

Msc Thesis

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**EXPLORING THE CRITICAL COMPONENTS AND ELEMENTS AFFECTING THE
PERFORMANCE AND MANAGEMENT OF PERFORMANCE IN THE
CONSTRUCTION INDUSTRY OF UAE**

Name

Students No.

**A research project submitted to the department of, in partial fulfillment of for
the award ofin the University of**

DECLARATION

52

I declare that this research work is a presentation of my own original input and not presented for award ofin University of.....or any other university for that matter. Inputs for others are clearly indicated in the research ensuring due reference to the work cited. Collaboration and priceless contributions from colleagues and relevant personnel are acknowledged in the research work.

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This research has been successfully completed and submitted for examination with my approval as the supervisor.

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DEDICATION

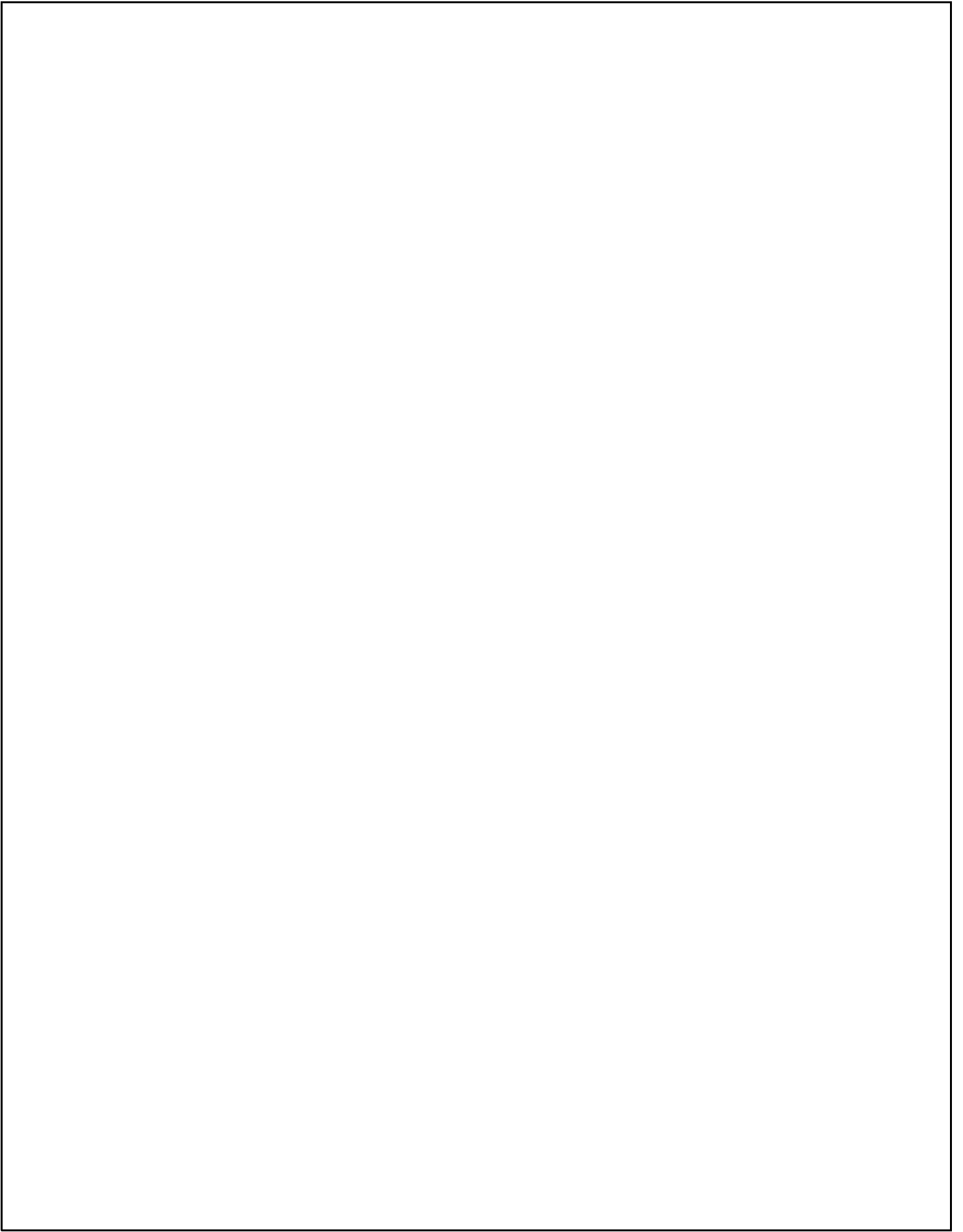
ACKNOWLEDGEMENT

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ABSTRACT

The construction sector is the third most important industry following oil and trade and consists of a total of around 6,000 companies, mostly located in Abu Dhabi. Construction sector investments totaled 56.2 billion euros in 2016, an increase of 24% since 2006, and account for almost 84% of the country's total investments. Dubai is now the largest construction market in the region, additionally boosted by the major projects undertaken in the Emirate in the run-up to Expo 2020. However, the country's investments in construction fell by 8.6% in 2016 with respect to 2015 following three years of continuous growth in the sector. Constant and significant growth rates are forecast in all market segments. ¹³ Amid slowing market conditions, government spending cuts and continued oil price decline, a number of realty projects in the UAE won't be completed as scheduled. ¹³ 18,200 residential units in UAE won't come as originally anticipated due to a number of issues. The figure represents 70% of the 26,000 units earlier planned for completion in 2016. ⁵⁵ This study intends to investigate the critical factors that affect the performance of the construction industry in United Arab Emirates and in so doing suggests ¹⁷ methods that can be used to enhance the performance of the construction industry in UAE.

CHAPTER 1: INTRODUCTION

This chapter will lay a foundation of the study: background to the study, statement of the problem, general and specific objectives of the study that the proposal aims to achieve, research questions which will guide the researcher, significance of the study, limitations and scope of the study and general overview of the study organization in exploring the critical components and elements that affect the performance and management of performance in the construction industry of UAE

1.1 Background of the study

The construction industry of an economy is a vital part of a country's economy that helps achieves economic growth and development in the long term (Sev, 2009). However, mismanagement of resources and performance in the industry are critical issues that are attracting a large stream of research (Toor and Ogunlana, 2008; Assaf and Al-Hejji, 2006). Despite large research, there is still lacking research that can aid the efficient practice of project management (Davis, 2014). A survey conducted on the project management research revealed that only 3% of the 3,000 projects that were studied were published in leading research publications which constitutes a very small percentage. Therefore, despite its few numbers in the research, there is nonetheless an important gap in the research of project management that calls for the need to study the factors of project failures to improve practices within the industry (Kloppenborg and Opfer, 2002).

With specific relation to Arab Gulf region, only a handful of studies focus on the construction risks and performance issues associated with the regional local firms (Al-Sabah et al., 2014). In

order to contribute to the gap, the research will focus on the key performance factors of the UAE's promising construction industry. MarketLine (2016) reports indicate that the UAE construction industry comprised of \$32.4bn in value in 2015, with the future performance of the industry expected to positively increase at the rate of 8.6% estimated for the year 2015 to 2020. The reports (MarketLine, 2016) further estimate an increase in the value of the industry of up to \$ 48.9bn by 2020. The expected increase in performance and scale of construction in the UAE makes it ideal to conduct research on performance management of construction projects. The construction industry is operated on a project basis which is fragmented in its very nature. The process of construction site management consists of various processes that are both dynamic and uncertain and is flexible with the changing process with the aim to achieve the set safety measures, quality and environmental goals (Laufer, 1985). However, obstacles occur in the management of the aforementioned process such as poor communication, conflict of interest, lack of cooperation and project stakeholder conflicts (Keung and Shen, 2013).

Established literature on the subject suggests that stakeholder perception towards the feasibility and success of the undertaken project is an important element in the success or failure of a project (Dalcher and Drevin, 2003). Therefore, the proposed research will study the parameters affecting performance management in the construction industry of UAE. In addition, the research will explore six critical performance parameters in the Comprehensive Performance Measurement Model (CPMM): interfirm networks, planning reliability at the operational level, leadership, and competency of project manager, Jointly Risk Management (JMR), strategies for improving codes of ethics and enhance the innovation. The research will contribute to the practice of enhancing performance and promote a better understanding of the parameters in the construction industry.

1.1.1 Project management in United Arab Emirates

The construction industry in United Arab Emirates has been marked with tremendous growth rates globally and rated eight globally, a little below United States of America that has been rated fifth globally, in technological efficiency and savviness in the construction industry for that matter. The construction industry in the United Arab Emirates is equivocally mirrored by the expansion and development of the project management discipline. This development can be attributed to the United Arab Emirates unique opportunity of having the ability to employ practically the best practices internationally and adopting them into their organization's culture through the Total Quality Management programs rolled out by the governments of the United Arab Emirates nations.

As a discipline, project management helps in delivering key objectives of a project particularly those that are marked as a key success factors in a projects. These objectives are time, cost and quality. Project management also further investigates whether project managers are merely relegated to a reporting and monitoring role or are involved at strategic levels with the authority and power to influence the course and direction of the project effectively and efficiently. Project management also as a discipline, looks into the performance of the project over its life period and measures its performance against specific standards that tell whether the project is performing as expected or rather has delayed and is failing. The project performance management practice is key in ensuring that the project is up to the required quality and avoids exaggerated costs and wastage and also is in alignment with the previously planned time of the project. Since its development therefore, project management and project performance management has become part and parcel of the construction industry globally.

Project management was developed in the 1950's during the war wars on large defensive projects. In this context, project management was then a separated function from an organization itself. This specialized knowledge of project management gave the project managers h power to command responsibility of the project, ⁵ autonomy and the space to make delivery of the project quality and goals. In recent times however, project management has had an evolution of more ⁵ multi-disciplinary definitions of project management. Some of these definitions include the popular definitions as ⁵ Project management institute (2004) definition of project management and that of the Association of Project Managers (2009) definition of ¹⁴ project management.

¹⁹ Project management institute (2004) defines project management as the application of the knowledge and skills, tool and techniques of a project manager on a project's activities to meet ¹⁷ the requirement of the project. Project management in this context is accomplished upon application and integration of the project management process. This process include initiations planning, monitoring, executing and controlling and closing of the project. The project managers, according to the Project management institute (2004), ⁵ is the person solely responsible for the accomplishment of the ³⁰ objectives of the project. Association of Project Managers (2009) defines project management as the process through which projects are planned defined monitored and delivered and controlled in such a manner that the agreed benefits of the projects are reached by the press of the same. Each and every project is unique in its own way and transient endeavors are undertaken to reach to the desired outcome of the projects. According to Association of ¹⁴ Project Managers (2009), projects bring out change and project management is the most efficient way of making such a change.

⁵ Within the construction industry however, there has been a growing problem of coming up with a clear definition of the project management role and subsequent poor project performance

management in United Arab Emirates and in the global construction industry for that matter. Project managers in United Arab Emirates are considered to be a new breed of construction professionals that are arising from the current construction industry increased specialization and complexity of building and construction projects. Project management has come a long way to be recognized as the most efficient tool that enabled mankind to handle very novel and complex activities. Project management is very effective in comparison to traditional methods of management with their formal hierarchies and functional divisions. In the context of the construction industry however, project management has an appearance of possessing functionalism, bureaucracy and technicality in the recent years as demonstrated by the construction industry in United Arab Emirates and Swedish construction industry too displaying the most recent incidents of the same. Project management no longer possesses the unstructured and explorative nature that it initially had and was designed to be. It has rather become a functional activity bringing about the conflicting views of project management and rooting the critical components and elements that affect the performance and management of performance in the construction industry of United Arab Emirates and global construction industry for that matter.

1.1.2 Project success and failure

In the United Arab Emirates and most other construction industries in the developed and developing nations, there has been a growing concern and recognition between project success and the project management success having very differentiable goals and objectives in the end. Project success is demonstrated to be measured against the overall project objectives over the life period of the project in question and rather it should not be measured against the narrow interpretation of only time, quality and cost of the project. The project management success however can be subjected to the more narrowly defined measures of the critical success factors

of time quality and cost over a shorter time frame. Six factors have been identified over time since the development of project management to be critical success factors and could therefore mean the success or failure of a project. These factors include corporate understanding, the organization adaptability, and project manager style of leadership, project manager selection criteria, commitment of the executives of the project and finally commitment to the planning and control of the project (Kezner, 1987). Pinto (1987) and Sleving (1987) on the other hand identify ten factors that can lead to success or failure of the project and therefore deterring its performance. These factors include the mission of the project, the top management of the project, the project schedule or the project plan, the project personnel, the clientele consultation, the technical tasks, the client acceptance, monitoring and feedback and finally the communication and troubleshooting execution in the project.

Success measurement of a building and construction project has also been under study by several scholars. Divre et al (2003) quote that Pinto (1990) and Mantel (1990) proposed performances measures benchmarks for project management and the subsequent project success. This benchmark includes the perceived value of the project, the implementation process of the project and the client satisfaction rate with the delivered product. Over the time, the gasoline of project attempt has come to be set against six measure of success of the project including the facility being proceed to the provided specification in the given time frame and within provided budget allocation, the project provision of satisfactory benefit to the project Weber, the projects achieving the pre-stated objectives in producing the facility, the project should satisfy the needs of the supporters and the project team in general and finally the project satisfying needs of the users.

Atkinson (1999) made a prevalent attempt to break down the success criteria that was contained in other previous researches into four broad categories and types that Atkinson (1999) coined as the Square route to the comprehension of the success criteria. Atkinson's (1999) categories and types included narrow traditional criteria that were initially coined as the "iron triangle", then progression through a type referred to as the information sites, and then into the organizational benefits of a project and then the fourth type which is the project benefits to the community and the stakeholders in general. A project manager must also utilize political power and behavior to promote successful implementation of the objectives of the project.

1.2 Statement of the problem

The construction industry in UAE is among the largest and the most performing industries globally and contributes heavily towards the GDP of the Emirates. However, mismanagement of resources and performance in the industry are critical issues that are attracting a large stream of research. At least 70% of the projects ongoing in any business year in the UAE will delay and not be completed within the projected period. A survey conducted on the project management research revealed that only 3% of the 3,000 projects that were studied were published in leading research publications which constitutes a very small percentage. The researcher will therefore contribute towards the filling the gap by explore of the critical components and elements that affect the performance and management of performance in the construction industry of UAE

1.3 Objectives

The aim of the proposed research is to study how performance can be measured and improved in the field of construction specifically in the UAE. In addition, the research will also explore the stakeholder perspective to identify the factors that make a construction project successful and

how productivity and performance can be improved in the field of construction. To undertake the aforementioned research, the study outlines the following objectives:

1. Identify the critical factors affecting and influencing performance in the construction projects.
2. Analyze the relationships between the different factors that affect performance in the construction projects.
3. Identify methods to enhance performance management in the construction industry.

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1.4 Study Research Questions

This study seeks to answer the following questions

1. What factors affect the performance in the construction projects in UAE?
2. How do the factors affect the performance in the construction projects in UAE relate to performance management?
3. What methods can be utilized to enhance performance management in the construction industry in UAE?

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1.5 Significance of the study

This study will contribute majorly towards the limited number of resources about the construction industry, performance and performance management of the same. It will look into the critical factors affecting and influencing performance in the construction projects, analyses their existing relation to the critical actors of success and also suggests the methods that can be utilized to enhance the performance of the construction industry in UAE. Being the largest and most fundamental industry, a study on determining factors influencing its productivity and enhancing the same will significantly contribute towards the successful development of the industry.

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CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter will focus on literature reviewed to gain an understanding on the exploration of the critical components and elements that affect the performance and management of performance in the construction industry of UAE. It will further discuss different strategic management concepts guiding the study, theories, empirical studies, gaps of knowledge, and operationalization of conceptual framework.

2.2 Theoretical review

Several researchers have gone ahead and analyzed the critical components and elements that affect the performance and management of performance in the construction industry of United Arab Emirates. However key concepts and theories that have contributed to the understanding of performance and appearance management in the construction industry are the theory of construction management and that of the lean construction theory. Theoretical review of this study will further analyses these theories in relation to gain comprehensive knowledge of the elements and components that have an influence over the performance and performance management of the construction industry, particularly in the United Arab Emirates.

2.2.1 Theory of construction management

This theory of construction management defines construction management and relates to wastage in that the definition of CM said to be the act of taking responsibility for performance of a construction organization and in turn is measured by efficiency. Construction management is stated to be inversely related to the wastage that is caused by external interference and

complexity which prevent organizations achieving their agreed objectives. The theory of construction management was developed by Milan Radosavljevic (2012) and John Bennet (2012) who lacking attempted to answer whether construction management can be reinterpreted in the terms of the economic theory of production, and if so if it would be able to make a significant improvement in the performance of the construction industry and whether or not a theory can be based particularly on the characteristics of the industry it is affiliated to.

Radosavljevic (2012) and Bennet (2012) provide a theory of construction management as a solution to founding construction management strategies by identifying the action that come in handy in making construction projects and companies efficient in their operation.

The theory particularly engages the challenge bringing to focus a defined and precise model of construction management. It does this by employing five differentiated methods that are used for delivering of construction and building projects. Radosavljevic (2012) and Bennet (2012) argue that the industry of construction is very different compared o other all other industries in the fact that it is complex. In construction industry the project success is dependent on the number of teams involved and interacting on the dame, the quality of the relationships of the involved teams and the performance viability of the teams. Radosavljevic (2012) and Bennet (2012), without relying on the general management theories, consciously developed the construction management theory that identifies and defines all the components that are needed in order to understand the concept of construction management.

The theory of construction management provides six inherent difficulty indicators used to determine the appropriate construction management theory. These include: The established relationships; relationships that existed before between interacting teams, Relationship fluctuations; difference between times of projects that have or do not have established

relationships, Relationship quality; previous times spent working together, Relationship configuration; patterns that have been established by interacting teams in their interactions, Performance variability; inconsistency of team performances between projects and finally, ⁹ External interference; factors that exist outside the control of the managers. Radosavljevic (2012) and Bennet (2012) note that by managing these IDI's the performance of the construction management significantly improves.

²¹ 2.2.2 Theory of lean construction

The theory of lean construction comes as a combination of the practical development and operation research in construction and design adapting to the lean manufacturing principles and the end to end construction process design. Developed by the International group for Lean construction, ²¹ the theory is concerned with the holistic pursuit and alignment of the continuous and concurrent improvements of both the natural and the built environment. This includes the construction, design, the maintenance, the activation the salvaging and the recycling of the built and the natural environment.

⁴⁹ Louis Koskela (2000) the founder of the Lean construction argues that there is a need of a production theory and related theories that can fully agglomerate the transformation, value concepts and flow. The ultimatum should however be aimed at creating a unified conception of the production instead (Koskela, 2000). The Lean construction model, which has evolved into the Transformational Flow Value theory, takes into consideration three paradigms or points of views and also based on the opinion of the existence of three fundamental aspects of in production that should be simultaneously managed to ensure success of a construction project. These include the supply chain cost management, design and project delivery. These make up the Lean Project Delivery systems as detailed by Koskela et al (2008).

The Lean construction theory comes as an alternative to the management theories existing in the construction industry. This is because the Lean Construction theory, prior to the Construction management theory (Radosavljevic and Bennet, 2012), was the only theory that was developed specifically for the construction industry as a theory of production. The Lean production theory in inclusion of the Lean Project Delivery System, is integrated approach towards management of the participants of a construction project and the stages of a project thereof, as form the initiation to operation of the project. The Lean project delivery system is a framework that begins from the life-cycle of the project to the completion of the project. The methods through which construction and building project are managed can be reconceptualised through the techniques and tools of the Lean construction theory and the Lean Project Delivery System.

2.3 Empirical literature review

The empirical literature review is organized in alignment with the major areas of the exploration of critical components and elements that affect the performance and management of performance in the construction industry of United Arab Emirates.

2.3.1 Construction industry in United Arab Emirates

The construction industry of the United Arab Emirates is part and parcel of the Gulf construction boom that was estimated at \$2.4 trillion having an excess of twenty one thousand eight hundred activities building and construction project in the year 2017. MarketLine (2016) reports indicate that the United Arab Emirates construction industry comprised of \$32.4bn in value in 2015, with the future performance of the industry expected to positively increase at the rate of 8.6% estimated for the year 2015 to 2020. The reports (MarketLine, 2016) further estimates an increase in the value of the industry of up to \$ 48.9bn by 2020. The expected increase in

performance and scale of construction in the UAE makes it ideal to conduct research on performance management of construction projects.

Chan and Seun (2005) define the international construction projects as projects where the contractor, the employer and the led consultants are not of the same domicile, rather at least one of them is working outside their country of origin. Gorgenlander (2011) expresses the fact that of the one hundred and twenty five thousand cranes for construction existing in the world, over 24% (thirty thousand) cranes were employed in the construction projects on the gulf region. The United Arab Emirates is ranked the eighth in the world, in terms of the construction technology, ahead of Germany at sixteenth position and a little below Unites States of America, at fifth position. The Construction industry in United Arab Emirates contributes to 14% of the highly rated GDP of UAE. Over half of the project are however delayed and not completed in time due to various factors that reduce the performance management of the projects.

2.3.2 Project management dimensions

Project can be defined as endeavors undertakes to come up with a unique product with market value. The processes of project management include Initiation planning, execution, monitoring, and control and closing of the project. However a large time proportion of the project is spent on the execution phase in planning and communication where the resources and people are coordinated and integrated as Wysocki (2007) elaborates. Sandhu (2009) identifies project management cultural dimension as quality, cost, human rousers, scope, risk and procurement. Stare (2011) on the other hand insinuates that the success of a project is highly related to the management skills of the project manager over the attitude and expectation of their employees. Brown (2008) depicts the organizational culture and a critical influencer towards project

performance. Defined as general attitude to projects, Brown (2008) compliments that a well-managed organizational culture ensures the success of construction projects.

2.3.3 Project management methodologies

In effort to understand project performance and project performance management the researcher engaged some of the top methodologies used in project management and further grouped them in their similarity and popularity. These methods are grouped as ³ traditional sequential methodologies, the PMI/PMBOK methodologies, the agile methodologies, the change methodologies, the process based management methodologies and other methodologies.

⁶⁶ 2.3.3.1 Traditional, sequential methodologies.

The traditional methods of project management included general management methods of project s such as the water fall method; the most common method of planning out a project. The project manager sequences the task that will ⁵⁷ lead to the desired end outcome and then work on ⁷ them form the order desired. A task must be commented before another is taken up. It's an ideal method for projects that result in physical objects (buildings, computers), and project plans can be easily replicated for future use. The power of this methodology is that every step is preplanned and laid out in the proper sequence. While this may be the simplest method to implement initially, any changes in customers' needs or priorities will disrupt the sequence of tasks, making it very difficult to manage. The ⁴ critical path method developed in the 1950s is based on the concept that there are some tasks you can't start until a previous one has been finished. When you string these dependent tasks together from start to finish, you plot out your critical path.

Identifying and focusing on this critical path allows project managers to prioritize and allocate resources to get the most important work done, and reschedule any lower priority tasks that may be clogging up your team's bandwidth. This way, if changes need to be made to the project schedule, you can optimize your team's work process without delaying the end results. Critical Chain Project Management (CCPM)³ is a methodology that puts a primary focus on the resources needed to complete the project's tasks. It begins by building a project schedule and identifying the most crucial tasks that need to be done — the “Critical Chain” — and reserving resource for those high-priority tasks. It also builds buffers of time around these tasks into the project's schedule, which helps ensure the project meets its deadlines.

2.3.3.2 The PMBOK/PMI Methodologies

³ While it may be debatable whether this is a true project management methodology, you will find organizations that say they use the PMI or PMBOK method for managing projects. What this simply means is they break down their projects into the five process groups agreed upon by the Project Management Institute (PMI) and documented in the Guide to the Project Management Body of Knowledge (PMBOK), namely: initiating, planning, executing, controlling, and closing.

Project management purists however insist that PMBOK is not so much a methodology as it is an agreed upon set of standards and conventions for managing projects. A similar analogy is that the dictionary is not a method for creating books, but it collects the agreed-upon vocabulary used to write books.

2.3.3.3 The Agile Methodologies of Project Management

3

After Waterfall and PMI/PMBOK, another popular project management methodology is Agile and the various frameworks with which to implement Agile. These methodologies include Agile Project Management where the core of the agile methodology was developed by 17 people in 2001 in written form. Their Agile Manifesto of Software Development put forth a groundbreaking mindset on delivering value and collaborating with customers. Agile's four main values are expressed as: Individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, responding to change over following a plan. The word Agile can refer to these values as well as the frameworks for implementing them, including: Scrum, Kanban, Extreme Programming, and Adaptive Project Framework. Project objectives are made clear by the customer while the final deliverable can change. The project team works in iterative cycles, always evaluating results at the end. Depending on the results of these evaluations, the final deliverable may be modified in order to better answer the customer's needs. Continuous collaboration is key, both within the project team members and with project stakeholders.

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Scrum is the most popular Agile development framework because it is relatively simple to implement but also because it solves a lot of problems that software developers have struggled with in the past such as convoluted development cycles, inflexible project plans, delayed production. In Scrum, a small team is led by a Scrum Master whose main job it is to clear away all obstacles to work getting done more efficiently. The team works in short cycles of two weeks called "sprints," though the team members meet daily to discuss what's been done and where there are any roadblocks that need clearing. This methodology allows for quick development and testing, especially within small teams. Kanban is another framework for implementing Agile but is based on a team's capacity to do work. It originated from the factories of Toyota during the

1940s and was originally a visual system of cards (“kanban”) used by a department to signal that their team is ready for more raw materials, that the team has more capacity to produce.

Today, this visual approach to managing a project is well-suited to work that requires steady output. Project teams create visual representations of their tasks often using sticky notes and whiteboards (though there are also virtual versions that can be used online) and move these through predetermined stages to see progress as it happens and identify where roadblocks occur. Extreme programming is another offshoot of Agile and is a methodology designed to improve the quality (and simplicity) of software and the ability of a development team to adapt to customers’ needs. Much like the original Agile formula, XP is characterized by short work sprints, frequent iterations, and constant collaboration with stakeholders. Change can happen within a sprint: if work hasn’t started on a certain feature, it can be swapped out and replaced by a similar task.

³
Adaptive Project Framework grew from the view that most IT projects can’t be managed using traditional project management methods, due to uncertain and changing requirements. Thus APF begins with a Requirements Breakdown Structure (RBS) to define strategic project goals based on product requirements, functions, sub-functions, and features. The project proceeds in iterative stages, and at the end of each stage, teams evaluate previous results in order to improve performance and practices. Stakeholders can also change the project’s scope at the start of each stage in order for the team to produce the most business value.

2.3.3.4 The Change Management Methodologies

There are the methodologies that deal with managing projects but with an extra focus on change management especially planning for risks and taking control of change when it happens. Notable methods include; Event Chain Methodology (ECM). The underlying idea behind event chain methodology is that there are potential risks that often lie outside the project's scope. It's important to prepare for these risks and plan what to do if they occur. Unexpected events will impact your project's schedule, deliverables, and potentially its success. Extreme Project Management (XPM) is another notable change management methodology. Extreme project management is the opposite of Waterfall in that it offers you a way to manage massive change and still move forward to project completion. In XPM, you can alter the project plan, budget, and even the final deliverable to fit changing needs, no matter where the project is. It's the perfect way to manage projects that have a short timeline of anywhere from a few weeks to mere days.

2.3.3.5 The Process-based Methodologies

Then there are the project management methods which practically veer into the areas of business process management (BPM) wherein each method focuses on work as a collection of processes. While project management purists may argue that these methods belong on some other list, it is important to note that these are still quite valid ways to plan for and execute a project plan. Lean is a methodology that is focused on streamlining and cutting out waste. The first step is to create a work process breakdown to identify and eliminate bottlenecks, delays, and all forms of waste ("muda"). The goal is to do more with less that is deliver value to the customer using less manpower, less money, and less time. Six Sigma is another process based project management

³ methodology. Six Sigma is a statistics-based methodology that seeks to improve the quality of a process by measuring the defects or bugs present and getting it down as close to zero as possible. A process can therefore attain a rating of Six Sigma if 99.99966% of the final product — your project deliverable — is defect-free.

³ Lean Six Sigma is a hybrid of the lean and six sigma methodology. Combining the minimalist approach of Lean (“no waste!”) and the quality improvement of Six Sigma (“zero defects!”), Lean Six Sigma focuses on eliminating waste so that projects are more efficient, cost effective, and truly answer customers’ needs.³ Process-based Project Management is a methodology that aligns all project objectives with a company’s larger mission and corporate values. Thus all project goals and tasks remain strategic, and must roll up to the larger corporate objectives. The actual steps involved include: defining the process, establishing metrics, measuring processes, and adjusting objectives when these prove unstable, planning improvements and then implementing them.

2.3.3.6 The Other Methodologies

⁴ PRINCE 2 stands for Projects In Controlled Environments. It’s a method for managing projects used by the UK government and characterized by a product-based planning approach. In PRINCE 2, high level activities such as setting the business justification and resource allocation are owned by a structured project board while a project manager takes care of the lower level, day-to-day activities such as scheduling. This methodology gives teams’ greater control of resources and the ability to mitigate risk effectively. PRISM is also another project management methodology.³ It is not the surveillance program of the same name initiated by the US National

Security Agency. Instead, PRiSM stands for Projects Integrating Sustainable Methods and is a project management methodology that is aimed at managing change while incorporating environmental sustainability into its processes. The goal with PRiSM is to complete projects while reducing a company's negative environmental and social impact. It is, quite literally, green project management. From conception to execution to delivery and beyond, the Benefits Realization methodology focuses on whether your deliverable satisfies the benefits the customer is expecting to get from it, not just whether or not a product was delivered on time or within budget. This methodology ensures that you deliver real value to customers and stakeholders.

2.3.4 Comprehensive Performance Measurement Model

The researcher embraces the CPMM (Comprehensive Performance Measurement Model) to indicate the performance of the management in the construction industry of the United Arab Emirates. Developed by Hall (2008), The CPMM includes parameters, six of which are relevant and are discussed. Interim Networks is the first parameter that ensures the networking that takes place among the key stakeholders of a project affecting the general performance of the project. It considers the project communication systems, the information exchange between stakeholders, the knowledge sharing capacity for collaboration, the corporate cultures that promote networking and the learning capabilities of the inter and intra-organizational settings.

The second aspect of the CPMM is the competency and leadership of the managers. This details the skill of the project managers contributing towards success of the project. It makes analysis of the leaders' relations and the forthcoming impact on the project success. The third aspect of the CPMM is the (JMR) jointly risk management. This parameter involves the determination of key risks in the contractor client relationship. Clearly defined risks assist in enhancing cooperation

and communication therefore success of the project. The fourth parameter in the CPMM covered by this study is that of the reliability of planning at the operational level. This parameter considers the fact that there are variances between management plan and actual progress of the project. It provides the Percentage plan complete (PPC) as an instrument to give the information on reliability of the planning the project.

The fifth parameter is the innovation enhancement. This parameter analyses the capability that companies have on innovativeness. It fosters the spirit of their creativeness and creativity throughout the organization. The last CPMM parameter that study will consider is that of the code of ethics improvement. Code of ethics play a rat role in developing organizations culture that determines the success of rate of the projects that the organization undertakes.

2.4 Conceptual framework

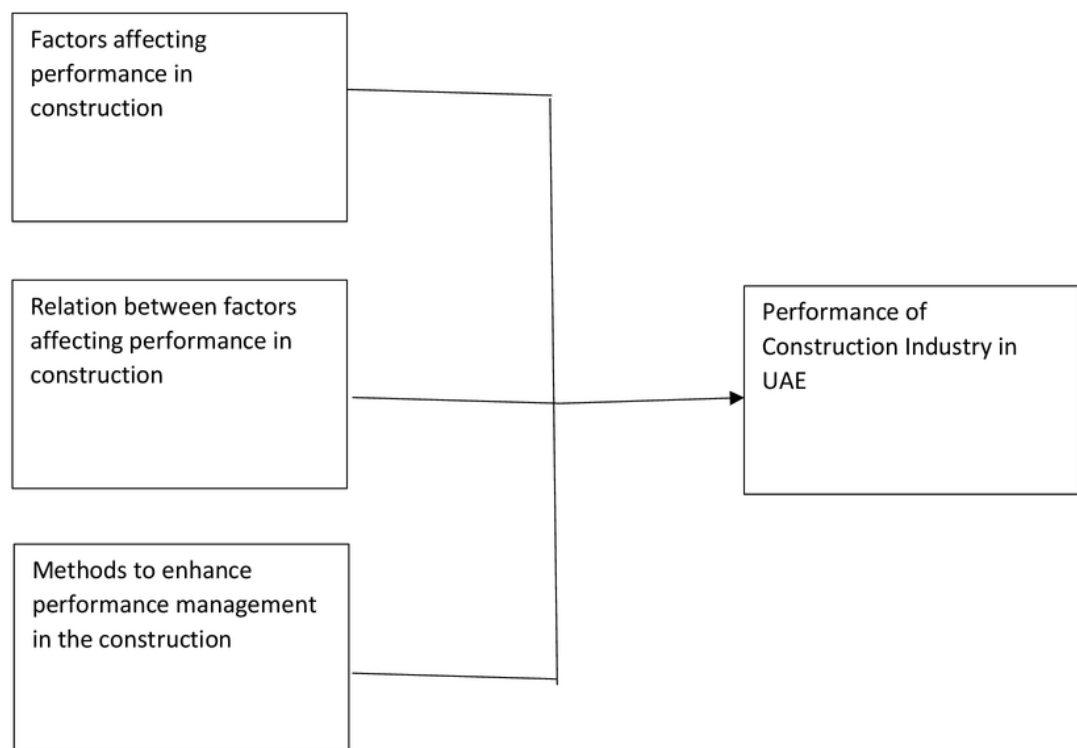


Figure 1 Conceptual Framework

2.5 Summary of literature review

This study considers the theory of construction management and the theory of Lean construction as the most relevant theories in exploring of the critical components and elements that affect the performance and management of performance in the construction industry of UAE. The theory of construction management and the Lean theory of construction are based on the characteristics of the construction industry rather than deriving from the general management theories. They are therefore comprehensive in underlining performance and performance management of the construction industry. The study also coders the CPMM model of performance measurement to be relevant in underlining the factors affecting performance in the construction industry in UAE.

CHAPTER THREE: METHODOLOGY

3.1 Introduction.

Previous chapters introduced the research study and a literature review of identification and analysis techniques for exploring the critical components and elements that affect the performance and management of performance in the construction industry of UAE. This chapter discusses the methodology adopted in the study, outlines some of the available methods for carrying out construction surveys, and highlights their known limitations. The main objective of the research was to; explore the critical components and elements that affect the performance and management of performance in the construction industry; The findings from the research were used to design the framework of the study, which are further discussed in findings .

This chapter therefore gives the various stages and phases that were followed in the completing the study. It involves the blueprint, the collection of data, the measurement and the analysis of data. To be specific the following were involved; research design, theoretical framework, specification of the model , definition and measurement of the variables, study area, target population, data collection procedure and then finally data processing and analysis.

3.2 Research Design

3.1.1. Overview

From the literature review, it was discovered that there are two fundamentals research approaches; the quantitative approach and the qualitative approach for the proper analysis of the research topic. The quantitative approach involves the generation of data in quantitative form using quantitative analysis in a proper way, whereas the qualitative approach depends on subjective decisions that are determined by the opinions and behaviours Radosavljevic (2012) and Bennet (2012)

These necessitated the use of different data collection methods however Bounds et al (1994) noted that whilst questionnaires have an advantage in saving the time used to collect information and

money spend in conducting research, the method lacks the flexibility of being able adapting the questions where appropriate to gain an understanding of the subject. An additional problem can occur when an entity is approached in relation to a questionnaire survey, because the researcher typically wants to have a detailed discussion about the issues on a far more sophisticated level than a questionnaire could produce.

3.1.2 Qualitative and Quantitative approach

Both qualitative and quantitative approaches are used in the research study given the objective of the study and the nature of the questionnaire involves both qualitative and quantitative analysis. Blois (2004) defined the qualitative method as an array of interpretative techniques, that seeks to describe, decode and translate terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world; in inverse, quantitative research is used to measure attitudes, satisfaction, commitment, and a range of other useful aspects that can be tracked over time. ² Additionally, quantitative research has a linear structure in which a hypothesis for instance takes the form of a belief about the possibility of causal links between the concepts identified.

3.1.2.1 Quantitative method

A quantitative research methodology is applicable where quantifiable measures of the variables of interest are possible, and where the hypotheses can be formulated, tested and a conclusion arrived at from samples to populations (Parkin, 2000). ² Quantitative research is majorly based on positive thought whereas qualitative research is more of constructivist theory. Of recent, strict scientific methods employed by quantitative analysis have been considered the best way to conduct any helpful research. ² However, currently the two methods are mutually inclusive and could very well support each other in most scientific and social researches.

3.1.2.2 Qualitative method

Qualitative methods are used when the phenomena under study are thought to be complex, social in nature, and therefore cannot be quantified” (Blois, 2004). Therefore its important to have direct and in-depth knowledge of research in order to achieve contextual understanding. Therefore, qualitative research methods are mostly associated with “face-to-face” contact with people in the research setting, combined with verbal data and observations. Qualitative research is meant for describing and efforts to understand observable features, patterns, and behaviors in people, what they say and report as their experience, and is based on natural settings. The method used by qualitative researchers exemplifies a common belief that they can provide a deeper understanding of social phenomena than would be obtained from purely quantitative data.

3.1.3 Secondary data

Secondary data to provide data involving the current research was obtained from different sources, including e-resources, past research projects, journals and books. The data involved both the quantitative and qualitative data for the research.

3.1.4 Questionnaire

A questionnaire is a technique used to collect data from a potentially large number of respondents that are the potential target. This is the only feasible means to achieve a number of responses large enough to allow statistically valid analysis of the results. A questionnaire that is well designed can gather information on both the overall performances and specific components of the research. If for instance the questionnaire includes demographic questions of the participants, these can be used to correlate performance and satisfaction with the test system among different groups of users or locations. Questionnaires are a multi-stage process beginning with definition of the different aspects to be examined and ending with interpretation of the results. The need to be design the questionnaire carefully should not be overlooked because the final findings are only as good as the weakest link in the questionnaire process. Although questionnaires may be economical to

administer compared to other data collection methods, they are every bit as expensive in terms of design time and interpretation (Houtkoop, 2000).

3.1.7 Interviews

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There are two types of Interviews, they can be structured or unstructured, and this depends on the requirements by the interviewer. In a study where the interviewer has say, close contact with the organisation they may do unstructured interviews, whereas in a structured interview the interviewer uses a questionnaire to ask respondents questions face to face (Houtkoop, 2000).

2

3.3 Background to construction industry survey

This section discusses the techniques in existence and practices that are used for collecting and analysing the data relating to the construction industry. Questionnaires are the major technique used for the collection of data from potentially large number of respondents. It is widely accepted it is a feasible means to achieve a wide range of opinions from professionals in the construction industry, and therefore to provide data that can be analysed statistically to get the required findings.

2

Still to note that a questionnaire should be viewed as a multi-stage process, start with definition of the different aspects to be examined and ending with clarification of the results. Questionnaires may be economical to administer compared to other data collection methods, such as interviews and focus groups, however they are more difficult when considering in terms of the design, the time limitations and the interpretation of findings. Several types of questions were used in the design of the questionnaire for this study [attach a copy and then appendix here]

2

3.2.1 Sampling

Social scientists use many different sampling strategies to find a representative sample, there exist different types of sampling techniques; the determination of a sampling technique depends on the following two factors: the degree of accuracy required in the study, and the costs anticipated. In the study, the selection of a sampling method was based on the need to avoid a biased sample, the time available, and the circumstances of the study. Random sampling method was adopted in this

survey since this method ensures that each sample has equal chance of being selected for questioning, considering different locations. It is however practically difficult to get data from all the professionals in the United Arab Emirates construction industries. Therefore carefully selected sample is called experimental units, with the sample having characteristics that are different from the overall population. I chose a proportion of the population at random without bias to get the best statistics for the study, with every possible experimental unit having an equal chance of being selected. A random sampling method was adopted for the distribution of the semi-structured questionnaires, with questionnaires distributed to randomly selected construction professionals in the United Arab Emirates construction industries.

3.6 Study Area

The study was entirely concerned with the situation in United Arab Emirates; it aimed exploring the critical components and elements that affect the performance and management of performance in the construction industry in the country. This provides a lot of data for the study given the rapid growth of the construction industry in the United Arab Emirates; therefore this provided the basis for undertaking the research.

3.7 Target Population

The questionnaires were distributed to the owners, consultants and contractors working in the United Arab Emirates construction industry, the survey covered the different towns and cities in the UAE such as Dubai, Abu Dhabi, Ajman, Sharjah and Ras Al Khaimah. The cities were selected since they are the most important regions in the UAE both in terms of high population and high infrastructural development, therefore the construction activities. Moreover, it is seen that some of these cities in UAE have been the largest and fastest growing cities in the country.

3.8 Data collection

A total of 300 questionnaires were distributed randomly amongst the selected companies for the construction industry. A total of 250 responses we received (83%).

3.9 Data Processing and analysis

The data will be process by use of distribution method and percentages. The results obtained then interested and analyzed in respect to the objective of the study.

CHAPTER 4: DATA ANALYSIS PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter will cover research analysis and discussions of the study results recommendations.

The analysis was guided by the objectives of the study that is to explore of the critical components and elements that affect the performance and management of performance in the construction industry of UAE. Findings have been presented in the following order. First the general information on the respondents and construction industry of United Arab Emirates, will be covered to be followed by information relating to the factors that affecting construction industry in United Arab Emirates. The research then relates these factors to performance of projects and project performance management in United Arab Emirates. The study proposes and establishes validity of project management methodologies that are suitable to eradicate or limit the influence of these factors in the United Arab Emirates Construction Industry.

4.2 Construction industry in United Arab Emirates.

Perhaps more than any other country in the Gulf region, the UAE has succeeded in exploiting its resources (especially oil and gas) and strategic geographical position to achieve truly impressive growth. As a result, it is a rich market open to international trade and investment with a diversified economy and excellent infrastructure and logistics.

Economic indicators reveal constantly positive GDP growth over the last 10 years (341.3 billion euros in 2016, +2.3%), making it the world's seventh highest country in terms of per capita GDP (at purchasing power parity) with more than 66,000 euros. The construction sector is the third most important industry following oil and trade and consists of a total of around 6,000 companies, mostly located in Abu Dhabi. Construction sector investments totalled 56.2 billion

euros in 2016, an increase of 24% since 2006, and account for almost 84% of the country's total investments.

Following the contraction in other GCC (Gulf Cooperation Council) countries triggered by falling oil prices, Dubai is now the largest construction market in the region, additionally boosted by the major projects undertaken in the Emirate in the run-up to Expo 2020. The country's investments in construction fell by 8.6% in 2016 with respect to 2015 following three years of continuous growth in the sector (+7.4% in 2013, +4.1% in 2014 and +1.9% in 2015). According to figures published by MEED (Middle East Economic Digest), 44% of contracts awarded in the construction and transport sector in the GCC area in the first six months of 2016 were in Dubai. In this context, preparations for Expo 2020, a world event held for the first time in a Middle Eastern country, will not only boost incoming tourist flows but will also create new jobs and push up demand for new structures, including hotels, homes, shopping centres and entertainment complexes. Ahead of Expo 2020 the annual number of new housing units is expected to rise to 39,000. This has boosted the recovery of the real estate and construction sector, and a number of projects that had been interrupted due to the 2008 crisis have been resumed and are under construction. In December 2015, Dubai passed the 2016 budget approving a 12% increase in expenditure for infrastructure investments. According to two different studies conducted by Deutsche Bank and Global Investment House, Dubai will allocate approximately US \$43 bn to infrastructure implementation ahead of the Expo, of which around \$10 bn will be spent on developing and improving transport.

Ongoing projects include expansion of the new Al Maktoum International Airport located in the Dubai South district, which will cover an area of more than 145 km², and extension of the Dubai metro with the construction of the third line connecting to the Expo. Additionally, the national

Etihad Rail project will provide the country with a high-speed passenger rail transport network and will carry freight from mining areas to ports of export. The new Midfield Terminal Complex (MtC) of the Abu Dhabi International Airport is due to be completed by the end of 2017.

Numerous projects are in the pipeline, including construction of the capital's cultural district in the Saadiyat Island area which will host a high concentration of top-level cultural institutions and the Dubai Creek Harbour, which is expected to become one of the city's most important tourism and residential locations with 9 residential districts, 22 hotels, a yacht club, a marina and the port.

Specifically, the 56.2 billion euros invested in construction in 2016 were divided up as follows:

29.7 billion euros invested in the non-residential sector (-8.5%), 17.8 billion euros in civil engineering projects (-8.3%) and the remaining 8.7 billion euros in residential building (-9.4%).

Comparing the various segments, we find that new construction investments in the non-residential segment amount to 20.8 billion euros, while investments in renovation total 8.9 billion euros. The equivalent figures for civil works are 12.5 billion euros in new construction and 5.3 billion euros in renovation; and in the residential segment 6.9 billion euros in new construction and 1.9 billion euros in renovation.

Experts are expecting to see significant increases in construction investments over the next three years: +14.6% in 2018, (+9.3%) in 2019 and (+5.9%) in 2020 to reach more than 83 billion euros.

Constant and significant growth rates are forecast in all market segments. The non-residential segment is expected to grow from last year's 33.2 billion euros (+11.8%) to 44 billion euros in 2020 (+5.9%). Civil engineering is also expected to grow steadily from 19.9 billion euros in 2017 (+11.9%) to 26.4 billion euros in 2020 (+5.9%). The residential segment is expected to grow by +14.3% in 2018 (9.7 billion euros) and reach 12.8 billion euros in 2020 (+5.8%)

4.3: Respondents

4.3.1: Gender and age

Table 1: Gender distribution of the respondents

Gender	Frequency	Percentage
Male	152	60.8 %
Female	98	39.2 %
Total	250	100%

The data collected from the questionnaire detailed the majority of the respondents in the banks being male in comparison to their female counterparts. However the participation between the two genders was not differentiated by much. This fact depicts the significant progress that the United Arab Emirates construction industry has made in gender equality in employment.

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Table 2: Age distribution of the respondents

Age	Frequency	Percentage
Below 25	89	35.6 %
Between 25-45	97	38.8 %
Above 45	58	23.2 %

Total	250	100%
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The data collected depicts that the distribution of age of the respondents fell in the bracket between twenty five and fifty years. The Majority were between twenty five and forty five years at 38.8 % representation while the rest were below twenty five, 35.6 % representation, and above fort five 23.2 % representation. The respondents below twenty five were mostly college leavers in an internship in the construction organizations. The one above for five consisted majorly of the senior level management in the construction organizations.

4.3.2: Designation

The respondent that participated in this study included the Chief executive officers of the construction organizations, managing directors, project managers, project supervisors and construction workers in the construction organizations. The designation of the respondents that participated in the research, as per the collected data, majorly included the project management level in the construction organizations. We can deduct for the given information that the respondents in this research were majorly the project managers at 46.7% representation. The project supervisors followed closely at 30% representation of the respondents and the construction workers at 13.3% representation of the total respondent populations. The chief executive officers or directors of the construction organization had the least representation at 10%. This data shows that the project managers and project supervisors were mostly responsible for handling the proeject performance and performance management at the construction organization.

Table 3: Designation distribution of the respondents

Designation	Frequency	Percentage
Director (CEO)	3	10%
Project Manger	4	46.7%
Project supervisors	9	30%
Construction workers	14	13.3%
Total	250	100%

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4.3.3: Work experience.

Table 4: Work experience distribution of the respondents

Work experience	Frequency	Percentage
1-5 Years	85	34 %
5-10 Years	110	44 %
Above 10 Years	55	22 %
Total	250	100%

The work experience was conducted to include three divisions. These were between one and five year, between five and ten years in and above ²⁵ ten years work experience in the construction industry in United Arab Emirates. Majority of the employees had worked for five to ten years in the construction companies they are currently in. While senior project managers had worked for over ten years, those that had below five years' experience were in mid-level management and in operations management.

³⁶ 4.4: Perceived competition in the construction industry in United Arab Emirates

The nature of competition in the microfinance sector is responsible for the kind of strategies that the players have adopted. The respondents were asked to rate competition in the construction industry in United Arab Emirates ⁶ and the findings are presented in the table below.

Table 5: Perceived competition in the construction industry in United Arab Emirates.

Competition	Frequency	Percentage
Easy	52	20.8 %
Fair	61	24.4 %
Stiff	67	26.8 %
Very stiff	70	28.0 %
Total	250	100%

Competition is evidently perceived to be very high in the construction industry in United Arab Emirates. The participants in the research believed the competition is very stiff at 28.0 % representation while 26.8 % deemed it stiff. Only 20.8 % thought the competition was easy and 24.4 % believed it was fair.

4.5 Performance measurement systems in United Arab Emirates

When asked what performance measurement their organizations mostly put to use to moderate and improve their organizations performance, the respondents rated the CPMM as the most utilized performance measurement tool at 42.81%, followed by Key Performance Indicator measurement at 24.23%, and Malcom Bride National Quality Award at 13.12% then European Foundation of quality management at 10.12%, lastly Balance score card used at 9.63% utility.

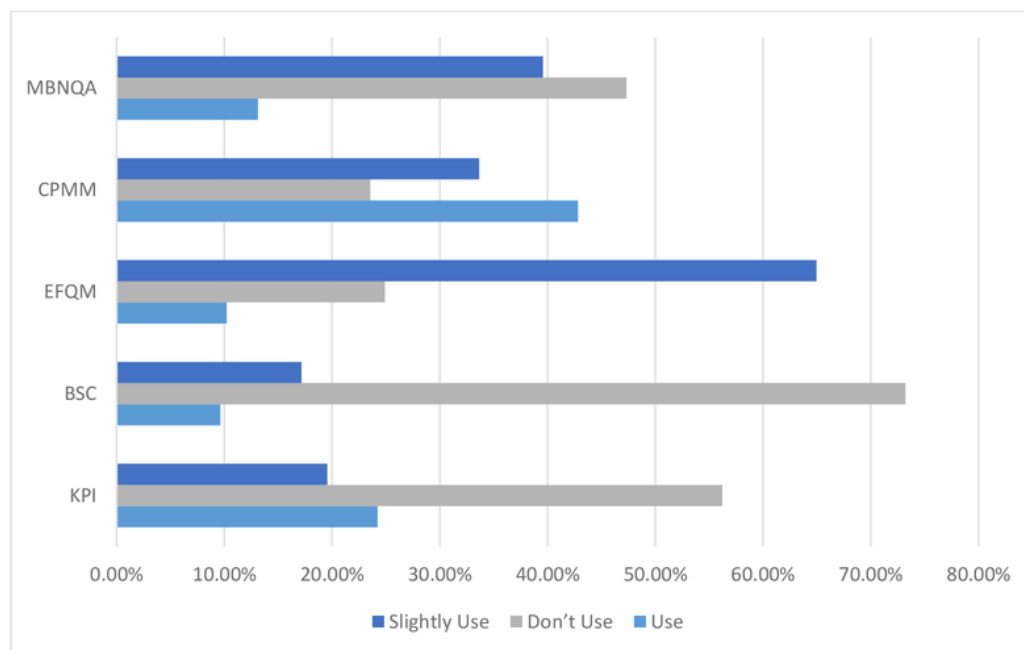


Figure 2 Performance measurement systems in United Arab Emirates

4.6 Factors affecting the performance and performance management of construction industry in United Arab Emirates.

Provided suggested factors that affect the performance and performance management of the construction industry in United Arab Emirates, the respondents rated the relevance of these factors as graphed. The project manager's competence was rated at 66.31% relevance towards project performance and performance management and 6.16% irrelevance. It was closely followed by Feedback and monitoring with a relevance rating of 65.92% towards project performance and performance management in United Arab Emirates Construction industry and 8.34% of the respondents saw it irrelevant. Availability of resources followed at 63.43% relevance and 13.77% irrelevance, Conflict and Conflict resolution among partisans at 54.25% relevance and 15.18% irrelevance, Internal interaction by partisans in the project at 49.61% relevance to performance and performance management, top management support at 45.25% relevance and 9.41% irrelevance, commitment by all the project participants at 38.26% relevance and 24.14% irrelevance, good coordination by the participants at 38.34% relevance and 11.63% irrelevance, favorable working conditions at 32.12% relevance and 32.36% irrelevance, faulty conceptualization of the project at 26.21% relevance and 34.83% irrelevance, external interaction by the project participants at 22.78% relevance and 40.78% irrelevance and finally owners competence had been seen as relevant to performance and performance management in construction industry in the United Arab Emirates industry at 21.11% relevance and 35.31% irrelevance.

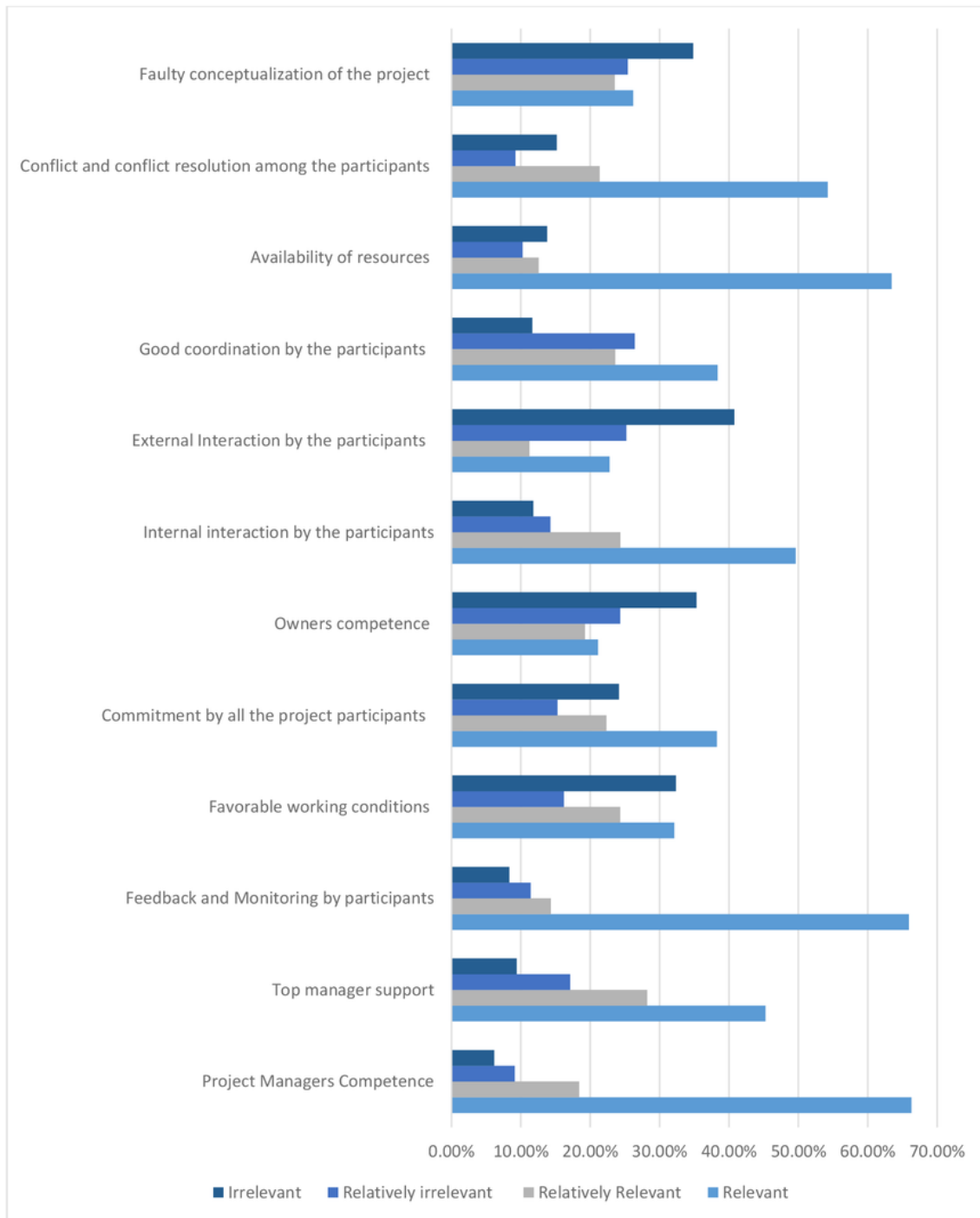


Figure 3 Factors affecting the performance and performance management of construction industry in United Arab Emirates

4.7 Relation of factors affecting performance and performance management in UAE to critical success factors of a construction project.

When asked to affirm or deny whether or not the factors afore mentioned as factors affecting performance and performance management of the construction industry in United Arab Emirates, the results showed that at owners competence at a standard deviation of 7.440, had the least spread influence to the success factors of project performance and performance management in United Arab Emirates . This was followed by top management support at 8.345229 standard deviation, External interaction by the participants of the project at 8.481071 standard deviation, Favorable working condition at 8.614771 standard deviation, Internal interaction by the participants of the project at 9.254342 standard deviation, feedback and monitoring by the participants at 9.523467 standard deviation, availability of resources at 9.963325 standard deviation, Good coordination by the participants at 10.23648 standard deviation, commitment by all the project participants at 10.48468 standard deviation and finally project managers competence ha the most wide spread influence towards the critical factors of success in the Construction industry in United Arab Emirates at 13.61459 standard deviation.

These success factors were labeled;

Time – F1

Quality – F5

Cost – F2

Innovation and learning – F6

Environment – F3

Health and Safety – F7

Stakeholder satisfaction – F4

Business performance – F8

Table 6: Relation of factors affecting performance and performance management in UAE to critical success factors of a construction project

Factor/ critical success factors of 56 project	F1	F2	F3	F4	F5	F6	F7	F8	Standard Deviation
Project Managers Competence	48	34	14	43	44	18	16	33	13.61459 3
Top manager support	30	24	22	25	39	31	32	47	8.345229 6
Feedback and Monitoring by participants	32	40	26	41	35	23	21	32	7.440238 09
Favorable working conditions	23	39	24	20	41	30	42	31	8.614771 37
Commitment by all the project participants	36	24	15	33	44	36	20	42	10.48468 27

Owners competence	23	39	26	43	33	16	41	28	<i>9.523467</i> <i>26</i>
External interaction by the participants	41	39	21	32	40	25	20	32	<i>8.481071</i> <i>36</i>
Internal Interaction by the participants	36	34	43	39	26	20	17	35	<i>9.254342</i> <i>61</i>
Good coordination by the participants	37	40	19	41	41	18	21	33	<i>10.23648</i> <i>94</i>
Availability of resources	38	43	39	33	37	20	17	22	<i>9.963325</i> <i>61</i>

4.8 Methods to enhance performance management in the construction industry.

25.67% of the respondents believed that the Lean construction method of management of construction project was the more effective of the four suggestion made by the researcher.

24.21% of the respondent believed that the construction theory method was the, more effective method of enhancing performance and performance management of construction project in the United Arab Emirates. The 20.32% decided that the Green building method was effective while 19.80% believed that Six sigma was more effective in enhance performance of construction project in UAE.

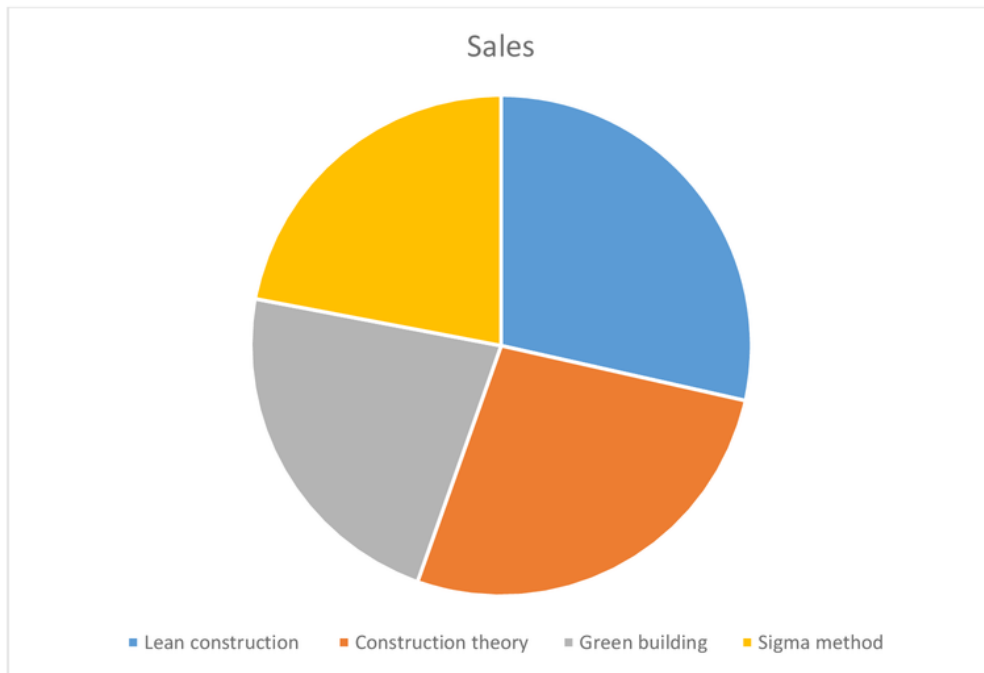


Figure 4 Methods to enhance performance management in the construction industry.

5.1 Introduction

This chapter presents a summary of the discussions, conclusion and recommendations drawn after analyzing data. Findings have been summarized alongside the objective of the study which was the exploration of the critical components and elements that affect the performance and management of performance in the construction industry of UAE. Conclusions have also been drawn from the study and recommendations for action are also given.

5.2 Summary of findings**5.2.1 Construction industry in United Arab Emirates**

Majority of the construction companies in United Arab Emirates are locally owned with a few being owned by foreigners and having joint ownership of local and foreigners. The construction sector is the third most important industry following oil and trade and consists of a total of around 6,000 companies, mostly located in Abu Dhabi. Construction sector investments totalled 56.2 billion euros in 2016, an increase of 24% since 2006, and account for almost 84% of the country's total investments. Dubai is now the largest construction market in the region, additionally boosted by the major projects undertaken in the Emirate in the run-up to Expo 2020. However, the country's investments in construction fell by 8.6% in 2016 concerning 2015 following three years of continuous growth in the sector (+7.4% in 2013, +4.1% in 2014 and +1.9% in 2015). Constant and significant growth rates are forecast in all market segments. The non-residential segment is expected to grow from last year's 33.2 billion euros (+11.8%) to 44 billion euros in 2020 (+5.9%). Civil engineering is also expected to grow steadily from 19.9 billion euros in 2017 (+11.9%) to 26.4 billion euros in 2020 (+5.9%). The residential segment is

expected to grow by +14.3% in 2018 (9.7 billion euros) and reach 12.8 billion euros in 2020 (+5.8%)

The competition in the construction industry is seen to be stiff. The participants in the research believed the competition is very stiff at 28.0 % representation while 26.8 % deemed it stiff. Only 20.8 % thought the competition was easy and 24.4 % believed it was fair. The construction companies have to, therefore, employ competitive performance measurement devices to stay abreast the competition. When asked what performance measurement their organizations mostly put to use to moderate and improve their organizations performance face, the respondents rated the CPMM as the most utilized performance measurement tool at 42.81%, followed by Key Performance Indicator measurement at 24.23%, and Malcolm Bride National Quality Award at 13.12% then European Foundation of quality management at 10.12%, lastly Balance score card used at 9.63% utility.

5.2.2 Factors affecting performance and performance management in the United Arab Emirates construction industry

The exploration conducted by the researcher came to the realization of ten main factors that affect the performance and performance management of the construction in United Arab Emirates. These factors were rates in accordance to the relevance attached to them on the entrance and performance management of the construction industry of United Arab Emirates by the participant o the project. The project manager's competence was rated at 66.31% relevance and 6.16% irrelevance. It was closely followed by Feedback and monitoring with a relevance 65.92% relevance and 8.34% irrelevance. Availability of resources followed at 63.43% relevance and 13.77% irrelevance, Conflict and Conflict resolution among participants at 54.25% relevance and 15.18% irrelevance, Internal interaction by participants in the project at 49.61% relevance to performance and performance management, top management support at 45.25% relevance and

9.41% irrelevance, commitment by al the project participants at 38.26% relevance and 24.14% irrelevance, good coordination by the participants at 38.34% relevance and 11.63% irrelevance, favorable working conditions at 32.12% relevance and 32.36% irrelevance, faulty conceptualization of the project at 26.21% relevance and 34.83% irrelevance, external interaction by the project participants at 22.78% relevance and 40.78% irrelevance and finally owners competence had was seen as relevant to performance and performance management in construction industry in the United Arab Emirates industry at 21.11% relevance and 35.31% irrelevance.

5.2.3 Relation of factors affecting performance and performance management in UAE to critical success factors of a construction project.

The researcher defined the critical factors of success of a construction of a project as Time, Cost Environment, Stakeholder satisfaction, Quality Innovation and learning, Health and Safety, and Business performance. These were labeled by the researcher and measured against the factors affecting the performance and performance management of the constructing industry in UAE.

Time – F1

Quality – F5

Cost – F2

Innovation and learning – F6

Environment – F3

Health and Safety – F7

Stakeholder satisfaction – F4

Business performance – F8

Owner's competence at a standard deviation of 7.440, had the least spread influence to the Success Factors of project performance and performance management in United Arab Emirates.

This was followed by top management support at 8.345229 standard deviations, External interaction by the participants of the project at 8.481071 standard deviations, Favorable working condition at 8.614771 standard deviations, Internal interaction by the participants of the project at 9.254342 standard deviation, feed back and monitoring by the participants at 9.523467 standard deviation, availability of resources at 9.963325 standard deviation, Good coordination by the participants at 10.23648 standard deviation, commitment by all the project participants at 10.48468 standard deviation and finally project manager's competence ha the most wide spread influence towards the critical factors of success in the Construction industry in United Arab Emirates at 13.61459 standard deviation.

5.2.4 Methods to enhance performance management in the construction industry.

25.67% of the respondents believed that the Lean construction method of management of construction project was the more effective of the four suggestion made by the researcher.

24.21% of the respondents believed that the construction theory method was the, more effective method of enhancing performance and performance management of construction project in the Untied Arab Emirates. The 20.32% decided that the Green building method was effective while 19.80% believed that Six sigma was more effective in enhancing performance of construction projects in UAE

5.3 Conclusion

This study intended to explore the critical components and elements that affect the performance and management of performance in the construction industry of UAE. In doing so the study objected to identify the critical factors affecting and influencing performance in the construction projects, analyze the relationships between the different factors that affect performance in the construction projects and, identify methods to enhance performance management in the

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construction industry. The study then came to the conclusion that the factors that are affecting the performance of the construction industry and the performance management of the same include

- Project Managers Competence
- Owners competence
- Top manager support
- External interaction by the participants
- Feedback and Monitoring by participants
- Internal Interaction by the participants
- Favorable working conditions
- Good coordination by the participants
- Commitment by all the project participants
- Availability of resources

These factors were closely related to the critical factors of success Time, Cost, Environment, Stakeholder satisfaction, Quality Innovation and learning, Health and Safety, and Business performance. They ranged at a standard deviation of 7-13 showing positive relation to critical success factors and hence the performance and performance management of the construction industry in United Arab Emirates. In this perspective the suggested method to improve in the performance management and performance of the construction industry of the UAE were concluded to be Lean construction method at 25.67%, construction theory method at 24.21%, Green building method at 20.32% and Six sigma at 19.80%.

5.4 Suggestions for further studies

1
The researcher, believes that this study sheds light on more areas to study on exploring the critical components and elements that affect the performance and management of performance in the construction industry of UAE. The following areas were suggested.

i. About a global perspective, a more comprehensive study should be carried out on ¹critical components and elements that affect the performance and management of performance in the construction industry of UAE.

⁶³ii. A study on the extent of each suggested factor on the performance and performance management of construction industry should be carried out on perspective for the UAE construction industry

iii. A study should be carried out to correlate the critical factors affecting performance and performance management to the rate of ⁶²development of the construction industry and the economy of the nation.

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APPENDIX II: SURVEY QUESTIONNAIRE
RESPONDENT BIOGRAPHY

First Name _____

Surname _____

Age _____

Sex

Male ☐

Female ☐

Organization _____

Occupation _____

1) What is the nature of ownership of your organization?

☐ ⁶ Locally Owned

☐ Foreign Owned

☐ Both Foreign and locally owned

2) Annual construction budget of your organization?

3) Average annual number of project

4) Project monetary size range in \$

- 5) Average monetary size of each typical project in \$
- 6) What is the rate of project completion of your organization?

(out of every five projects)

- 7) How do you find the business competition in your region?

- ☐ Easy competition
- ☐ Fair competition
- ☐ Stiff competition
- ☐ Very Stiff competition

- 8) How would you rate the average quality of construction projects in UAE

- ☐ ³⁹Excellent Quality
- ☐ Above Average Quality
- ☐ Average Quality
- ☐ Below Average Quality
- ☐ Unsuccessful or Experienced Significant Quality Problems

- 9) Have you been in your line of work for more than five years?

Yes ☐ No ☐

- ²⁸10) Have you received any training about performance measurement systems?

Yes ☐ No ☐

If yes please specify:

- 11) Do you have experience in measuring performance? If yes please specify

Yes ☐ No ☐

- 12) Which performance measurement systems does your organization use?

	Use	Do not use	Slightly use
--	-----	------------	--------------

Key performance indicator	24.23	56.21	19.56
Balance score cards	9.63	73.21	17.16
European foundation quality management	10.21	24.89	64.90
Comprehensive Performance Measurement Model	42.81	23.54	33.65
Malcom Bridge National Quality Award	13.12	47.32	39.56

13) What factors do you believe affect the performance of the construction industry with regard to your organizational performance on a rate of one(no influence) to five (very high influence)

Factor	Irrelevant	Relatively irrelevant	Not sure	Relatively relevant	Relevant

Project Managers 19 Competence					
Top manager support					
Feedback and Monitoring by participants					
Favorable working conditions					
Commitment by all the project participants					
Owners competence					
Internal interaction by the participants					
External Interaction by the participants					
Good coordination by the participants					
Availability of resources					
Conflict and conflict resolution among the participants					
Faulty conceptualization of the project					

14) How would you rate the relation between these factor and the critical success factors of projects?

Factor/ critical success factors of project	Time	Cost	Enviro nment	Stakehol der satisfacti on	Quality	Innova tion and learnin g	Health and Safety	Business performa nce
Project Managers Competenc e								
Top manager support								
Feedback and Monitoring by participant s								
Favorable working conditions								

Commitment by all the project participants								
Owners competence								
Internal interaction by the participants								
External Interaction by the participants								
Good coordination by the participants								

Availability of resources								
---------------------------	--	--	--	--	--	--	--	--

15) Which if these methods do you believe have is more effective in improving performance in the construction management in an organization

☐ Construction theory

☐ Green building

☐ Lean construction

☐ Six sigma method

APPENDIX III: INTERVIEW QUESTIONNAIRE
RESPONDENT BIOGRAPHY

First Name _____

Surname _____

Age _____

Sex

Male ☐

Female ☐

Organization _____

Occupation _____

45

I) To what extent do you agree that the proposed success factors are important to the success of an organisations?

Success factor	Not Important	Important	Very Improtant
Time			
Quality			
Business Performance			
Satisfaction of stakeholders			
Cost			
Environment			

Innovation and learning			
Health and safety			

2) To what extent do you agree with the significant of the performance measures?

Key performance indicator					
Balance score cards					
European foundation quality management					
Comprehensive Performance Measurement Model					
Malcom Bridge					

National Quality Award					
---------------------------	--	--	--	--	--

- 3) To what extent do agree with the guven factr affectinf perfnce in cineutryction industry?
(1-strongly disagree, 5-stringly agree)

	1	2	3	4	5
Clear					
Practical					
Applicable					

- 4) Is there any factor needed to be added? If yes clarify
- 5) To what extent do you agree with the proposed methods of improving performance
management in the construction industry in UAE?

	1	2	3	4	5
Clear					
Practical					
Applicable					

- 6) Is there any method needed to be added? If yes clarify

APPENDIX IV: RESEARCH TIME PLAN

ACTIVITY	TIME
Introduction of topic	
Proposal writing	
Data collection	
Report writing	
Presentation	

APPENDIX V: RESEARCH PROJECT BUDGET

Research Activity	Description	Amount
Research Resources	Internet access, books, and journal	
Pilot study	Transport of researcher	
Data Collection instruments	Design and photocopy of research instruments	
Data collection	Transport and subsistence	
Research assistance	Travel costs to collect questionnaires	
Computer services	Typing production of data	
Miscellaneous		

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