribution. If the distribution is flat, it gets negative kurtosis where the mentioned distribution which is more peaked gets a positive kurtosis. Normal distribution has a kurtosis of 0. Kurtosis also shows the matches with Gaussian distribution which has a

kurtosis of 0. In this case, flatter distribution than a Gaussian distribution has a negative kurtosis where more peaked one has a positive value. Moreover, Kurtosis value does not have unit. Furthermore, Kurtosis statistics are highly dependent on the sample size. That is to say, small sample sizes can be misleading where more data increases the reliability regarding shape of the distribution (Shewhart and Deming, 1939). Fortunately, the sample size of this research is enough to calculate accurate Kurtosis values, thus flatness of the distributions can be quantified. As George and Mallery (2010) stated that if the Kurtosis value has a range between -2 and +2, it can be considered normal distribution.

Table 3 shows the survey's descriptive statistics regarding BPR implementation factors. As can be seen from Table 1, all the factors have negative kurtosis values which are between -2 and +2, therefore it can be said that the distribution is normal. When it comes to Table 2, it provides information regarding the survey's descriptive statistics about productivity factors at workplace. Furthermore, all the kurtosis values are negative and have a range between -2 and +2. Once again, there is a normal distribution at Table 4.

Skewness

Skewness is calculated to investigate a data distribution's symmetry or lack of symmetry. A distribution can be considered symmetric when its Skewness value is around 0. An asymmetrical distribution with a right tail has a positive value where the one with a left tail has a negative value. Moreover, Skewness does not have unit. As Cramer and Bryman (2011) stated that acceptable Skewness value has a range between -2 and +2. The further the value is away from zero, it is more likely that the distribution is far from symmetrical.

As can be seen from Table 3 and Table 4, all the skewness values are in range between -2 and +2 and mostly around 0. Therefore, it can be said that the relevant data distributions are symmetric.

Mean Value

Mean value is an arithmetic mean which is calculated to find out the average value of a data distribution (Cramer, 2011). This value provides information regarding the central tendency of statistical data. In this research, mean values are analysed in the next section in order to explore success and failure factors.

Descriptive Statistics	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Common vision among participants	263	3.29	0.119	0.150	-1.055	0.299
Openness to communication	256	3.50	-0.22	0.152	-1.173	0.303
Trust in colleagues	259	4.19	-0.501	0.151	-0.974	0.302
Taking participants' ideas into consideration	259	3.34	0.114	0.151	-1.042	0.302
Sufficient knowledge about the process	259	3.28	0.114	0.151	-1.413	0.302
Realistic expectations regarding outcomes	258	3.33	0.162	0.152	-1.481	0.302

Table 3: The survey's descriptive statistics regarding BPR implementation factors

Descriptive Statistics	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Empowering people	266	2.60	0.376	0.149	-1.222	0.298
Providing information	261	2.59	0.284	0.151	-0.650	0.300
Providing tools	262	3.33	-0.350	0.150	-0.600	0.300
Providing training	263	2.35	0.504	0.150	-1.007	0.299
Eliminating unnecessary paper work	263	4.13	-1.320	0.150	-0.338	0.299

Table 4: The survey's descriptive statistics regarding productivity factors at workplace

4.3. Data Analysis Method

4.3.1. Mean Score Ranking Technique

Mean score ranking technique is one of the most common ways to describe the central tendency with all data values (Saunders et al., 2016). 95% confidence interval is chosen in this research. In order to investigate success and failure factors of BPR implementation in Turkish construction sector, results of mean score ranking technique is used in this research. In this research, mean score is calculated for the frequency of the ratings in terms of success and failure factors.

Mean score is based on adding up the scores and dividing by the total number of scores, and it can be calculated for the relevant data by the given formula (Field, 2013):

$$\bar{x} = \frac{1}{N} \sum_{i=1}^N x_i$$

where:

n = total number of scores

\bar{x} = Mean score

x= Relevant scores

4.3.2. Pearson's Chi Square Test

Pearson's Chi Square test is used to test whether the variables are dependent (Saunders et al., 2016). That is to say, if two categorical variables are examined in terms of their relationship, Chi Square test can be used. The main idea of this test is based on frequency comparison to see whether they might occur by chance alone (Field, 2013). For example, 0.05 as a result means that there is 5% likelihood of the data occurring by chance, also it means that there is 95% likelihood of two variables could not occur by chance alone (Saunders et al., 2016).

Pearson's Chi Square test is used to explore research questions 1 and 2 which are BPR implementation success & failure factors and to what extent they differ in construction sector. In this regard, dependency is tested between relevant factors of BPR implementation and BPR implementation outcomes.

4.3.3. Cramer's V Test

Cramer's V test is used to test whether the variables are associated and it is suitable for examining categorical data type, also Cramer's V test measures the association within a scale where 0 means there is no association between selected variables and 1 means there is a strong association (Saunders et al., 2016).

In this research, Cramer's V test is used to measure the association between relevant success and failure factors of BPR and outcomes of BPR implementation in order to answer research questions 1 and 2.

4.4. Chapter Conclusion

In this chapter, summary of respondent statistics in terms of sector distribution, age distribution, employee number in department distribution, employee number in organization distribution, training for job role distribution and awareness of department goal and objectives is given. Furthermore, suitable data analyse techniques for the research are defined and explained. In this sense, the data collected from online questionnaire is analysed by various techniques, including mean score ranking technique, Pearson's Chi Square test and Cramer's V test. According to those information, research results and findings is stated in the next chapter.

5. Results and Findings

5.1. Hypothesis Testing

Part of the quantitative data comes from online questionnaire is analysed in order to answer research question 2 which is about to what extent success rate of BPR implementation differs in Turkish construction sector. In this sense, two different hypothesizes are given:

H1: There is a dependency and association between stakeholder communication and BPR implementation outcomes in Turkish construction projects

H2: There is a dependency and association between information flow among stakeholders and BPR implementation outcomes in Turkish construction projects

In order to test the hypothesis 1 and 2, Pearson's Chi Square test is used. Thus, the dependency between 2 variables is tested. Then, Cramer's V test shows the association between two variables. The key variables in those hypothesises are about stakeholder communication, diversity & complexity of information flow between stakeholders and BPR implementation outcomes. By this means, to what extent success and failure factors differ in construction projects in terms of stakeholder management is investigated.

5.1.1. Pearson's Chi Square Test

As part of the research, the main purpose of the Pearson's Chi Square test is to find out the relationship between variables in terms of dependency. Earlier analysis shows that there are 275 valid respondents in the sample without any missing data. Bearing in mind the assumptions of Pearson's Chi Square test, H1 and H2 are tested to show the dependency.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	50.800 ^a	12	.000
Likelihood Ratio	42.857	12	.000
N of Valid Cases	275		

Table 5: Results of Chi Square test regarding H1

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	62.043 ^a	12	.000
Likelihood Ratio	26.539	12	.009
N of Valid Cases	275		

Table 6: Results of Chi Square test regarding H2

As can be seen from Table 3 and 4, the result of Chi Square test regarding H1 and H2 are summed up:

H1: [$\chi^2 = 50.800^a$, df = 12, $p < 0.001$]

H2: [$\chi^2 = 62.043^a$, df = 12, $p < 0.001$]

The significance of .000 (Asymp. Sig. – two sided) shows that the probability of the relevant values occurring by chance alone is less than 0.001. Furthermore, the relevant variables are extremely unlikely to be independent. Therefore, the following statements can be made:

1. *There is a dependency between stakeholder communication and BPR implementation outcomes in Turkish construction projects*
2. *There is a dependency between information flow among stakeholders and BPR implementation outcomes in Turkish construction projects*

5.1.2. Cramer's V Test

With another approach, Cramer's V test investigates the relationship between variables in terms of association. According to earlier analysis results, the number of valid respondents are 275 without any missing data. H1 and H2 hypothesis are tested to show whether there is an association between variables.

		Value	Approx. Sig.
Nominal by	Phi	.430	.000
Nominal	Cramer's V	.304	.000
N of Valid Cases		275	

Table 7: Results of Cramer's V test regarding H1

		Value	Approx. Sig.
Nominal by	Phi	.475	.000
Nominal	Cramer's V	.336	.000
N of Valid Cases		275	

Table 8: Results of Cramer's V test regarding H2

As can be seen from Table 7 and 8, the results of Cramer's V test regarding H1 and H2 are summed up:

H1: [$V_c = 0.304$, $p < 0.001$]

H2: [$V_c = 0.336$, $p < 0.001$]

The Cramer's V value of .304 and .336, significant at the $<.001$ (Approx. Sig.) means that there is a positive association between relevant variables. Therefore, the following statements can be made:

1. *There is an association between stakeholder communication and BPR implementation outcomes in Turkish construction projects*
2. *There is an association between information flow among stakeholders and BPR implementation outcomes in Turkish construction projects*

Moreover, a more detailed look reveals that 42.4% of the participants, who find the stakeholders in construction projects hard to reach when it is necessary to do so, describe the outcomes of BPR implementation below the average satisfactory. In contrast, only 15.9% of the participants, who think it is not hard to get in touch with the stakeholders when it is necessary to do so, describe the outcomes of BPR implementation below the average

satisfactory (Appendix D). The difference between percentages is highly significant.

Lastly, 34.6% of the participants, who find the information flow among stakeholders diverse and/or complex, describe the outcomes of BPR implementation below the average satisfactory. In contrast, only 13.6% of the participants, who think the information flow among stakeholders is not diverse and/or complex, describe the outcomes of BPR implementation below the average satisfactory (Appendix D).

The success rate of BPR implementation is analysed within the frame of stakeholder. According to the given figures, there is a significant difference between the percentages of those describe outcomes of BPR implementation below the average satisfactory. Therefore, it can be said that stakeholder communication and information flow among stakeholders are associated and dependent with the BPR implementation outcomes to a great extent.

5.2. Mean Score Ranking Analysis

5.2.1. Issues in BPR Effort

Resistance to change Factors	Yes (%)	No (%)
Fear of losing authority	32	62.2
Fear of losing job	24	71.6
Scepticism about implementation outcomes	55.6	36
Feeling uncomfortable with new working environment	30.9	57.1

Table 9: Resistance to change Factors' Percentages

Table 9 provides information regarding resistance to change factors as percentage. As can be seen from Table 9, four factors regarding resistance to change is examined and it can be said that scepticism about project outcomes is the major failure factor with 55.6% among other factors. According to Table 9, majority of the participants had worries about BPR outcomes before implementation process. In contrast, minority of the participants experienced other failure factors with less than 50 per cent. A more detailed look at Table 9 reveals that fear factors regarding losing authority and losing job have the lowest percentages with 32 per cent and 24 percent respectively. Resistance to change factors' percentages provides information to sort the failure factors of BPR in terms of importance. Therefore, it can be said that scepticism about implementation outcomes play the most important role where fear factors regarding losing authority and losing job play the least important roles in the context of resistance to change.

5.2.2. Success Factors of BPR Implementation

Table 3 shows the mean scores of BPR implementation success factors. Furthermore, mean value varies between 1 (most important) and 6 (least important). As can be seen from Table 3, sufficient knowledge about BPR process has the lowest mean value with 3.28 which is followed by common vision with 3.29 mean value. Trust in colleagues has the highest mean value with 4.19 which means that it is the least important success factor in order to implement BPR successfully.

A more detailed look at Table 3 reveals that five success factors (sufficient knowledge about BPR, common vision, realistic expectations about outcomes, taking participants' idea into consideration and open communication) have relatively low and close values where trust in colleagues has relatively high value. It can be said that all those five factors play an important role in terms of successful BPR implementation.

Since one of the aims of BPR is to provide productive working environment in an organization, it is important to investigate productivity factors in order to understand and initiate BPR before implementation process. In this sense, Table 4 provides information regarding productivity factors at workplace. As can be seen from Table 4, providing relevant training has the lowest mean value with 2.35. Furthermore, providing information and empowering employees have relatively low mean values with 2.59 and 2.60 respectively. In contrast, providing necessary information and eliminating unnecessary paperwork have high mean scores with 3.33 and 4.13 respectively. Overall, it can be said that providing training plays the most important role where eliminating unnecessary paperwork plays the least important role in the context of productive working environment. Therefore, BPR aim and objectives should be defined according to actual needs of a workplace.

5.3. Chapter Conclusion

This chapter shows the results from online survey questionnaire in order to address the research questions. Firstly, the findings are analysed to test the association and dependency between stakeholder variable and BPR implementation outcomes by chi square test and Cramer's V test. According to results, Hypothesis 1 and Hypothesis 2 are tested which is related to research question 2, then association and dependency are confirmed. Thereafter, mean score analyse provides information regarding success and failure factors of BPR implementation which is related to research question 1. It is noteworthy that scepticism about project outcomes is the major resistance to change factor in the context of failure factors of BPR implementation. When it comes to success factors, sufficient knowledge about the process becomes the most important factor. In the next chapter, discussion will be provided according to the findings in chapter 4 and chapter 5.

6. Discussion

The purpose of this study is to identify and discuss the success and failure factors of BPR in Turkish construction sector and examine to what extent outcomes of BPR implementation differ in Turkish construction sector.

Changes and uncertainty in the construction projects create a dynamic working environment that differs the construction sector from others. The methodologies which are suitable for static working environment may not be appropriate for dynamic working environment such as construction project lifecycles. Furthermore, complexity of construction projects (such as involvement of various stakeholders) decreases the overall success rate. Therefore, an approach which reduces the construction projects' complexity becomes a necessity to deal with possible sources of uncertainty when the organizations require radical changes in order to achieve better results in terms of time, cost and quality. In this sense, to

examine success and failure factors of BPR and evaluating the outcomes of BPR in the construction sector is crucial.

6.1. Discussion of Identified Findings

First of all, hypothesis 1 and hypothesis 2 are developed based on literature review in order to explore the stakeholder involvements' and relevant information flow's impact on BPR outcomes in the context of research question 2. With the appropriate use of analysis methods, satisfactory evidence is obtained to confirm hypotheses. In this sense, hypotheses are given:

H1: There is a dependency and association between stakeholder communication and BPR implementation outcomes in Turkish construction projects

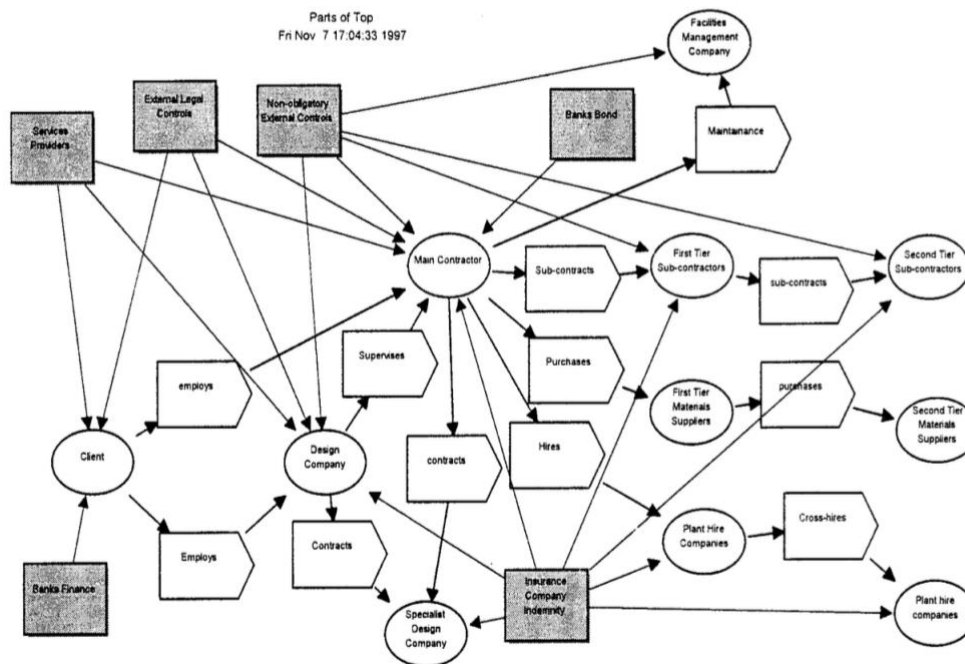
H2: There is a dependency and association between information flow among stakeholders and BPR implementation outcomes in Turkish construction projects

According to results of analysis techniques (Chi square and Cramer's V test) both of the hypotheses are accepted.

In the construction projects it can be said that there are three main stakeholders which are client, designer and contractor. Furthermore, those stakeholders are generally supported by internal/external consultants and subcontractors. Moreover, construction business consists of various business activities such as tendering, marketing, purchasing, contract management etc. In the circumstances, activity networks become complicated which decrease the success rate of the projects. As a basic model, each activity output is used as an input in order to complete the business activities circle. In other words, even a single business activity is associated with various stakeholders and large numbers of other business activities like a cobweb. Therefore, in order to get things done properly with

the limited project time and the limited budget, communication among stakeholders and relevant information flow play a substantial role in a construction project.

Figure 12: Activity Network of a construction project (Brown and Riley, 2000)



To implement BPR in a dynamic environment requires more effort than implementation in a static environment. According to literature review chapter, most of the cases are taken from static environment which differs the BPR outcomes as expected. In this sense, success and failure factors as well as implementation outcomes vary in the construction sector. As can be seen from Figure 12, even a single construction project requires many connections within the stakeholders and responsibilities are distributed among a large number of stakeholders. Complexity of construction projects makes the BPR implementation even harder. That is to say, BPR brings radical changes to an organization, consequently implementing those radical changes successfully in a complex activity network requires stakeholder collaboration up to hilt. At this point, as can be seen from

Hypothesis 1, communication level with stakeholders affect the BPR implementation outcomes. Moreover, according to online questionnaire findings, percentage of employees, who have difficulties to get in touch with stakeholders, is two times higher than those have no difficulty to get in touch with stakeholders in terms of finding the BPR outcomes inadequate (Appendix D). This information shows that inadequate communication level among stakeholders is negatively associated with BPR success rate.

Especially tendering process of a construction project consists of in a multitude of sub-processes, and this indicates the complexity of the organically grown process (Brown and Riley, 2000). Since one of the aims of BPR is to increase the profitability, tendering process takes an important part within the big picture. In order to get every tendering activity done to use them as outputs for the next input, information flow among concerned stakeholders has to be taken into consideration. A possible misunderstanding or lack of information regarding tendering process requires iterations which mean more workload as well as waste of time. The mentioned circumstances are valid in other high-level business processes such as contract management, purchasing etc. That is to say, tendering process is given as an example to show how complicate a construction project's processes can be. Therefore, as can be seen from Hypothesis 2, information flow among stakeholders affect the BPR implementation outcomes. Moreover, according to online questionnaire findings, percentage of employees, who have difficulties regarding information flow within stakeholders, is two times higher than those have no difficulty regarding information flow within stakeholders in terms of finding the BPR outcomes inadequate (Appendix D). This information shows that inadequate information flow among stakeholders is negatively associated with BPR success rate.

To sum up, Hypothesis 1 and Hypothesis 2 shows that if the main aim is to achieve successful BPR implementation in a construction organization, stakeholder variable plays an important role. Overall, due to unique nature of construction projects, BPR outcomes differ to a great extent.

Due to the unique nature of construction projects based on dynamic environment, success and failure factors may vary. Research question 1 developed based on the literature review in order to gather sufficient evidence to investigate success and failure factors of BPR in Turkish construction sector. Many BPR researches that have been done so far which are based on static environment. Therefore, this research shows investigate those factors in the dynamic environment. As Meng (2012) stated poor performance becomes a common issue in terms of cost, time and scope in the construction projects. For this reason, performance improvement is required to address those issues that arise from various pressures by its environment (Corfe, 2011). Those pressures may be connected to market share competition, globalisation, risk and uncertainty, therefore it can be said that there is a visible increase in the level of complexity in the context of construction processes (Gidado, 1996). At this point, BPR provides positive changes required by the nature of construction processes. In other respects, complexity makes things done regarding BPR implementation harder. Therefore, success and failure factors and/or level of their priorities differ in the construction sector. In this sense, distribution graphs in chapter 1 and mean score ranking analyse are used to investigate success and failure factors in construction sector.

It is important to increase productivity at the workplace in order to prevent cost and time overruns. For instance, after the economic crisis in automotive sector at the beginning of 1980, Ford Motor was affected negatively and started to cut back on various departments that include accounting department (Attaran, 2004). Before the layoff in the accounting department, there were 500 employees in that department and after 20% reduction in employees, at the end the employee number was still higher than the one that board of directors wanted, especially when it was compared with one of the biggest rival in the automotive sector (Attaran, 2004). Therefore, Ford investigated the sources of unproductiveness and implemented BPR, as a result number of employees decreased by 75% with more productive accounting department (Attaran, 2004). For this

reason, identifying productivity factors at the workplace provides better initiating phase of BPR; therefore, the whole process ends up meeting higher expectations.

The survey's descriptive statistics regarding productivity factors at workplace at the Table 4 provides necessary information to explore productive environment in a construction organization. In a dynamic working environment, employees are supposed to know how to get things done in order to obtain optimum number of iteration. Since every output becomes an input for another construction activity's output, unnecessary iterations may occur easily during these periods. Furthermore, to increase rate of output per input is possible with information that can be given by training. In this sense, providing training for employees increase the success rate of BPR. Empowering employees can be seen as a substantial productivity factor with the 2.6 mean value in a dynamic environment. Within a complex activity network, it is essential to give a certain degree of autonomy and responsibility to the skilled and experienced employees in order to reduce time and cost overruns. Redesigning organizational policies and structures as a part of BPR requires increased organizational responsiveness to possible issues regarding BPR implementation. A desired degree of employee commitment to BPR goals reduces resistance to change which seems the biggest obstacle in BPR implementation. However, coordination problems as a result of empowering employees should be taken into consideration in order to take necessary precaution for it.

When the case is about resistance to change, many forms of it can exist. The most important point is to understand the nature of resistance. Therefore, underlying reason of resistance to change has to be investigated to motivate the employees to participate in making the radical changes. Otherwise, BPR implementation may end up as a failure. Such an important failure factor should be highlighted. Blind spots and attitudes such as fear of losing job and/or authority usually trigger resistance to change. As Table 9 shows that scepticism about outcomes of BPR implementation is a

common resistance to change factor. After identifying the underlying reason of resistance to change, the next step is what to do about it. As can be seen in Table 4, providing information via relevant trainings are substantial and once employees feel more comfortable with the process, they stop being sceptical about the current process.

Especially when the initiating phase of the BPR is completed successfully, possible sources of uncertainty can be addressed with a better knowledge in the upcoming phases of BPR. At this point, Table 3 provides sufficient information to discuss success factors of BPR. That is to say, creating a common vision among the participants sustains an environment that is required for a successful initiating BPR phase. In order to achieve goal and objectives of BPR, common vision is supposed to show the way that goes to success. Undoubtedly that common vision should be adopted by all the participants of BPR. Otherwise, even part of the participants shows great effort during the process, common vision cannot be put into practice. Furthermore, common vision can be created and adopted by those who have sufficient knowledge about the process. Moreover, with the help of healthy communication among participants, realistic expectations about the outcomes of BPR are supposed to be determined. One of the conditions of determining realistic expectations is to take participants' ideas into consideration in a dynamic environment.

IT participates in almost every stages of BPR includes initiating phase. Especially, in a dynamic working environment, business information systems become more complex to be controlled. Providing information access and coordination within the complex business activities, which can be seen at Figure 12, requires powerful new design options and a relevant department can apply and support it. At this point, the roles that IT is responsible for become the major success factor of BPR. As can be seen from Figure 7, IT takes responsibility for mainly knowledge management and informational. That is to say, sharing databases and making relevant information available for BPR with the expert systems make IT department a major enabler of the BPR which is crucial for BPR success. With the help

of IT regarding knowledge management and informational area, uniform effectiveness of BPR implementation can be obtained which can be seen at Figure 11.

In the context of productivity and commitment regarding BPR, motivational incentives are the key drivers of employee engagement in the dynamic working environment. Monetary and non-monetary incentives satisfy the employees by rewarding system which can be financial as well as non-financial. In this way, participation in BPR implementation can be increased to desired level. Therefore, when it comes to implementing BPR in a dynamic environment, role of motivational incentives should be taken into consideration. As can be seen from Figure 9, 64.3% of the respondents are happy with the level of motivational incentives, and of course it affects the level of commitment to a great extent. On the other hand, when it is about radical changes in a dynamic environment, drop in performance is expected during the implementation. However, as can be seen from Figure 10, majority of the respondents did not experience drop in performance during the implementation stage that shows how the proper steps were taken regarding performance effectiveness and productivity.

Furthermore, adequate project management is essential when it comes to executing BPR project in a dynamic environment. That is to say, lack of adequate execution throughout the BPR phases can be considered one of the major reason of failure in BPR projects. Therefore, the use of proper methodology and software systems are essential. In this sense, those projects are supposed to be supported by experienced and skilled external consultants. Moreover, one of the highlighted points should be the consultant's methodology regarding execution of the BPR project. However, it is important to keep in mind that deploying external consultant differs according to many variables such as the type of the project, aim & objectives, and most importantly scope of the BPR implementation. As can be seen from Figure 8, percentages of external consultant involvement are so close to each other that there is only 2.2 percent difference between those involved external consultant and those did not involve external

consultant. Because of the given reasons, it can be said that involvement of external consultant in a BPR project increase the rate of success of a BPR project in dynamic and complex environment.

6.2. Chapter Conclusion

This chapter presents the discussion based on findings from the distributions and several analyses. At first, research question 2 is discussed based on Hypothesis 1 and Hypothesis 2 according to Pearson's Chi Square test and Cramer's V test results. Secondly, research question 1 is discussed according to distributions in Chapter 4 and mean value analysis in Chapter 5. In the next chapter, the research conclusion and recommendation are provided with the limitation, implications and future research.

7. Conclusion and Recommendation

7.1. Limitation

Since all studies have limitations, there are limitations in this research as well. The first limitation is the low representative likelihood ratio due to the purposive sampling technique. Due to the fact that there is no specific number of population in the research, the sampling frame cannot be specified. The sampling technique adopted is the limitation of the study. However, representative likelihood ratio differs depending on researcher's choices. In this sense, necessary precautions are taken which are explained in the Methodology chapter.

Secondly, although participants of online questionnaire are from 59 different departments with 81 different job titles which include majority of the departments in construction sector, distribution of job titles are not completely uniform. For instance, 14.9% of the participants are civil engineers and 12% of the participants are site engineers where only 1.1%

of the participants are project managers. Therefore, the mentioned factor affects the results being representative.

7.2. Implications

This study provides not only technical information regarding success and failure factors of BPR, but also states practical knowledge for the project managers in the sectors that have dynamic environment. By taking these findings into account, project managers can execute BPR projects successfully in the construction sector as well as in other dynamic environments. Due to globalization and increasing competition in the global market, organizations need various changes in order to increase their market share as well as meeting customer expectations. Day by day, firms lose their market share due to not keeping up with innovations. Therefore, project managers are supposed to improve themselves according to up to date researches based on different working environments in the context of BPR implementation.

This study highlights success and failure factors of BPR and to what extent they differ in construction sector. But the findings can be used for other sectors that have dynamic and complex activity networks as well as complex information flow among stakeholders. Thus, the research can prevent sources of uncertainty at any stage of BPR in the dynamic environment. Especially the findings regarding stakeholder provide sufficient information for project managers in the area of stakeholder management.

Last but not the least, human aspects of BPR should be taken into consideration in practice which is widely discussed in the Discussion section of the research. The findings can be used as a guidance regarding how to make employees support BPR and the human challenges in BPR. In this sense, project teams can develop new processes instead of using the traditional process with the help of the findings in this research in order to prevent resistance to change regarding BPR. Therefore, it can be said

that the research can make project management teams think innovatively especially in the private sector when the variation of success and failure factors in the research is noticed and it is realized that they differ depending on the environmental factors.

7.3. Future Research

This research mainly focuses on private sector in the context of BPR. Therefore, there are several areas that can be investigated in the future research. Firstly, BPR implementation in public sector can be investigated to find out to what extent success and failure factors differ in dynamic environment that has complex activity network. Moreover, there are various private sectors that have dynamic environment except construction sector. For this reason, the future research can focus on different sectors and with the participants come from various backgrounds to investigate BPR in the dynamic environment.

Furthermore, Hofstede's cultural dimensions can be used to investigate cross-cultural communication in the BPR stages in order to analyse human aspect of the process. In this way, BPR implementation process in different countries can provide sufficient information for the literature. Moreover, more collectivistic cultures and individualistic cultures can be examined in terms of the level of BPR project commitment. In spite of the fact that there are many studies about the impacts of collectivistic cultures and individualistic cultures on projects, BPR-orientated studies regarding mentioned cultures can be highly useful.

7.4. Conclusion

Up to the present, many researches on BPR have been conducted in different countries and resulted in a variety of list of success and failure factors to obtain better BPR outcomes.

In this research, dynamic and complex environment is investigated due to the nature of construction industry in the context of BPR implementation. In this sense, online survey questionnaire was conducted with 275 participants (number of participants who completed the survey) who involve in BPR projects in Turkish construction sector. With proven results of stakeholder communication and information flow among stakeholders being dependent and associated with BPR implementation outcomes in Turkish construction projects, it was deduced that in order to get things done properly with the limited project time and the limited budget, communication among stakeholders and relevant information flow play a substantial role in BPR projects in dynamic and complex environment. These theoretical standings combined with difficulty level of information flow among stakeholders and stakeholder communication based on results of online survey questionnaire in construction sector, consequently it is found that BPR outcomes differ to a great extent in a dynamic environment.

Moreover, according to the findings with the help of mean score ranking analysis, it was deduced that success and failure factors vary in the construction sector due to the unique nature of construction projects based on dynamic environment. In addition to this, the role of information technology in BPR and the human aspects of BPR were analysed and discussed in a wide range.

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APPENDICES

Appendix A: Survey questionnaire

BUSINESS PROCESS REENGINEERING QUESTIONNAIRE

As part of the research, I am interested in your opinions as these will help me to complete my dissertation. All information will be kept confidential. Any concerns can be communicated to (yp3g15@soton.ac.uk). Thank you for your time and cooperation.

PART 1

Please write the answer under the question briefly

1. What is your official job title?

2. What department are you are working in currently?

Please tick ✓ the appropriate box

3. Which sector do you work or used to work in?

- Private Sector
- Public Sector
- Other

4. Your age:

- 17 or less
- 18-25
- 26-30
- 31-35
- 36-40
- 41-45
- 46-50
- 51-60
- 61 or more

5. How many employees are there in your department?

- 10 or less
- 11-20
- 21-50
- 51-100
- 100 or more
- I am not sure

6. How many employees are there in your organization?

- 10 or less
- 11-20
- 21-50
- 51-100
- 100 or more
- I am not sure

PART 2

Please tick ✓ the appropriate box

7. Did you have training for your official job role, as well as responsibilities?

- Yes
- No

8. Are you aware of the goal and objectives of the department?

- Yes
- No

9. Have you been given any roles which are not related to your job title?

- Yes
- No

10. Do you find stakeholders in a construction project (such as client, designer or contractor) hard to reach when it is necessary to do so?

- Yes
- No

11. Do you consider information flow between stakeholders in a construction project diverse and/or complex?

- Yes
- No

You can tick ✓ more than one appropriate box in the Question 13

12. What were the major motives for radical changes in your organization?

- Improving efficiency
- Customer service improvement
- Cost reduction
- To increase profitability
- To increase the size of contracts undertaken by the organization
- To decrease the necessary effort in the tendering process
- To decrease the necessary effort to produce documentation
- Other
- I don't know

Please tick ✓ the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
13. My job is often checked by a superior or a manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. My job role is clearly stated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I spend much more time dealing with internal stakeholders (e.g. colleague) than external stakeholders (e.g. customer)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. In general there is a necessity of reengineering in my department in order to increase productivity and efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
17. Before implementation, objectives were defined clearly and I was informed about them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Before implementation, I was aware of what to achieve and how to achieve about process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Before implementation, pilot study for radical change process has been conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The scope of organizational change has been estimated before implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Resource requirement needs have been estimated before implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. I was given training about the implementation process					
23. There was redeployment of IT department during the implementation					

- 24. Some changes have been occurred in the reward system during implementation
- 25. When something went wrong during implementation, modifications have been made immediately
- 26. After implementation, process has been evaluated and monitored

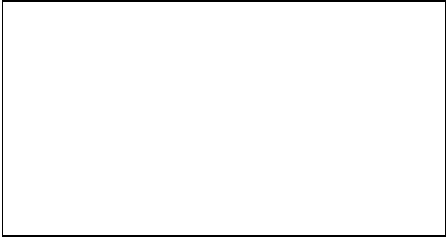
27. What role did IT (Information Technology) play in organizational radical changes?

- a) Knowledge Management
- b) Informational
- c) Analytical
- d) Transactional
- e) Other
- f) I am not sure

28. When there was an organizational radical change, did your organization hire external consultant for it?

- Yes
- No
- I am not sure

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
29. Financial resources and adequate human capital were enough to implement radical changes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. There was experienced IT expertise in the firm to take part in radical changes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Participants in this process fully supported the radical changes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. There was sufficient cooperation between cross-functional teams during implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Lack of vision affected implementation negatively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. IT infrastructure was adequate in the organization in order to perform implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Place the most important item as (1), the following as (2) and so on

35. Place the factors listed below in order of importance to you in implementing the radical changes at the workplace

- a) Common vision among participants
- b) Openness to communication
- c) Trust in colleagues
- d) Taking participants' ideas into consideration
- e) Sufficient knowledge about the process
- g) Realistic expectations of the implementation outcomes

36. Place the factors listed below in order of importance that encourages you to participate in radical change process

- a) New reward system
- b) Employee empowerment
- c) Sufficient performance measurement
- d) Confidence and trust among participants

PART 3

Please tick ✓ the appropriate box

37. Did you worry about losing your authority in the workplace when you heard the radical changes were going to happen?

- Yes
- No

38. Did you worry about losing your job when you heard the radical changes were going to happen?

- Yes
- No

39. Were you skeptical about successful implementation process when you heard the radical changes were going to happen?

- Yes
- No

40. Did you feel uncomfortable with new working environment after implementation?

- Yes
- No

41. How would you best describe the motivational incentives which is related to after the implementation?

- Satisfactory
- Good
- Reasonable
- Poor
- Awful
- I did not have any motivational incentives

Place the most important item as (1), the following as (2) and so on

42. Place the factors listed below in order of importance to you in increasing productivity at the workplace

- a) Empowering people
- b) Providing information
- c) Providing tools
- d) Providing training
- e) Eliminating unnecessary paper work

PART 4

Please tick ✓ the appropriate box

43. How would you best describe the results of the implementation?

- Satisfactory
- Good
- Reasonable
- Poor
- Awful
- I am not sure

44. Did you experience a drop in performance during the implementation?

- Yes
- No

45. As far as you experienced, was the effectiveness of implementation uniform within all the organizational activities?

- Yes
- No

46. To what extent there was decrease in your department activity cost after implementation of the change?

- a) less than 10%
- b) 11 to 20%
- c) 21 to 30%
- d) 31 to 40%
- e) 41 to 50%
- f) more than 50%

47. As far as you know, to what extent the revenue of the organization increased after the implementation?

- a) less than 10%
- b) 11 to 20%
- c) 21 to 30%
- d) 31 to 40%
- e) 41 to 50%
- f) more than 50%

48. To what extent numbers of customer increased in your organization after the implementation?

- a) less than 10%
- b) 11 to 20%
- c) 21 to 30%
- d) 31 to 40%
- e) more than 40%
- f) other

49. Have you got any performance related bonus and/or increase in your salary after the implementation?

- Yes
- No

50. How do you describe the change of your workload after the implementation?

- a) My workload increased
- b) My workload decreased
- c) Nothing changed
- d) Other

51. Have your annual working hours been increased after the implementation?

- Yes
- No

Thank you for your time to complete the questionnaire. If you have any further comments please feel free to contact me by (vp3g15@soton.ac.uk).

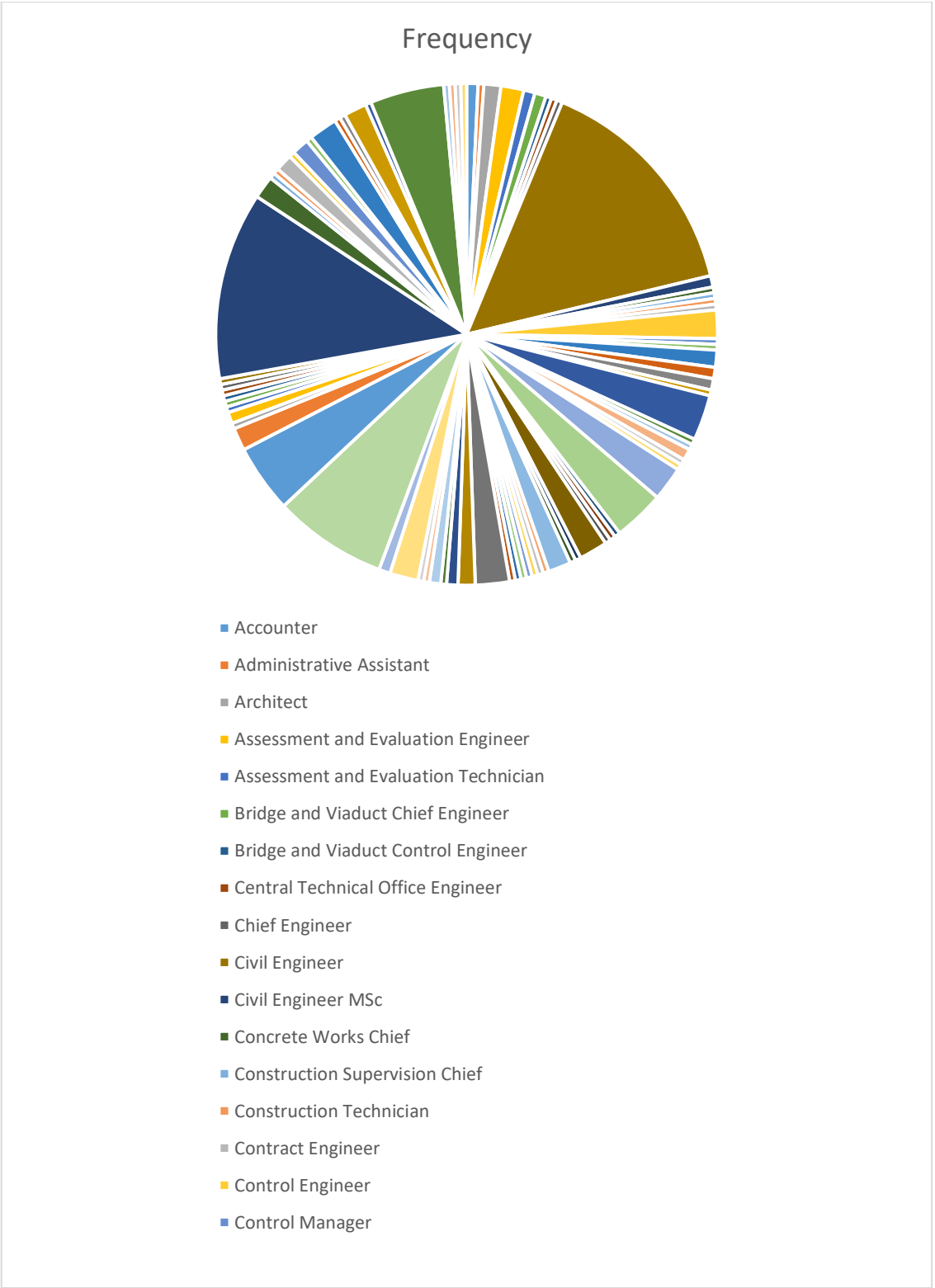
Appendix B: Frequency Table of Job Titles by SPSS

Job Title	Frequency	Percent
Accounter	2	0.7
Administrative Assistant	1	0.4
Architect	3	1.1
Assessment and Evaluation Engineer	4	1.5
Assessment and Evaluation Technician	2	0.7
Bridge and Viaduct Chief Engineer	2	0.7
Bridge and Viaduct Control Engineer	1	0.4
Central Technical Office Engineer	1	0.4
Chief Engineer	1	0.4
Civil Engineer	41	14.9
Civil Engineer MSc	2	0.7
Concrete Works Chief	1	0.4
Construction Supervision Chief	1	0.4
Construction Technician	1	0.4
Contract Engineer	1	0.4
Control Engineer	5	1.8
Control Manager	1	0.4
Control Section Manager	1	0.4
Craft	3	1.1
Deputy Project Manager	2	0.7
Earth Works Engineer	2	0.7
Earth Works Control Chief	1	0.4
Earth Works Control Engineer	8	2.9
Electric Group Chief	1	0.4
Electronic Systems (Scada) Engineer	1	0.4
Engineer	2	0.7
Engineering Structures Chief	1	0.4
Engineering Structures Chief Engineer	1	0.4
Engineering Structures Control Engineer	6	2.2
Engineering Structures Engineer	9	3.3
Engineering Structures Section Manager	1	0.4
Engineering Structures Technician	1	0.4
Expert	1	0.4
Final Account Engineer	5	1.8
Final Account, Allowance and Documentation Chief Engineer	1	0.4
General Director	1	0.4
Geological Engineer	4	1.5
Highway Control Section Manager	1	0.4

Highway Section Chief Engineer	1	0.4
Highway Section Manager	1	0.4
Intern	1	0.4
Map and Cadastre Technician	1	0.4
Programming Technician	1	0.4
Project Engineer	6	2.2
Project Manager	3	1.1
Project Monitoring Engineer	2	0.7
Project Section Manager	1	0.4
Project Survey Manager	2	0.7
Quality Control and Research Engineer	1	0.4
Quality Control Chief	1	0.4
Quality Control Chief Engineer	5	1.8
Quality Control Craft	2	0.7
Quality Control Engineer	20	7.3
Quality Control Technician	12	4.4
Research Technician	4	1.5
Researcher	1	0.4
Retired from Public Sector	2	0.7
Road Construction Chief	1	0.4
Road Construction Chief Engineer	1	0.4
Road Maintenance Engineer	1	0.4
Runway Superstructure Section Manager	1	0.4
Section Chief	1	0.4
Site Director	1	0.4
Site Engineer	33	12
Site Manager	4	1.5
Site Section Manager	1	0.4
Strategy Chief Engineer	1	0.4
Superstructure Engineer	3	1.1
Superstructure Chief	1	0.4
Superstructure Control Engineer	3	1.1
Superstructure Engineer	1	0.4
Survey Engineer	5	1.8
Tax Assessor	1	0.4
Technical Office Chief	1	0.4
Technical Office Engineer	4	1.5
Technical Office Manager	1	0.4
Technician	13	4.7
Tendering Engineer	1	0.4
Topographer	1	0.4
V.H.K.I	1	0.4

Vice General Director	1	0.4
Total	275	100

Pie of Job Titles

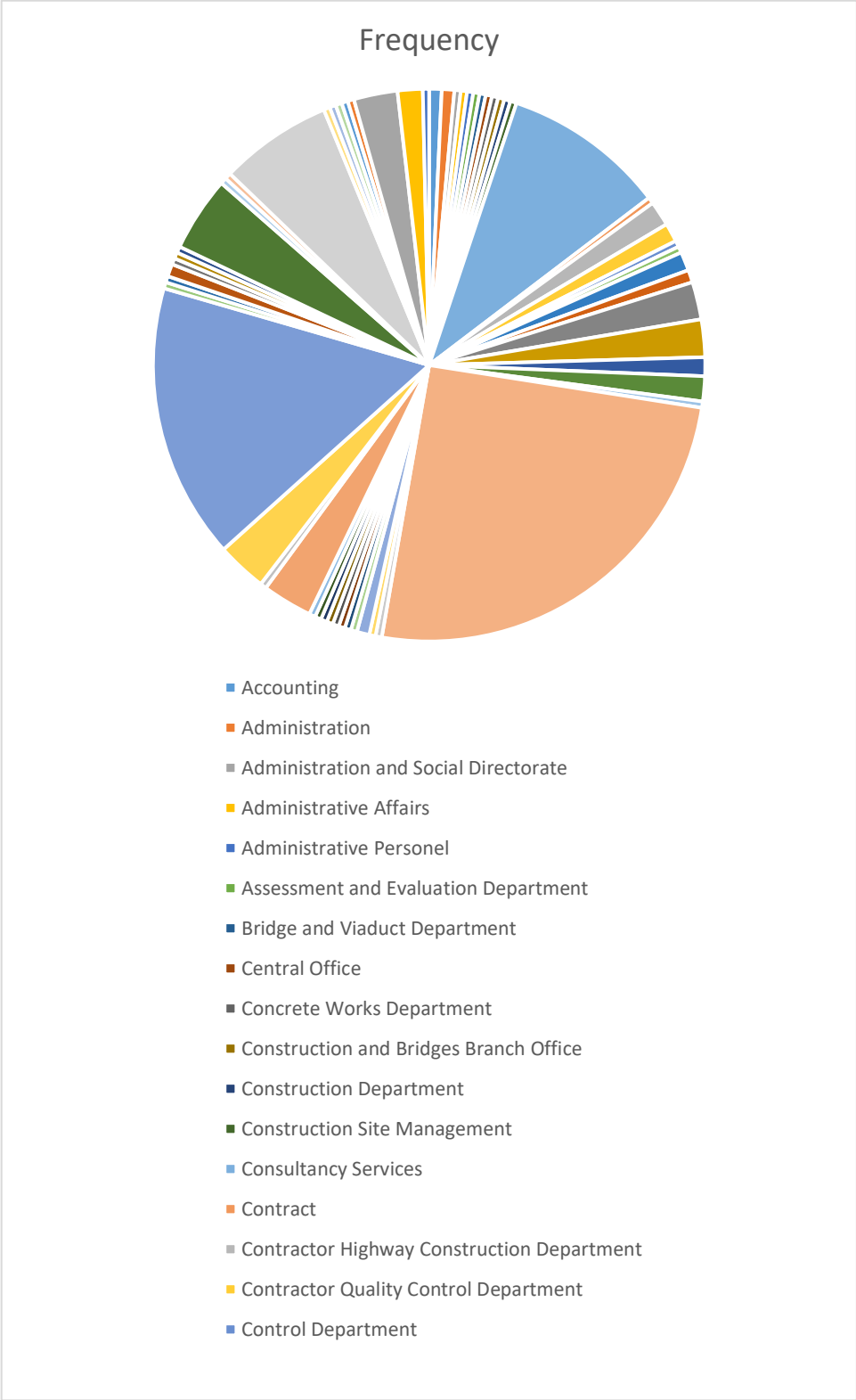


Appendix C: Frequency Table of Departments by SPSS

Name	Frequency	Percent
Accounting	2	0.7
Administration	2	0.7
Administration and Social Directorate	1	0.4
Administrative Affairs	1	0.4
Administrative Personnel	1	0.4
Assessment and Evaluation Department	1	0.4
Bridge and Viaduct Department	1	0.4
Central Office	1	0.4
Concrete Works Department	1	0.4
Construction and Bridges Branch Office	1	0.4
Construction Department	1	0.4
Construction Site Management	1	0.4
Consultancy Services	26	9.5
Contract	1	0.4
Contractor Highway Construction Department	4	1.5
Contractor Quality Control Department	3	1.1
Control Department	1	0.4
Control Services	1	0.4
Design	3	1.1
Earth Works Control Department	2	0.7
Earth Works Department	6	2.2
Engineering Structures Department	6	2.2
Engineering Structures Subcontracter	3	1.1
Final Account Department	4	1.5
Geotechnical Department	1	0.4
Highway Construction Department	69	25.1
Highway Management Consultancy	1	0.4
Human Resources	1	0.4
Laboratory	2	0.7
Monitoring Department	1	0.4
Occupational Health and Safety Office	1	0.4
Planning	1	0.4
Planning and Control	1	0.4

Product Department	1	0.4
Production Control Department	1	0.4
Production Department	1	0.4
Project Department	8	2.9
Project Monitoring Department	1	0.4
Project Surveying Department	8	2.9
Quality Control	44	16
Quality Control Consultancy Services	1	0.4
Quality Control Regional Directorate	1	0.4
Quantification Department	2	0.7
Regional Directorate	1	0.4
Research and Development (R&D)	1	0.4
Research Department	1	0.4
Road Construction Department	12	4.4
Road Maintenance Department	1	0.4
Sales Department	1	0.4
Site	18	6.5
Software Department	1	0.4
Strategy Regional Directorate	1	0.4
Superstructure Department	1	0.4
Survey Department	1	0.4
Tax Office	1	0.4
Technical Office	7	2.5
Tendering	4	1.5
Transportation Project Department	1	0.4
Total	275	100

Pie of Departments



Appendix D: Frequency and Crosstab Tables regarding stakeholders by SPSS

Frequency Table regarding whether stakeholder communication is challenging:

	Frequency	Percent
Valid		5
No	145	52.7
Yes	125	45.5
Total	275	100

Crosstab Table regarding whether stakeholder communication is challenging:

	Awful	Good	Poor	Reasonable	Satisfactory	Uncertain/ not Applicable	Total
	0	1	1	0	1	1	5
No	12	33	19	29	28	23	145
Yes	31	23	34	19	5	12	125
Total	43	57	54	48	34	36	275

Crosstab Table regarding whether information flow among stakeholders is complex:

		Awful	Good	Poor	Reasonable	Satisfactory	Uncertain/ not Applicable	Total
INFORMATION_FLOW		1	0	0	1	0	0	2
	No	1	7	19	11	19	13	88
	Yes	1	36	38	42	29	21	185
Total		3	43	57	54	48	34	275

Appendix E: List of Organizations participated in the online questionnaire

Table of organizations in which the only survey was conducted:

Name of Organization	Brief Organizational Profile	References
IGA Joint Venture	The consortium was founded for the construction and operation of Istanbul new Airport, when they won the bid for the project. There are five investors within IGA consortium	IGA, 2016
Seza Engineering Company	The company was founded in 1974. It has several projects in infrastructure foundations and bridges	Seza, 2016
Tekfen Construction and Installation Co., Inc.	The organization was founded in 1956. It is an international contractor with many projects in, Africa, Central Asia and Central Europe.	Tekfen, 2016
Nurol Construction and Trading Inc.	The company was founded in 60's. It is part of Nurol Group which has forty operating companies	Nurol, 2016
Göçay Construction Contracting & Trade Co., Inc.	It was founded in 1979 and has projects in highways & motorways	Göçay, 2016
Makyol Construction	One of the leading contractor firm of Turkey. It is part of Makyol Group	Makyol, 2016
Özaltın Construction	It was founded in 1965. The company especially has important projects in dam construction	Özaltın, 2016
Yüksel Proje	The largest engineering and consultancy firm of Turkey	Yüksel Proje, 2016
Okur Construction	It was founded in 1997. The company has project in only construction sector	Okur, 2016
Onur Construction	It was founded in 1996. The company has projects in real estate	Onur, 2016

General Directorate of Highways	The state agency that is responsible for all the public roadways outside of the centres of towns	KGM, 2016
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Organizations within the Joint Venture IGA:

Name of Organization	Brief Organizational Profile	References
Cengiz Construction	One of the biggest construction companies of Turkey. The value of completed projects by Cengiz is approximately 3.65 billion USD	Cengiz, 2016
Mapa Construction	Part of MNG group of companies. The construction part of the group has completed projects with a value of 5.55 billion USD	Mapa, 2016
Limak Construction	Part of Limak Holding. Limak Construction has completed many projects with a value of over 6 billion USD	Limak, 2016
Kolin Construction	Part of Kolin group of companies. The company completed projects by 37 years of experience	Kolin, 2016
Kalyon Construction	The company was founded in 1974 and has many completed projects over the world	Kalyon, 2016

I declare that this dissertation is my own work, and that where material is obtained from published or unpublished works, this has been fully acknowledged in the references.

Yetkin PEKER

