



**EXAMINATION OF PROJECT MANAGEMENT METHODOLOGY:  
FACTORS AFFECTING THE SUCCESS OF PROJECT FIRMS IN THE  
CONSTRUCTION SECTOR**

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## ÖZET

### **Proje Yönetim Metodolojisinin İncelenmesi: İnşaat Sektöründe Proje Firmalarının Başarısını Etkileyen Faktörler**

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İnşaat sektörü yarattığı katma değer ve istihdam olanaklarıyla ülke ekonomileri için büyük bir öneme sahiptir ve dünya üzerindeki ekonomik faaliyetlerin başında gelen sektörlerden biridir. Günümüzde rekabetin artarak uluslararası hale geldiği inşaat sektöründe, Proje Yönetiminin profesyonel ve etkin kullanımı projelerde küresel olarak değer yaratmaktadır ve inşaat sektöründe varlığın sürdürülebilirliğinde önemli bir katkı sağlamaktadır. Bir inşaat projesi başlangıcından projenin tamamlanmasına kadar geçen tüm süreçlerde yoğun bir iş kapasitesine sahiptir. Her geçen gün gelişmekte olan inşaat sektöründe, karmaşıklaşan projelerin daha kapsamlı ve kompleks bir yapıya sahip olmasıyla proje yönetimi gün geçtikçe zorlaşmaktadır. Sektördeki rekabetçi ortam, firmaların eş zamanlı olarak birçok projeyi aynı anda yürütmelerini gerektirmektedir. Bunun için de iyi bir planlama yapmak gerekmektedir. Proje yönetimi, inşaat projesinin yürütülmesi sırasında ortaya çıkacak tüm bu risklere ve sorunlara karşı projenin belirlenen hedefler doğrultusunda gerçekleşmesini sağlamakta yardımcı olmaktadır. Proje yönetimi metodolojisinin etkin kullanımı projelerde süre, maliyet ve kalite performansları açısından başarı sağlamaktadır. Kaynakları israf etmeden kurumsal yetenekleri ürün, hizmet ve sonuçlara dönüştürebilmek profesyonel proje yönetim ile mümkün olmaktadır.

Şirketlerin başarıya ulaşması doğru ve gerçekçi vizyonların belirlenmesine, belirlenen vizyonların strateji ve hedeflere dönüştürülmesine bağlı olduğu gibi; hedeflerin projelere dönüştürülmesi, projelerin de bilimsel veriler ışığında çağın gerektirdiği profesyonellik anlayışına uygun olarak yürütülmesine de bağlıdır. Proje yönetim süreçlerinin ve tekniklerinin kullanılması proje amaç ve hedeflerinin gerçekleştirilmesinde sağlam bir temel oluşturmaktadır. Kurumsal Proje Yönetimi güncel eğilimlerle uyumlu, planlı ve organize bir metodolojiye dönüştürülebildiğinde projeleri verimli sonuçlara götürmektedir. İnşaat sürecinin karmaşıklığı ve farklı proje paydaşlarının senkronize olarak çalışma gerekliliği göz önünde bulundurulduğunda bir projenin başarılı olması için birçok faktörün dikkatle irdelenmesi gerekmektedir. Bu çalışmada inşaat sektöründeki proje firmalarının uyguladıkları Proje Yönetim Metodolojisi üzerine detaylı bir çalışma yapılmıştır. Ayrıca Proje Yönetim Kriterlerinin inşaat sektöründeki proje firmalarının başarısına etkisi de incelenmiştir.

**Anahtar Kelimeler:** Project Yönetimi Metodolojisi, Proje Yönetimi, Proje Başarısı, İnşaat Sektörü

## **ABSTRACT**

### **EXAMINATION OF PROJECT MANAGEMENT METHODOLOGY: FACTORS AFFECTING THE SUCCESS OF PROJECT FIRMS IN THE CONSTRUCTION SECTOR**

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The construction sector is of great importance for the economies of countries around the world thanks to the added value and employment opportunities it provides, and it is one of the leading sectors for the economic activities in the world. Today, in the construction sector, in which the increasing competition has reached to international levels, the professional and effective use of Project Management ensures value to be gained in the global projects, and it makes a significant contribution to the sustainability of the presence in the construction sector. A construction project has an intense work capacity in all processes starting from the beginning to the completion of the project. Project management is becoming more difficult by the time, since the projects getting more complex in the construction sector that is progressing day by day, have a more comprehensive and complex structure. The competitive environment in the industry requires companies to carry out many projects simultaneously. Thus, making a good plan becomes a major necessity. Project management helps ensuring the realization of the project in line with the determined goals against all these risks and problems that may arise during the execution of the construction project. Effective use of project management methodologies provides success in terms of time, cost and quality performances in projects. Turning corporate talents into products, services and

results without wasting any resource is only possible through a professional project management.

The success of companies depends both on the determination of correct and realistic visions, the transformation of the determined visions into strategies and goals, and the transformation of the goals into projects and the execution of the projects in accordance with the professionalism required by the age in the light of scientific data. The use of project management processes and techniques constitutes a solid baseline in the realization of project goals and objectives. When Corporate Project Management can be transformed into a planned and organized methodology that is compatible with current trends, it leads projects to productive results. Given the complexity of the construction process and the need for different project stakeholders to work in sync, many factors should be carefully examined for a project to be successful. In this study, a detailed analysis has been made on the Project Management Methodology applied by the project companies in the construction sector. Besides, the effect of Project Management Criteria on the success of project companies in the construction sector has also been examined.

**Keywords:** Project Management Methodology, Project Management, Project Success, Construction Industry

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## **DEDICATION**

*This thesis is dedicated to my family who encouraged me to pursue my dreams and finish my thesis.*



## TABLE OF CONTENTS

TO THE GRADUATE SCHOOL OF SOCIAL SCIENCES ECONOMICS AND ADMINISTRATION SCIENCES OF ÇANKAYA UNIVERSITY .....	iii
ÖZET .....	iv
ABSTRACT.....	vi
ACKNOWLEDGMENTS .....	viii
DEDICATION.....	ix
TABLE OF CONTENTS.....	x
LIST OF TABLES.....	xiii
LIST OF FIGURES .....	xiv
LIST OF GRAPHS .....	xv
LIST OF ABBREVIATIONS.....	xvi
CHAPTER I INTRODUCTION.....	1
1.1.    PROBLEM STATEMENT .....	2
1.2.    OBJECTIVE OF THE STUDY.....	3
CHAPTER II LITERATURE REVIEW.....	5
2.1.    THE PROJECT MANAGEMENT FRAMEWORK .....	5
2.1.1.    The History of the Project Management .....	11
2.1.2.    The Project Management Process Groups .....	13
2.1.3.    The Project Management Knowledge Areas.....	16
2.2.    PROJECT MANAGEMENT IN THE CONSTRUCTION SECTOR.....	20
2.2.1.    Initiating Process in the Construction Sector .....	22
2.2.2.    Planning Process in the Construction Sector .....	22
2.2.3.    Executing Process in the Construction Sector .....	23



2.2.4.	Monitoring and Controlling Process in the Construction Sector .....	24
2.2.5.	Closing Process in the Construction Sector .....	25
2.3.	THE PROJECT SUCCESS.....	25
2.3.1.	The Importance of the Project Management in the Construction Sector .....	27
2.3.2.	The Project Manager’s Role in the Success of Project .....	29
2.3.3.	The Project Management Knowledge Areas in the Construction Sector .....	32
2.4.	PREVIOUS STUDIES ABOUT CRITICAL FACTORS AFFECTING SUCCESS IN THE CONSTRUCTION SECTOR .....	36
CHAPTER III METHODOLOGY .....		43
3.1.	RESEARCH DESIGN .....	43
3.2.	RESEARCH STRATEGY .....	44
3.3.	DATA COLLECTION .....	44
3.4.	ANALYSIS OF DATA.....	45
CHAPTER IV A PROJECT CASE .....		46
4.1.	PRE-CONSTRUCTION PHASE OF THE PROJECT CASE.....	47
4.2.	PROJECT MANAGEMENT PRACTICES FOR THE PROJECT CASE.....	50
4.2.1.	Project Integration Management in the Project Case .....	51
4.2.2.	Project Scope Management in the Project Case.....	52
4.2.3.	Project Schedule Management in the Project Case .....	54
4.2.4.	Project Cost Management in the Project Case .....	56
4.2.5.	Project Quality Management in the Project Case .....	57
4.2.6.	Project Resource Management in the Project Case.....	60
4.2.7.	Project Communication Management in the Project Case.....	63
4.2.8.	Project Risk Management in the Project Case .....	66
4.2.9.	Project Procurement Management in the Project Case .....	67
4.2.10.	Project Stakeholder Management in the Project Case .....	68
4.3.	THE PROJECT CLOSE-OUT PHASE FOR THE PROJECT CASE.....	70

4.4.	THE AUTHOR’S ROLE IN THE PROJECT CASE .....	71
CHAPTER V RESEARCH FINDINGS .....		73
5.1.	IN-DEPTH INTERVIEWS WITH CONSTRUCTION PROJECT FIRMS.....	73
5.1.1.	The Company Profiles .....	73
5.1.2.	The Interviewers Profiles .....	77
5.1.3.	The Awareness, Usage and Knowledge about Project Management Methodologies for Interviewed Companies.....	81
5.1.4.	The Critical Success Factors Identified in Interviews.....	95
5.1.5.	Summary .....	98
CHAPTER VI CONCLUSION AND DISCUSSION .....		101
	Limitations and Suggestions .....	103
REFERENCES .....		105
APPENDIX A INTERVIEW QUESTIONS.....		115
APPENDIX B QUESTIONNAIRE .....		118
APPENDIX C CIRRICULAM VITAE .....		131

## LIST OF TABLES

Table 1 The Functions and Characteristics of Each Single Type of Organizational Structure	9
Table 2 Project Management Process Groups and Knowledge Areas Table .....	20
Table 3 The Project Manager Skills and Competencies Table .....	31
Table 4 The Critical Success Factors Revealed as a Result of Theoretical Studies.....	39
Table 5 Construction Supervision Activities .....	55
Table 6 The Indicative Main Timeline of The Project.....	56
Table 7 Followed Summary of Key Plans and Procedures within the Project .....	60
Table 8 The Risk Matrix of the Project (L=Low, M=Medium, H=High).....	67
Table 9 The Research Findings of the Company Profiles.....	77
Table 10 The Findings of Interviewers Profiles.....	81
Table 11 The Information about the Companies.....	94
Table 12 The Effects of Factors on the Project.....	94
Table 13 Summary of Obtained Results from Participant Survey and Interviews .....	95
Table 14 The Critical Success Factors Stated in the Interviews .....	97
Table 15 Summary of Obtained Results for Effect of Success .....	99

## LIST OF FIGURES

Figure 1 Project Constraints Triangle .....	8
Figure 2 The Relationship Between Success Factors in Pinto and Slevin's 10 Factor Model	41
Figure 3 The Project Management Overview of the Project.....	52
Figure 4 Interrelation of Objective, Purposes and Results.....	54
Figure 5 Four Essential Principles of the Project.....	58
Figure 6 The Project Organizational Structure .....	61
Figure 7 The Principles of the Company's Approach.....	61
Figure 8 The Ten Attributes of Effectively Managed Utilities and Five Keys to Management Success.....	62
Figure 9 The Processes of Communication Strategy .....	64
Figure 10 The Distinctive Levels of Target Groups .....	65
Figure 11 The Relationship of the Critical Factors Affecting Construction Project Success .....	100

## LIST OF GRAPHS

Graph 1 Typical Costs and Levels of Staffing over the Life Cycle of the Project.....	11
Graph 2 Overlap of Process Groups in a Phase .....	15
Graph 3 Each Individual Process Category's Time Spent Percentage.....	16
Graph 4 The Importance of Success Factors According to Project Phases .....	42



## LIST OF ABBREVIATIONS

AEG:	Anderson Economic Group
AICCP:	Associate for Institute of Construction Claims Practitioners
CEO:	Chief Executive Officer
CFCU:	Central Finance and Contract Units
CPM:	Critical Path Method
CSN:	Construction Sector News
CV:	Curriculum Vitae
DNP:	Defects Notification Period
EIA:	Environmental Impact Assessment
EOI:	Expression of Interest
EU:	European Union
EVM:	Earned Value Method
FIDIC:	International Federation of Consulting Engineers (La Federation Internationale des Ingenieurs Conseils)
FOPIP:	Financial and Operational Performance Improvement Plan
H&S:	Health and Safety
ICIOB:	The Chartered Institute of Building
IPMA:	International Project Management Association
ISO:	International Organization for Standardization
MoEU:	The Ministry of Environment and Urbanization
PDM:	Precedence Diagram Method
PERT:	The Program (Project) Evaluation and Review Technique
PIU:	Project Implementation Unit
PM:	Project Manager

PMBOK:	Project Management Body of Knowledge
PMI:	Project Management Institute
PMO:	Project Management Office
PMP:	Project Management Professional
PRAG:	Practical Guide to Contract Procedures Financed from the General Budget of European Communities in the context of the external actions
PTA:	Point of Total Assumption
RFP:	Request for Proposal
SOW:	Statement of Work
QA/ QC:	Quality Assurance/ Quality Control
TNA:	Training Need Assessment Report
WBS:	Work Breakdown Structure
WUD:	Water Utility Department
WWTP:	Wastewater Treatment Plant

## **CHAPTER I**

### **INTRODUCTION**

Project management provides a major contribution in building value internationally for the business community. The corporations seek to create and optimize market interest in ventures. Today, project management is using the tools and techniques that provide effectiveness to the projects (Cikot, 2019). Transforming corporate capabilities into products, services, and results without wasting resources is only possible with the use of professional project management tools and techniques. Project management is a technique which aims to assist in the successful conducting of the projects. The success of the companies depends on determining the correct visions, transforming them into strategies and goals, and transforming hidden ideas into projects. Besides, the projects are carried out in the light of scientific data, and in accordance with the professionalism required by the age. Corporate project management will lead us to produce results only when it can be transformed into a planned and organized methodology that is compatible with current trends. Since organizations with high performance recognize that project management is just more than prioritization, project management is increasingly becoming important, and is the endpoint of a competitive strategy where executives identify and co-ordinate the programs and projects that will turn their intentions into reality (KPMG, 2017).

Project management is guided by many decisions taken daily. Some decisions are small whereas a difficulty is observed while some others become prominent. Some other decisions require deep thought because they include people, resources and the environment. Occasionally, these factors are in conflict, creating a contradiction and may have important risks. Although project managers know what to do and how to do when the interests of stakeholder conflict, they can have some difficulties in coping with the problem. At this point, the importance of project management is understood (PMI, 2020). Many individuals and organizations are starting to have a new interest in project management today. The latest PMI talent



gap analysis commissioned by AEG clearly reveals the outstanding opportunities in employment and career growth for project managers in the 11 countries studied. The project management-oriented labor force in seven project-oriented sectors is expected to reach 33 percent or to enable approximately 22 million new jobs, by 2027. The Project Management Institute reported that the number of job opportunities reached almost 66 million in 2017. It is expected that employers will need 88 million individuals to be employed in project management-oriented positions, by 2027. This report indicates that project managers have great contributions in providing productivity (PMI, 2017).

The construction sector is an important part of the economies all over the world. The construction industry practices very large scale of projects. It avails itself of huge amounts of resources for these projects to come true. Misuse of the resources will cause great amount of losses. It is only possible to prevent losses that may arise in the construction industry through a correct and an effective project management. Construction project management requires managing many processes and interdisciplinary cooperation at once, and using a lot of resources. An integrated system is required to manage planning, design and the entire environment to be built, by the reason of the complexity of construction projects, unexpected events and many unpredictable situations. Professional project management standards are important requirements for the project management firms that define the project management concept as information, tools, techniques and methods required to achieve goals of the project (Ata, 2009).

### **1.1. PROBLEM STATEMENT**

A construction project requires the establishment of various organizational structures and the development of different functional relationships. Since the type, location and conditions of the construction are different in each project, the production methods also vary. Before starting a construction project, things must be calculated in detail at each stage. Construction projects include very complex processes to be managed because of its multi-stakeholder structures (e.g. employer, designer, consultant, contractor, supplier and manager). The execution consists of processes such as feasibility approval, designer selection, design process, tender contractor selection, construction process and provisional acceptance process. Projects as well as a centralized information collection and centralized information

distribution, play a critical role in achieving cost, time and scope goals. In addition to the construction process, stakeholders have a considerable impact on construction projects. If all processes are not managed properly, future changes will both impose serious burdens on the project budget and cause extension in the project duration. A change brought to the agenda by the Designer should be reviewed in terms of time, cost and constructability, confirmed by all relevant stakeholders and ultimately approved by the Employer. For a successful project result that is completed within its scope, duration and budget, Project Management should be active in the process until the end of these processes and leave end of the process to the user. Unrealistic budgets and/or work schedules cause many problems during the project process and complicate it for employers to make decisions. Also, external factors have a significant impact on production. Risks and uncertainties are high in construction projects due to external factors that the administration cannot control. Risks continue throughout the project process. If the deviation of the project in terms of its goals is not detected on time, it may be impossible to take action against it.

When all these situations are experienced, construction projects may be interrupted, prolonged and some problems may occur that affect the project negatively. It is possible to overcome all these technical problems only with project management. If all these processes are managed by a Project Manager, the process will be shortened and the expected result will be achieved, and time delays and/or cost increases that may occur in the later stages of the project will be prevented. Briefly, project management provides the highest level of planning and coordination if it is included in the project with the right systems at the right time. Thus, the possibility of the project to achieve its goals (e.g. duration, cost, scope, and quality and job security) will increase.

## **1.2. OBJECTIVE OF THE STUDY**

A detailed study was made on the Project Management Methodology applied by the companies in the construction sector, within the scope of this research. In addition, the effect of Project Management Criteria on the success of companies was examined. In order to better understand the use of Project Management Methodologies and Standards in the construction industry, the project phases from the start of a project to its completion was discussed through a Case Study. Then, the factors affecting the success of the project were examined by in-depth face-to-face

interviews and surveys with four experienced companies and their experts in this sector in Turkey, to achieve aim of the thesis. 4 successful companies were selected out of the first 10 firms that took place in ranking by "CSN 100 Consulting List of Turkey in 2021" for the interview and survey. (Interviews were conducted with 4 successful firms out of the first 10 firms that took place in ranking by "CSN 100 Consulting List of Turkey in 2021").

The study was focused on three main contents, to achieve this goal. First of all, the awareness of the Project Management Methodologies and Standards in the construction sector was researched and analyzed. Then, detailed research was conducted on the use of Project Management within these companies. Moreover, a detailed investigation was made on the application of the Project Management Knowledge Areas in these companies. Finally, the effect of the use of Project Management on success was examined and interpreted.

## **CHAPTER II**

### **LITERATURE REVIEW**

In this section, the professional project management framework was explained in detail. In order to understand the professional project management standard, the definition, the components and the cycle of the project were described. The project functions and characteristics for each type of project were explained. The history of project management and the project management organizations were examined. Project processes and knowledge areas were defined, and their relations with each other were analyzed. The tools and techniques for project management processes were clarified. After the project management framework was expressed in general, project management applications in the construction sector were described with examples. The importance and necessity of project management in the sector has been studied.

#### **2.1. THE PROJECT MANAGEMENT FRAMEWORK**

The project managers should use systems having goals concerning carrying out the projects. Thus, the project gains a holistic perspective. A system approach to define a holistic and an analytical approach, concerning management and problem-solving processes, emerged in the 1950s. This approach regarding the system allows project managers to consider their tasks often within the framework of the broader organization. The system consists of three parts that are philosophy, system analysis and systems management. System analysis is an approximation to solve problems (Schwalbe, 2019). In this respect, Three Sphere System Management Model addresses business, organization, and technological aspects and topics related to the project, which must be defined and taken into account in order to select and manage projects effectively and successfully. The scope of the business includes project cost of the company, its impact on enrollments, and the maintenance cost of the entire system and so forth. The technological part consists of an operating system, server platform, scripting language and database, server and desktop specifications and so

on. The technological sphere should contain the appropriate hardware and software matters to be resolved. Organizationally, issues concerning stakeholders should be fully taken into account. The organizational issues include the existing manpower to develop the project, the necessary high management support, and the infrastructure necessary to complete the project. If the project manager is able to demonstrate issues mentioned above as early as possible, and integrate them into the project, it will definitely assist in whether an organization will invest in the project (PMBOK Guide, 2017).

An organization is an entity consisting of more than one person, such as an organization or association with a specific purpose. It means a collection of resources that somehow work together to achieve a common goal, and refers to a group of people. A general organization may include several small organizations in it, such as various departments and human teams (McNamara, 2006). The project organizational structure is a necessary configuration to determine people's hierarchy, functions, workflow, and reporting system. It is a framework that helps an organization to manage its activities effectively and achieve its goals with minimal effort. There are different project organizational structures defined according to the sphere of activity of the organization and the activities related to the main field of activity. In Table 1 eight types of organizational structures are listed as organic or simple, functional (centralized), multi-divisional, weak matrix, balanced matrix, strong matrix, project-oriented (composite or hybrid), virtual, hybrid, and PMO (PMBOK® Guide, 2017).

The Four Frame Model is designed to help you understanding and having an approach on these issues about organizational problems, development and change. Bolman and Deal argued that leaders should look at and approach organizational issues from four perspectives, which they called frames. According to their view, if a leader works with only one habitual frame of reference, he risks being ineffective. The four frames are listed as structural, human resource, political, and symbolic. The structural framework includes duties and tasks, teamwork, and control. It focuses on the architecture of the organization. This includes goals, structure, technology, roles and relationships. The human resources framework is adapted according to needs of company and individuals. The human resource emphasizes individuals' needs, emotions, fears, prejudices, skills, and opportunities. The political framework involves coalitions of diverse individuals and communities of interest. The political

framework emphasizes power and competition, taking into account diverse beliefs, interests, behaviors, and skills. Community, language, rituals, and photographs are all symbolic parts of the framework (Bolman and Deal, 1991).

To understand the logic of successfully managing a project, it is necessary to have a clear understanding of what the project is (Verzuh, 2003). A project is “a temporary endeavor undertaken to create a unique product, service, or result” (PMBOK® Guide, 2017). Projects end when their goals are achieved or when the project is terminated. The project can also be terminated if the user requests it. There are distinctive features to define an activity as a project. A project has a precise start and finish date, a budget, a unique purpose and output, project cycle, cost, duration, and performance targets. It should be specific to the environment in which it exists (Ata, 2009). The project is temporary. Most projects are carried out to achieve a permanent result. It encourages change and creates value. It is developed using progressive detailing. It must have a primary customer or sponsor, also, it includes uncertainty (Schwalbe, 2019).

Every project has several constraints. There are limitations and risks to be considered to ensure the final success of the project. A constraint in project management is any restriction that defines the limitations of a project (PMBOK® Guide, 2017). The Triple Constraint is defined as “a framework for evaluating competing demands” (Siegelaub, 2007). These Triple Constraints in project management are guided on the key factors defining the framework of a project and where it should be done when one or another of these project constraints becomes problematic. Figure 1 demonstrates the project's constraints, scope, time, and cost. The effort to shorten the time in the project will lead to an increase in costs due to reasons such as advanced technology and excessive time. Increasing coverage will cause an increase in cost, time, or both. Constraints should not be dealt with separately, but together, for a successful project because of this direct interaction between constraints (Gerger, 2006). Time constraint means the project completion schedule, including deadlines for each stage of the project and the delivery date of the final delivery. The scope of a project defines its specific goals, outcomes, features, and functions, and the activities required to complete the project are additional. Proper timing is important when it comes to time constraints. The project cost includes the financial resources to complete the project on time. Cost does not

just mean finance for materials. It includes the costs of labor, vendors, quality control, and other factors (PMBOK®, 2017).

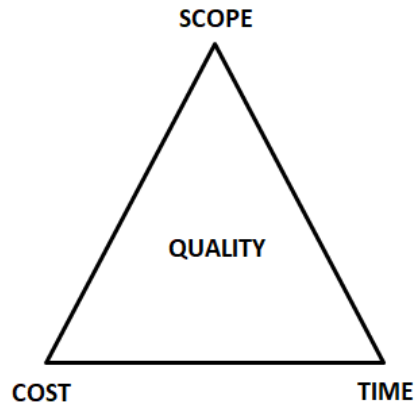


Figure 1 Project Constraints Triangle  
(Source: PMI. (2017). A Guide to the Project Management Body of Knowledge, PMBOK® Guide, Sixth Edition.)

Organizational Structure Typology	Project Features					
	Work Teams Organized by:	Project Manager Authority	Project Manager Role	Resources Availability	Who Handles the Project Budget?	Project Management Administrative Staff
Organic or simple	Flexible, people work side by side	Limited or non-existent	Part-time: could be either or not a defined professional role, i.e. coordinator	Limited or non-existent	Owner or operator	Limited or non-existent
Functional (Centralized)	Work that is taking place (i.e. planning, production)	Limited or non-existent	Part-time: could be either or not a defined professional role, i.e. coordinator	Limited or non-existent	Functional Manager	Part-time
Multi-division (could replicate functions for each division with limited centralization)	One out of product; productive processes; portfolio; program; geographical area; type of client	Limited or non-existent	Part-time: could be either or not a defined professional role, i.e. coordinator	Limited or non-existent	Functional Manager	Part-time
Strong Matrix	Professional task, having project manager as task	Moderate to high	Full time defined professional role	Moderate to high	Project Manager	Full-time
Weak Matrix	Professional task	Low	Part-time: performed within another role, not a defined professional role, i.e. coordinator	Low	Functional Manager	Part-time
Balanced Matrix	Professional task	Low to moderate	Part-time: considered as a skill, it cannot be a defined professional role, i.e. coordinator	Low to Moderate	Mixed	Part-time
Project-oriented (Composite, Hybrid)	Project	High to almost total	Full time defined professional role	High to almost total	Project Manager	Full-time
Virtual	Network structure with knots at points of contract with other people	Low to moderate	Full time or part time	Low to Moderate	Mixed	Could be part-time or full-time
Hybrid	Mix of other typologies	Mixed	Mixed	Mixed	Mixed	Mixed
PMO*	Mix of other typologies	High to almost total	Full time defined professional role	High to almost total	Project Manager	Full-time

Table 1 The Functions and Characteristics of Each Single Type of Organizational Structure



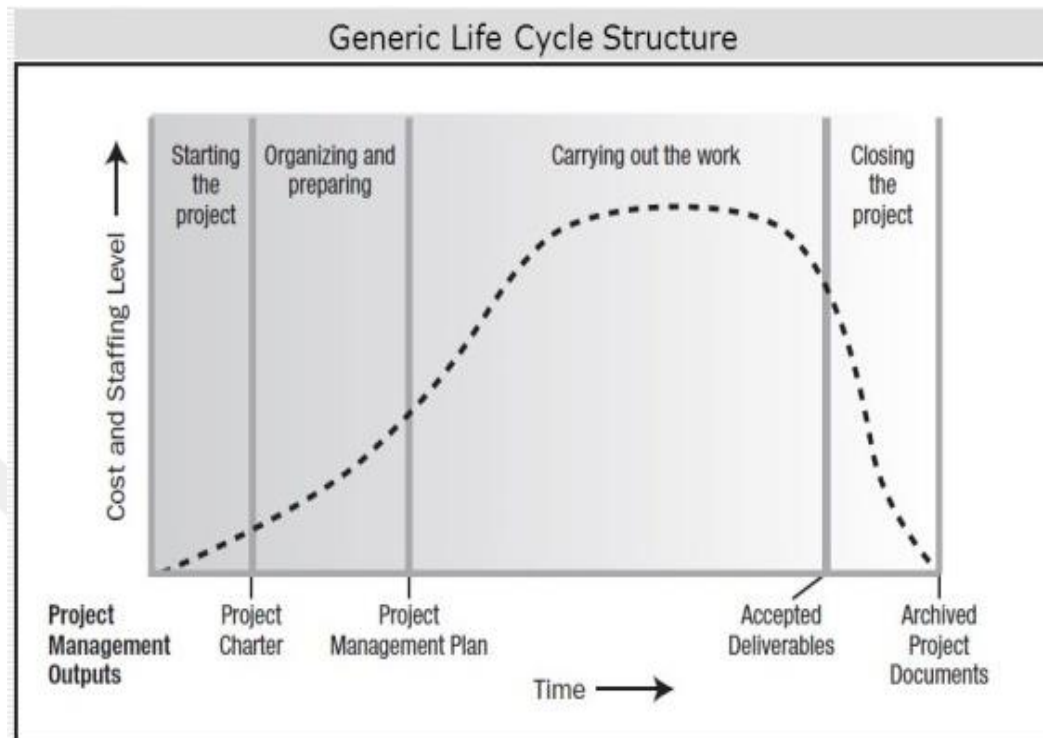
(Source: PMI. (2017). A Guide to the Project Management Body of Knowledge, PMBOK® Guide, Sixth Edition.)

\*PMO refers to an office or organization that manages the portfolio, the program or the project.

Projects are generally classified according to their duration and characteristics classified as long term, medium-term and short term (Dinç, 2005). Long Term Projects are projects that last more than 10 years. Industrial development, aircraft, ship, or defense industry projects are projects that constitute an example for them. Medium Term Projects are projects with 3-10 years duration. Examples of such projects are the establishment of a steel production plant, large dam construction, or part of a long-term project. Short Term Projects are projects with 6 months-3 years duration. Some projects such as road construction and conference organization are examples for this group (Çalışkan, 2009).

Since projects are part of a system and contain uncertainty, dividing the projects into multiple phases is required (Schwalbe, 2019). Organizations performing projects will usually divide each project into several project phases to improve management control and provide for links to the ongoing operations of the performing organizations. The project phases are known as the project life cycle. It's the sequence of phases that a project continues through from start to finish (PMBOK® Guide, 2017). PMI describes the life cycle of a project as a step of success. It moves starting from the beginning of the project until its completion at these stages (Çikot, 2019). There are 4 phases of project life cycle. They are initiation, planning, implementation, and closure phases (Tuuli, 2018). The initiation phase includes defining the strategic institutional goals within the scope of the project, selecting the project manager and project management team, preparing the project goals and business plan, defining the project stakeholders. The purpose or need of the project is determined. The project strategy is formulated and preferred to accomplish the goal of the project plans in The Planning Phase. Execution Phase, the project plan is implemented and the project is executed. The closing Phase focuses on leaving final outputs to the customer, transferring documents to the firm, closing supplier contracts, withdrawing capital, and notifying stakeholders (Barron & Merrie, 2013). Graph 1 indicates the generic life cycle of the project. Resource requirements are the lowest level in the early phases. Also, uncertainties are high. There are more resources needed in the middle phase. The final phase analyzes

whether project requirements are met or not, and whether the sponsor confirms completion of the project or not (Schwalbe, 2019).



Graph 1 Typical Costs and Levels of Staffing over the Life Cycle of the Project  
(Source: PMI. (2017). A Guide to the Project Management Body of Knowledge, PMBOK® Guide, Sixth Edition.)

### 2.1.1. The History of the Project Management

In projects, unlike the activities that depend on repetitive processes, related to products, services, and outputs resulting from the properties, there may be uncertainties (PMI, 2008). Because project processes are limited by product performance, process, and resource factors, and these three parameters are constantly being tried to be kept in balance (HBS, 1997). Therefore, there is a need in developing a consistent and systematic process that will keep these three balances in order for the project to reach its goal and manage it successfully. Depending on this requirement, the sum of the processes in which information, tools, skills, and techniques are used together in order to reach the target of the project is defined as project management (Ata, 2009). Project management is the planning, time management, and control of project activities in order to achieve scope, cost, and time objectives. Managing the project is controlling and finishing the project with the lowest cost and loss (Gerger, 2006). Organizational Project Management is a

framework in which portfolio, program, and project management are integrated with organizational enablers to achieve strategic objectives (Schwalbe, 2019). Executing business-wide project management helps establishing a strategic competitive value chain that gives businesses an advantage over their competitors, especially in high-risk industries and markets such as the construction industry.

Project management has been used for hundreds years. Some people claim that building the Egyptian pyramids as well as building the Great Wall of China was also a project. Many people consider the Manhattan Project to be the first project made use of “modern” project management. Examples of some project results are the Olympic Games, Taj Mahal, Panama Canal, development of commercial jet airplanes, and so on (PMBOK® Guide, 2017). When the history of project management and professional project management organizations are examined, it is observed that there is a common consent that the roots of modern project management are based on a closer recent past, which is the 1950s (Morris, 1999). According to Stretton, who conducted research on the history of project management, American Bechtel Company used the term "project manager" for the first time in an international project in 1950. In the mid-1950s, CPM and PERT, two project planning-oriented techniques that include important details to understand the history of project management, were developed. Kelley and Walker developed the CPM method (Kelley, 1989). It is understood from the study of Stretton that the PDM technique was developed in the 1950s, thanks to the researches of the American Ministry of Defense (Stretton, 2007). In the 1950s, when project management field occurred, it is the first time that an individual has been appointed as a "project manager" and this individual has been given the responsibility to achieve the objectives of the project. Again in the 1950s, network diagram techniques, which are the basic tools of the project management approach, were developed in relation to project time management. The professional project management institutions, which deal with project management issues independently, started to form up in the 1960s in Europe and North America (Kelley, 1989). PMI, which is the most well-known organization in the development and improvement of project management field, was established in 1969. PMI is the world's leading association for people, whose profession is about managing a project, program, or portfolio. PMI has developed methods and tools covering different activities for more than four decades. In the 1980s, PMI took concrete steps, as an important development for the project

management field, for the "Professional Certification Program". PMI conducted research on the necessity of "Professional Certification" and held its first certification exam in 1983. In the 1990s there was a period when PPMO became widespread and created its own certification programs and systems. The most important and obvious result of these efforts is the development of Project Management Body of Knowledge (PMBOK) that is a professional project management standard by PMI (Weaver, 2008). It is a guide containing standard terminology, best practices, and process guides for project management as defined by the PMI (PMBOK Guide, 2017). PMBOK is a standard developed and accepted for the project management profession. PMI considers the PMBOK standard as the project management information source of professional development programs and certifications (PMI, 2008).

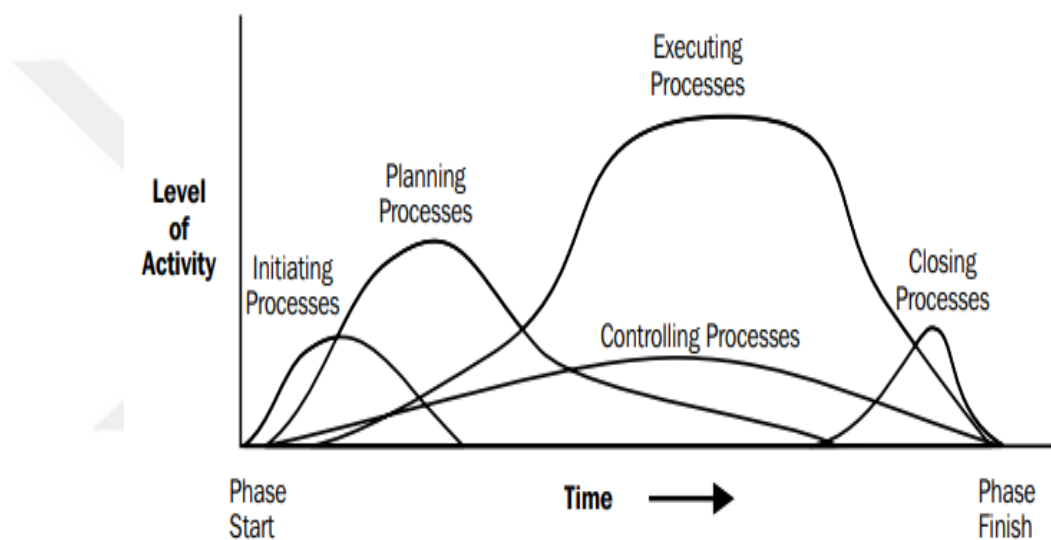
### **2.1.2. The Project Management Process Groups**

According to PMI, projects include 5 groups of project management processes, which are initiating, planning, executing, monitoring, controlling, and closing processes. The input of each process is defined by the tools and techniques that can be applied and the resulting outputs (PMBOK® Guide, 2013). The PMBOK Guide defines a process as “a set of interrelated actions and activities performed to create a pre-specified product, service or result”. Increase the likelihood of project management success by applying these sets of methods to address individual project needs. A project has to pass each phase of the project successfully to proceed to the next phase.

In the Initiating Processes a project or a phase of a project is initiated. These processes are performed to determine a new project or an existing project phase with the authority to start the project or phase. The scope of the project at the beginning level is prepared. All internal and external participants to be involved in the project are determined at this stage. If not selected, a project manager is appointed in this process. In the initial processes group, large and complex projects are divided into separate phases. The objectives of the project are defined by a clear document containing its inputs and outputs. Internal and external stakeholders are specified (Çikot, 2019). Initiating reflects the organization's vision, mission, priorities, goals, and objectives and provides a ground for project planning (PMBOK Guide, 2017). The Planning Processes should identify the direction to be followed to assess the

scope, compile the goals, and achieve the project goals. It defines and refines goals and selects the best alternative action paths to achieve the goals, in which the project has undertaken to address. It consists of activities aiming to create scope of the project, define and compile the project objectives, and develop the path that should be used to achieve these objectives. Documents describing how the project will be carried out are developed within the scope of project planning processes. The project management plan and project documents that are the most important of these documents include supply, risk, communication, quality, cost, duration, and scope (Ata, 2009). The main purpose of project planning is to guide execution, identify the strategies and tactics to successfully complete the actions. These processes help to define goals and cover the work to be done. Project management plan and project documents are developed in this process (Çikot, 2019). The outputs of the planning process are the list of prioritized risks, project, team contract, project scope statement, WBS, schedule of the project, and Gantt Chart (Schwalbe, 2019). The Executing Processes were performed to complete the work outlined in the project management plan and meet the project needs. It coordinates people and other resources in order to execute the plan. This cycle includes the activities to be carried out with a view to complete the work specified in the project management plan and achieve the project goals. These processes include coordinating employees and resources and applying all work and activities together in accordance with the project management plan (PMBOK Guide, 2017). The activities of these processes are coordination of stakeholders, allocate to resources, manage to expectations, and perform (Çikot, 2019). The Monitoring and Controlling Processes are required to monitored, reviewed, regulated, and organized progress and performance of the project. It ensures that the project objects are met by monitoring and measuring the progress in order to detect deviations from the plan so that corrective action can be taken if necessary. It covers the processes of monitoring, analyzing, making adjustments to the project performance, defining in which areas the project plan should be changed and making these changes happened. The most important feature of these processes is that the changes in the project can be managed by monitoring and measuring the project performance regularly and consistently (Ata, 2009). The objective is to evaluate the project's performance and to analyze it. The changes in plan are defined, implemented, regulated, and monitored (Schwalbe, 2019). In addition, the group of monitoring and controlling processes includes monitoring the ongoing project

activities according to the project management plan and project performance values, to prevent factors that may adversely affect all controlling processes in order to implement approved changes and to prepare preventive measures. The Closing Processes group includes the processes of formal termination of the activities in the groups, such as the project completion, a phase of the project, or contractual obligations, stakeholder gaining, and acceptance of customers, storing all documents, and closing out procurement activities. The outputs of this process constitute the final report and presentation (Schwalbe, 2019). Graph 2 demonstrates how the phases interact with each other, and the flow of information in a subset of each phase.



Graph 2 Overlap of Process Groups in a Phase  
 (Source: PMI. (2017). A Guide to the Project Management Body of Knowledge, PMBOK® Guide, Sixth Edition)

According to Andy Crowe’s study in his book, he gathered data from 860 project managers in many U.S. organizations, and focused on alpha project managers who spent more time on each process group excluding group of execution processes. In the Graph 3, the percentage of time spent on each process category is reported, and it is demonstrated that the alpha PM's spent time on the planning process is nearly two times more than the others. If the alpha PM spends more time on planning process, it causes fewer time spent on execution process. Thus, the result of it should be seen in practice (Crowe, 2006).



Graph 3 Each Individual Process Category's Time Spent Percentage  
 (Source: Schwalbe, K. (2019). Information technology project management, 6th Edition)

### 2.1.3. The Project Management Knowledge Areas

According to PMI, project management consists of 10 knowledge areas, which are integration, scope, schedule, cost, quality, resource, communications, risk, procurement, and stakeholder management (Schwalbe, 2019). The areas imply the key competencies that project managers must develop. Project Integration Management includes activities and processes that define, explain, combine, correlate and regulate the various activities and processes of the process groups. In this context, it involves the important activities necessary for the completion of the project, the merge, regulation, and net merge activities required to manage the expectations of the project participants successfully and to meet the project needs completely (Ata, 2009). The Project Integration Management processes consist of developing the project charter, developing the project management plan, directing and managing project work, managing project knowledge, monitoring and controlling project work, performing integrated change control, and closing the project or phase (PMBOK Guide, 2017). Project Scope Management covers all the work needed in the project in order to finish the project successfully. Managing the scope of the project is essentially about identifying and controlling what has been included in the project and what is to be included in it (Ata, 2009). The determination of powers and responsibilities is the planning of the work, the definition of the business volume, and the management of the changes that may occur in the business volume (Giran, 2002). The main processes of Project Scope Management can be

summarized as planning scope management, collecting requirements, defining scope, creating the WBS, validating scope, and controlling scope (PMI, 2017).

Project Schedule Management includes planning, estimating, budgeting, financing, funding, managing, and controlling costs in order for the project to be completed within the approved budget. The project manager should divide the project into group of tasks (Çikot, 2019). Project time management processes are planning schedule management, defining activities, sequencing activities, estimating activity durations, and developing and controlling the schedule. Project Cost Management includes cost estimation, financing, managing, and monitoring. One of the critical parts of a project is the project budget. The budget should create proper tight estimation methods, and it pursues to make sure that there are no unnecessary changes that make stakeholders dissatisfied (Schwalbe, 2019). The main purpose of cost management is to ensure that the project is completed within the projected budget (Giran, 2002). Project cost management processes consist of planning the cost management, estimating costs, determining the budget, and controlling the costs (PMBOK Guide, 2017). Project Quality Management incorporates the quality policy of the firm with a view to meeting stakeholder requirements. There is a need to put more time or cost if better quality is expected (Ata, 2009). The quality level during project planning should be determined and specified in the project management plan because of this integral nature of project output quality. Quality management of projects includes practices and procedures in which quality laws, priorities, and obligations are defined to meet the needs of the project to be carried out (Giran, 2002). Project quality management ensures that the project meets the needs it undertakes (Schwalbe, 2019). Project Quality Management processes are planning quality management, managing quality, and controlling quality (PMBOK Guide, 2017).

Project Resource Management covers processes for identifying, acquiring, and managing the resources required to complete a project successfully. Besides, the project team is another critical factor in a project. Having a good team brings a successful project along. This knowledge area is about finding the appropriate team and following its results. The success and failure of organizations and programs are decided by individuals. Most project managers believe that one of the most daunting tasks they face is to handle human capital effectively. People management is a critical part of the project management of capital (Schwalbe, 2019). The Project Resource



Management includes the following processes: Planning resource management, estimating activity resources, acquiring resources, developing the project team, managing the project team, and controlling resources (PMBOK Guide, 2017). Project Communications Management includes the processes required to ensure timely and appropriately planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and ultimate disposition of project information (Çikot, 2019). Also, communication with stakeholders is essential to maintain satisfaction of the stakeholder, even if sudden changes do arise. It is important to keep a cycle of all stakeholders throughout the project, and to develop a communication plan to communicate earlier and frequently when unexpected problems arise (Giran, 2002). The biggest threat of many projects is not being able to communicate. Each project team member needs both types of skills to be successful (Schwalbe, 2019). Main processes of Project Communications Management are planning communication management, managing communications, and monitoring communications (PMBOK Guide, 2017).

Project Risk Management implies the planning, analyzing, response planning, response implementation, and risk observation processes for a project. The key risk in the project management program is rarely predefined and evaluated, but project members prefer to overlook unexpected problems more quickly (Ata, 2009). Objectives of this process are enhancing the probability and impact of positive risks, minimizing the possibility and effect of the negative risk of maximizing the chance of the project's success (Giran, 2002). Project risk management helps to define and handle risks that are not covered by other methods of project management. Unless they are under control, these risks would likely cause the project to deviate from the plan and not meet the targets set for the project. The efficacy of project risk management is, therefore, directly linked to the performance of a project (Schwalbe, 2019). Main processes of Project Risk Management are planning risk management, identifying risks, performing qualitative risk analysis, performing quantitative risk analysis, planning risk responses, implementing risk responses, and monitoring risk (PMBOK Guide, 2017). Project Procurement Management covers the processes required to purchase or obtain the necessary products, services or results from outside of the project team (Ata, 2009). Procurement means acquiring goods and/or services from an outside source. It includes the contract management and change control processes required to prepare and manage project supply management contracts or

orders issued by effective members of the project team (Giran, 2002). This process includes contracts, including legal contracts between the buyer and the seller. In a complex project, many contracts or subcontracts may require to be managed simultaneously or sequentially (Çikot, 2019). In such cases, each contract lifecycle can end at any phase of the project lifecycle. Main processes of the Project Procurement Management are planning procurement management, conducting procurements, and controlling procurement (PMBOK Guide, 2017).

Each project has stakeholders that affect the project, or that can affect the project positively or negatively. The purpose of Project Stakeholder Management is to identify all people or organizations affected by a project, analyze stakeholder expectations, and effectively engage stakeholders (Schwalbe, 2019). It involves the mechanisms required to recognize individuals, groups, or organizations that may affect or may be affected by the project to evaluate perceptions of the stakeholder and their effects on the project, and to establish appropriate management strategies to involve stakeholders effectively in project decisions (Ata, 2009). Stakeholder satisfaction should be defined and managed as a project goal (Schwalbe, 2019). Project Stakeholder Management Processes are identifying stakeholders, planning stakeholder management, managing stakeholder engagement, and monitoring stakeholder engagement (PMBOK Guide, 2017). Table 2 clarifies the relationships between The Project Management Process Groups and The Knowledge Areas Mapping.

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring & Controlling Process Group	Closing Process Group

<b>1. Project Integration Management</b>	1.1 Develop Project Charter	1.2 Develop Project Management Plan	1.3 Direct and Manage Project Work 1.4 Manage Project Knowledge	1.5 Monitor and Control Project Work 1.6 Perform Integrated Change Control	1.7 Close Project or Phase
<b>2. Project Scope Management</b>		2.1 Plan Scope Management 2.2 Collect Requirements 2.3 Define Scope 2.4 Create WBS		2.5 Validate Scope 2.6 Control Scope	
<b>3. Project Schedule Management</b>		3.1 Plan Schedule Management 3.2 Define Activities 3.3 Sequence Activities 3.4 Estimate Activity Durations 3.5 Develop Schedule		3.6 Control Schedule	
<b>4. Project Cost Management</b>		4.1 Plan Cost Management 4.2 Estimate Costs 4.3 Determine Budget		4.4 Control Costs	
<b>5. Project Quality Management</b>		5.1 Plan Quality Management	5.2 Manage Quality	5.3 Control Quality	
<b>6. Project Resource Management</b>		6.1 Plan Resource Management 6.2 Estimate Activity Resources	6.3 Acquire Resources 6.4 Develop Team 6.5 Manage Team	6.6 Control Resources	
<b>7. Project Communications Management</b>		7.1 Plan Communications Management	7.2 Manage Communications	7.3 Monitor Communications	
<b>8. Project Risk Management</b>		8.1 Plan Risk Management 8.2 Identify Risks 8.3 Perform Qualitative Risk Analysis 8.4 Perform Quantitative Risk Analysis 8.5 Plan Risk Responses			
<b>9. Project Procurement Management</b>		9.1 Plan Procurement Management	9.2 Conduct Procurements	9.3 Control Procurements	
<b>10. Project Stakeholder Management</b>	10.1 Identify Stakeholders	10.2 Plan Stakeholder Engagement	10.3 Manage Stakeholder Engagement	10.4 Monitor Stakeholder Engagement	

Table 2 Project Management Process Groups and Knowledge Areas Table  
(Source: PMI. (2017). A Guide to the Project Management Body of Knowledge, PMBOK® Guide, Sixth Edition)

## 2.2. PROJECT MANAGEMENT IN THE CONSTRUCTION SECTOR

The construction industry is one of the largest industries in the world, no matter if it exists in developed or developing countries. In today's world, construction industry is an important part of the economies of all countries around the world as it affects a wide range of markets. Construction projects have specific features. In the most general sense, all the activities from the handling of the need of the owner as an abstract idea to the realization of this dream are called construction projects (Bayoğlu, 2005). The construction project is a complex effort using time and monetary resources to bring about a particular product. It is a process consisting of successive and parallel activities. Construction projects are long-term projects. While many industrial products are manufactured within hours or days expressed, a construction product requires years of effort (Karaesmen, 1997). One of the most important features that differentiate the construction industry from other industries is that the uncertainty it has during this industrial activity is very high (Timor, 2006).

The main reason for the development of the concept of construction management, new organizational structures, and highly specialized and complex planning and control techniques is that traditional organizational structures and management techniques fail to solve the management problems of construction projects (Gould, 2009). The concept of professional construction project management services has evolved due to the fact that it has been understood that the design and construction environments in which projects focused on quality, cost, and work safety cannot be realized without planned and systematic delivery processes. Construction project management is a professional management process and covers all the procedures from the first idea (dreams) to the end of the work (delivery), time, cost and quality control (Sorguç, 2002). In the construction industry, the projects undertaken to reach huge amounts, includes several factors such as many different cost types, large fluctuations in construction materials, labor, and prices, and work in the construction industry, obligation to work with people with a large number of different professions. Thus, it is not an easy task to determine the costs in the industry in advance. Production methods change, as the location and conditions of construction type vary in each project. Project management in the construction sector provides that the project completed in line with the determined targets and eliminating all the risks and problems that may arise during the execution of the construction project.

### **2.2.1. Initiating Process in the Construction Sector**

The purpose and feasibility of the project are determined during the starting process in construction projects. Goal setting and feasibility study is an important phase of the entire construction project, as it indicates whether the project is a good opportunity. A suggested solution or plan is published based on the results. At the beginning of the project, the construction companies create and evaluate the construction project to determine if it is feasible and should be undertaken. In this process, the purpose or needs of a construction project are determined. A Project Contract is created when everything is decided. This contract forms the basis of the construction plan and is one of the most vital works in project management (Çalışkan, 2009). The project charter is developed, a project kick-off meeting is held and stakeholders are defined. Stakeholder record tables are created that provide information about the stakeholder's name, location, role in the project, internal or external status and contact information (Bayoğlu, 2005). The analyses and reports produced during the initiation phase constitute an important input for the planning phase. The outputs of the initiation phase also constitute data for implementation, monitoring and control processes. Thus, the project strategy to be followed in the future emerges approximately. Projects deemed unsuitable as a result of feasibility studies are eliminated and construction is not started.

### **2.2.2. Planning Process in the Construction Sector**

The planning phase of construction projects has become more important day by day. Today, the scope and size of construction projects have increased and become more complex. The increasing use of subcontractors has increased the number of organizations that need to be coordinated, and over time, external controls on the project have much more increased. The product range has increased, economic and social change has accelerated, and predicting future events has become difficult (Tosun, 1987). All these demonstrate the need for professional planning in the construction industry. Planning works of construction projects can be seen as paper works that are used in order to fulfill a provision in the contract. However, planning is not just a formality, it is an approach that facilitates the project, saves time and solves problems. It plays an important role in project management by covering issues other than traditional engineering methods such as planning, construction cost estimation and timing, minimizing delays. The main objectives in construction

planning can be summarized as follows: Organizing construction activities, determining who, what, when, how and why, determining the material and human resources that will be required, distributing these resources to certain stages in time and appropriately, identifying and distributing responsibilities, integrating the work of all relevant organizations, proposing measures to be prepared for unexpected events and changes, and determining the end time of the construction are main goals of the planning in construction projects (Barutçugil, 1986).

During the information gathering phase, information such as contract documents, official correspondence and standards, construction site and environmental conditions, construction technology, internal and external construction resources, worker and equipment efficiency and the goals set by the senior management are collected (Bayoğlu, 2005). During the preparation of the plans, using techniques about resource planning and work schedule (such as site layout, flow diagrams, GANTT, LOB, CPM, PERT and GERT), the collected information is evaluated and cost analysis is made (Laufer & Tucker, 1987). In the planning process of construction projects, the details of the project schedule are determined, the basic work items are listed, the construction techniques to be applied are decided, the factors limiting the project are determined, the work plan is prepared, the activity sequence and duration are determined, and cost estimates are made. In construction projects, basic work items are listed like ground works, fine, rough works, environmental, carcass, concrete, reinforcement, mold, isolation works and so on. The construction techniques and equipment required by the construction project are decided on the construction techniques to be applied such as using formwork, using ready-mixed concrete, using cranes (Ünder, 2006).

### **2.2.3. Executing Process in the Construction Sector**

In this process, construction firms build the outputs of the physical project and present them to their clients for signing. The Project Execution Phase is generally the longest phase in the construction project cycle. It makes use of energy and resources for the maximum. It includes the processes of performing the activities required for the successful completion of the project, providing technical and organizational adjustments, reporting and implementation of work packages and outputs, and providing the necessary human resources to complete the project (Çalışkan, 2009). This is where the project plan is implemented and the construction

work of the project is carried out on site. At this stage, as the team completes the work, change corrections are made, and the construction materials are delivered to the construction site. Once the construction deliveries are produced and the customer has agreed on the final solution, the construction project is ready to be ended (Barutçugil, 1986). This process starts from the date of delivery and continues until the date when the construction is completed and the temporary acceptance is made.

#### **2.2.4. Monitoring and Controlling Process in the Construction Sector**

In this process, the ongoing construction activity results are compared and controlled with the targets determined during the planning process. If the construction works are not controlled, the plans will be useless. Therefore, planning and control functions are interdependent (Türengül, 1998). For construction project management, control means not only comparing the point reached with the standards, but also making the necessary evaluations and taking corrective measures. In order to control the activities, the targets and standards related to the activities should be determined in a measurable way. The first and most important condition for different project planning and controlling techniques applied in construction projects to achieve the desired success is that the center, construction site, project and planning managers maintain a harmonious team work from the beginning until the end of the project (Çalışkan, 2009). A failure in any of these units to do their part will cause the entire planning system and, consequently, production on the job site to fail. The success of the works initiated by senior managers, who believe in the success of planning in construction projects, can be achieved by the same managers playing an active role in the planning system by giving planning duty to the planners, who have to direct other units proportional to their responsibilities (Ünder, 2006). In construction projects, concrete casting, reinforcement placement, wall, column manufacturing, facade, insulation, filling and many similar applications progress simultaneously in the field. This concurrent process can bring about many changes in the construction practice. When a change is noticed, a preparation is made for the activities to manage the change, the factors that cause the change are understood, and it is made sure if the change brings any benefit. All approved changes require new adjustments to the project plan. As a result of these changes, the scope of the project changes, thus, it affects the performance measurement bases (Horasanlı, 2002). Therefore, the monitoring and control process is of great importance.

### **2.2.5. Closing Process in the Construction Sector**

It is important to start the project appropriately and to close it correctly. In successful construction projects, Project Closure, in such conditions like approval of the scope, correction of deficiencies and problems, making the necessary documentation, approving all deliveries, delivering construction materials to the customer, transferring the paperwork to the company, cancelling the supplier contracts, releasing the workers and construction equipment, evaluating customer satisfaction, includes receiving payments if the client approves, closing contracts and reminding the stakeholders about the administrative closing of the project (Çalışkan, 2009). All documents, contracts, meeting reports, and correspondence related to the project are archived. When the construction project is closed, a Post-Implementation Review is conducted to analyze the success of the construction projects. Creating a Project Completion Report is the first step before ending a building project. It is important to list every construction activity required to close the project in this Project Closing report to ensure the effective completion of the project closure. After the report is approved by the Construction Sponsor, the closing activities specified in the report will be implemented. A project closing report is prepared, which includes the success of the project, the organization, factors and tools that may affect similar projects, and the techniques used (Ünder, 2006). The implementation phase officially ends along with provisional acceptance in construction projects. Final acknowledgement is made according to the relevant article in the project contract and the project is terminated and closed (Horasanlı, 2002).

### **2.3. THE PROJECT SUCCESS**

This part of the study is focused on the concept of project success in general and includes the project success definitions of various researchers in the literature. In the ICB, project success is defined as the fulfillment of all accepted conditions of the projects. Although the success of the project management is related to the success of the project, it is emphasized that they were not the same. The ICB standard put the "Project Management Plan" in the foreground in order to ensure effective integration and successful project management (IPMA, 2009).

According to Kerzner, a successful project management aims to achieve the project on time, at the anticipated cost, at the expected performance, provided that



the resources are effectively balanced and accepted by the customer. In his opinion, the project becomes successful if the project is completed at a budget-appropriate cost within the specified time period, reached the appropriate performance and specification level, completed within the framework of customer acceptance, the project is not disrupt the main work flow of the organization, and are not change the organization's unity culture (Demir, 2006). Baker, Murphy & Fisher created a definition of project success as a result of their research in 1974. According to this definition, the project is successful if the project meet the technical performance specifications, also if key persons in the main organization, client and user organization, and project team are highly satisfied with the project results (Hughes, 2004). Cleland da Baker made a similar definition of project success. He evaluated the project success in terms of project management and defined it as meeting the cost, work schedule and technical performance targets and ensuring customer satisfaction. He believed that a certain strategy should be designed and implemented for a successful project to be realized (Clelend, 1999).

Cimen defined project success in three ways, which are functional success, success in project management and commercial success. The researcher emphasized that these definitions alone are not sufficient for project success and argued that for a project to be considered successful, it should meet all three dimensions. According to Cimen, a project that was considered successful by the personnel involved in a project because it was completed within the stipulated time and cost was considered unsuccessful by the project owner if it was not meet the commercial expectations of the project owner, or a functionally successful project may fail due to timeout or cost overrun reasons. Cimen made a definition of project success covering all aspects of project success similar to the project description proposed by Baker et al. According to Cimen, if the project had reached its technical performance expectations, and if there was satisfaction among the key personnel in the project owner organization and the project team, then the project was considered as successful” (Cimen, 1994). Considering the definitions of all these researchers, it can be said for a project to be considered successful that a project should reach its cost, work schedule and technical performance goals, and all project participant organizations must be satisfied with the project results, and must be agreed on the project results (Demir, 2006).

In order to understand the issue of being successful in construction projects, it is necessary to understand construction projects by looking at other projects. Every

construction project is unique, different and specific. Every construction project has its own influencing factors so that each one requires different management techniques (Gould & Joyce, 2000). Construction projects have different phases. Various specialties and organizations are active at every stage. Participants in these stages from project planning to project completion constitute the complexity feature of construction projects (Clough & Sears, 1991). Construction projects have more risks than the other sectors. There are variable and unforeseen risks at every stage of the project. Construction projects bring together different groups with different skills and expertise. These groups work together for a single purpose. The most important feature of construction projects is that they consist of different labor groups that come together for a specific purpose. Therefore, human quality in construction projects is of great importance in project success and failure (Gould & Joyce, 2000). Senior managers, one of them, are key stakeholders of projects. Many projects will fail without an effective top management. Senior managers are considered as an important factor in projects such as stakeholders. Senior management's level of involvement and assistance from top management help the Project Manager while managing projects. By providing sufficient resources, it can assist in coaching project managers in timely approval of unique project needs, collaboration with other departments of the organization, mentoring, and leadership management (Schwalbe, 2019).

### **2.3.1. The Importance of the Project Management in the Construction Sector**

Since construction projects are complex, they have unexpected events and a lot of unpredictable situations. There should be a comprehensive system that can control planning, design, and the entire environment that can be built, because of the existence of many unpredictable situations. The vast majority of the information specific to the project approach required to manage construction projects is within the framework of project management knowledge areas. This contributes in the form of stages, strategies, methods, and tools, to the project managers to achieve the purpose of the construction projects. Construction project management is a professional management process and covers all the procedures prepared from the first idea to the end of the work in terms of duration, cost, and quality control (Sorguç, 2002). Construction project management is required for the purpose of eliminating problems in construction projects, achieving project objectives, increasing

efficiency, and creating a systematic working environment between project top management and the site (Gould, 2009). Since the constructions are unique and individually executed commitments, defining the work, organizing the work, distributing authority and responsibilities, ensuring planning, budgeting and controlling, effective communication and regulation will cause serious problems. All of these problems can be solved and the goals of the construction project can be realized if the management function is successfully fulfilled (Barutçugil, 1986). Since every construction is a unique project, the results cannot be predicted exactly and precisely. In construction projects, there are uncertainties, errors and risks in terms of time, cost and technical success, especially in large-scale projects with a long construction period, high cost and technical superiority. That is why, it is necessary to enrich the training studies on general business management with the experience gained in the construction sector for an effective construction project management (Yılmaz, 2002).

Businesses undertaking a construction business or its subdivisions may be working on several construction projects at the same time, each of which may be at a different stage of their cycle. A construction business, therefore, looks rather complicated in terms of participating businesses or interdepartmental dependencies. This requires a complex organization made up of people from different professions, different fields of activity, departments, and businesses. In addition, these relationships and dependencies are constantly evolving and changing. Typically, the majority of works at the beginning of construction covers feasibility and survey studies. This importance and majority then changes its direction immediately into the department or business, which is directly responsible for the design and supply, and from there on, the construction. The work is finally transferred to the departments related to the trial, delivery, and commissioning (Sorguç, 2002). This multi-staged system highlights the importance of project management in the construction industry. A study was conducted to examine the use of professional project management standards of professional project management companies operating in the construction industry in China. Accordingly, it is understood that project management companies operating in the construction industry in China are using the PMBOK standard widely (Bukağılı, 1995). In construction management, there is a need for managers that have different organizational forms, specialized information

systems, project planning and controlling techniques and managers that have skills to solve human problems that will arise due to the characteristics of the constructions.

Each construction project is different and must be carried out in different places each time. Construction projects require the coordination of the workforce of many people and organizations. Project managers have to evaluate different technologies and different worker and equipment alternatives. However, issues such as weather conditions, lack of materials, worker problems, unknown underground conditions and incorrect time and cost estimates should be taken into account. As a result, all these assumptions cause the construction project to be considered as a dynamic problem (Ünder, 2006). Construction project management has to make predictions for the future events and performance to solve the dynamic problem they face. Anticipated developments and the actual output, because of lack of precise information about future events, will indispensably differ. Construction project managers have to deal with different types and amounts of problems. The behavior of external elements, inaccuracies in drawings, delays in project approvals, the effect of weather conditions, late material supply, variable workforce performance rates, malfunctions in work machines, rejection of the work done and reconstruction can be demonstrated as examples of these problems (IMO, 1997). All these factors and the complexity of the construction problem have long been recognized, and have made the development and implementation of the construction project management concept necessary.

### **2.3.2. The Project Manager's Role in the Success of Project**

Nowadays, it is not enough to recognize the success of a project as a tactical element only, but also the overall project success must be understood by observing the strategic needs of the business. If the project is technically successful but does not advance the organization strategically, it cannot be counted as a real success. The Project Manager has a huge role in this regard. The Project Manager is responsible for achieving the project goals and assigned to project organizations to lead the team (PMBOK® Guide, 2013). Project managers have a unique perspective on the organization that is lack of many other roles. Project managers face many daily challenges that guide them to successfully complete their projects. Project Managers should be familiar with organizational strategy, ensure that their projects are compatible, and have the knowledge to join the management team if there is an

arrangement that will affect their strategies and projects. Reaching the end of the project and considering success as a rewarding part of project management, make every effort worthwhile. Project managers work in cross-functional teams with subject matter experts throughout the day. They discuss the problems, analyze how the project affects their functional areas, and interact with top management as stakeholders (Zeihner, 2015). Thus, the Project Manager's efficiency is the key factor for the project success. Project managers who have such a great contribution and importance in the success of the project should have responsibilities. The project manager is one of the most important factors that affect the success of the project, either positively or negatively. The Project Manager should have experience in managing the relevant construction project. The project manager is involved in all stages of the project, and is the person that manages the project team during planning, organization, and controlling processes. They provide sufficient resources, acknowledge their unique project needs in a timely manner, and receive collaboration from other parts of the organization. Therefore, the leadership characteristics of the project managers in the construction project management sector, especially in the construction sector where human relations are at the forefront, is essential for the success of the project (Mamash, 2015). An experienced project manager uses project management knowledge and skills as well as project management processes and tools to achieve the targeted success in the project (PMI, 2001). Project Managers have unique access to cross-functional teams across the organization, and he/she plays a key role in the successful implementation of the strategy by combining it with the strategic knowledge and project manager (Zeihner, 2015).

In construction projects, the project manager aims to bring the project to the desired point by keeping in touch with the investor so often. Enforcing leadership behavior allows the construction project manager to plan the project effectively, to monitor and control project processes (Gharehbaghi & Mcmanus; 2003). As in the other projects, in construction projects, the project manager should solve his/her problems as soon as possible, and return to his normal agenda. He/she should be able to detect and control potential problems that may be encountered in the future before they grow (Özışık, 2013). The project manager has to complete his job in accordance with the design and schedule, with the quality defined in the specifications, within his budget, without harming human life and the environment. However, it will not be possible for all these factors to occur at the same time. For example, shortening

project time will reduce operating costs, but will often result in overtime budget deficits in the workforce. Another problem is that it is required to use more equipment than planned if more work is needed to be done at the same time. Overtime and night work will also bring additional costs. The project manager is the person who finds the best solution by considering all these factors.

According to an investigation, 60 project managers gained a slightly clear view of key project manager skills and competencies. The important project manager skills and competencies are stated in Table-3. The project manager skills and competencies for a project have been asked. The top five skills and competencies are leadership ability, old experience, planning, human skills, and both oral communication and building strong teams to be effective for the project manager. According to the study, a different combination of main project management skills and competencies requires different project characteristics (Krahn & Hartment, 2006). As it is observed in the Table 3, ability of leadership is important skill for the PM in large project. In a project with high uncertainty the most important competence is risk management. The second, third, fourth and fifth most important competencies are expectation management, leadership, people skills and planning, respectively. In a very novel project, considerable innovation required the most important skill is leadership. People skills, has a vision, purpose or goals, self-confidence, expectation management, and listening is followed the other important skills.

<b>Project characteristic (context of project management work)</b>	<b>Most important skill/competence</b>	<b>Second most important</b>	<b>Third most important</b>	<b>Fourth most important</b>	<b>Fifth most important</b>
1. A very large project (large scope)	Leadership	Relevant prior experience	Planning	People skills	Verbal communication Strong at building teams
2. A project with high uncertainty	Risk management	Expectation management	Leadership	People skills	Planning
3. A novel project; considerable innovation required	Leadership	People skills	High vision, purpose, goals	Self confidence	Expectation management Listening

Table 3 The Project Manager Skills and Competencies Table

(Source: Krahn, J. & Hartment, F. (2006). Effective project leadership: a combination of project manager skills and competencies in context. Paper presented at PMI® Research Conference: New Directions in Project Management, Montréal, Québec, Canada. Newtown Square, PA: Project Management Institute.)

### **2.3.3. The Project Management Knowledge Areas in the Construction Sector**

Construction projects are the total of activities that have a processing capacity. Coordination is essential for determining these activities and defining the determined activities, and for the defined activities to work in harmony with each other. The effective and professional use of project management knowledge areas has a great contribution in achieving success in construction projects. The coordination of all units and activities from the beginning to the closing of the project is made and the system works in harmony, with the integration management (Çalışkan, 2009). Project Integration Management guarantees that all elements of the project can come together at the right time in order to complete the project successfully (Horasanlı, 2002). In construction projects, integration management provides comprehensive coordination and optimization of dynamic management and project objectives during the construction phase, so that it ensures that the project is implemented in the best working conditions to achieve the best results in a relatively short time (Wu & Yao, 2006). According to a study, a questionnaire was designed and administered to construction professionals, and data from 121 projects was analyzed using structural equation modeling. The results of the research demonstrate that integration management has a strong impact on project management performance. Industry practitioners may benefit from the framework developed by considering the components proposed and following strategies recommended for construction phases (International Journal of Project Management, 2017).

Scope Management in construction projects is to ensure the control of the project according to the qualifications, objectives and target subject of the project owner. It means determining the authorities and responsibilities, planning the work and work volume, and managing the changes that may occur (Giran, 2002). The scope of the project is defined in detail, such as the duration, cost resource, progress and control of each construction project activity. The technique called WBS is used to determine the construction works to be carried out within the project and to separate them into smaller pieces. WBS divides works by assigning business units in the entire construction project to units within the organization or external units like

subcontractors (Kocakulak, 1997). Misidentification of scope and business costs, insufficiency of quality requirements, and inability to control the scope adversely affect the success of the project. Schedule Management is required within the scope of defining, prioritizing activities, determining target durations, and scheduling in order to complete the construction project on time. In order for the construction project to be completed in the desired time and in an economic way, it is necessary to know which critical processes are directed to attention and to make these processes more controlled. Those who undertake duties and responsibilities at various stages of the construction project should carry out their work according to the short and long term plan goals. These requirements made it necessary to develop some work program methods. In construction applications, CPM is widely used for work program (Ünder, 2006). In building projects, it is mainly provided by project management applications such as MS project or PRIMAVERA. Reliable timing can eliminate many risks that may arise during a construction project. The main purpose of programming is to improve the allocation of materials and resources within a project. In this way, possible delays can be avoided and better communication can be established between all different parties. The work schedule prepared in construction projects gives the start and end dates, durations, total abundance and other information about the activities within the scope of the project (Kocakulak, 1997).

One of the most important issues to be managed in construction projects is cost. The main purpose of the Cost Management studies within the scope of construction projects is to create a realistic project budget within the financial limits of the building owner, to plan, design and to build the project in the most economic way in line with the articles specified in the contract (Sorguç & Kuruoğlu, 2007). Cost and time are the basic elements that should be kept under constant control from the beginning to the end of a project. Every project manager wants to complete his project with the least cost. The cost of the project can only be reduced to a certain point depending on many parameters such as the scope, duration, cash flow of the project. Cost control is basically about how much will be spent at the beginning of the project and how much deviation from the expenditure considered in the later stages. In order to realize the project activities, it is determined which resources (human, machine, raw material) will be used in what quantity or amount, resource costs are estimated and the created budget is controlled with the actual values. Analyzes made for this purpose are called Earned Value Analyzes. As long as the



cost control is done, the estimates made at the beginning of the project should be constantly revised. The point to note here is that the new costs must not fall outside the approved cost schedule. By determining the causes of deviations, designing the measures to be taken and reporting and storing them, it will be easier to overcome the problems both in the later stages of the project and in other projects (Giran, 2002).

In construction projects, Resource Management is required to identify, collect and manage the resources required for the successful completion of the project. Failure to provide critical construction equipment or infrastructure in a timely manner can result in delays in manufacturing the final product. Resource management ensures that the right resources are delivered to the project manager and project team at the right time and place (Özışık, 2003). Factors such as the type of the project, the location of the project site, the size of the site should be taken into account when mobilizing, using and distributing resources. It also includes processes for organizing, managing and guiding the Project team. In this way, the required human resources for the project team are obtained in terms of number and quality. One of the most important duties of construction project managers is to keep all participants who are parties to the project in the communication network. Nowadays, as technological developments enable the communication to accelerate; all developments in the project can be instantly communicated to all participants. The important thing is to determine what information people involved in the project processes will need for the jobs they are obliged to do. Communication Management is of great importance due to the multi-stakeholder structure in construction projects. It includes the processes that require the timely and appropriate production, collection, distribution, storage, finding and arrangement of construction project information (Ata, 2009). It is important to deliver the necessary information to the necessary people in a timely manner by adhering to the elements mentioned in the communication management plan (Kocakulak, 1997). In order for such a distribution to be possible, business results must reach the required places in a complete and timely manner, in this context, a written information flow is the healthiest way. Detailed filing of shared information plays an important role in reducing miscommunication and misunderstanding, which is one of the most important problems of projects and organizations (Özışık, 2003).

Risk management, which can be defined as an approach in which the balance between the risks involved in large-scale projects and possible returns is determined,

and it is aimed to deteriorate this balance with the implementation of the right strategies in a way that the returns will outweigh, includes features that can provide many advantages for the construction sector, which is the locomotive of the economy in developing countries (Dalyan, 2010). In the construction industry, it is possible to minimize financial losses and conflicts that may arise between the parties by systematically evaluating the risks depending on the size, complexity of the project, the techniques used and the environment in which it is carried out, that may be present in different proportions in each project. However, the methods used in the project evaluation phase in our country often do not allow the risks to be analyzed in a realistic way. Risk Management in construction projects consists of the stages of defining the risks, classifying them, determining their size and making appropriate decisions and making the necessary arrangements depending on the attitudes of the people regarding the risk, and includes objective/subjective data collection studies, numerical analysis and thought generation processes where different ideas are discussed and solutions are suggested. The main purpose of risk management practices is not limited to ensuring the elimination of risks, contrary to the current general belief, the effects of the risks on the project are determined, the future estimates are based on more solid foundations, the risk factor is also reflected in the regulations during the evaluation phase, and the appropriate contract terms are determined to raise awareness (Kocakulak, 1997). Typical risks in a construction project can be listed as failure to finalize the work at the time of the promised design and construction, failure to obtain the expected draft plan, detailed plan or building legal approvals within the time allowed in the design program, unexpected, adverse ground conditions causing the delay of the project, delay of the project. extreme weather conditions, strikes, unexpected price increases in labor and materials, the inability to find a tenant/operator after the job is completed, an accident causing a physical injury to one of the operators, deficiencies and faults in the building due to bad workmanship, natural disasters (floods), earthquake and so on, and the request by the contractor to meet the losses and expenses caused by the late completion of the design details, the project cannot be completed within the limits allowed by the customer's budget, the workforce and material cannot be put into operation on time and in the desired quality, lost from the contract, country of production, economic and political risks (Uğur, 2006).

Providing the resources required by the project when needed is only possible with a good project Procurement Management. Some of the services required by the project are outsourced due to the diversity of workload in construction projects. It covers procurement planning, purchasing decision, bid planning, evaluation of offers from vendors, selection of the most suitable offer, and contract management processes. Contract management is also within the scope of procurement management. Every construction project starts from the signing of a contract. Contracts include specific clauses to consider project-specific issues. Time and material contracts and unit price contracts can be high/low risk depending on the complexity of the project and other contractual terms. A termination provision offers the customer or manufacturer the right to cancel the deal. There are different types of contracts that used in the construction industry such as fixed price or lump sum contracts, PTA, cost reimbursable contracts, cost-plus incentive fees, cost plus fixed fees, and cost-plus percentage of costs, unit price contracts, time and material contracts. A contract SOW is a type of scope statement. SOW is a description of the work required for procurement. If an SOW is used as part of a contract to describe only the work required for that particular contract, it is called as contract statement of the work. A good SOW gives bidders a better understanding of the buyer's expectations (PMBOK Guide, 2017).

#### **2.4. PREVIOUS STUDIES ABOUT CRITICAL FACTORS AFFECTING SUCCESS IN THE CONSTRUCTION SECTOR**

Many researchers conducted studies on determining and defining the factors that affect the success in projects. The first of these studies was the work by Sayles and Chandler in 1971. Researchers wanted to identify critical project success factors with a systematic study. Although the factors they described were useful, they were far from impractical as they must be determined separately for each project. According to this study, the critical success factors affecting the project were (Pinto, 1986) competence of the project manager, project schedule, control system and existence of responsibility, communication, and monitoring, willing participation in project activities. It can be stated that the critical project success factors revealed by Sayles and Chandler as a result of their research were generally related to project management. The factors were mostly of the nature that can be valid in the implementation phase of the project.

The second study on project success was by Martin in 1976. The researcher investigated the factors affecting the success in the projects with a theoretical study. As a result of the study, the critical project success factors were revealed as defining the project objectives, choosing the organizational philosophy of the project, supporting general management, selection of the project team, allocation of sufficient resources, provision of information and control systems, planning and examination (Demir, 2006). Unlike Sayles and Chandler, among the critical success factors Martin suggested, those related to the project implementation phase were not too many. The support of the general management and conducting an examination can be considered as the success factors that were valid in the implementation phase of the project. Other factors were revealed by the researcher can generally be described as factors that may be valid in the formation and definition phase of the Project (Demir, 2006).

Cleland was another researcher who studied critical project success factors. He examined the project success from the owner point of view and stated that success would only be understood from two points. These two points were the achievement of the technical performance targets of the project on time and on budget and the contribution of the project to the strategic mission. In a study conducted by King in 1983, success factors of the Project were listed. According to King, the project summary, the support of senior management, the financial support, the project program, the training and development level of personnel, the manpower and organizational structure, the project reviews, the project implementation philosophy, the logistics needs, the facility and equipment support, and project user were the success factors of a project (Hughes & Tippett & Thomas, 2004). The critical project success factors revealed by Cleland and King did not concentrate on a particular phase of the project. They suggested factors that were relevant to all other phases of the project, except the termination phase.

Locke conducted another study on critical project success factors in 1984. The researcher prepared a list of factors that will increase the success of the project. Also, the study did not go beyond being theoretical. According to Locke, the critical success factors affecting the project were awareness of the project objectives by everyone, delegation of authority to the project by the senior management, appointment of a competent project manager, ensuring communication, establishment of the control mechanism, situation evaluation meetings (Demir, 2006). It can be interpreted that the first three of the critical success factors proposed

by Locke were related to the formation and definition phase of the project, and the other three were related to the implementation phase. Researchers did not suggest a factor for the cessation phase, similar to the study by Cleland and King. Similar to success factors determined by Sayles and Chandler, factors were usually related to project management.

Morris conducted a study on project success in 1986. In his study, he examined the situation of projects before their success and failure. The presence and absence criteria for achieving project success were examined. According to their findings, many external factors such as internal factors were required to be managed in order to achieve success. According to Morris, these external factors were listed as state-related factors, regulations, technical developments, political environment, and the internal factors were listed as efficient leadership, positive participant views, good planning, good process and job descriptions (Jaselskis, 1988). Unlike the aforementioned researchers, Morris also considered external factors while revealing the factors that affect success. Other researchers focused on internal factors. Therefore, they defined the internal factors affecting the project success in more detail than Morris. Factors put forward by Morris were more general.

When the critical success factors were revealed by the mentioned researchers as a result of theoretical studies examined together, various common items determined by the researchers stand out. Some of these factors have been expressed in the same way by different researchers. There were also common success factors that meant the same but were expressed using different forms of expression. When the critical success factors of the mentioned researchers were examined in this direction, the critical factors affecting the success of the project can be listed as clear definition of project objectives, appointment of an adequate project manager, and support of senior management, effective project team, planning activities, resource provision, communication and control. The critical success factors revealed by the researchers mentioned above as a result of theoretical studies are summarized in the Table 4.

<b>RESEARCHER</b>	<b>CRITICAL SUCCESS FACTORS</b>
<b>SAYLES &amp; CHANDLER</b>	Competence of the project manager
	Project schedule
	Control system and existence of responsibility
	Communication
	Monitoring
	A willing participation in project activities
<b>MARTIN</b>	Defining project objectives
	Choosing the organizational philosophy of the project
	General management support
	Organization and transfer of authority
	Selection of the project team
	Adequate resource allocation
	Providing information and control systems
<b>CLELAND &amp; KING</b>	The project summary
	Support from senior management
	Financial support
	Project schedule
	Training and development level of the staff
	Manpower and organizational structure
	Information and communication channels
	Project reviews
	Project implementation philosophy
	Logistics Needs
	Plant and equipment support
	Knowing the market and the project user
<b>LOCKE</b>	Knowing the project goals by everyone
	Transfer of authority from senior management to the project
	Appointment of a qualified project manager
	Providing communication
	Establishment of the control mechanism
	Due diligence meetings
<b>MORRIS</b>	Government Factors
	Regulations
	Technical developments
	Political environment
	Efficient leadership
	Positive participant views
	Good planning
	Good process and job description

Table 4 The Critical Success Factors Revealed as a Result of Theoretical Studies  
(Source: Created by the Author)

Since the studies were related to the critical success factors mentioned above were of theoretical origin, they had to be supported with empirical studies in order to be used in project work. A study required in this area was carried out by Pinto and Slevin (Pinto & Slevin, 1998). Unlike theoretically based studies, these researchers determined critical success factors with an empirical study and developed a factor set that most researchers were based on. Another feature of the results of Pinto and Slevin were that they supported the findings of the studies of theoretical origin so far. Pinto and Slevin established the following equation in their model as a function of project success factors:

$$S=f(x_1, x_2, \dots, x_n)$$

S: Project Success,  $x_i$ : Critical Factor of Success

In this case, it was accepted that success factors positively affected the success of the projects. The researchers developed the 10 factor model after meeting with representatives from various projects such as R&D, construction, and information systems. The 10 factors that Pinto and Slevin determined as a result of their studies were project mission and objectives, support of senior management, project plan and program consultation, personnel, technical issues, project acceptance, monitoring, communication and problem solving. One of the general characteristics of the model built on these 10 factors was that the factors were interdependent and had a time order. For example, it was important to identify or define the mission and objectives of the project before getting the support of senior management. If the expectations of the final user of the project were not determined in advance and integrated into the project with an appropriate communication and consultation system, it will negatively affect the success of the project. However, in practice, the time order of the factors may sometimes not be clearly differentiated due to the overlaps in the order (Pinto & Slevin, 1998). Another feature of this model was that the first seven factors can be ordered in a critical orbit-like orbit according to information flow and time order. (Figure 3.1) Other factors, in terms of time order, were present in the system simultaneously and in harmony with these seven factors. For example, monitoring and control should take place in all phases of the project, regardless of the time sequence. This model was allowed project managers to actively intervene and monitor the project (Çimen, 1994).

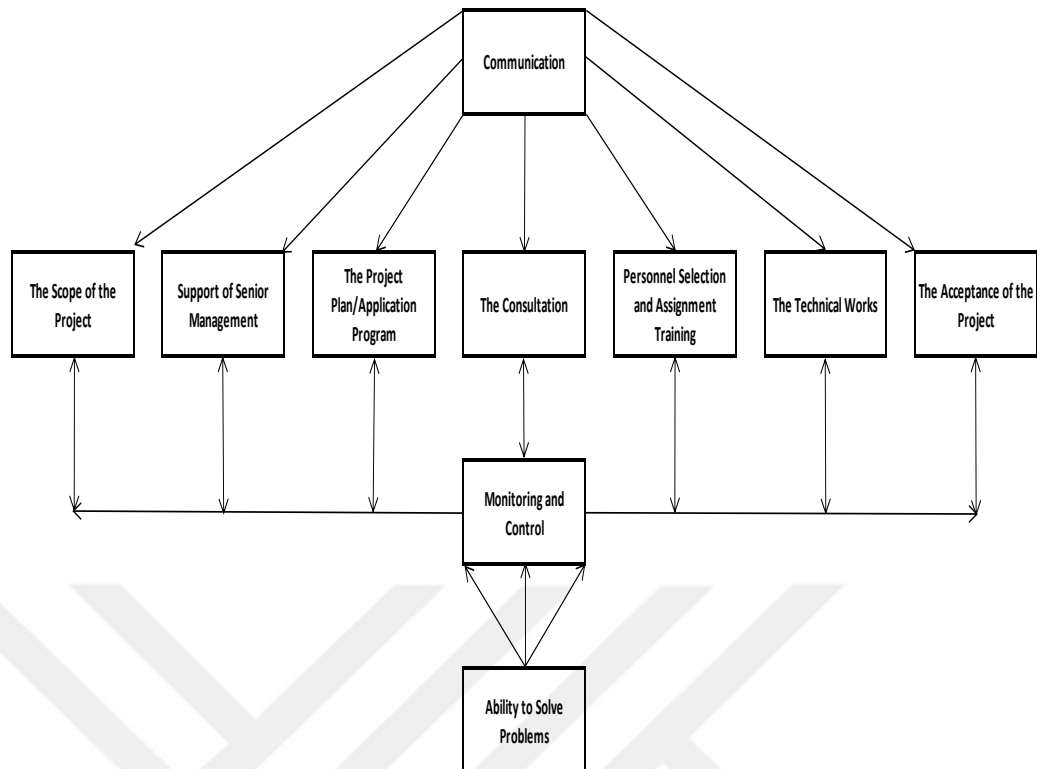


Figure 2 The Relationship Between Success Factors in Pinto and Slevin's 10 Factor Model (Source: Pinto, J.K., 1986. Project Implementation: A determination of its critical success factors, moderators, and their relative importance across the Project life cycle, PhD Thesis, University of Pittsburgh, Pittsburgh)

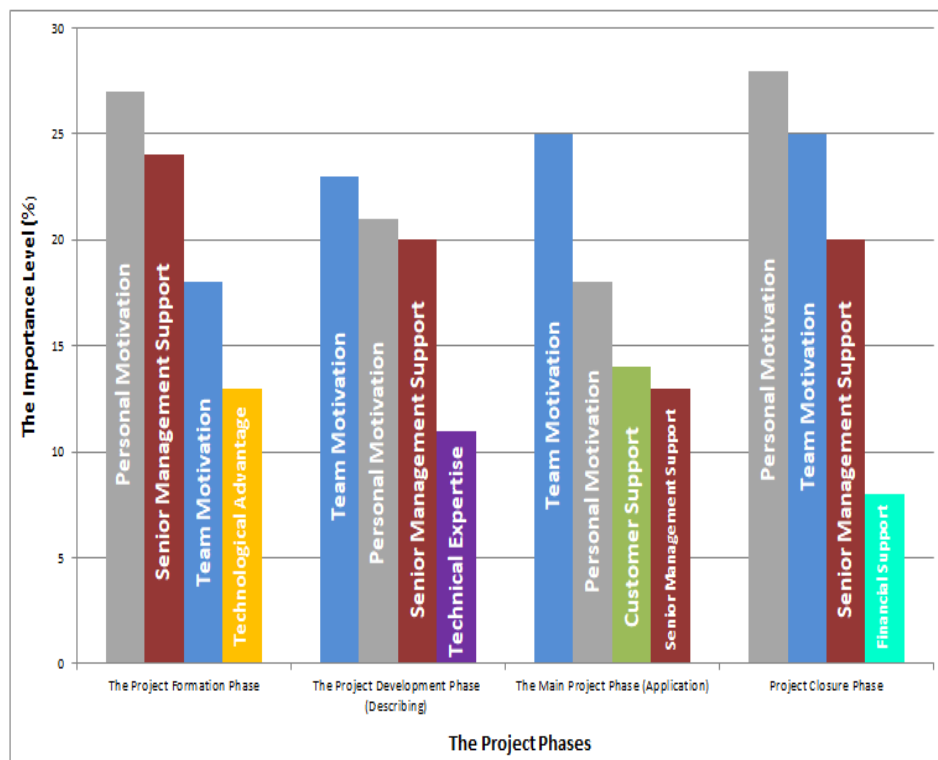
Pinto and Slevin argued that critical success factors may differ depending on the project phases. In a study, it was described as a continuation of the 10 factor model, they examined the project success factors throughout the life of the project. Researchers identified important success factors according to the project phases. According to this research, the importance of success factors was not equal or stable throughout the project. Different sets of factors were gained importance in different project phases. 418 participants conducted a subjective study on 72 questions and 10 success factors. As a result of this study, the success factors determined according to the project phases were as follows (Jaselskis, 1988):

- The Project Formation Phase; project mission and objectives, consultation
- The Project Development (Describing) Phase; project mission and objectives, support from senior management, project acceptance
- The Main Project Phase (Application Phase); project mission and objectives, problem solving, project plan and schedule, technical issues, consultation



- The Project Closure Phase; technical issues, project mission and objectives, consultation.

As it can be seen in the Graph 4, different success factors were effective in different project phases. In addition, all success factors that were effective in a project phase were not at the same importance. The personal motivation factor with the 27% of importance level was the most importance among the success factors that affect the project formation phase. At this phase, the least important factor was the technological advantage with the 13% of importance level. The team motivation factor was the most important factor in the project development phase of the project with the 23% of importance level. At the same phase, the least important factor was technical expertise with the 11% of importance level. In the application phase, the team motivation factor was the most important factor with the 25% of importance level, and the top management support factor was the lowest factor with the 13% of importance level. At the project closure phase, personal motivation was the most important factor with the 28% of importance level, and financial support was the least important factor with the 8% of importance level. As can be seen in the Graph 4, there were also common factors that were effective in different phases of the project. However, the importance of these factors varied.



Graph 4 The Importance of Success Factors According to Project Phases  
(Source: Created by the Author)

## **CHAPTER III**

### **METHODOLOGY**

#### **3.1. RESEARCH DESIGN**

Within the scope of this research, a detailed study was made on the Project Management Methodology applied by the project companies in the construction sector. In addition, the effect of Project Management Criteria on the success of the project companies was examined. In order to better understand the use of Project Management Methodologies and Standards in the construction industry, the project phases from the start of a project to its completion was discussed with a Case Study. A project where the project management was implemented effectively and was ultimately concluded in success was examined as a Case Study. Then, the factors affecting the success of the project were examined by in-depth face-to-face interviews and surveys with four experienced companies and their experts in this sector in Turkey, to achieve aim of the thesis. Thus, 4 successful companies were selected out of the first 10 firms that took place in ranking by "CSN 100 Consulting List of Turkey in 2021" for the interview and survey. (Interviews were conducted with 4 successful firms out of the first 10 firms that took place in ranking by "CSN 100 Consulting List of Turkey in 2021"). "Turkey CSN (Construction Sector News) 100 Consultancy List" is a list based on the consultancy contracts signed in the last 3 years (2021-2019), and instant changes on the contracts signed during the year. There are listed total of 100 companies on the list.

In order to achieve aim of the thesis, the research was focused to three main contents. First of all, the awareness and knowledge of Project Management Methodologies and Standards of these companies are researched and analyzed. Secondly, detailed research was conducted on the use of Project Management within these companies. A detailed investigation is made on the Project Management Knowledge Areas and Process Groups was applied in these companies. Finally, the contribution and effect of the use of Project Management on the success of these

companies was examined and interpreted. As the success was the subject examined in the research, it was elaborated the selection of the companies that have been operating in the sector for a long time and have at least 30 years of experience while choosing 4 of the companies in the CSN 100 Consulting List of Turkey in 2021. Since the role of the project manager in the success and management of the project was one of the topics examined in the research, the participants were selected from those who worked as Senior Managers in these companies. The job titles of the interviewees were General Director, Project Manager, CEO and Deputy Project Manager.

### **3.2. RESEARCH STRATEGY**

In this study, data was collected by applying qualitative approaches. While the qualitative approach was applied with face-to-face interviews, the research was supported by questionnaires. In-depth interviews were focused on the usage of the project management practices in the construction sector, the current challenges faced in project management, and the effect of project management on success. Meanwhile, structured interviews with company managers were focused also on the role and contribution of the project manager in the management and success of the project. At the end of interviews, 4 questionnaires were collected from every company. Participants were asked to state their views on the project management standards, knowledge areas, process groups, tools and techniques described in the literature review of the study and the contribution of their use to project success. In addition, based on their experiences, the participants were asked to list the criteria that affect the success in construction projects.

### **3.3. DATA COLLECTION**

Data collection for this research consisted of two stages related to the three objectives of the study. The first stage of data collection was to collect information about the company's and the interviewer's profile. Following this information, the Project Management Practices in the construction sector was examined in the interview. The second stage of data collection was to gather information about the awareness of the Project Management Methodologies and Standards in the construction industry, the use of Project Management in the sector, the application of the Project Management Knowledge Areas, and their effect on the project success.

The interviews were conducted in English language. The companies specifically were requested that the names of the interviewed persons and their companies remain confidential. For ethical reasons, company and interviewer information were not shared clearly.

### **3.4. ANALYSIS OF DATA**

The research was conducted as qualitative analysis, and the experiences and opinions of the participants were analyzed in detail. For the purpose of clearer illustration, Microsoft Office Excel was used for demonstrating the tables and figures. All obtained data and their detailed analysis were presented in Chapter 5.



## **CHAPTER IV**

### **A PROJECT CASE**

In order to better understand the use of project management methodologies and standards in the construction industry, the project phases from the start of a project to its completion were discussed with a case study. The name of the company and the name of this sample project were kept confidential. The work as an example includes Technical Assistance and Supervision Services. The Project was about the provision of Technical Assistance (TA), and main tasks of Supervision Services determined by the Company were as follows:

- Administrative, technical and financial capacity building for the Water Utility Department (WUD)/Project Implementation Unit (PIU) of the Municipality;
- Modernization of the WUD and provision of the necessary training and support for institutional sustainability;
- TA to the WUD/ PIU by practical training including project management, and management of the Wastewater Treatment Plant (WWTP) after construction, TA to the WUD/PIU in performance of leakage detection and Non-Revenue Water reduction program
- Preparation of Sludge Management Plan to assess the final usage alternatives of the sludge produced at the wastewater treatment plant.
- Contract management and construction supervision for the implementation of wastewater treatment plant (Works Contract)

The main works WWTP (FIDIC Yellow Book) carried out were as follows: design and build of approximately 15,500 m<sup>3</sup>/d average flow rate capacity wastewater treatment plant including the supply and installation of electrical and mechanical equipment and all auxiliary facilities for the operation of the plant, design and build of approximately 70 m, 1200 mm diameter reinforced concrete collector,

testing and commissioning, operation and maintenance, training of the municipality staff.

#### **4.1. PRE-CONSTRUCTION PHASE OF THE PROJECT CASE**

The first step at the beginning of the project was the investment decision. It was about the stage of deciding on an investment in a region or area. The investment decision may arise from a need such as a factory, business center, power plant, wastewater treatment plant, and drinking water line or it may be for financial gain. Public institutions can invest to meet the needs such as transport, infrastructure, and landscaping. In the case of legal or private persons, the person himself or his organization can also make an investment decision. For example, building a house on a land in Yuksekova is a personal investment decision. An institution's decision to build a wastewater facility is an institutional decision. Going back to sample project, the wastewater treatment plant in Yuksekova was an investment decision for the public needs. The investment was initiated after the decision made. All necessary feasibility studies were conducted. The investment was decided by evaluating the issues such as the project capacity, location and environmental impacts. The next stage after the investment decision made was about finding financial source(s) for the investment. In this sample project, Yuksekova Municipality has determined an investment need in Yuksekova. Yuksekova Municipality received investment aid from the Ministry of Environment and Urbanization (MoEU) for this project. The MoEU has received financial support from the European Union (EU). This project was a European Union Project and conducted by CFCU (Central Finance and Contract Units). The contracting authority was General Directorate of EU and Foreign Relations within the MoEU. The responsible institutions for the implementation of this contract were the General Directorate of EU and Foreign Relations within the MoEU as the Contracting Authority, and the Operating Structure and the Yuksekova Municipality as the End Recipient for the project.

Before beginning execution of the project, the construction and operation phases of the investment were planned. During the construction phase, both office and field studies were carried out. Within the scope of field studies, map and measurement, dimensional drawing, ground and survey studies, environmental effects and similar project field studies were carried out. Preliminary project details such as architectural, static, mechanical, electrical, plumbing, infrastructure,

landscaping and so on are created, and productions were defined in office work. Following the preliminary project, final and application projects were prepared. Cost studies were made and prepared for the project. As a result of these studies, the approximate cost of the project was determined. After the investment studies and planning, the project was ready to tender process that was an invitation to bid for a project and to accept a formal offer such as a takeover bid. Contractors, service providers and consultants of the project were determined by the tender procedure. The tender was done by collecting offers, through the tender procedure or through direct agreements. The administration determined the tender method, prepared the specifications and presented the project to tender. When the project's tender notice was announced, tender documents were published by the administration, and interested companies were asked to submit their proposals. Part of the firm's involvement in the project process started at this stage. The stages I mentioned earlier were about how the work progresses in the background. In this project, the tender was carried out in two stages. The first stage was the pre-qualification stage. Bidders submitted a Prequalification Dossiers that included the financial and technical capacity of the company indicating general and specific work experiences. This first stage was called as Expression of Interest (EOI) stage. The companies that were found to be shortlisted in the first stage were invited to the second stage of the tender. This stage was called RFP. The firms submitted the technical and financial offers to the administration within a certain time period. The deadline for the submission of tender documents was determined as one month after the tender. The firms conducted both technical and financial feasibility studies in this process. They specified the scope, goals and objectives of the project. They identified the risk analysis, risk responses and risk solutions for every possible risk. After the feasibility studies, firms submitted the proposals in two separate envelopes which were financial proposal and technical proposal. In the technical proposal, the companies explained how and in what method they will do this work before they win the tender. In this context, they clarified work plans. They created a work planning with a Gant Chart by specifying the dates and work descriptions in detail. They mentioned about which techniques they will use while doing the project. They defined the key personnel that they will employ in the project, and their experiences, also the roles and responsibilities they will take on this project. In the meantime, companies were given the right to make site visits in order to better understand, observe and analyze the

work. A requesting clarification was provided by the Administration for the issues that was not understood or requested to be explained about the tender documents. Tenderers was submitted the questions in writing 21 days before the deadline for submission of tenders. Companies introduced their company profiles, listed and demonstrated their similar work experiences, completed work experiences and ongoing works to prove their competence for this work. Also, they presented the official and legal documents of their companies. In the financial proposal, they offered a comprehensive offer with details about man-month salary calculations for each key personnel, estimated numbers of working days for each category of expert during the period of implementation of the tasks, fee rates, budget breakdown, overhead expenses and how much this work will cost, and so on.

Tender process was consisted of announcing, opening, evaluation, and final selection of the tenderers. The Administration reviewed both offers of all companies, including financial and technical proposals. The quality of each technical offer was evaluated in accordance with the award criteria and the weighting detailed in the evaluation grid. Upon completion of the technical evaluation, the envelopes containing the financial offers for tenders that were not eliminated during the technical evaluation were opened (i.e. those with an average score of 75 points or more). Tenders exceeding the maximum budget available for the contract were unacceptable and eliminated. The best price-quality ratio was established by weighting technical quality against price on an 80/20 basis. The successful tender was informed in writing that its tender has been accepted. The successful tenderer was then confirmed availability or unavailability of their key experts within 5 days from the date of the notification of win. Tenderers were bound by their tenders for 90 days after the deadline for submitting tenders or until they have been notified of non-award. The administration was announced the winner of the tender within approximately 3 months. The results of the offers were clearly listed and included the prices, the number of candidates and scores. Within 30 days of receipt of the contract was already signed by the contracting authority, the selected tenderer, the company, was signed and dated the contract and returned it to the contracting authority. 15 days after the contract was signed, the project period was started with the delivery of building site.

As it is seen, the planning of a work was started before the work is taken or won. The company was used all Project Management Methodologies and Project



Management Knowledge Areas, including Project Integration, Scope, Schedule, Cost, Quality, Resource, Communication, Risk, Procurement, and Stakeholder Management during the tender preparation process. In addition, the company followed Project Management Process Groups such as Initiating and Planning Process Group. This planning, which was made before winning the project, visibly affected the success of the project. In this way the project's success, productivity, satisfaction, integration, and quality were increased. The project's duration, cost, and possible risks were decreased. These project management plans, made at the tender stage, was provided positive reflections in the future. Since the customer was a wide source of suppliers, it was the ability to select those who can produce the highest quality product or service at the lowest price. This helped with saving money without having to compromise on quality. Although the bidding process took time, procurement was a profitable, long-term process from an organization's perspective. Additionally, the bidding created a competition market. Each bidder tried to reduce redundancies and inefficiencies in order to reduce cost and improve quality. This was because the auction selection depends on quality and price. All of these were provided healthy competition in the market, which supports innovation and new ideas. As a result, the tender process was a process that is suitable for the scope of the project, efficient, timely, quality, cost-effective, providing satisfaction for all stakeholders and helping to reduce risks. All these were the first steps that lead the project to success. This project was started with the project site delivery according to contract.

#### **4.2. PROJECT MANAGEMENT PRACTICES FOR THE PROJECT CASE**

The company was aware of the need of project management for the project to be successful. For this reason, the company used the professional project management in all processes from the starting to the closing of the project. The staff working in the PMO prepared a Project Management Plan, and all works were carried out within this framework. In this part, the project management applications used in the project case was examined in detail. The application of project management knowledge areas and processes, the methods, tools and techniques were examined separately for this project.

#### **4.2.1. Project Integration Management in the Project Case**

The company created a project initiation document covering business needs, current customer needs and the new project to be created, service and results, within the scope of Integration Management. The company developed the Project Management Plan, and documented the necessary actions to define, prepare, integrate and coordinate all sub-supporting plans. The company analyzed the background of the project by conducting project management disciplines before starting the work. The company planned the project management overview which was mentioned in the Figure 3. Also, the company analyzed the main challenges of the project and described. The water and wastewater sector, operational and financial performance of municipal water management was poor, inadequate revenue generation and services were not provided efficiently by the current situation in Turkey's. Resource wastage, high level of physical losses and lack of financial logic in operations and investments were the weaknesses of this project. Financial performance was hampered by the lack of capacity of the revenue administration in financial management and investment programming and budgeting. The municipality was lacked the financial resources, technical knowledge, human resources capacity and institutional structure required to manage infrastructure projects. The responsibilities for environmental protection issues were mainly borne by the MoEU at the Central Government level and by the respective Local Administrations (Municipalities and Special Provincial Administrations) at the Local Government level. During the work, the company used Project Integration Management successfully and it completed following the Project Tasks:

- The company established a supervisory organization including monitoring systems to ensure a fast and efficient administration of the activities, a timely implementation of the works and an efficient use of the financial resources.
- The company prepared a benchmarking system as a basis for performance monitoring.
- The company prepared of manual/guidelines for operation and maintenance for water and wastewater assets.

- The company prepared of an Asset Management Plan including all water and wastewater assets lists with their definition of functionality, condition and valuation through an asset management program.
- The company prepared of a Regulation on Discharge of Wastewater to Sewerage System, if necessary.
- The company prepared established a computer based monitoring system for operation and maintenance activities, and prepared a supervision plan for the training in operation and maintenance period.

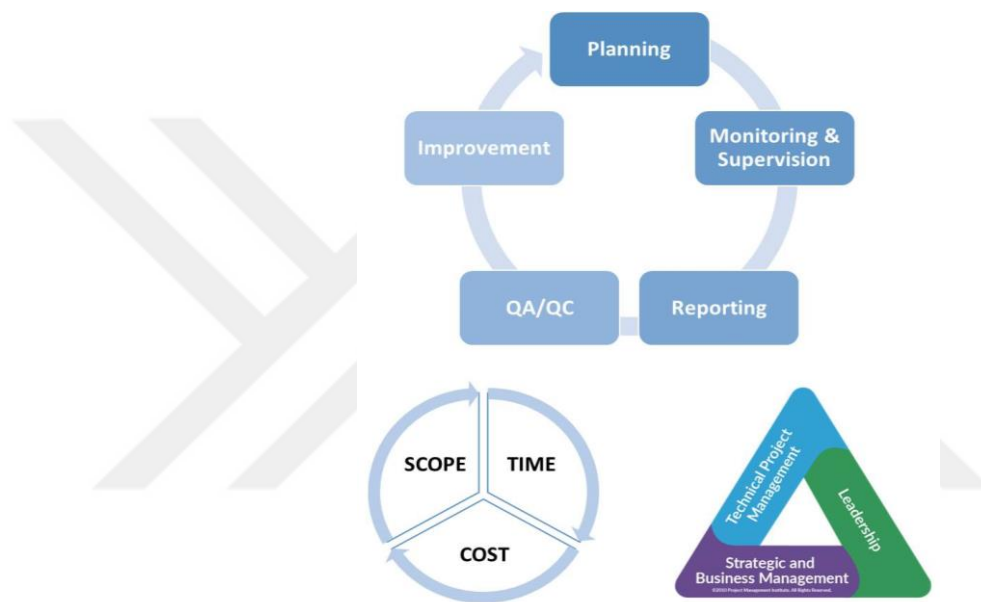


Figure 3 The Project Management Overview of the Project  
(Source: Created by the Author)

#### 4.2.2. Project Scope Management in the Project Case

The company determined the overall objective of the project by conducting project management disciplines before starting the work as in the Figure 4. The objective of work was to accelerate Turkey's accession to the EU by enabling Turkey to achieve a high level of environmental protection and compliance with the EU water and wastewater sector directives. The purpose of the project was specified with project management disciplines before starting the work. The purpose of the project was to provide TA to Yuksekova Municipality through administrative, financial and technical capacity building, modernization of the WUD, and assisting the Municipality in setting up and operating an efficient water and wastewater department WUD, and provision of construction supervision for the wastewater

treatment plant according to FIDIC Yellow Book. Then, the Company's Role was determined in this project. The company was a consultancy, technical assistant and controller firm. The company audited the contractor firm determined by the Administration through the tender procedure, followed the process, and as a Consultant, ensured that the work was completed in accordance with the quality and procedures. The firm worked as a Consultant under the administration, the contractor firm was worked under the firm, and subcontractors were worked under the contractor firm. The company was not responsible for the subcontractor firm. The company played a crucial role in all phases of the project implementation. The scope of the Consultancy Services was comprised the preparation and the execution of the capacity building program based upon a training needs assessment for the Municipality/WUD and PIU, and a TA for the WUD and PIU. The company demonstrated its understanding of the local conditions and proposes, and practical measures and activities to be carried out within the frameworks of the Consultancy Services. Eventually, the company determined the target group of the project before the work started. The final target group for this project was the residents of the Yuksekova Municipality who will benefit from improved quality of the Municipal services and the functioning Wastewater Treatment Plant. The overall performance of the works was checked and controlled at all stages continuously.

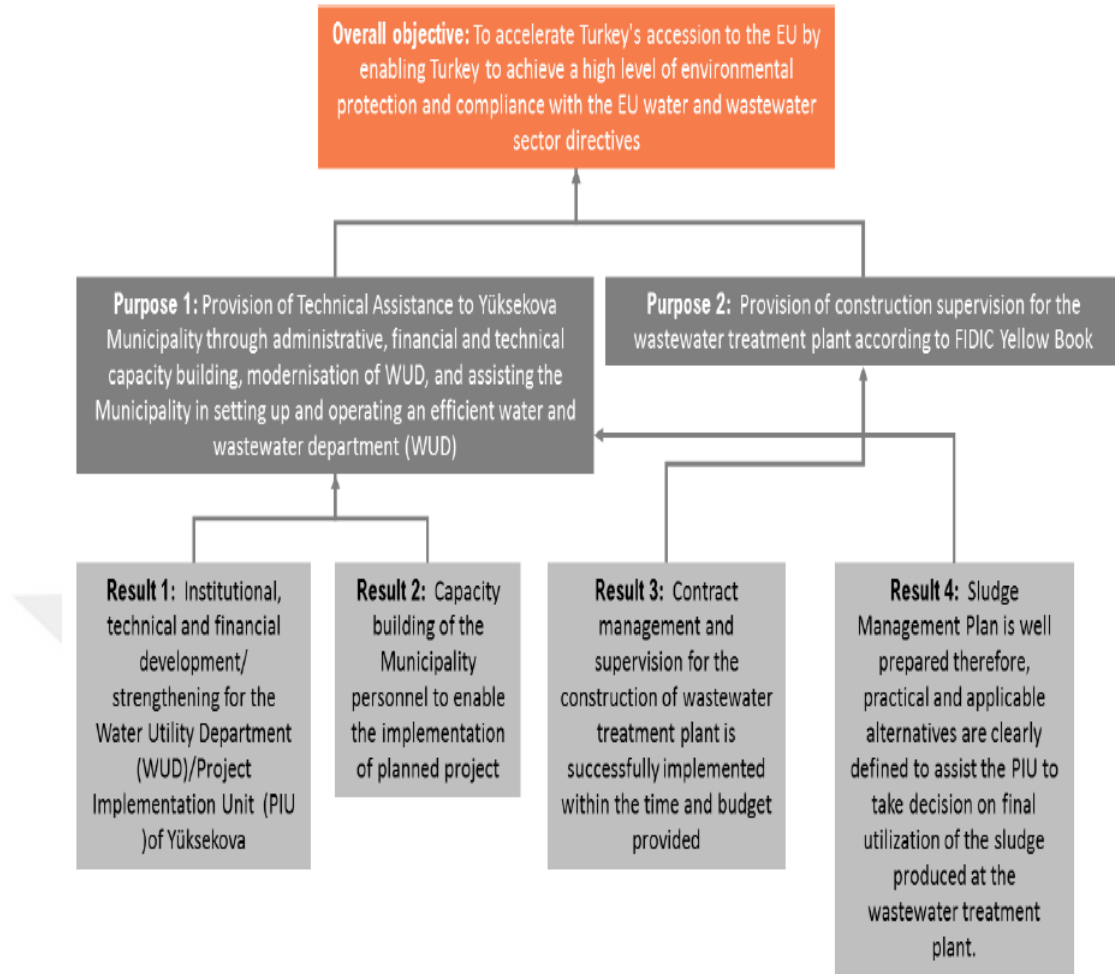


Figure 4 Interrelation of Objective, Purposes and Results  
(Source: Created by the Author)

#### 4.2.3. Project Schedule Management in the Project Case

The company developed the Schedule Management and prepared Schedule Management Plan within the project management framework. The construction activities were described in Table-5, and their durations were determined in Table-6. The estimated sources of activity were developed in the timeline. The company prepared Gantt Chart Diagrams for determining the start and completion dates of the project, and used CPM and PERT Techniques for the time planning. The Duration of work was determined according to studies. The works with the duration of 30 months construction period and 12 months of Defects Notification Period (DNP) was supervised in this project comprises construction of wastewater treatment plant. The company did not delay any action required to be taken by the company during the construction. During the work, the company used successfully Project Schedule Management, and completed the following Project Tasks:

- The company proposed new organizational structure including technical operations, and improved the (administrative, technical, financial, etc.) working procedures and processes.
- The company defined the job descriptions for each department and made all staff aware of their responsibility, and confirmed the responsibilities and duties of the Contractor’s supervisory personnel with the Contracting Authority.
- The company prepared a schedule of defect and maintenance criteria to guide assignment of liability for defects during the Defects Notification Period. Also, the company was prepared a schedule of inspections needed to verify if any defects have developed in the completed works during the Defects Notification Period.
- The company prepared and submitted Progress Reports which included progress reporting, and photos, physical and financial progress schedules, minutes of meetings related to the duration of the report, and was prepared ad hoc technical reports.

<b>Construction Supervision including Pre-construction, Construction and Post-Construction activities</b>	
<b>Pre-construction Activities</b>	General assistance to the Contracting Authority
	Preparation for the Execution of the Contractor's obligation during Construction and Post-Construction
<b>Construction Activities</b>	General Site Management and Program Monitoring
	Financial Monitoring, including; Management of payments, Variations and Works Contractor and Employer claims
	Technical and design including; review of the Works Contractor Documents, material submissions, issuing further design as required
	Environmental oversight
	Quality Assurance/Quality Control (QA/QC)
	Tests on Completion and Taking-Over
	Preparation for the Execution of the Contractor's obligation during Post-construction
	Reporting
<b>Post-construction Activities</b>	Tests after Completion
	Defects Notification Period Preparation for the execution of the Contractor's obligation during post-construction
	Works Contract(s) Financial Close-Out
	Reporting

Table 5 Construction Supervision Activities  
(Source: Created by the Author)

<b>Task</b>	<b>Indicative Schedule of Implementation</b>	<b>Completion (End of the Month)</b>
1	Project commencement (1 Month)	1
2	Inception Report (2 Months)	2
3	Training Need Assessment Report (TNA) (3 Months)	5
4	Modernization of WUD and the Municipality (16 Months)	24
5	TA and Capacity Building Program for Municipality/WUD and PIU (12 Months)	30
6	Design Review of WWTP and other designs (4 Months)	5
7	Supervision of wastewater treatment plant (30 Months)	30
8	DNP of wastewater treatment plant (12 Months)	42
9	Draft Final Report	42
10	Final Report	45

Table 6 The Indicative Main Timeline of The Project  
(Source: Created by the Author)

#### **4.2.4. Project Cost Management in the Project Case**

The company planned the project costs. Travel costs and subsistence allowances for missions, and outside the normal place of posting (Yüksekova) were undertaken as parts of this contract. Cost of the study tour was calculated as full-board accommodation, costs of travel (plane, bus, train), and other expenditures (e.g. intercity travel) of all the participants. However, cost of translation, interpretation, printing of training materials regarding study tour deemed under fees and visa, and passport costs of end recipient representatives were not deemed under incidental expenditure. Visibility material and events such as symposiums, seminars, ground breaking/opening ceremony for the works components, sampling and testing concerning the wastewater, sludge and receiving body cost were estimated. During the work, the company used Project Cost Management successfully, and completed following Project Tasks:

- The company prepared and implemented a “Financial and Operational Performance Improvement Plan" (FOPIP). This includes rerunning of the cost-benefit analysis financial model with realized figures during the implementation.

- The company studied of the works cash-flow schedules with the Works Contractor and the Contracting Authority. Also, the company prepared of a long-term NRW reduction program with annual targets on the reduction of each of the two main water balance components, and estimation of the appertaining investment and/or (extra) operation costs to achieve the stipulated goals.
- The company implemented medium-term infrastructure improvement plans that can be financed, and monitored construction costs and was prepared monthly construction cost reports, included a statement of projected cash flows for the project; a statement of project expenses, and payments; a statement of outstanding payments due under the contract; a statement of adjustments to the Contract Sum due to variations etc.
- For WWTP, one year operational cost from the taking-over was monitored and deviations from the Works Contract regularly was recorded and reported to the Contracting Authority. Also, one-year operational cost from the taking-over (during DNP) was monitored and deviations from the Works Contract regularly was recorded and reported to the Contracting Authority.

#### **4.2.5. Project Quality Management in the Project Case**

The company's team was executed its consultancy and project management processes according to specific plans and procedures, as per its ISO & PMP Certifications. The project was started with a statement of work or a business case, and the project was made use of our Enterprise Environmental Factors (codes & regulations, government & industry standards, organizational culture and structure, etc.) and Organizational Process Assets (organizational standard policies and process definitions, templates, historical information & lessons learned knowledge base, etc.). The Company was responsible for supervising the construction and installation of the works as well as the inspection and testing of all materials, continuous performance reporting, validation of progress payment, and handing-over activities. In order to achieve physical quality in designing for the project, four essential principles were addressed as in the below Figure-5.



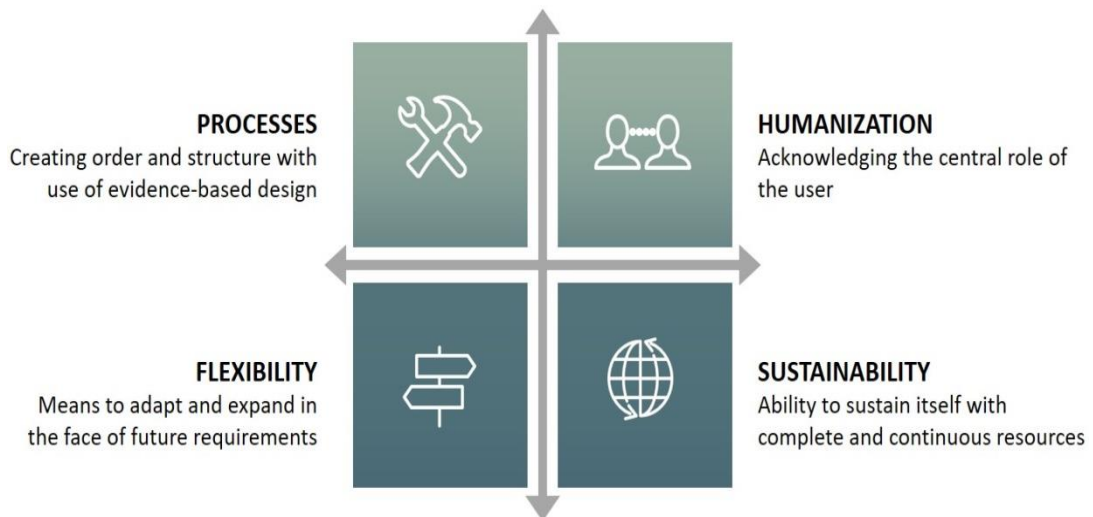


Figure 5 Four Essential Principles of the Project  
(Source: Created by the Author)

During the work, the company was used successfully Project Quality Management Knowledges and Practices and completed following Project Tasks:

- The company prepared a Procedures Manual which will outline procedures for the site supervision as well as the recording of work performed by the Works Contractor. The manual included preparation of QC and Administration procedures and forms. Further, it included procedures for monitoring and updating of work Program for the entire project implementation as well as review of the Works Contractor's design, if any, and construction Program.
- The company ensured that the Works Contractor performs the Works in accordance with the approved H&S Plan and any other H&S provisions included in the Works Contract or existing in Turkish law.
- The company monitored and reported on the progress of the works with respect to time, quantity, and quality, including submission of monthly progress reports covering the work in progress.
- The company checked the Works, quality of executed Works, quality of built-in materials and installed Plant checking quality certificates, approvals, statement of compliance, certificates, guarantees etc. Also, the company was checked for compliance with the EIA and controlled all the mitigation measures and the monitoring plan from the EIA study to prevent the environmental pollution due to the construction works (e.g. oil, leakage, noise, air pollution).

- The company established a computer based monitoring system for operation and maintenance activities.
- The company maintained of a presence on the site, as well as specific visits by specialists, in order to observe and to report on the progress and the quality of construction and the installation of equipment.

The Company was reviewed the Contractors H&S plans against Turkish safety legislation and applicable international standards, and against accepted industry best practices. The Company was also reviewed and monitored Contractors Environmental & Social plans against Turkish legislation and applicable international standards. The Occupational H&S Specialist employed on-site was very watchful for infringements in safe working practices which were notified to the Contractor for immediate action. The company was placed occupational and public H&S at the highest priority within the project. Steps were taken to ensure that all safety risks in the works were assessed in advance, and a risk minimization program introduced in advance of the relevant construction/commissioning activity. The company was known that the Company's operations had an impact on the environment. Therefore, the company was committed to the continuous improvement of its environmental performance and confirmed that it was an endeavor, where applicable, to meet the standards outlined in relevant environmental guidelines and legislation. Within this context, the company complied with all applicable environmental law, regulations and other requirements to the best of its ability, was used its resources and capabilities to promote energy efficient and environmentally friendly outputs, and promoted recycling and reuse of waste materials. Below Table-7 was a summary of key plans and procedures that were followed within this Project:

Reference No	Plan / Procedure	ISO 9001:2008 Reference
PMP-001-R00	Project Management Plan	PMBOK 6 <sup>th</sup> Edition
DMP-002-R00	Design Management Plan	7.3
SAP-003-R00	Statutory Approvals Plan	
RMP-004-R00	Risk Management Plan	4.1, 5.4.2
COP-005-R01	Communication Management Plan	5.5.1, 5.5.3
QMP-006-R01	Quality Management Plan	All
CMP-007-R00	Change Management Plan	5.4, 5.4.2
DEP-008-R00	Submittal Management Plan	
PMP-009-R00	Contract Management Plan	
PCMP-010-R00	Project Control Management Plan	

Table 7 Followed Summary of Key Plans and Procedures within the Project  
(Source: Created by the Author)

#### 4.2.6. Project Resource Management in the Project Case

The company made a resource estimate and identified the required resources. The company prepared a resource management plan that was included the people, materials and infrastructure (materials, equipment, facilities, services, information technology, information and documents, funds) required to carry out the project activities. The project organization was defined and the project team developed. Due to the very large scale of the project, several well experienced experts worked in the project. These were Team Leader, Project Manager, Deputy Team Leader, Resident, Civil, Mechanical, Infrastructure, Engineers, Wastewater, Sanitary, Chemical Engineers, Process and Design Engineers, Senior and Junior Non-Key Experts, Support and Backstopping Staffs. The qualifications, duties and responsibilities of the personnel were determined. The company provided all the necessary experience, expertise and backstopping skills required to fulfill the expectations of the Client and the Beneficiary. The Project Organization Structure was mentioned in Figure-6.

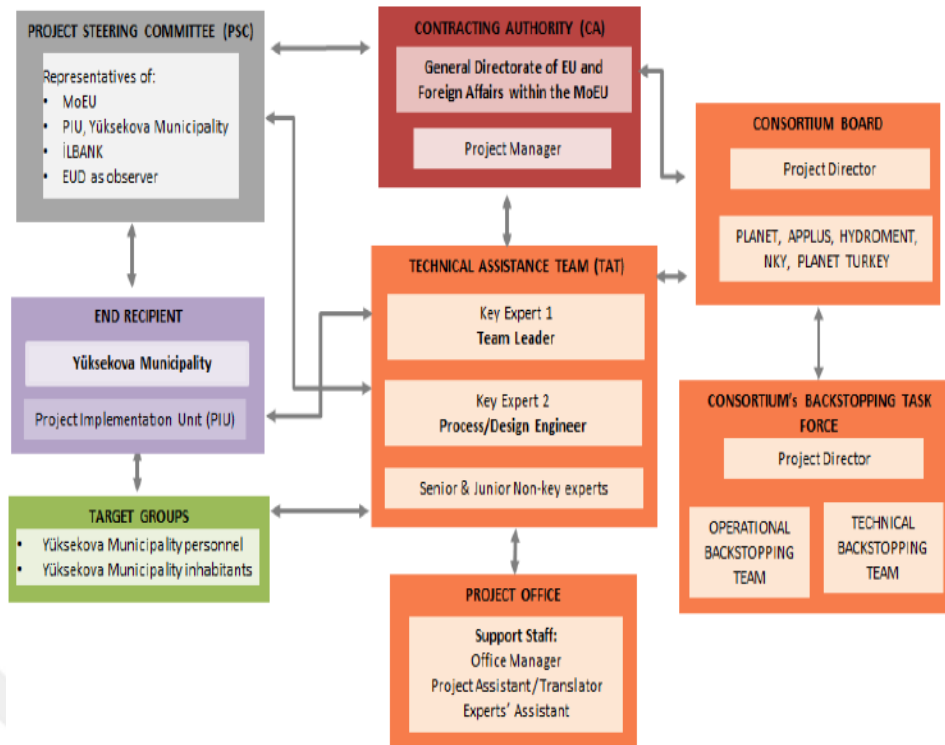


Figure 6 The Project Organizational Structure  
(Source: Created by the Author)

The company's approach was the selection and deployment of the technical assistance and supervision team the company was assembled to lead, managed and implemented the Project. The company's approach was seen in Figure-7. The company identified the right skills for each task, and selected key and non-key experts with long-standing experience covering all aspects of the project and ensuring efficient implementation.



Figure 7 The Principles of the Company's Approach  
(Source: Created by the Author)

Also, the company planned the office accommodation for resource management. Office accommodation of a reasonable standard and of approximately 10 square meters for each expert working on the contract was provided by the following party in accordance with the implementation stages. The company provided the costs of technical experts, office running expenses and consumables, an adequate management of organizational and logistical support to all the experts with strong backstopping, necessary support equipment for the experts to enable them to fulfill their duties efficiently, adequate secretarial and interpreting services for all activities. They provided all necessary work permits for its staff. Equipment that necessary to perform the services consisted of computers, software, printers, telephones, fax, copy machines, etc. was provided by the company. Expenditures such as translation, interpretation, and printing of all reports and materials, refreshments, etc. required for training, workshops, and meetings also was provided by the company. The review of the organization and operation of Company PUC was considered the relevant international experience, such as the principles of the Effective Utility Management (EUM) initiative (developed in the US), the approach of which was based around the Ten Attributes of an Effectively Managed Utility and Five Keys to Management Success, as follows and in Figure-8.



Figure 8 The Ten Attributes of Effectively Managed Utilities and Five Keys to Management Success (Source: Created by the Author)

- **Ten Attributes of Effectively Managed Water Sector Utilities (Attributes):** These Attributes was provided a clear set of reference points and are intended to help utilities maintain a balanced focus on all important operational areas rather than reactively moving from one problem to the next or focusing on the “problem of the day.” The ten attributes were: Product quality, customer satisfaction, Stakeholder Understanding and Support, Financial Viability, Operational Optimization, Enterprise Resiliency, Employee and Leadership Development, Infrastructure Strategy and Performance, Community Sustainability, Water Resource Sustainability.
- **Five Keys to Management Success:** These proven approaches were helped utilities maximize their resources and improve performance. By embedding the Five Keys to Management Success into their workplace culture, utilities create a robust foundation for strong, ongoing performance in the Ten Attribute areas. These five keys were: Leadership, Strategic Business Planning, Knowledge Management, Measurement, and Continual Improvement Management.

#### **4.2.7. Project Communication Management in the Project Case**

The Company kept the information regarding the works or activities of the Client confidential and no information was conveyed to the third parties without written confirmation of the Client. Regular progress reports and meetings have created the ability to anticipate and forestall problems and delays and were therefore amongst the most important functions of the team. The Company initiated and chair weekly site meetings and semi-monthly progress meetings with each contractor. Minutes of these meetings were prepared and submitted to all participants within 2 (two) days. Periodic inspections and site meetings were held between the Company’s team and the Contractor was reviewed progress over the previous week and was confirmed works to execute in the following week. These meetings were the vehicle for identifying any delays in the overall schedule and reviewing the measures that the Contractor proposed for overcoming these delays. During the work, the company used successfully Project Management Knowledges and Practices and completed the following Project Tasks:

- The company held a pre-construction meeting (as appropriate) with the PIU, the Municipality / WUD and the Contracting Authority, and prepared, and distributed of visibility materials (brochures, flags, pen, boards, notebooks etc.) during organization/events etc.
- The company arranged visibility organization such as seminars/symposiums to the public, and ensured efficient communication and reporting mechanism with the Contracting Authority, the EU Delegation and the PIU as directed by the Contracting Authority.
- The company held project kick-off meeting with the stakeholders and the Works Contractor, and arranged Weekly/Monthly Progress Meetings. The progress of the project was monitored during the weekly/monthly progress meetings at site with the participation of the Works Contractor, Engineer and the PIU.

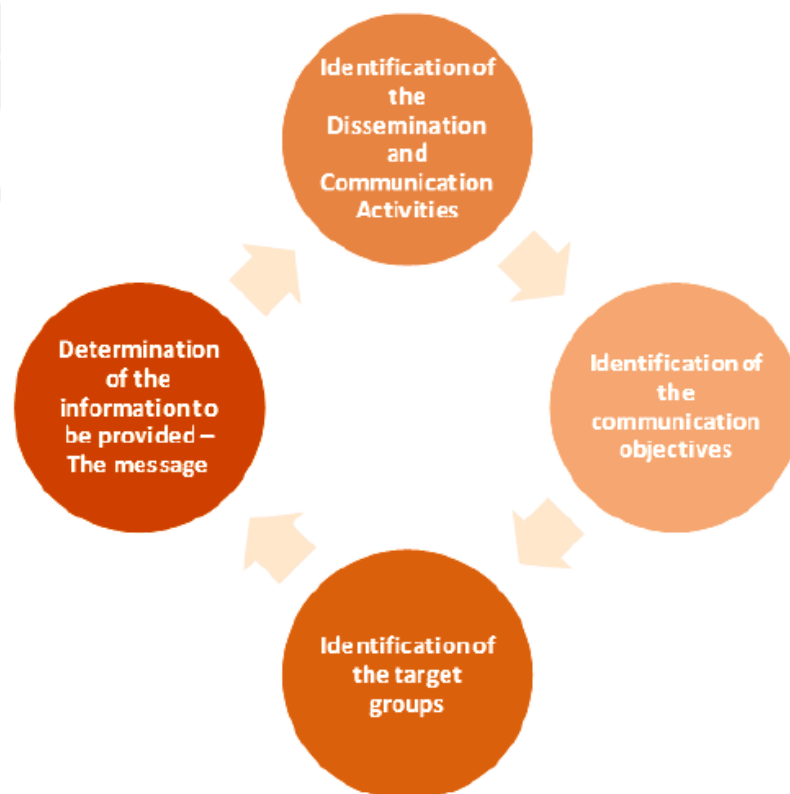


Figure 9 The Processes of Communication Strategy  
(Source: Created by the Author)

The Company's communication strategy was defined a consistent approach to key target groups and was based on a target group analysis with support of key stakeholders, including also language adaptation and content of translation by the

respective partners. Figure 9 was showed the processes of Communication Strategy. In this strategy, one of the major steps was identified the groups which were ultimately affected or potentially interested in the operation of the project. The definition of the target groups was helped to assess the appropriate type of participation of different stakeholders at successive stages of the strategy. In general, the target groups were addressed at below, and in Figure-10.

- Contracting Authority
- WUD/PIU
- European Commission
- Customers
- Academic community
- Relevant Water Groups
- Industrial sector
- Business network
- Strategic partners
- Decision makers and water authorities
- NGOs
- Public

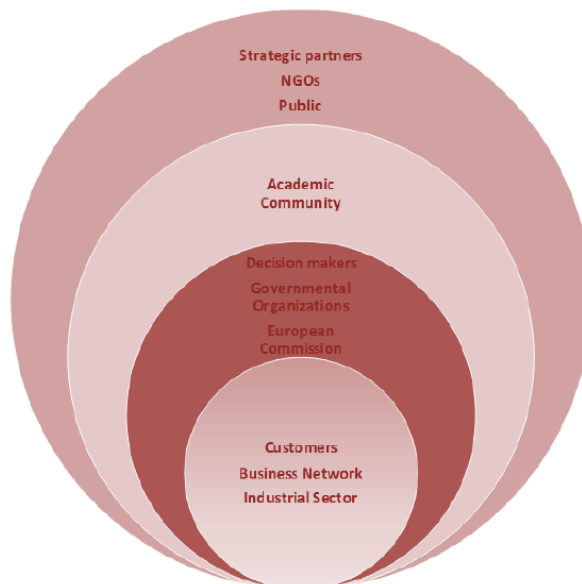


Figure 10 The Distinctive Levels of Target Groups  
(Source: Created by the Author)



#### **4.2.8. Project Risk Management in the Project Case**

Managing uncertainty was an inherent part of this project. While a detailed and comprehensive risk register was developed at the beginning of a project, it was inevitable that some risks had not been predicted. The company identified the possible risks as follows: the tendering process for the project was delayed resulting in delays in signing the works contract or failure of the signature of the works contract, the poor performance of the work contractor in the construction implementation stage, structural changes within the ministry and/or related institutions, sensitive security conditions on the region. Hence the company's approach to project risk management rested on two main aspects:

- Establishment of a Register of Risks based on the available evidence of past and continuing experience with similar technical assistance assignment and on our best evaluation of the infrastructure investment context in which the project was implemented;
- Implementation of a project risk management system, which was designed to: (a) identified new risks through adequate and regular risk monitoring procedures, and (b) responded the risk rapidly and with the means necessary.
- The initial risk assessment and risk management strategy was presented in Table-8 as well as risks that the company identified based on previous experience in similar assignment. The risk assessment was formally updated every 3 months and will provide the Contracting Authority and the beneficiaries with a clear and simple tool for monitoring the effectiveness of the TA team in tackling and mitigating these risks.

Before starting the project, some assumptions were made for the project and potential risks were identified using project management methodologies techniques. Risks were identified, their effects on the course of the project were evaluated, and the measures to be taken in case of a risk were planned, monitored and controlled. The company assumed that the project activities were conducted in close cooperation between the Contractor and all the stakeholders in the project. The active contribution of all parties to the Contract phases was assumed. The residents in the area as well as the Yüksekova Municipality were willing to provide the required support and assistance with no resistance and opposition against the project implementation. Properly skilled staff was allocated for the establishment of the PIU and for the implementation of the project. Required institutional setup and related positions were

fulfilled by the Municipality. Assumed that a specific risk materializes, the company then proceeded to identify the primary risk responses, which fall basically within four categories:

- **Av – Avoid risk:** Change plans to circumvent the problem;
- **M – Mitigate/Control risk:** Reduces impact or likelihood (or both) through intermediate steps;
- **Ac – Accept risk:** Take the chance or self-insure against the negative impact, and eventually budget the cost (e.g. via a contingency budget line);
- **T – Transfer risk:** Outsource all or a portion of the risk to third parties that can manage the outcome (e.g. through insurance, hedging or outsourcing of an activity).

<b>Risk</b>	<b>Probability</b>	<b>Impact</b>	<b>Risk Management Strategy (Av, M, AC, T)</b>
The tendering process for the project was delayed resulting in delays of signing the Works Contract or failure of the signature of the works contract	<b>M</b>	<b>H</b>	<b>Ac., M.</b> The Company, in close cooperation with the CA and the End Recipient will work on the any necessary amendments on the time schedule.
Poor performance of the work contractor in the construction implementation stage	<b>H</b>	<b>H</b>	<b>Av.</b> The Company will ensure a monitoring /supervision program that will minimize the potential delays, by close cooperation of the Team with the Works Contractor.
Structural changes within the Ministry and/or related institutions	<b>L</b>	<b>M</b>	<b>M.</b> Structural changes may result to delays in the execution of the project. The Company will be ready to immediately provide all relevant information and update to the new structures.
Sensitive security conditions on the region	<b>L</b>	<b>H</b>	<b>Ac. Av.</b> Security conditions in the area have ameliorated during the recent years. The Consultant will take all necessary measures to ensure the security of its staff.
There was delays in obtaining comments and approvals from the Client and/or other authorities	<b>L</b>	<b>H</b>	<b>M.</b> The Company will keep the CA duly informed about project progress.
Limited certified laboratory capacity in the area for performing the required tests on materials during construction.	<b>M</b>	<b>H</b>	<b>Av.</b> The Company will notify early on the issue and will coordinate with the CA on alternative solutions. Tests carried out in different location.

Table 8 The Risk Matrix of the Project (L=Low, M=Medium, H=High)  
(Source: Created by the Author)

#### 4.2.9. Project Procurement Management in the Project Case

During the work, the company used successfully Project Procurement Management and completed the following Project Tasks: The company prepared a Sludge Management Plan contained sludge treatment, storage, and volume: It was described how the sludge was treated and stored in the WWTP. The types and capacities of units were involved identified. The volume of sludge stored in the facility and its solids content was given. The inventory of the present and the future area was prepared for the disposal strategy of the sludge. The disposal strategy for the sludge was generated from WWTP described. There was a contingency plan to use when the primary plan was not available. A transportation plan for defining the most straightforward and cost-effective way of transporting the sludge was included in the disposal strategy. The required sludge quality was identified in accordance with the selected disposal strategy. The parameters were analyzed and the frequency of testing and the appropriate methodology was determined and the Sludge marketing plan was prepared. Also, the company was checked for compliance with the EIA and controlled all the mitigation measures and the monitoring plan from the EIA study to prevent the environmental pollution due to the construction works (e.g. oil, leakage, noise, air pollution) and was prepared of updated Water Balance of the entire water supply system based upon IWA definition. The operation and maintenance of water and wastewater components, asset management plan, billing and collection procedures, and cost accounting for maintenance and repair activities, Information management practices including terms of reference for integrated information technology systems were prepared.

#### **4.2.10. Project Stakeholder Management in the Project Case**

The very nature of construction work included requests for information and further instructions on details occur frequently. There were also many occasions where a Contractor needs to be formally advised that the work was defective. It was essential that instructions given to the Contractor were clear and unambiguous and that the Contractor knows whether it was an instruction to correct and rectify defective workmanship and materials, an instruction giving extra information or detail or an instruction which may involve additional work and payment. The Company ensured that a clear protocol was established for site communications procedures included requests for further information from the Contractors and the format of the responses, included the levels of authority required at different levels

of communication was set out. The Team Leader reviewed all Site Instructions given to the team. The company kept the Client and other relevant parties involved and informed about progress as well as problems on site, variations through regular briefings and the monthly reporting system. The Team Leader also advised in timely way of any major claims that the Contractor had indicated his intention to pursue. During the work, the company used successfully Project Stakeholder Management, and completed following Project Tasks:

- The company introduced of the Project for the local authorities/university/press, and held project kick-off meeting with the stakeholders and the Works Contractor, and hold regular weekly and monthly progress meetings and site inspection meetings with the Works Contractor, PIU and other affected parties to discussed specific issues arising from construction activities, involving where necessary representatives from relevant government authorities, and prepared and submitted minutes of all such meetings (monthly meetings, Steering Committee Meetings etc.).
- The company developed of a web site for the Project, which was contained satisfactory actual information on all aspects and components, including TA and supervision, works, environmental impact aspects, public awareness etc.
- The company assisted in asset and customer management, and was maintained a daily and weekly reports included weather, soil moisture, standing water, unusual activities, obstructions, etc.; manpower on site, (both engineer and the works contractor personnel), scheduled manpower, work days and days off; plant and equipment on site in operational condition; payments, variations, extra work authorized or undertaken, delays, etc.; site instructions given; non-conformance letter for works; progress achieved, works were completed and approved with quantities.

#### **4.3. THE PROJECT CLOSE-OUT PHASE FOR THE PROJECT CASE**

It was important to start the project correctly as well as to close it correctly. The scope of the project was approved, deficiencies were corrected. Contracts were approved, payments were completed. The project closing report, which was included the project success, project organization, factors that affected the project, and opinions about the project, was prepared and delivered. During the work, the company used successfully Project Management Processes, and completed followings:

- The company prepared post taking-over documentation (including performance certificate for WWTP), checked the Works Contractor's Statements that amounts claimed were actually due in accordance with the requirements of the Contract, and ensured the Engineer's role in regard to processing the Works Contractor's draft final Statement and Final Statement, and prepared the Final Payment Certificate.
- The company finalized documentation of all outstanding claims by the Works Contractor, in accordance within the limits of the Engineer's role under the Works Contract. On completion of the Works Contract, upon issue of the Statement of Completion within 15 calendar days the company as submitted a "Completion Report" to the Contracting Authority, the EU Delegation and the PIU.
- Also, the company submitted a comprehensive "QA Dossier" contained all original requests for inspection, approval, test forms and certificates relating to the construction of the Works.

The company achieved the purpose of the contract through, but not limited to the following results. Institutional, technical and financial development/strengthening, capacity building of the Municipality personnel to enable the implementation of the planned project, contract management, and supervision for the construction of wastewater treatment plant was successfully implemented within the time and budget provided, and Sludge Management Plan was well prepared, therefore, practical and applicable alternatives were clearly defined.

#### **4.4. AUTHOR'S ROLE IN THE PROJECT CASE**

The author has worked as a Tender and Bidding Engineer at the tender stage of the project before the project tender was won. As a responsible and authorized engineer in all phases of the tender phases, the author managed all the processes after starting the job. In this part, the author's tasks included preparation, controlling, leading and delivery of all necessary documents in the tender documents, finding the necessary personnel in accordance with the conditions of the specification (according to TOR), preparing the personnel's CVs and organizational charts, preparation of technical and financial proposals based on specifications, approximate cost research, calculation of unit price proposals, creation of tender documents including quantity, exploration and analysis, follow-up of the tender process, preparation of all necessary documents, tender and contract process follow-up of this tender in European Union (EU), management and follow-up of the contract process, plans, procedures and correspondence in this work. During the tender process, the author participated in many field trips, and made preliminary analysis for feasibility studies by taking notes by examining the project area. During the tender process, the author also went on out-of-town trips to negotiate with the administration.

When project was won and officially started, the author participated in this project as a Support Staff and Backstopping Expert at the beginning of the project. The author's tasks, in this part, were data collection, feasibility studies, communication, coordination, meeting, correspondence, preparation of documents and follow-up of the process with the Joint Company, Administration, Contractor and Subcontractor in joint ventures, consortium and business partnerships during the tender preparation process, implementing business development programs, establishment of a work schedule, implementation of project management disciplines and procedures, creation and follow-up of program and project execution plans, preparation of methodology and management plans, technical plans, engineering calculations and analysis, preparation of daily/monthly/quarterly progress reports. The author prepared Gant Chart Diagrams, Work Performance Index, and used CPM and PERT Techniques. The author had held project kick-off meeting with the stakeholders and the Works Contractor, hold regular weekly and monthly progress meetings and site inspection meetings with the Works Contractor, PIU and other affected parties to discussed specific issues arising from construction activities, involving where necessary representatives from relevant government authorities, and

prepared and submitted minutes of all such meetings (monthly meetings, Steering Committee Meetings etc.). Besides, the author's other tasks were financial monitoring including management of payments, variations and works that the contractor and the employer claims, technical situations and design including review of the document works that contractor claims, material submissions, issuing further design as required, environmental oversight, defects notification period, preparation for the execution of the contractor's obligation during and post-construction, and PMP Methodologies for the author's tasks during and post-construction phase.



## **CHAPTER V**

### **RESEARCH FINDINGS**

This chapter presents the findings of this research. In this study, a detailed study was performed with regard to the examination of the Project Management Methodology criteria that affect the success of project companies in the construction sector. Interviews and questionnaires were conducted with 4 successful firms out of the first 10 firms that took place in ranking by "CSN 100 Consulting List of Turkey in 2021". (Interviews were conducted with 4 successful firms out of the first 10 firms that took place in ranking by "CSN 100 Consulting List of Turkey in 2021".)

#### **5.1. IN-DEPTH INTERVIEWS WITH CONSTRUCTION PROJECT FIRMS**

It is necessary to state that the names of interviewed individuals and their companies were not mentioned clearly due to the ethical rules. These interviews were used to achieve the purpose of the research. The interviews and surveys were focused on 3 key questions:

1. Do the Companies in the construction industry knowledgeable about Project Management Methodologies?
2. Do the Companies use the Project Management Methodologies while conducting construction projects?
3. What is the effect of the use of the Project Management Methodologies in construction projects on success of the companies?

##### **5.1.1. The Company Profiles**

In this part of the interview, the general questions about the company were asked. Company A is a company on global design and project management, which is headquartered in Turkey and which has branch offices in Saudi Arabia, U.A.E., Iraq, Kuwait, Kazakhstan, and Bangladesh. Company A was celebrated its 31st year in 2021 with a current staff record exceeding 500 people worldwide. It has been



determined that this company provides design, engineering, supervision, and project management services in different areas such as public buildings, healthcare facilities, schools and universities, technological centers, transportation, and infrastructure. This company, with success in both Turkish industry and overseas, has many awards worldwide. The firm has provided complete key solutions to the construction industry, starting from feasibility studies and extending all the way to the preparation of construction details, within the scope of Design and Engineering. Some of their specific design and engineering services includes site surveys, geotechnical surveys, topographical surveys, Environmental&Social Impact Assessment (ESIA) studies, Feasibility studies, master planning and conceptual design, detailed design documentation in all disciplines, energy efficiency studies, tender documents, design management and coordination, statutory approvals, permits, design validation, time value engineering, scope and cost efficiency. Besides, their services in Supervision and Project Management also contains a wide range of tasks and activities such as construction supervision, design review, labor inspection, operational monitoring, contract and risk management, compliance, material inspections, assurance and control of quality, health and safety management, testing and commissioning, work scheduling, budget planning, baseline creation, payment valuation and cost control, and change management, including variations, defects of liability period services, stakeholder management, third-party coordination, statutory approvals, technical assistance, and building institutional capacity. It has been observed that Company A mostly supports public employers in the management of scope/quality, time and cost in large-scale investments. This firm was the firm where the researcher worked in. The researcher had 1-hour interview with the General Coordinator of Company A in the company's head office in Ankara. The interviewer was graduated from METU, and he had B.Sc. Degree in Architecture. Also, he is currently continuing his MBA's master program in METU. He has been working in the construction sector for 16 years.

Company B that is the second interviewed company is an independent and internationally recognized Consulting Engineering group based in Ankara, Turkey. It consists of 2 firms. They have been providing consulting services to the civil engineering industry since 1972. The firm has employed about 50 people of whom more than half are engineering professionals with extensive work experience in their respective fields. Since the beginning of its activities until now, the firm has

successfully completed more than 120 projects expanding over 38 years in the consultancy engineering sector. They have supplied consultancy-engineering services in the fields of water supply, wastewater and water treatment, storm water and sewerage management, solid waste management, flood control, river basin management, leak detection in water systems, irrigation, drainage, environment planning, highway engineering, natural gas engineering, and construction management. They have been providing services all around the World like Azerbaijan, Cyprus, Iraq, Iran, Libya, Palestine, Russia, and Turkey. Company B is one of the leading firms in water engineering including water supply and monitoring, transmission and distribution, agricultural irrigation, dams and lagoons, river basin management, flood control systems, streambed remediation, wastewater management, treatment technologies, sludge management, collection and disposal systems, and other environmental infrastructure sectors worldwide. The company B has a rich software library on water, wastewater, drainage, solid waste, highway and natural gas engineering, and drafting works, some part of which are specially developed to meet the exact needs of clients with particular specifications. The researcher had 55 minutes interview with the Project Manager of Company B in the company's Ankara office. The interviewer was graduated from METU, and he had B.Sc. Degree in Civil Engineering. Also, he had a Master's degree in Civil Engineering, in the USA. He has been working in the construction sector for more than 27 years.

Company C that was the third interviewed company is a design, consultancy, engineering, and project Management Company, and it is celebrating its 36th year in 2021 with 200 workers. The company has started out as a local company in Turkey. After their successful projects in Turkey, they also had successful works abroad. It was observed that Company C has executed commercial, infrastructure such as road, bridge, wastewater and more, and superstructure such as residential, building, mall, and hotels type projects. The researcher had 45 minutes interview with the Founder and Chief Executive Officer (CEO) of Company C in Ankara office of the company. The interviewer was graduated from METU, and he had B.Sc. Degree in Civil Engineering. Also, he had M.Sc. Degree in Construction Management in the UK and had M.Sc. Degree in Construction Law and Practices in the UK. He has been working in the construction sector for more than 45 years.

Company D that is the final and the fourth interviewed company is a global company based in Madrid, with permanent offices in Argentina, Algeria, Bolivia, Chile, Colombia, Costa Rica, El Salvador, Honduras, India, Peru, Poland, Philippines, Saudi Arabia, Turkey, United Arab Emirates, United States of America and Vietnam. As one of the leading engineering companies in Spain, truly committed to innovation and excellence in all aspects of infrastructure development, it is observed that Company D is now among leaders in the key areas of transport, environment, water, building, and urban development. With more than 50 years of experience all around the world, Company D have specialized in the comprehensive management of infrastructure in all its phases, starting from the Feasibility Study to the Operation and Maintenance, including all the intermediary steps such as profitability analysis, studies, preliminary design, detailed design, construction supervision, project management, detailed design, value engineering as well as PPP Projects and financial management. These specialized services are especially carried out in the field of Urban Development, Construction Supervision, Urban Planning, Buildings and Environment. Additionally, the company's added value strategy consists of rendering engineering consultancy services with a sustainability component of training and technology transfer, application of the best practices and institutional strengthening. Company D has developed its activity within the Civil and Industrial Sector, offering its clients planning services, institutional support, feasibility studies, and analysis of PPP projects, value-for-money assessment, detailed designs, construction supervision and project management. These services are mainly focused on Urban Planning, Building and Construction Supervision. Over the years, the group have respectively done business in Europe, Asia, Africa and America through a series of acquisitions and gained a key role, by being recognized internationally in its field. It is determined that Company D is ranked among the most important multidisciplinary companies that are active in some sectors such as construction, transport infrastructure, water and energy. The interviewer states that they are one of the world's fastest-growing engineering, architecture and construction management groups. It is observed that since its founding, the company has grown to become a multicultural group with a total of 4,000 employees today. In addition, they have been operating in Turkey since 2003, and they have stabilized their presence by establishing a branch office in Ankara in 2011. The Turkish Branch Office has been active ever since. The researcher had 55 minutes interview with the

Deputy Project Manager and QA/QC Specialist of Company D in their Ankara office. The interviewer was graduated from Yıldız Technical University, and he had B.Sc. Degree in Civil Engineering in 1999. He has been working in the construction sector for more than 21 years. The research findings of the firm profiles are stated in the Table 9.

<b>Items</b>	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>	<b>Company D</b>
<b>Experience Year of the company</b>	30 years	38 years	35 years	50 years
<b>Origin</b>	Both Local/Foreign Company	Local Company	Both Local/Foreign Company	Foreign Company
<b>Approximate Headcount</b>	500 persons	50 persons	100 persons	500 persons
<b>Main Business Areas</b>	Design and Project Management Consultancy	Design and Project Management Consultancy	Design and Project Management Consultancy	Design and Project Management Consultancy
<b>Projects Type</b>	Commercial Transportation Superstructure Education Sports Healthcare Infrastructure	Commercial Industrial Superstructure Infrastructure	Commercial Superstructure Infrastructure	Commercial Industrial Transportation Superstructure Education Sports Healthcare Infrastructure Aviation Heavy Construction
<b>Client Type</b>	Public and Private	Public and Private	Public and Private	Public and Private
<b>Conducting simultaneously projects</b>	15 projects	10 projects	10 projects	11 projects
<b>Stakeholders</b>	11 stakeholders	6 stakeholders	9 stakeholders	11 stakeholders

Table 9 The Research Findings of the Company Profiles  
(Source: Created by the Author)

### 5.1.2. The Interviewers Profiles

The interviews were continued with personal questions asked to the participants about the position and job descriptions within the company. Then, questions were asked about whether they knew about project management standards and their use. Interviewer of Company A was 37 years old and he was General Coordinator of the company. He has worked for this company for 16 years, and he has professional experience in the construction sector. He has worked on several

projects in this company as a Design Manager, Project Manager, Project Coordinator, Project Director, Team Leader, and Deputy Project Coordinator. The interviewer A stated that he has followed the Project Management very closely in terms of his position, and he has attached great importance to the business management. It is observed that he has work experience over 12 years in project management. He had Project Management Professional (PMP) Certificate, and attended many seminars and conferences. As a General Coordinator of the company his relevant job descriptions are as follows: He is fully responsible for the management of the head office in Ankara, and he has many responsibilities specific to each project they carry out. He has managed the project management office in Turkey, and all works the company conducted abroad. His activities have included design management, project coordination and validation of design deliverables, value engineering, cost control, client meetings/presentations, stakeholder management, management of a +50 design team, +10 consultancy team, and +5 administrative team, design review, supervision of technical office managers, on-site follow-up of construction works, preparation of progress reports, management of submittals and correspondences, client meetings/presentations, project coordination, stakeholder management, team organization and mobilization, both national and international coordination, coordination of key experts, preparing the knowledge-planning base, financial/administrative monitoring and so on.

The interviewer of Company B was 51 years old, and he was Project Manager of the company. He has worked for this company for 8 years, and he has professional experience in construction sector for 27 years. He worked in many countries as Structural Lab Employee, Research Assistant, Site Civil Engineer, Chief Control Engineer, Technical Office Manager, Contract/Tender Manager, Deputy Contract Manager, Project Manager, Deputy Project Manager, Senior Contracts Manager, Site Project Manager, Contract Supervisor, Resident Engineer and Project Manager. It was determined that he has knowledge about PMP standards, and he also had PMP Certificates. He stated that he has gained knowledge in Project Management in the Construction sector in different type of projects for many years. He was a member of Project Management Institute (PMI). His relevant tasks included construction management, supervision of site activities, validation of all reports including weekly-monthly progress reports and Periodical Interim Audit (PIA) Reports, validation, preparation of executive dashboards, monitoring of activities and works and

Contractor's progress, progress meetings with Owner, value engineering, management of Consultant's site team (+50 employees), managing change and variations, monitoring all contractual and project control activities including on site applications, reporting, analyzing general terms of contracts and conditions to highlight areas of risk, conflicts or deviations from the scope of works, coordination of department managers on progress planning activities, establishment of training system for engineers, analyses claim notices, subcontractor/supplier review and approvals, preparing meeting agendas, contractual letters/memorandums, contractual progresses with monitoring-reporting, advising to top management for key issues, review of certificates, client on-off site meetings, tender evaluations, sub- contracts management, insurances department management, claims evaluation - variation orders, tracking correspondences, contractual submittals, requirements, delay analysis and risk management.

The interviewer of Company C was 68 years old. He is the Founder and Chief Executive Officer (CEO) of the company, having 45 years of general professional experience in the construction industry. He has worked as a Site Engineer, Project Engineer, Site Manager, Project Manager, Deputy Manager, Senior Project Manager until he had his own company. He stated that he attended to many training programs and received several certificates throughout his career, by considering project management as the most important point in success and in order to progress in this field. He had a Certificate in Construction Contract Law & Administration from Liverpool John Moore's University, UK. He attended the course to get "NEBOSH Certificate in Construction Health and Safety", University of Bolton. Also, he attended to FIDIC 2015 Online Course Module 1 including Conditions of Contract for Construction (Red Book), and Conditions of Contract for Plant and Design Build (Yellow Book); and to FIDIC 2015 Online Course Module 4 including Conditions of Contract for Construction (Red Book), and Conditions of Contract for Plant and Design Build (Yellow Book). He got Construction Claims Certificate given by CLAIMS CLASS. Besides, he was a Member of the Chartered Institute of Building: Chartered Construction Manager, Incorporated Member of the Chartered Institute of Building (CIOB), Associate for Institute of Construction Claims Practitioners (AICCP), member of the Chambers of Turkish Civil Engineers. He also had PMP Certificate.

The interviewer of Company D was 46 years old, and he was Deputy Project Manager and QA/QC Specialist of the company for 5 years. He has been working actively in the construction industry for 22 years. He has worked as Deputy Site Manager, Site Supervisor, Lead QA/QC Engineer, Senior QA Engineer, and QA/QC Manager. Since 2005, he has been working in the QA/QC Management positions for the most well-known major construction companies, and adding values to projects. He stated that he is very interested in PMP applications, and he has got PMP Certificate. In addition to PMP Certificate, he has Internal Auditor Certificate of ISO 9001-2000 systems, and QMS ISO 9001:2015 Leader Auditor Certificate, and CSWIP 3.1 Registered Welding Inspector (Certified by TWI). He attended Training and Development Modules for Employees, Training for NDT, interpretation of ASME Codes (Section II, IV, IX), and training for setting up QA systems in Construction Projects. The scope of responsibility for his work is very closely related to Quality Management from PMP Standards. In this context, his tasks includes preparation of Projects Quality Assurance and Quality Control Plan, Quality Management System procedures, setting up the Non-conformance management system, trainings of project quality awareness, preparation of weekly/monthly quality reports, scheduling and moderating the periodic quality meetings, reviewing the contractors' all quality-related submittals, implementing the quality system in the project in accordance with ISO 9001, QA/QC inputs, preparing letters related to QA/QC issues at contractors' works, ensuring the applicable QA/QC evaluation, and so on.

When the profiles of the participants were examined, it was detected that all of them has worked in managerial positions within the company. It has been observed that these participants were very suitable for surveys and interviews on the thesis research topic. According to interviews, all of four interviewers had knowledge about the Project Management Methodologies and Standards. It was determined that all interviewers had PMP Certificate. It was identified that all these participants have used PMP standards in their professional work life due to their job positions, their duties and responsibilities. The findings on profiles of the interviewers are given in the Table 10.

<b>Items</b>	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>	<b>Company D</b>
<b>Age</b>	37 years	51 years	68 years	46 years

<b>Gender</b>	Male	Male	Male	Male
<b>Educational Level</b>	License (B. Sc.)	License (B. Sc.) Post Graduate (M. Sc.)	License (B. Sc.) Post Graduate (M. Sc.)	License (B. Sc.)
<b>Academic Graduate Department</b>	Architectural	Civil Engineering	Civil Engineering, Construction Management, Construction Law and Practices	Civil Engineering
<b>Position</b>	General Coordinator	Project Manager	Founder and Chief Executive Officer (CEO)	Deputy Project Manager, QA/QC Specialist
<b>Experience in the construction sector</b>	16 years	27 years	45 years	22 years
<b>Experience in their company</b>	16 years	8 years	35 years	5 years
<b>Experience in construction management</b>	14 years	25 years	45 years	23 years
<b>Knowledge about PMP Standards</b>	Yes	Yes	Yes	Yes
<b>Having PMP Certificate</b>	Yes	Yes	Yes	Yes

Table 10 The Findings of Interviewers Profiles  
(Source: Created by the Author)

### 5.1.3. The Awareness, Usage and Knowledge about Project Management Methodologies for Interviewed Companies

In the third part of the interview, the questions were asked about the company's knowledge and practices on project management. Company A had used PMP Standards in their firm and had a Project Management Office. More than 15 people were working on their PMOs. As the interviewer had PMP certificate, he stated that he attached great importance to the training and the use of it in the company. Company A provided their staff with the training on Project Management in 2018, to expand this awareness and to become more professional. The interviewer indicated that it was a training that lasted for months and offered a professional perspective to their employees. He stated that there were also those who took the post-training exam, who succeeded in the exam and who got a certificate. The Company had 5 people in senior management staff in the head office in Ankara, and this staff had PMP Certificates. Company A used all Project Management



Knowledge Areas and Project Management Process Groups in their construction works. The interviewer asserted that this was the proof of how they successfully manage their projects and why they were successful in the sector. The interviewer stated that project management was an issue that he very closely followed the agenda about it in accordance with the position he has worked, and he attached great importance to it during his business management duty. In addition, Company A remarked that they attached great importance to Quality Management, and they realized its projects in accordance with these standards. The company had ISO 9001 (Quality Management), ISO 14001 (Environmental Management), and ISO 27001 (Information Management) Certificates. Besides, Company A employed a management team with Project Management Professional (PMP) and LEED (Green Building) certifications. According to the interviewer of company A, sustaining quality standards were in the center of their business. Therefore, they executed quality standards processes as per specific plans and procedures. In each project, they used their Enterprise Environmental Factors (codes & regulations, government & industry standards, organizational culture and structure etc.), and Organizational Process Assets (organizational standard policies and process definitions, templates, historical information & lessons learned knowledge base etc.). As interviewer A indicated, they understood that their operations had an impact on the environment. Therefore, they have committed to the continuous improvement of the environmental performance and confirmed that they will endeavor, where applicable, to meet the standards outlined within the relevant environmental guidelines and legislation. As Company A has worked exclusively for the construction industry, they believed that commitment to the statements to be mentioned were paramount in terms of a sustainable model, which are: compliance with all applicable environmental laws, regulations, and other requirements, using resources and capabilities to promote energy-efficient and environmentally friendly outputs, assuring that its employees gain the necessary knowledge and skills to follow a sustainable business practice, and promotion of recycling and reuse of waste materials. Moreover, according to Firm A, implementation of Project Management Standards increased project success by 76-100%. Company A stated that they reduced the time and cost by 76-100% and the risks by 51-75%, in the projects completed with project management. Likewise, Company A claimed that they increased the scope, resource, quality, communications, procurement, and customer/stakeholder satisfaction by 76-100%,

in the projects completed with project management. In addition, Company A clarified that they increased the integration and productivity with the rate of 51-75%, with project management applications.

The interviewer A put some comments on project management in the construction industry. The interviewer stated that the basic rule of this business was not only to get cheap, but also to choose managers who know the job well, who are experienced and qualified enough, to establish an experienced management team and personnel. In his opinion, choosing the right personnel in the projects and determining the right project manager were the fundamental points in the way of success. In his 16-year of career, he had the chance to observe and experience them very closely. For example, Company A had won a large complex work in Bangladesh, and they had a hard time in finding the qualified personnel to be sent to that area because of many factors. The project had to start as soon as possible, and they had lost a lot of time. Thus, they had to choose a Project Manager, who did not satisfy them and who was unqualified. In consequence of wrong team (an inexperienced team) selection, they faced with upsetting problems such as delay in the deadline of the work, technical mistakes, complaints, and failure to satisfy the administration. The risk that they did not care about or that they considered as a small possibility brought many other risks and consequences after all. All of these factors affected their time, quality, scope, cost, stakeholder, resource, communication, procurement, and risk management, negatively. It was a great lesson and experience for the Company A. The interviewer's advice was about always working with qualified, knowledgeable, competent people, and not pursuing low costs. He stated that expenses avoided in the short term will multiply in the future, resulting in much greater costs and losses. He suggested that there should be a regulation that describes the required construction project management services in Turkey for better awareness about project management of firms in the construction sector. He believed that construction project management services should be legal obligation in all construction projects to get successful outcomes from the projects. In his opinion, there is a lack of legal legislation in the Turkish construction sector, and he deemed that this is an issue required to be discussed and resolved in detail.

The interviewer A described the role of a project manager in project management, and listed ideal characteristics of a project manager. According to the Interviewer A, the person to ensure that the project goes as desired from the

beginning to the end was the Project Manager. The interviewer A stated that a successful Project manager should have many talents. He mentioned that a good project manager should be someone who could communicate with people of all levels. He stated that trust was the building block of a good relationship, and the project manager must be first trust his team in order to gain their trust. He stated that the Project Manager should be honest in communication with the team, should value the ideas of the team, should convey the vision of the project correctly, should act in accordance with this vision, should provide regular information about the progress of the project to his team, and should control and interfere the works as much as possible in order to gain the trust of the project team. He indicated that a good project manager should know how important it is to recognize the achievements of his team. He also added that keeping the motivation of the team high should be one of the characteristics of a good project manager, and the project manager should be the person who follows up the work well, and makes sure that the result is completed in the desired quality and time. According to him, a good project manager knows that planning is essential, and does not start the project without planning. He stated that the project manager is the person who can foresee the problems that may arise, and intervenes in the problems with the right decisions at the right time. He marked that a project manager should not hesitate to seek the support of the team when appropriate since he/she knows that it is impossible to handle all problems alone. In the Interviewer A's opinion, the project manager should go to task sharing by analyzing the abilities of the people in the project team well and considering the strengths of those people. He indicated that it is essential that the project manager is able to properly organize and track them all when he/she is responsible for a wide variety of monetary, technical and human resources. Therefore, he stated that organizational skills are the key skills for the project manager. According to interviewer A, the project manager does not have to follow all details in each minute as a supervisor, but he should have information on that every resource is always being used effectively to maximize output. The interviewer remarked that being solution-oriented is the most important feature he looks for in a Project Manager during the execution of the project. According to him, in the face of emerging problems, the Project Manager should first look at the Project Plan he/she has prepared, and if there is an unidentified risk or problem, he/she should be able to give the most appropriate response for the solution. He believed that being solution-oriented will not only save

the project from the bottlenecks, but also will make it one step closer to the targets. According to Company A, the project manager affected project success by increasing the success rate to 76-100%.

The second interviewer B had knowledge about Project Management, but the company had not any PMO offices so that they could not provide any PMP training to their staff. They carried out a project management with their own knowledge and experience. They focused on quality, budget and risk management within the company. He believed that the project management awareness was weak, especially in their local companies. He marked that the Company B did not pay attention whether they had a PMP certificate or not, while hiring their personnel. Company B cared for the knowledge and experience of personnel candidates. According to Interviewer B, this was a lack of management in their company that they were supposed to improve. Although the Company B had provided project management consultancy, capacity building consultancy, engineering design, project management consultancy, environmental consultancy, operational consultancy services, they had not fully use PMP methodologies and techniques. He indicated that the company did not take great steps in this respect as a company although he had awareness of the importance and necessity of project management in the sector. The company B claimed that they focused on quality, budget, and risk management within the company. The company gave priority to the quality of their services. They used (ISO 9001: 2015) Quality Standards. He stated that the aim of the Quality Management System of the company was to analyze the true functions of the project at first, and then to plan the necessary developments, target system continuity and client satisfaction throughout the development, and to ensure that the system is free from faults. According to Interviewer B, the company B formed some responsibilities for customer satisfaction, error prevention, continuous improvements, costs, and management to provide guidance and tools that ensures quality. They made a plan according to which standards the project will be carried out, what kind of operations should be done in order to comply with these standards, the financial and time analysis required for each operation, and the documentation of all outputs. Interviewer B stated that the projects that were well planned and realized in the desired quality brought high productivity, low cost, increased stakeholder satisfaction and profitability. In the planning stage, Company B used tools such as cause-effect charts, flow charts, control charts, Pareto charts, histograms, control

charts, and distribution charts to assist decision making. They utilized affinity diagrams, process decision program tables, interrelation diagrams, tree diagrams, prioritization matrices, network diagrams and matrix diagrams to ensure quality management and control. While defining, evaluating and controlling quality in their projects, they took into account that each project provides a unique focus. Therefore, naturally one or more quality theories were being relied on, to realize project quality management. The Interviewer B clarified that determining which quality theory to use during a project depends on how comfortable they are in a particular theory and whether that theory fits the project.

The company B emphasized the importance of risk management in project management. According to the Company B, construction sector can be faced the several problems and risks. The Interviewer B gave some examples for the project risks which are: the failure to reach the result, the risk of delay, the risk of exceeding the budget, the risk of deficiencies in the final product, poor planning, deficiency in the definition of deliveries, insufficient prioritization of projects, insufficiency of allocated funds/resources, conflicts with other projects, the changes in laws/regulations, unrealistic expectations, tight budget poorly defined activities, inadequate staff. It was detected that the Company B determined the measures taken by minimizing the possibility of some unwanted situations in the risk management. It was observed that the Company B used two approaches to evaluate risks, which are qualitative risk analysis and quantitative risk analysis. The Interviewer B enounced that classifying the risks encountered during the projects was an important study for the project manager to reduce the effects of the risk. In reducing the effects of classified risks, they assigned responsibilities to Senior Management, the Project Manager and the Project Team in line with their authorizations. It was observed that they have ranked the risks according to their importance level, by taking into account the probability of occurrence of the identified risks and the amount of impact on the project. In these studies conducted at regular intervals, the current situation was evaluated and the development of factors that may pose a risk over time was examined. They determined the importance level of the risks by classifying the risks according to the urgency of the measures to be developed against the risks. According to the Interviewer B, project management companies or services often employs when only there is a major problem or a limited scope of services such as site inspection, procurement, tender management or more in Turkey. He observed that project

management is not given enough attention from the beginning to the completion of a job in the construction sector.

According to interviews, Company B claimed that they increased the scope, quality, and customer/stakeholder satisfaction by 76-100% in the projects completed with project management. The Company B claimed that they increased the integration, communication, and procurement by 51-75% in the projects completed with project management. The Company B asserted that they increased the resource and productivity by 26-50% in the projects with project management. Also, the Company B stated that they reduced the duration, and cost by 26-50% with project management. However, according to Company B, implementation of Project Management Standards increased project success by 26-50%. According to Company B, the project manager affected project success by increasing 76-100%. The Company B stated that the project management awareness was weak in Turkey, especially in local companies. Also, the Company B clarified that they did not care about PMP certification while they were hiring staff candidates.

The third interviewer from the Company C has knowledge about project management. Although there was not a Project Management Office within their company, they had 3 personnel in the head office for project management tasks. They did not provide any project management training program for their staff. According to the Company C, PMP training was a very expensive program, and obtaining certification was a very laborious and expensive process. The participant of Company C stated that he had worked hard to draw attention to the importance of project management trainings, but he emphasized that the awareness of the project management training and certification was still not enough in Turkey. The Company C underlined the role of the project manager in success, like other participants. According the Interviewer C, PMP Certificate demonstrates the knowledge and competence in being a successful project manager. He believed that project management has a very important contribution to the success of the project with multi-faceted thinking, mastering the project, correct planning and risk analysis and measures. He indicated that the control and successful follow-up of this are only possible by using the PMP Methodology correctly and effectively. He clarified that the ownership of the project by the senior management and the adoption of the project by the stakeholders and employees contributed to their success. According to him, the person who will keep the project going as desired from the beginning to the end

is the Project Manager. He expressed that the successful Project Managers are the ones who always prioritize the customer. According to the Interviewer C, successful project manager listens to the customer effectively, analyzes the requests and demands together with the project team, and makes the necessary changes. He also added that the most important feature of the Project Manager is communication and empathy. He remarked that project communication requires constant communication with all stakeholders of the project. He additionally demonstrated that the Project Manager who can show empathy will take one step ahead. According to the Interviewer C, a successful Project Manager should always check the Basic Plans (Scope, Time, Cost) of the Project. In this content, he explained that he applies the Earned Value method by comparing the targets and these plans at every stage of the project. He highlighted that he observes how much the Project deviates from the goals with this technique. It was observed that A Gantt Chart Diagram, PERT Chart, Microsoft Project, Network Diagrams, Project Documentation, Critical Path Method, or CPM, Project Breakdown Structure and Work Breakdown Structure were their standard tools they use in their project management. Also, it was detected that they generally arranged daily or weekly kick-off meetings. According to the Interviewer C, the successful Project Manager should always exercise coordination and organizational skills between stakeholders and across teams, including meetings with the Sponsor and the client. He claimed that the success of the project is directly related to the coordination ability of the Project Manager. According to the Company C, the project manager affected project success by increasing to 76-100%.

The Interviewer C has managed a few projects in his career. He stated that the biggest problem he observed was the change. For example, he remarked that when the content of a phase changes as a result of the change required in phases that start at the same time with the progress, the phases are used or will be used, if the phase requires any change, and that in this case they have to deal with the additional labor and different types of costs that they cannot take into account before the change. He clarified that when the next phase had started right before the end of the first phase, the time was shortened and the risk increased with it. He said he was looking at the most important tasks first to get it done. He had formed the critical path of the project and identified the tasks that had the greatest impact on the deadline. He first went through these tasks to resolve timing issues. He changed the terms of the mission and shortened the terms to fit the deadline in order to fix the problem. He

was so careful while shortening the duration of critical tasks that had the biggest impact on the project's deadline. If there are too many assignments at the same time, the Project's resource assignments are leveled and distributed more evenly. He hired more people to work on tasks that forced him to extend the deadline. He tried to change the end date of the project by changing people's work schedules. People added additional working days to their schedules, and unfortunately they worked overtime. He indicated that the execution and completion of the project in accordance with the budget was a factor that affected all balances in the project. It has been observed that they use cost calculation plans to facilitate follow-up during cost planning. It was understood that they made cost estimates for each job by assigning an estimated cost to the required resources. He also added that they constantly check the changes in the project budget. It was detected that they created the main project plan and project calendar. It was realized that they did "What If" analysis until no changes were made to the plan. It was determined that they obtained a cost table based on the time and resources used by multiplying the work usage table prepared with the resource costs assigned to the jobs. He underlined that with this table, it enabled them to easily see from which source and when the cost element will occur during the project. It was observed that they made many cost risk analyzes in line with the information obtained from previous similar projects. He stated that they balanced the technical and economic differences resulting from the time lapse and the cost differences between the new project and the old project. He emphasized that the biggest challenge for project managers is implementing project management processes and calculating the budget in projects where there is a lot of uncertainty.

The Company C highlighted the importance of project management. According to the interviewer C, Turkey's needs and requirements with the start of the investment in the private sector has increased the importance of Project Management. He stated that making decisions quickly, acting more sensitively, dynamic solutions for projects, ensuring optimum use of resources, ensuring efficiency are the factors that make the project management important. He believed that project management was a necessity for the construction industry to make the right decisions and to dominate the management area. According to him, the project management provided that the problems of the construction sector were detected as soon as possible, these problems became debatable and the rules were determined. He stated that project management is of great importance in order to bring a general framework to the



event, to ensure the establishment of ethical rules and to take steps leading to institutionalization. The Company C claimed that they increased rate of the scope, communication, and procurement by 76-100% in the projects completed with project management. Also, the Company C asserted that they increased rate of the integration, quality, productivity, stakeholder satisfaction, and resource by 51-75% in the projects with project management applications. Also, the Company C stated that they reduced rate of the duration by 51-75% and rate of the cost by 76-100% with project management. According to Company C, implementation of Project Management Standards increased rate of project success by 51-75%.

The last interviewer that is from the Company D had knowledge about Project Management Applications, and they used PMP Methodologies for their work. In this context, the Company D was so careful about them to have experienced, educated, and talented project management experts while choosing their employees. They had a multi-disciplinary certified and experienced team consisting of 1200 professionals (many of them working on company's projects abroad), which were engineers (Civil, Mechanical, Electrical, Telecommunications, and Agronomist), environment specialists, geologists, economists, lawyers... All of them were familiarized with different working environments and had necessary knowledge and experience to meet rigorous standards in the supervision of civil works, required by Private and Public Sector and in contracts with International Financial Institutions. Functional system based on teams presented some advantages, which were team specialization according to client, profession and field of activity and optimal distribution and integration of workload. The Company D had a professional PMO and they had attached great importance to this issue. Approximately 20 staff members had worked in their PMOs for project management. The Company D conducted PMP training in their company. The Company D had used some Project Managements within the body of their company, which were Interface and Integration, Schedule and Cost, Risk, Procurement, Communication and HR, Quality, Scope, Claims, Safety Management and RAMS. In the content of construction management, it was observed that they performed design review, audits, construction supervision, control and monitoring, construction management, supervision of the manufacture of electromechanical devices, environmental monitoring, independent engineer, quality and materials control, health and safety coordination, technical support office, land acquisition management, and environmental management services.

The Company D highlighted the importance of quality management in project success. The Interviewer D stated that doing quality work is one of its main principles. He stated that they maintain their quality in their projects and carry out their studies on this issue with care. According to him, quality control and quality assurance were an integral part of the company's Project Management. They have proven and documented QC/QA procedures and guidelines strictly followed by team members. It was observed that the strategy engaged by the company to achieve the goals of the consultancy contract was always based on the implementation of a Quality Assurance and Environmental Management System, approved by the national and international organization AENOR, prepared in accordance with ISO 9001 and 14001 standards. The Interviewer D claimed that some construction projects sometimes exceed their predetermined budgets, these deviations were critical for the company and these deviations were more frequent than expected. He underlined that project management was necessary in order to make successful projects and to prevent works with bad project management that will also result in bad results. He believed that the only way to achieve the projects with the targeted outputs and to exceed the expectations of the stakeholders was through the management of the projects. He marked that project management is needed in the sector due to limited resources, dynamic environmental factors, complex business structures and various problems in communication. Throughout his career, he had observed that project management provides many advantages in success. He emphasized that these advantages are effective coordination, improvement in customer relations, increase in efficiency in resource use, economic development processes, knowing the project goals and costs in advance, determining the necessary resources and technology in advance, economic development processes, increased efficiency and high profit margin. He highlighted that they were a business with more than one complex project and therefore project management was of great importance for their company. The Company D stated that it increased its interest in project management due to the complexity and cost of the projects carried out every day, multidisciplinary studies and the existence of multinational projects. He believed that the company eased the increasing workload with its systematic project management approach. The Interviewer D considered that it was possible to reduce or prevent the risks and pressures on the person or organizations carrying out the project in a timely

manner through the systematic perspective and effective coordination of the project management.

The interviewer D was asked about his comments on project management practices in the construction industry. He responded that in the early 2000s, international investors and Turkish companies to enter Turkey with that of the global capital to expand and change the size of the Project Management sector started to take its place in the case. He underlined that one of the important reasons for this was that it was difficult to follow both management and control processes in companies that are growing and turning to more than one investment. He stated that another reason was that the necessary and experienced organizational structure with sufficient capacity could not be established in a limited time. He emphasized that the most important reason is that Project Management started to be considered as a 'Specialization' and 'Risk Management and Transfer' within the framework of the need to quickly integrate global capital expectations and local capital expectations into common grounds. He implied that today, with the growth and complexity of the scope of projects, the need for integrated, proactive and solution-oriented processes in Project Management had emerged. He stated that many companies started to prefer Project Management companies in the last 10 years. He emphasized that especially with the emergence of large-scale and mixed projects; Project Management companies took serious steps due to their fast decision-making advantages, well-equipped structures, and analysis and process management skills. However, he clarified that today, the importance and obligation of Project Management has increased significantly. He underlined that the widespread use of developing technologies, BIM and similar applications, the integration of digital technologies into the sector, and the importance of project costs and durations enabled the sector to develop and grow. The interviewer D still thought that project management was not given enough attention in the construction sector. He believed that with the project management, the effective use of large budgets would be ensured and that they could make great contributions to the development of our country beyond the construction sector by ensuring that they were followed in a larger picture. Thus, he emphasized the necessity of a management in which all this awareness was possible, in which problems with Project Management were discussed, general rules were determined, ethical rules were established, and well-established experts were brought together within the framework of sector needs. He believed that this would make a

significant contribution to the optimum use of our country's limited resources and to the international development of companies.

To sum up, the Company D stated that project management provided benefits in many aspects such as efficient use of resources, low cost and high profit, high quality and safety, effective coordination and motivation, and improvement in customer relations. The Company D claimed that they increased rate of the integration, quality, communication, procurement, stakeholder satisfaction, and productivity by 76-100%, in the projects completed with project management. Also, the Company D underlined that they increased rate of the scope and resource by 51-75%, in the projects with project management applications. Besides, the Company D stated that they reduced rate of the duration by 51-75% and rate of the cost by 76-100%, in the projects with project management. According to the Company D, implementation of Project Management Standards increased the rate of project success by 76-100%. In addition, the Company D clarified that the project manager affected project success by increasing the rate to 76-100%. The findings of interviewers' awareness are given in the Table 11, Table 12, and Table-13.

<b>Project Management Practices</b>	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>	<b>Company D</b>
<b>Uses of PMP</b>	Yes	Sometimes	Yes	Yes
<b>Having PMO</b>	Yes	No	No	Yes
<b>Number of Personnel Working in Project Management Activities</b>	15 people	None	3 people	20 people
<b>Given training program on PMP</b>	Yes	No	Yes	Yes
<b>Usage of Knowledge Areas</b>	All	Cost, Quality, Risk Management	All	All
<b>Usage of Process Groups</b>	All	All	All	All

Table 11 The Information about the Companies  
(Source: Created by the Author)

<b>Project Management Practices</b>	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>	<b>Company D</b>
<b>PMP Effected to project success in %</b>	76-100% Increase	26-50% Increase	51-75% Increase	76-100% Increase
<b>PMP Effected to project integration in %</b>	51-75% Increase	51-75% Increase	51-75% Increase	76-100% Increase
<b>PMP Effected to project scope in %</b>	76-100% Increase	76-100% Increase	76-100% Increase	51-75% Increase
<b>PMP Effected to project duration in %</b>	76-100% Reduction	26-50% Reduction	51-75% Reduction	51-75% Reduction
<b>PMP Effected to project cost in %</b>	76-100% Reduction	26-50% Reduction	76-100% Reduction	76-100% Reduction
<b>PMP Effected to project quality in %</b>	76-100% Increase	76-100% Increase	51-75% Increase	76-100% Increase
<b>PMP Effected to project resource in %</b>	76-100% Increase	26-50% Increase	51-75% Increase	51-75% Increase
<b>PMP Effected to project communications in %</b>	76-100% Increase	51-75% Increase	76-100% Increase	76-100% Increase
<b>PMP Effected to project risks in %</b>	51-75% Decrease	76-100% Decrease	51-75% Decrease	76-100% Decrease
<b>PMP Effected to project procurement in %</b>	76-100% Increase	51-75% Increase	76-100% Increase	76-100% Increase
<b>PMP Effected to project customer/stakeholder satisfaction in %</b>	76-100% Increase	76-100% Increase	51-75% Increase	76-100% Increase
<b>PMP Effected to project productivity in %</b>	51-75% Increase	26-50% Increase	51-75% Increase	76-100% Increase
<b>Effect of Project Manager Roles on project success in %</b>	76-100% Increase	76-100% Increase	76-100% Increase	76-100% Increase

Table 12 The Effects of Factors on the Project  
(Source: Created by the Author)

<b>Project Management Practices</b>	<b>% of Participants Result</b>
Project Management Effected to project integration in %	76-100% Increase
Project Management Effected to project scope in %	51-75% Increase
Project Management Effected to project duration in %	76-100% Increase
Project Management Effected to project cost in %	76-100% Reduction
Project Management Effected to project quality in %	76-100% Reduction
Project Management Effected to project resource in %	76-100% Increase
Project Management Effected to project communications in %	76-100% Increase
Project Management Effected to project risks in %	76-100% Increase
Project Management Effected to project procurement in %	51-75% Decrease
Project Management Effected to project customer/stakeholder satisfaction in %	76-100% Increase
Project Management Effected to project productivity in %	76-100% Increase
Project Management Effected of Project Manager Roles on project success in %	51-75% Increase
Project Management Effected to project success in %	76-100% Increase

Table 13 Summary of Obtained Results from Participant Survey and Interviews  
(Source: Created by the Author)

#### **5.1.4. The Critical Success Factors Identified in Interviews**

One of the topics examined in the research was about identifying the critical factors affecting project success in the construction industry. In determination of the critical success factors in the construction sector, the comments and opinions of the participating companies, which were experienced and successful in the sector for many years, were used. As a result of the interviews, the critical success factors that the participants identified for the construction projects were listed in the Table 13. The researcher categorized the critical success factors stated by the interviewees as project management activities, the external factors, the project features, and the project manager role in the success. In the interviews, it was observed that the most important critical success factor was the role of a project manager in the project. The characteristics and core competencies of the project manager were highlighted by the participants. The interviewees stated that the project manager should have a combination of skills in general management, project management, and human management. The general management skills of the project manager were described by the participants as vision provision, being a coach/mentor for the team members, sound judgment, problem and conflict resolution, effective decision-making, negotiation, communication, and qualified team building. The interviewees listed the Project Manager's project management skills as flexibility, ability to adapt to change and cultural realities, trust and commitment, proactive, capable attitude, open-

mindedness, common sense, reliability and creativity. Also, the participants implied that the project manager should have human management skills such as interpersonal relationships, gaining influence and respect, being politically sensitive, active listening, being a role model and providing justice.

Moreover, all participants remarked that sub-disciplines of project management were of great importance in a project's success. Beyond the project management, the participants evaluated the specific features of the project and external factors as one of the critical factors affecting the project's success. According to participants, economic, social, physical, sectoral, and technological environment were the external critical factors of the project. The participants stated that the type, structure, and complexity of the construction project also affected success of the project.

CATEGORIES	CRITICAL SUCCESS FACTORS
<b>Project Management Activities</b>	<ul style="list-style-type: none"> <li>• Determination of project goals</li> <li>• Dividing the project into sub-sections</li> <li>• Determination of Work Plan</li> <li>• Preparation of Project Management Plan</li> <li>• Contract management</li> <li>• Program management</li> <li>• Cost management</li> <li>• Quality management</li> <li>• Contact management</li> <li>• Time management</li> <li>• Resource management</li> <li>• Administrative and financial management</li> <li>• Staff management</li> <li>• Design management</li> <li>• Purchasing and subcontractor management</li> <li>• Construction management</li> <li>• Job completion procedure</li> <li>• Documentation</li> <li>• Stakeholder management</li> <li>• Integration management</li> <li>• Control systems</li> <li>• Planning and monitoring activities</li> <li>• Feedback mechanism</li> <li>• Occupational health and safety program</li> </ul>
<b>The Project Manager Role</b>	<ul style="list-style-type: none"> <li>• Experience as a project manager (years)</li> <li>• Total experience of the project manager in the construction industry (years)</li> <li>• The core project management competencies and skills</li> <li>• Determination of project scope, vision and mission by project manager</li> <li>• Technical experience in construction sector</li> <li>• Determination of the project organization by the project manager</li> <li>• Motivation ability to project team</li> <li>• Project coordination and organization ability</li> <li>• Project planning ability</li> <li>• Leadership</li> <li>• Communication skills</li> <li>• Problem solving ability</li> </ul>
<b>The External Factors</b>	<ul style="list-style-type: none"> <li>• Economic environment</li> <li>• Social environment</li> <li>• Politic environment</li> <li>• Physical environment</li> <li>• Sectoral environment</li> <li>• Technological environment</li> </ul>
<b>The Project Features</b>	<ul style="list-style-type: none"> <li>• The project type</li> <li>• The project structure</li> <li>• The complexity of the construction project</li> </ul>

Table 14 The Critical Success Factors Stated in the Interviews  
(Source: Created by the Author)



### **5.1.5. Summary**

According to surveys and interviews done, it was determined that most of the participating companies used Project Management Practices effectively in their projects. It can be stated that most of the interviewers were not yet fully aware of the positive effect of having a Project Management Office on project management and success. However, it was observed that the Company A, which has PMO for project management, employed the biggest amount of employees for construction management. It has been detected that the Company A was aware that having a PMO has a tremendous positive effect on project success. According to interviews, it was specified that most of the participating companies supplied the Project Management Training to their staff employed in their own company in order to catch project management awareness and ensure success of the project. All participants stated that the Project Manager should take PMP Trainings, and they also stated that the Project Manager has a significant impact on the project and a great contribution to the success of it, in both interviews and surveys. It can be indicated that these companies that participated in the interview had general knowledge and awareness about project management.

Table 15 summed up the obtained results from the conducted questionnaire and interviews. According to the participants, Project Cost Management and Project Risk Management were the factors that affected the success of the project mostly. According to the results, participant companies have reduced the project cost and risk rate by approximately 76-100%, thanks to Project Management. Likewise, it was concluded that the participating companies increased rates of the project's customer/stakeholder satisfaction, scope, quality and procurement by 76-100%, through the Project Management. It was concluded that Project Efficiency and Integration increased to 51-75% in the interviewed companies through Project Management. The research results have demonstrated that project management reduces the project duration rate by 51-75%, for the interviewed companies. In the face-to-face interviews, it was concluded that the factor of Time Management was one of the most important factors affecting the success of the project.

<b>Rate of Project Management Discipline Affecting the Success of the Project</b>	<b>The Critical Success Factors</b>
<b>76-100% Reduction</b>	Project Cost
	Project Risks
<b>76-100% Increase</b>	Project Customer/Stakeholder Satisfaction
	Project Scope
	Project Quality
	Project Procurement
	Project Managers Role
<b>51-75% Increase</b>	Project Productivity
	Project Integration
<b>51-75% Reduction</b>	Project Schedule

Table 15 Summary of Obtained Results for Effect of Success  
(Source: Created by the Author)

When the critical success factors were examined in the Table 15, it was striking that most of the critical factors, from setting goals to job completion procedures, included issues related to project management. These defined factor groups interacted with each other. A factor belonging to one group affected a factor in another group. Accordingly, as a result of the research, a conceptual framework related to the factors was created by the researcher in the Figure 11. It has been observed that these critical factors did not affect the success of the project independently, because there was a relationship between these factors. According to these critical factors, it appears that the success of a construction project is directly related to project management. Therefore, effective project management can be interpreted as an important tool to achieve success in construction projects. The interviewers emphasized the necessity of project management in the construction sector in order to evaluate and implement all these critical factors together. These results have been an important study in which the factors affecting the construction project success were grouped and listed.

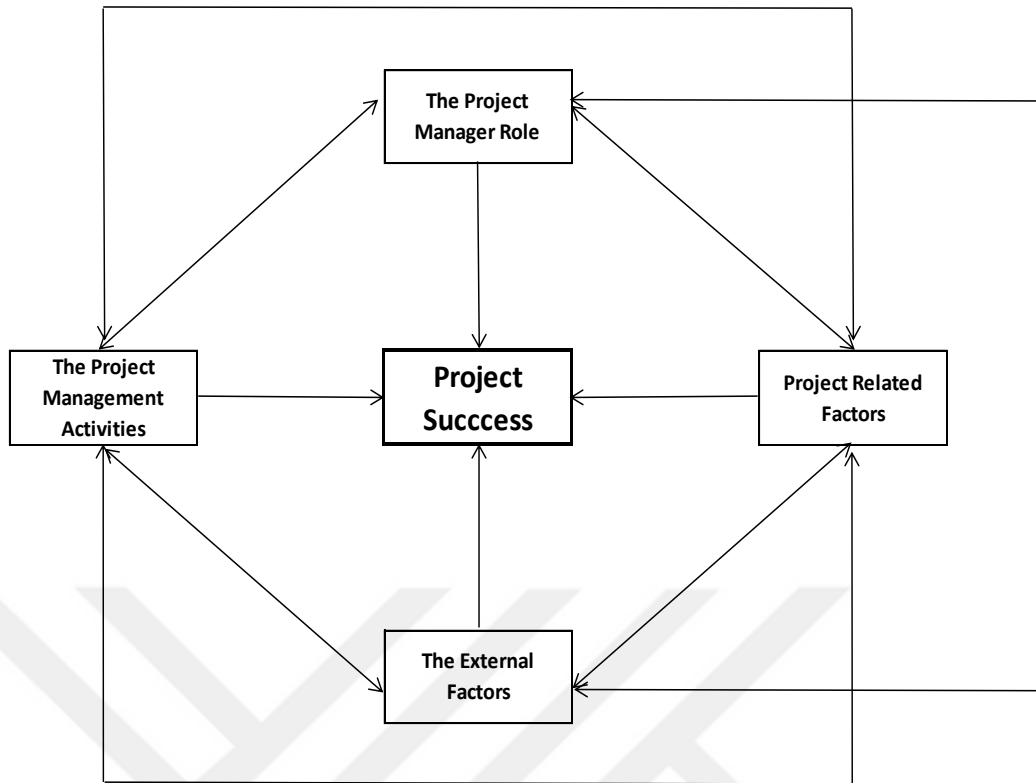


Figure 11 The Relationship of the Critical Factors Affecting Construction Project Success  
 (Source: Created by the Author)

## **CHAPTER VI**

### **CONCLUSION AND DISCUSSION**

The Construction Sector, which is of great importance for the economies of countries around the world, is one of the leading sectors of economic activities in the world. Project management is getting more difficult day by day, as the projects getting more complex in the construction sector that develops day by day have a more comprehensive and complex structure. Determining the critical factors affecting the success is important in terms of ensuring that the project is carried out in line with the determined goals. Given the complexity of the construction process and the need for different project stakeholders to work in sync, many factors need to be carefully considered for a project to be successful. Thus, a thesis study that aims to determine the critical factors affecting the project success in the construction sector was carried out.

A detailed literature study was surveyed on the Project Management Methodology applied by the companies in the construction sector, within the scope of this research. The literature review was served the purposes of understanding project management in the general framework, examining project management practice in the construction industry, and identifying critical project success factors for a project to be evaluated successfully. In line with these purposes, the concept of the project has been focused on primarily. After examining the concept of the project in general, the project management processes in the construction sector were explained in detail. At the end of the literature study, the concept of project success was explained. Various definitions for the project success concept were provided. Then, the studies of various researchers in the literature on success measurement criteria were examined, and the critical project success factors they identified were listed.

After the literature study, the effect of Project Management Criteria on the success of construction companies was examined. In order to better understand the use of Project Management Methodologies and Standards in the construction

industry, the project phases from the start of a project to its completion was discussed through a Case Study. Then, the factors affecting the success of the project were examined by in-depth face-to-face interviews and surveys with four experienced companies and their experts in this sector in Turkey, to achieve aim of the thesis. 4 successful companies were selected among the top 10 companies in the "CSN 100 Consulting List of Turkey in 2021" for the interview and survey. To achieve this goal, the study was focused on three main contents. Regarding the broad experience of the interviewees the main topics discussed within the study were as follows. Primarily, the awareness of the Project Management Methodologies and Standards in the construction sector was researched and analyzed. Next, detailed research was conducted on the use of Project Management within these companies. Then, a detailed investigation was made on the application of the Project Management Knowledge Areas in these companies. Finally, the effect of the use of Project Management on success of the project was examined and interpreted. Face-to-face interviews made a great contribution in receiving instant feedback from the interviewees, and in obtaining direct comments and opinions on the factors discussed in the thesis. It has been observed that most of the interviewed companies had knowledge and experienced about project management. According to the results, participating companies have reduced the project cost, time and risk thanks to Project Management. Likewise, it was concluded that the participating companies increased the project's customer/stakeholder satisfaction, scope, quality, procurement, integration and efficiency through Project Management.

As a result of the interviews, the critical success factors were identified by the researcher under the categories, which consisted of the project management activities, project manager's role, the project features and the external factors. It has been observed that these critical factors did not affect the success of the project independent from one another, because there was a relationship between these factors. According to these critical factors, it appears that the success of a construction project is directly related to project management. Most importantly, participants had a common opinion about the contribution of the project manager in the project success. All participants remarked that a project manager is the person who will keep the project to go on the desired way, from the beginning to the end. The interviewees stated that the project manager cannot have a single skill that is sufficient to be successful. All participants implied that a good project manager is a

person that should be someone, who is reliable, who is able to communicate with people of all levels, who keep the motivation of his team at the high levels, who can make a plan perfectly, who anticipate the problems that may arise by making the right decisions at the right time, and who intervene in the problems, who is solution-oriented, who is able to make quick decisions, and who has high organizational skills. The participants also stated that it is of great importance for the Project Manager to have communication skills and ability for empathy. As a result of the research, it has been concluded that effective project management is an important tool to achieve success in different disciplines by ensuring control throughout the project life cycle for construction projects. It has been concluded that determining how, and with which techniques and methodologies the project management will be applied specific to each project has an important contribution to successful completion of the projects. As a result of the study, it has been revealed that the successful completion of the project in accordance with the time, scope and budget of the project is possible with project management by considering the critical success factors determined in the research. It has been observed that project management ensures that the project is the most efficient, highest quality and least costly successful project by minimizing risks.

In summary, it has been determined that project management provides the highest level of planning and coordination if it is included in the project with the right systems at the right time. These results of the study have been an important survey in which the factors affecting the success of the construction project are grouped and listed.

### **Limitations and Suggestions**

In this study, there were some limitations. Unfortunately, there were major recessions in business life, and many safety and health measures were taken all over the world because of the coronavirus pandemic affecting all industries in 2020. Only the limited numbers of companies were able to be reached due to the precautions in Ankara. The study data were obtained from 4 detailed face-to-face interviews and surveys, conducted with construction companies. Therefore, interviews and surveys were able to represent only a small portion of large population taking place in project firms in the construction sector. In addition to this limitation, the study had to be limited by the perceptions, comments, experiences and opinions of the participants.

In the future studies, it will be useful to make a quantitative success assessment along with reconstruction of the success measurement criteria within the scope of the thesis, by applying a measurement method. It would be beneficial to conduct a more comprehensive research by expanding profiles of the companies in the construction sector.



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## **APPENDIX A**

### **INTERVIEW QUESTIONS**

1. How old are you? What is your education level?
2. What position are you currently working in for your company? How many years of experience in your company? How many years of experience do you have in the construction industry?
3. Did you start your career as which responsibilities? And, what positions do you currently work in your company? What are your task descriptions in this firm? What are your contributions to this success?
4. What is the origin of your Company? What is the legal form of the company? Could you please provide information about your company? What kind of services do you provide in which sector? What types of projects are you executing?
5. What is your client type has the highest percentage in total number of projects of your company?
6. What kind of activity and services do you provide in which sector? What types of projects are you executing?
7. Do you know Project Management Methodology Standards, Principles, and Knowledge Areas? Does Your Company Use Project Management Methodologies? Do you have any Project Management Certificates? How many years of experience do you have in Project Management in the construction industry? Could you please share with me your trainings and certificates about Project Management?
8. Could you please share with me your trainings and certificates about Project Management?
9. Why do you attach so much importance to PMP Certification? What do you think about project management? Do you think project management has an important role in being successful in the construction industry? Do you believe that project management really gives the companies benefit and

success? How do you ensure that your construction projects develop and complete successfully?

10. What are your task descriptions in this firm? What are your contributions to this success?
11. How important do you think the project manager is in success? Is choosing the right project manager in projects a step in success? Did you ever encounter any challenges or risks during managing your projects? How did you overcome these challenges and risks? Have you ever made a mistake as a project manager before, and have you had jobs that ended up failing?
12. Which qualifications do you look for when choosing a project manager? What do you think about the project manager's skills to succeed?
13. What do you think about the project manager's skills to succeed? Did you ever encounter any challenges or risks during managing your projects? How did you overcome these challenges and risks?
14. Do you have a Project Management Department? What is the number of personnel working in project management activities of your company? Have you given any training program to your personnel on Project Management Standards and Knowledge Areas? Do you care about having PMP certification in recruitment? Why do you attach so much importance to PMP Certification? Which of the Project Management Knowledge Areas does your company use?
15. Which of the following Project Management Knowledge Areas does your company use? What are the different kinds of project management tools and techniques you worked with?
16. What kind of planning do you do for project quality management?
17. How much importance your company attaches to the importance of quality management. What works are doing in quality management? Which techniques and tools are used in the company?
18. What were the risks you encountered in the projects?
19. What do you do for risk management in your company? Are there any risks that you could not f during the project? What do you think about the importance of risk identification and risk management in project success? Are you encountered the most kind of risks in your projects? Which factors cause a risk?

20. Have you experienced the intertwining relationship, that is, the project stages where the stages start before the end of the previous stage? How did you deal with this?
21. What kind of planning do you do for project budget management? What do you think about the importance of project budget management?
22. What do you think about project management? Do you think project management has an important role in being successful in the construction industry? Do you believe that project management really gives the companies benefit and success?
23. What can you comment on project management practices in the construction industry in general?



**APPENDIX B**  
**QUESTIONNAIRE**

**“Examination of Project Management Methodology: Factors Affecting the  
Success of Project Firms in the Construction Sector”**

This questionnaire form is prepared for the master's thesis titled *“Examination of Project Management Methodology: Factors Affecting the Success of Project Firms in the Construction Sector”* conducted at Çankaya University the Graduate School of Social Sciences. The information obtained from you will be used purely for scientific purposes. Your contributions are important to us. Thank you in advance for your valuable contribution.

Prof. Dr. Alaeddin TİLEYLİOĞLU  
Çankaya Üniversitesi İ.İ.B.F.  
Business Administration  
(Thesis Advisor)

Hande ANKARA  
Çankaya University the  
Graduate School of Social  
Sciences Master of Business  
Administration (MBA)

### **Instructions**

Answer questions as they relate to you. For most answers, check the box(es) most applicable to you or fill in the blanks.

## **Section 1: Respondent's Background**

### **1.1. Your Name /Surname**

.....

### **1.2. Your Age**

- 17 or less
- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66-75
- 76 or more

### **1.3. Your Gender**

- Female
- Male
- Other

### **1.4. Your Education Level**

- Primary School
- Secondary School
- High School
- Undergraduate
- License (B. Sc.)
- Post Graduate (M. Sc.)
- Doctorate (Ph. D.)
- Other

### **1.5. Your Academic Graduate Department**

- Engineering
- Architectural
- Business Administration
- Economics
- Administrative and Social Sciences
- Law
- Statistics
- Other

### **1.6. Your Job Title**

- Chief Executive Officer (CEO)
- Chief Project Officer
- Board of Directors
- Managing Director
- General Director
- General Coordinator
- General Manager
- Project Manager
- Deputy Project Manager
- Senior Project Manager
- Program Director
- Program Manager
- Department Head
- Branch Manager
- Junior Executives
- Assistant Project Manager
- Project Administrator
- Quantity Surveyor
- Office Engineer

- Project Management Assistant
- Civil Engineer
- Architect
- Mechanical Engineer
- Electrical Engineer
- Site Engineer
- MEP Engineer
- Technician
- Other

**1.7. How many years of experience do you have in the construction sector?**

- 0-5 years
- 6-10 years
- 11-20 years
- 21-30 years
- 31-40 years
- 40-or more years

**1.8. How many years of experience do you have in Project Management in the construction industry?**

- 0-5 years
- 6-10 years
- 11-20 years
- 21-30 years
- 31-40 years
- 40-or more years

**1.9. How many years of experience in your company?**

- 0-5 years
- 6-10 years
- 11-20 years



- 21-30 years
- 31-40 years
- 40-or more years

**1.10. Do you know Project Management Methodology Standards, Principles and Knowledge Areas?**

- Yes
- No

**1.11. Do you have any Project Management Certificates?**

- Yes
- No

**Section 2: General Information about Your Company**

**2.1. Name of Your Company**

Confidential

**2.2. Experience Year of Your Company**

- 0-5 years
- 6-10 years
- 11-20 years
- 21-30 years
- 31-40 years
- 40-or more years

**2.3. Origin of Your Company**

- Local Company
- Foreign Company
- Both Local/Foreign Company

#### **2.4. Approximate Headcount of Your Company**

- 0-10 worker
- 11-20 worker
- 21-50 worker
- 51-100 worker
- 101-250 worker
- 251-500 worker
- 501-or more workers

#### **2.5. Main Business Areas of Your Company**

- Employer/Client
- Investor/Financing
- Main Contractor
- Subcontractor
- Project Management Consultancy
- Research and Education
- Design Consultancy
- Supplier/Vendor
- Contractor
- Other

#### **2.6. Projects Type of Your Company**

- Commercial
- Industrial (Factory, Plant, Energy, etc.)
- Transportation
- Superstructure (Residential, Building, Mall, Hotel, etc.)
- Education
- Sports
- Healthcare
- Infrastructure (Road, Bridge, Waste, Water, etc.)
- Aviation

- Heavy Construction (Dam, Maritime, Dredging, etc.)
- Other

**2.7. Client Type has the Highest Percentage in Total Number of Projects of Your Company**

- Government Sector
- Private Sector
- Public and Private

**Section 3: Awareness and Usability of Project Management Standards and Knowledge Areas of Your Company**

**3.1. Does Your Company Use the Project Management Methodologies?**

- Yes
- No
- Sometimes

**3.2. Number of Personnel Working in Project Management Activities of Your Company**

- 0-3 personnel
- 4-10 personnel
- 11-20 personnel
- 20-or more personnel
- None

**3.3. Have you given any training program to your personnel on Project Management Standards and Knowledge Areas?**

- Yes
- No

**3.4. Which of the following Project Management Knowledge Areas does your company use?**

- Project Integration Management
- Project Scope Management
- Project Schedule Management
- Project Cost Management
- Project Quality Management
- Project Resource Management
- Project Communication Management
- Project Risk Management
- Project Procurement Management
- Project Stakeholder Management
- All
- None

**3.5. Which of the following Project Management Process Groups does your company use?**

- Initiating Process Group
- Planning Process Group
- Executing Process Group
- Monitoring & Controlling Process Group
- Closing Process Group
- All
- None

**3.6. What do you think about the effect of Project Management Standards on project success?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase

- 76-100% Increase
- No Change

**3.7. What do you think about the effect of Project Management Standards on project duration?**

- Increase
- 1-25% Reduction
- 26-50% Reduction
- 51-75% Reduction
- 76-100% Reduction
- No Change

**3.8. What do you think about the effect of Project Management Standards on project cost?**

- Increase
- 1-25% Reduction
- 26-50% Reduction
- 51-75% Reduction
- 76-100% Reduction
- No Change

**3.9. What do you think about the effect of Project Management Standards on project productivity?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.10. What do you think about the effect of Project Management Standards on customer/stakeholder satisfaction?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.11. What do you think about the effect of Project Management Standards on project integration?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.12. What do you think about the effect of Project Management Standards on project quality?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.13. What do you think about the effect of Project Management Standards on project risks?**

- Increase
- 1-25% Decrease

- 26-50% Decrease
- 51-75% Decrease
- 76-100% Decrease
- No Change

**3.14. How many projects on average are conducting simultaneously in your company?**

- 1-5 projects
- 6-10 projects
- 11-20 projects
- 21-30 projects
- 31-or more projects

**3.15. How many stakeholders do the projects carried out in the company have on average?**

- 1-5 stakeholders
- 6-10 stakeholders
- 11-20 stakeholders
- 21- or more projects

**3.16. Do you believe that Project Managers should receive Project Management Professional training in construction projects?**

- Yes
- No

**3.17. Does your company have a Project Management Office?**

- Yes
- No

**3.18. What do you think about the effect of Project Manager on project success?**

- Decrease
- 1-25% Increase

- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.19. What do you think about the effect of Project Management Standards on project scope?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.20. What do you think about the effect of Project Management Standards on project procurement?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

**3.21. What do you think about the effect of Project Management Standards on project communication?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change



**3.22. What do you think about the effect of Project Management Standards on project schedule?**

- Decrease
- 1-25% Increase
- 26-50% Increase
- 51-75% Increase
- 76-100% Increase
- No Change

