

Optimizing the construction team's performance

The influence of an agile project manager on a construction project team's Success

تحسين أداء فريق العمل في نطاق المشاريع الانشائية

تأثير أداء المدير المجتهد على نجاح فريق العمل

by

FAIK RAID AL-HADDADIN

**Dissertation submitted in partial fulfilment
of the requirements for the degree of
MSc CONSTRUCTION PROJECT MANAGEMENT
at
The British University in Dubai**

June 2023

DECLARATION

I warrant that the content of this research is the direct result of my own work and that any use made in it of published or unpublished copyright material falls within the limits permitted by international copyright conventions.

I understand that a copy of my research will be deposited in the University Library for permanent retention.

I hereby agree that the contents of this dissertation for which I am author and copyright holder may be copied and distributed by The British University in Dubai for the purposes of research, private study or education and that The British University in Dubai may recover from purchasers the costs incurred in such copying and distribution, where appropriate.

I understand that The British University in Dubai may make a digital copy available in the institutional repository.

I understand that I may apply to the University to retain the right to withhold or to restrict access to my thesis for a period which shall not normally exceed four calendar years from the congregation at which the degree is conferred, the length of the period to be specified in the application, together with the precise reasons for making that application.

Signature of the student
FALKE Habbadin
3 Aug 2023

COPYRIGHT AND INFORMATION TO USERS

The author whose copyright is declared on the title page of the work has granted to the British University in Dubai the right to lend his/her research work to users of its library and as an open source and to make partial or single copies for educational and research use.

The author has also granted permission to the University to keep or make a digital copy for similar use and for the purpose of preservation of the work digitally.

Multiple copying of this work for scholarly purposes may be granted by either the author, the Registrar or the Dean only.

Copying for financial gain shall only be allowed with the author's express permission.

Any use of this work in whole or in part shall respect the moral rights of the author to be acknowledged and to reflect in good faith and without detriment the meaning of the content, and the original authorship.

ABSTRACT

This research investigates the factors influencing construction team success, with a particular focus on optimizing performance through the influence of key determinants. The aim is to explore the role of project manager agility, team dynamics and collaboration, and technological utilization and innovation in achieving construction team success. The research adopts a deductive approach and a cross-sectional time horizon to quantitatively analyze the relationships between the variables.

The study's findings highlight the significant impact of project manager agility on construction team success, emphasizing the crucial role of agile leadership in guiding teams towards positive project outcomes. While team dynamics and collaboration contribute to team success, their influence is comparatively weaker. The impact of technological utilization and innovation on team success is also less pronounced than initially hypothesized.

These insights hold practical implications for the construction industry, underscoring the importance of fostering agile project managers and promoting adaptability and collaboration within construction teams. The research contributes to the field by shedding light on the interplay of these determinants and providing valuable guidance for practitioners seeking to enhance team performance and project success.

In conclusion, this study provides essential knowledge for the construction industry, encouraging the prioritization of project manager agility and collaborative team dynamics to achieve successful project outcomes. It also emphasizes the need for continuous exploration of innovative technologies to optimize construction processes. The research underscores the significance of a dynamic and skilled project management approach in navigating the ever-evolving construction landscape and sets the stage for future investigations to delve deeper into the complexities of construction team success.

ABSTRACT

يبحث هذا البحث في العوامل التي تؤثر على نجاح فريق البناء ، مع التركيز بشكل خاص على تحسين الأداء من خلال تأثير المحددات الرئيسية. الهدف هو استكشاف دور مرونة مدير المشروع ، وديناميكيات الفريق والتعاون ، والاستخدام التكنولوجي والابتكار في تحقيق نجاح فريق البناء. يعتمد البحث منهجا استنتاجيا وأفقاً زمنياً مقطوعياً لتحليل العلاقات بين المتغيرات كميًا .

تسلط نتائج الدراسة الضوء على التأثير الكبير لمرونة مدير المشروع على نجاح فريق البناء ، مع التأكيد على الدور الحاسم للقيادة الرشيدة في توجيه الفرق نحو نتائج إيجابية للمشروع. بينما تساهم ديناميكيات الفريق والتعاون في نجاح الفريق ، فإن تأثيرهم أضعف نسبياً. كما أن تأثير الاستخدام التكنولوجي والابتكار على نجاح الفريق أقل وضوحاً مما كان مفترضاً في البداية. تحمل هذه الأفكار آثاراً عملية على صناعة البناء ، مما يؤكد أهمية تعزيز مديري المشاريع الرشيدة وتعزيز القدرة على التكيف والتعاون داخل فرق البناء. يساهم البحث في هذا المجال من خلال تسليط الضوء على التفاعل بين هذه المحددات وتقديم إرشادات قيمة للممارسين الذين يسعون إلى تعزيز أداء الفريق ونجاح المشروع.

في الختام ، توفر هذه الدراسة المعرفة الأساسية لصناعة البناء ، مما يشجع على إعطاء الأولوية لمرونة مدير المشروع وديناميكيات الفريق التعاوني لتحقيق نتائج ناجحة للمشروع. كما يؤكد على الحاجة إلى الاستكشاف المستمر للتقنيات المبتكرة لتحسين عمليات البناء. يؤكد البحث على أهمية اتباع نهج ديناميكي وماهر لإدارة المشاريع في التنقل في مشهد البناء المتطور باستمرار ويمهد الطريق للتحقيقات المستقبلية للتعمق في تعقيدات نجاح فريق البناء.

DEDICATION

I dedicate this thesis to my family, whose unwavering support and encouragement have been the driving force behind my academic journey. Their love and belief in my abilities have been a constant source of inspiration, pushing me to reach new heights and pursue my passion for knowledge and learning.

I also dedicate this work to my advisors and mentors, whose guidance and expertise have been invaluable throughout this research. Their mentorship has shaped my academic growth and enriched my understanding of the subject, making this endeavor possible.

Lastly, I dedicate this thesis to the construction industry professionals and teams, who are at the heart of this study. Their dedication and hard work in building the physical infrastructure that shapes our communities have been the motivation behind this research. It is my hope that this study contributes to the advancement of construction management practices and enhances the success of future construction teams.

ACKNOWLEDGEMENTS

I extend my heartfelt gratitude to Professor Khalid Al Marri for his invaluable guidance, unwavering support, and expert supervision throughout this thesis. His profound knowledge in the field of construction management and his dedication to fostering academic excellence have been instrumental in shaping the success of this research. His insightful feedback and encouragement have been an immense source of inspiration, driving me to explore new horizons in the realm of construction team success.

I would also like to express my deep appreciation to the British University in Dubai for providing me with the platform and resources to pursue this academic endeavor. The university's commitment to fostering a conducive learning environment has been pivotal in enabling me to delve into this research with diligence and passion.

Additionally, I extend my heartfelt thanks to my esteemed employer, EMAAR, for their unwavering support, encouragement, and provision of technical expertise. Working at EMAAR has been a transformative experience, and the knowledge and exposure I gained through their guidance have been paramount to the execution of this research. Their commitment to excellence in the construction industry has been a driving force behind my passion to explore the factors influencing construction team success.

I would also like to extend my gratitude to my friends and colleagues for their encouragement and motivation during this academic journey. Their unwavering support and belief in my capabilities have been a constant source of strength and inspiration.

Finally, I express my deepest gratitude to my family for their love, patience, and unwavering support. Their encouragement and belief in my abilities have been the cornerstone of my academic achievements, and I am forever indebted to their unwavering faith in me.

Each of these individuals and entities has played a significant role in shaping the trajectory of this research, and I am truly honored to have had their support and guidance throughout this academic pursuit.

TABLE OF CONTENT

CHAPTER 1: INTRODUCTION.....	1
1.1. Background	1
1.2. Aim.....	1
1.3. Research Significance	2
1.4. Research Context:	2
1.5. Thesis structure:	5
CHAPTER 2: LITERATURE REVIEW	7
2.1 Team Performance.	7
2.1.1 Team performance measures:	8
2.2 Drivers of team performance in construction project management	12
2.2.1 Theoretical framework RBV.....	14
2.2.2 Influence of project manager agility on team performance.	16
2.2.3 Team Dynamic and collaboration influence their performance.	18
2.2.4 Utilizing technology influence the team performance.....	20
CHAPTER 3: METHODOLOGY	24
3.1. Philosophy.....	24
3.2. Approach	25
3.3. Research strategy.....	26
3.4. Method of data collection:.....	27
3.5. Method of data analysis –Multiple regression analysis.	35
3.6. Ethics.....	36
CHAPTER 4: Analysis	37
4.1 Sample characteristics	37
4.2 Reliability and Validity Analysis	38
4.2.1 Reliability	38

4.2.2	Validity Analysis.	40
4.3	Hypothesis testing	43
4.3.1	Assumptions.	44
4.3.2	Hypothesis testing.....	47
CHAPTER 5: Discussion.....		55
5.1	Critical discussion with empirical evidences:	55
5.2	The Role of Project manager Agility:	57
5.3	The Role of team dynamic:	58
5.4	The Role of utilizing technology:	58
5.5	Research’s insight	59
CHAPTER 6: Conclusion.....		63
6.1	Theoretical and practical implication.	64
6.2	Address the research objective	67
6.3	Acknowledge of the research limitation.....	68
6.4	Recommendation.....	69
References		74

LIST OF FIGURES

Figure 1 Research model	23
Figure 2 Dependent variable - residual test	46
Figure 3: Scatterplot SPSS - Dependent variable	47
Figure 4: Graph for the three variable relation with the independent after the multiple regression analysis.....	54

LIST OF TABLES

Table 1 measures for project manager agility	30
Table 2 measures for team dynamic factor	31
Table 3 measures for utilizing technology	32
Table 4 measures for team performance	33
Table 5 questionnaire list with variable factors	34
Table 6 Reliable analysis Table	38
Table 7 The Kaiser- Meyer Olkin (KMO) Measure for team success dependent variable	41
Table 8 KMO and Bartlett's Test - independent variable -	41
Table 9 Component Matrix - Dependent variable - team Success.....	42
Table 10 Pattern Matrix - measures for the three factors - independent variable.....	43
Table 11: Coefficients table highlighting the Collinearity statistics VIF	44
Table 12 Normality and residual analysis table	45
Table 13 Shapiro - Wilk test	46
Table 14 Model Summary Table for Multiple regression analysis.....	47
Table 15 Analysis Of Variance Table ANOVA	49
Table 16 Coefficients table highlighting Beta Values for the three variables.	50

CHAPTER 1: INTRODUCTION

1.1. Background

In the highly competitive and rapidly evolving construction industry, optimizing team success is paramount to delivering projects on time, within budget, and meeting quality expectations. The purpose of this research is to investigate the influence of three critical factors on construction team success: project manager agility, team dynamics and collaboration, and technological utilization and innovation. These factors are integral components that, when combined, can lead to enhanced project outcomes and a more efficient construction process (Alzoubi, 2011).

The adoption of agile project management methodologies is one of the major factors influencing the success of the construction industry, which has been changing quickly (Alomari, 2017). This study looks at how agile project managers affect the success of teams working on construction projects. Based on a comprehensive literature review, this study shows how important it is for agility of project managers to encourage team cohesion, adaptability, and continuous improvement, all of which contribute to the success of the project as a whole.

1.2. Aim

The aim of this research is to critically examine and illuminate the intricate relationships between three pivotal elements that constitute the primary independent variable of optimizing construction team performance. Specifically, this study seeks to delve into the role of project managers' agility, the dynamics within the team, and the utilization of technology within the project's framework. By methodically exploring how these integral components influence the overall performance of construction teams, this research aims to unravel the complex interdependencies between these factors and the measure of success that construction teams achieve. Through this rigorous investigation, the study endeavors to contribute to a deeper understanding of the associations between these determinants and the resultant success metrics of construction teams, thereby providing valuable insights for the field.

1.3. Research Significance

Project manager agility, the ability to adapt to changing circumstances and navigate challenges, plays a vital role in steering a construction team towards success. An agile project manager is capable of anticipating risks, responding to unforeseen obstacles, and making informed decisions that ensure the project's continuity and effectiveness. By understanding the impact of project manager agility on team success, this research aims to shed light on the importance of incorporating flexibility and adaptability into managerial practices. (Alomari, 2017).

Team dynamics and collaboration are the lifeblood of any construction project. The intricate and interconnected characteristics of construction operations necessitate unambiguous correspondence, reliance, and collaboration among the members of the team (Chileshe, N., & Haupt, T. C., 2010). This research will explore how fostering a positive and collaborative work environment can enhance overall team performance and contribute to the successful completion of construction projects. Additionally, the study will analyze strategies that can be implemented to improve team dynamics and encourage collaborative behavior.

In today's digital age, the integration of technology and innovation has become increasingly important in the construction industry. Technology is a crucial factor in optimizing processes, improving precision, and minimizing expenses, from the initial stages of design and planning to the final stages of execution and monitoring. This research will examine the impact of utilizing available technology and introducing innovative solutions on construction team success. The inquiry will additionally endeavor to ascertain optimal methodologies for the integration of technology that can facilitate project goals and enhance efficacy in construction endeavors (Azhar S., 2011).

1.4. Research Context:

The construction field is distinguished by its dynamic nature, wherein a multitude of variables contributes to the overall success of a given project (Chan A P Scott D. & Chan A. P. , 2004). The performance of construction teams is influenced by a plethora of factors. However, three crucial components have surfaced as pivotal drivers of project triumph, namely, the agility of the project manager, team dynamics and collaboration, and the utilization and innovation of

technology (Le H & Le Q. , 2016). The aforementioned elements, which serve as the principal independent variable with the aim of optimizing the success of the construction team, exert a significant influence on the dependent variable, namely the success of the construction team. The objective of this literature review is to furnish a comprehensive amalgamation of pertinent research and theories that have been formulated concerning the three factors, along with their interrelationships and the eventual triumph of construction teams (Pinto J K & Slevin D. P. , 1988).

It has been established for a long time that project management is a crucial component of construction projects. This is due to the fact that the efficiency of the project manager may have a significant impact on the results of the project (Turner J R, 1999); (Muller R, & Turner R. , 2007). As a result of the intricate and ever-changing nature of construction projects in recent years (Conforto,, 2014); (Dingsoyr T Nerur S Balijepally V & Moe N, 2018), adaptability among project managers has been recognized as an increasingly important quality. This literature study will look into the numerous facets of project manager agility, such as adaptability, flexibility, and the capability to make rapid decisions, as well as their contribution to the overall performance of the team. In addition, the examination is going to look at several tactics that may be used to improve the flexibility of project managers working in the construction business.

A construction team is made up of specialists who work together to provide a high-quality constructed environment. Effective communication, good leadership, efficient resource allocation, and a dedication towards safety and sustainability are all factors that contributed to the team's success (Chileshe, N., & Haupt, T. C., 2010). The successful construction team will include a variety of members, including architects, engineers, construction managers, surveyors, and skilled laborers. These individuals will effectively collaborate with one another to ensure that the construction project is finished on time, within budget, and according to the highest quality standards (Meredith, J. R., & Mantel, S. J. , 2017).

Leaders who are nimble are also adept at problem solving. In construction projects, frequently several difficulties and impediments must be addressed. Leaders who are able to successfully handle issues may contribute to the timely and cost-effective completion of projects. Leaders who can promptly detect and resolve issues with design of a building project, for instance, may

minimize expensive delays and guarantee the project is finished on schedule. (Sánchez-Fernández, 2019)

Being proactive is one of the primary ways that leadership can exhibit agility, and it is one of the most important. Proactive leaders are able to predict and react to shifts before they take place, hence decreasing the chance of adverse repercussions. Proactive leaders, for instance, may be able to detect possible problems with a building project earlier on and then take actions to limit the risks associated with these concerns. This may assist in ensuring that projects are finished on schedule and within their allotted spending limits. (Aguirre, J., & Ledezma, 2017).

Agile project managers and leaders also have excellent communication abilities. They are able to communicate effectively among members of the team, stakeholders, and other crucial construction partners. Good communication is crucial in construction projects because it ensures that everybody is working toward the same objective and that the projects are finished swiftly and effectively. (Golloway, J., 2017).

This study is situated within the scope of the construction sector of the United Arab Emirates (UAE), which was selected due to its significance and active nature. The primary objective of this research is to make a substantial contribution to the existing knowledge regarding the drivers of construction team success, and the crucial significance of agility in project management for enhancing team performance. The aim of this study is to offer valuable insights for scholars and professionals in the construction industry by conducting a thorough and rigorous examination of the interconnections among the fundamental elements.

This inquiry holds significant importance and relevance, given the swiftly developing construction environment in the UAE. The statement highlights the urgency for project management methodologies that are adaptable and flexible enough to navigate the intricate and frequently unstable construction landscape (Kerzner, H. , 2013). The present study aims to investigate the essential factors and dynamics that play a significant role in achieving successful performance of construction teams, within the given context.

The primary objective of this study is to elucidate effective methodologies for improving project results within the construction industry. The statement highlights the importance of construction companies allocating resources towards agile project management education and

certification initiatives. This will enable their project teams to acquire the requisite competencies that are essential for achieving favorable outcomes (Heldman, 2018). The prioritization of training and capacity building is based on the increasing acknowledgement of the crucial significance of agility in project management, specifically in the ever-changing construction sector of the UAE (Atkinson, R. , 1999).

The findings of this study have significant implications for enhancing project success strategies, thereby offering valuable guidance for professionals in the relevant field. Moreover, the study provides insights that can be further explored in academic research.

1.5. Thesis structure:

In order to accomplish research goal, the study is going to be carried out in the following manner:

Investigating the roles that these three crucial aspects have in determining the overall success of construction teams: The purpose of this research is to conduct an in-depth investigation of the relationship between the performance of construction teams and factors such as the agility of project managers, the dynamics and cooperation of teams, and the usage of technical resources. The purpose of this study is to identify important drivers that determine team performance and analyze the interrelationships among these aspects. This will be accomplished via a review of the current research literature, as well as case studies and empirical research.

Examining the connection between the criteria that were discovered and the amount of success that the construction team was able to achieve: This study will analyze the strength and type of the links between the specified factors and the overall effectiveness of the construction team by examining real-world instances and making use of statistical methodologies. This inquiry attempts to find the most relevant aspects and make suggestions for improving team performance that are based on information gathered throughout the course of the study.

An investigation using quantitative methods into the purported link between certain parameters and the outcome (the performance of the construction team): In order to investigate the hypothesized links between the listed parameters and the successful completion of building

projects by teams, the research will make use of rigorous quantitative methodologies such as regression analysis and structural equation modeling. The study will contribute to a more in-depth knowledge of the factors that are most important to the performance of teams working in the construction sector by exploring these linkages using quantitative methods.

The following information may provide valuable insights into the association between the three variables of the most important independent variable (optimizing the construction team's performance) and the degree of project manager agility: In the last part of the research, an investigation into the relationship between the three elements that make up the major independent variable and the degree of project manager agility will be carried out. This study intends to reveal the pathways via which greater agility may be obtained and give practical advice for construction industry experts by evaluating how these elements together contribute to project manager agility. The research will be conducted by analyzing how these factors collectively contribute to project manager agility.

CHAPTER 2: LITERATURE REVIEW

2.1 Team Performance.

Constructing project is a difficult task, and in order to attain a good conclusion, it requires the coordinated efforts of a wide collection of construction specialists. The construction team is an especially important component of any construction project since it provides the essential skills, coordination, and support to guarantee that the project is completed successfully. Here I will provide a definition of the construction project team, examine how it is constituted, and highlight the important traits that are necessary for a team to be deemed compatible in order to effectively execute a construction project (Alan Griffith and Paul Watson, 2004).

Collections of persons who collaborate toward the goal of successfully completing a construction project constitute what is known as a construction project team. Each member of this team has a distinct function and area of expertise. Depending on the demands of the project, the usual composition of the team includes important project stakeholders such as the customer, the engineer, the project leader, workers, subcontractors, and various other professionals. These experts collaborate in order to combine their resources and skills, which helps to guarantee that the project will be completed ontime, within budget, and high quality. (Cheng, 2005).

The customer is the one that kicks off the construction project by stating their needs and budgetary constraints, which is the first phase in the process of putting up the team. The customer makes their decision over which engineer and any one from the project's team to hire in order to generate the design and requirements for the project based on these parameters. In turn, the architect works in tandem with a variety of professionals, like structural, mechanical, as well as electrical engineers, to hone the design and make certain that it can be executed successfully (Oyewobi, 2015).

When the design phase of a project is finished, the client will typically hire a project leader or manager to manage the building phase of the project. After that, the project manager will put together the construction team, which will consist of general contractors, subcontractors, plus any other professionals that are necessary for the successful completion of the project (Oyewobi, 2015). The manager of the project is also responsible for arranging communication

amongst the different members of the team and making sure that everybody works together effectively. This is an extremely important function.

2.1.1 Team performance measures:

It is very essential, in the interest of gaining a knowledge of the aspects that contribute to the success of construction teams, to investigate the important measurements that may be used to assess the performance of a project. We will provide an in-depth understanding of the dependent variable in this research by discussing the many different indications of team performance in the section of the literature review that we are currently working on. Achievement of goals, productivity, quality, adherence to schedule, and clarity of objectives are some of these markers. In the research that has been done on the topic (Atkinson R. , 1999); (Kerzner, H. , 2013); (Larson E W & Gray C. F. , 2018), it has been generally recognized that each of these metrics is an essential component of successfully completed construction projects. This literature review intends to offer a strong basis for future research of the elements that contribute to construction team success by assessing the value of each measure and the linkages between them. Specifically, this review will focus on the importance of each measure in relation to the others.

Achievement of Goals: According to (Atkinson R. , 1999), the degree of success that a team achieves in fulfilling the predetermined objectives of a project is directly proportional to the degree to which the team is able to satisfy the project's goals. A complete assessment of the project's performance takes into account a variety of factors, including those related to cost, scope, and the level of satisfaction felt by stakeholders. Project objectives may incorporate such factors. In the following literature study, we will investigate the significance of achieving one's goals and address the myriad of elements that might affect the capacity of a construction team to accomplish its objectives.

Productivity: Productivity, or the measurement of work performed over a particular duration, serves as an important indicator for measuring the effectiveness and efficacy of a team (Kerzner, H. , 2013). Productivity may be defined as the amount of work that is completed during a certain timeframe. The availability of resources, the level of coordination among the members of the team, and the quality of their communication may all have an impact on the

productivity of a construction crew. This literature study will investigate the connection between productivity and the overall performance of a team and will focus specifically on the ways in which construction teams may improve their productivity in order to provide more favorable results for their projects.

Quality: According to (Kerzner, H. , 2013), the quality of the work performed by a construction team is an essential aspect that has a major impact on both the degree to which a project is successful as a whole and the amount of contentment experienced by the customer. In the context of construction projects, quality may refer to a variety of different aspects, including adherence to design requirements, compliance with building regulations, and the endurance of the finished product. The purpose of this literature evaluation is to explore the significance of quality to the accomplishments of construction teams as well as the strategies that might be used to guarantee high-quality results.

Timeline: According to (Atkinson R. , 1999), one of the most important considerations in determining how effective a construction crew is determining how well they adhere to a timetable that has been established in advance. Construction projects are sometimes subject to substantial time limitations; thus, the capacity to finish activities within the allocated period is essential to assuring the success of the project. In this literature study, we will investigate why it is so important to stick to the schedules for projects and talk about the several tactics that may assist construction teams in remaining on track.

Clarity of aims and Definable Goals: According to (Larson E W & Gray C. F. , 2018), in order for a construction team to accomplish optimum coordination of operations, each member of the team has to have a full grasp of the project's aims and goals. When there is a clear understanding of what needs to be accomplished, members of a team are better able to communicate with one another and work together to get the job done, which increases the likelihood that the intended results of the project will be achieved. This literature study will investigate the role that objective clarity and well-defined objectives play in the accomplishments of construction teams, with a particular emphasis on the significance of ensuring that project goals are aligned with the expectations of all relevant stakeholders.

Clear communication: According to (Oyewobi, 2015), it is essential to have good communication in order to guarantee that all members of a team understand what their responsibilities are and are able to work successfully. This involves keeping the lines of

communication open at all times, swiftly resolving any problems or concerns that may arise, and making sure that all is kept up to date on the progress that is being made on the project.

Trust and cooperation: According to (Cheng, 2005), an appropriate team needs mutual confidence and a collaborative mentality in order for its members to be able to work together without friction and share their respective areas of skill and knowledge. It is easier for members of a team to feel confidence in their capacity to depend on one another when there is an atmosphere at work that is characterized by trust.

Effective leadership: Successful management is vital in directing the team through the many stages of a construction project, guaranteeing that objectives are accomplished and that the team stays motivated and focused (Walker, 2007). Strong leadership ensures that objectives are achieved, and that the team stays focused and motivated. A capable leader is able to properly manage the dynamics of the team, distribute resources, and make difficult choices when they are required.

A wide variety of skills and areas of knowledge: According to (Oyewobi, 2015), a suitable team working on a construction project has to have a wide range of abilities and areas of expertise. This gives them the ability to solve the numerous obstacles and complexity that develop throughout the course of the project. Having specialists on hand who have specialized expertise in areas like engineering, design, construction, and management of projects is an essential component of this.

Comprehending the determinants that influence the success of the team within the project is crucial in efficiently administering projects and attaining intended results. Several critical factors that significantly contribute to the construction team success have been identified based on an extensive literature review and empirical evidence. Through an analysis of these factors within the framework of our reliant variable (the success of the team), our objective is to cultivate a more profound comprehension of the underlying mechanisms and feasible avenues for intervention to enhance project results. As the research progresses, these variables will provide a basis for directing our investigative endeavors and shaping our approaches to data gathering. This will ultimately facilitate the discovery of significant findings regarding the

intricate interrelationships among project manager agility, team dynamics, technology utilization, and overall team achievement in the context of construction projects.

- **(Goal-Achievement):** its team ability to meet project goals; This variable is a determining factor in the degree of success that a team attains in accomplishing the established project goals (Atkinson R. , 1999).
- **(Productivity):** The quantification of work accomplished during a specified timeframe serves as a significant metric for evaluating a team's effectiveness and efficacy (Kerzner, H. , 2013).
- **(Quality):** The caliber of the work produced by the team is a critical factor that significantly influences the overall success of the project and the level of satisfaction of the client (Kerzner, H. , 2013).
- **(Timeline):** Punctuality in adhering to a predetermined timeline is a crucial aspect in assessing the efficacy of a construction crew (Atkinson R. , 1999).
- **(Objective):** and clear goals: In order to achieve optimal coordination of activities, a construction team must possess a comprehensive comprehension of the objectives and objectives of the project (Larson E W & Gray C. F. , 2018).
- **(Effective communication):** Effective and transparent communication among team members is crucial to uphold a collective comprehension of the project's advancement and to tackle any potential challenges that may emerge (DeChurch L. A & Mesmer Magnus J. R., 2010).
- **(Collaboration and teamwork):** Effective collaboration and teamwork skills facilitate the ability of team members to work cohesively, resolve issues, and arrive at joint decisions, thereby enhancing the overall achievement of the project (Hoegl M. & Gemuenden H. G. , 2001).
- **(Skilled & Efficiency)** and competent members: An efficacious construction team ought to comprise proficient and capable personnel possessing the requisite knowledge and skills to execute their respective duties and obligations with utmost efficiency (Pinto J. K & Kharbanda O. P, 1995).
- **(Speed):** Enhanced operational velocity can result in reduced expenses and heightened customer contentment, thereby augmenting the triumph of a group (Kerzner, H. , 2013).

2.2 Drivers of team performance in construction project management

The construction sector is very important to the development of a country's economy since it makes considerable improvements to a country's physical infrastructure and offers a great number of job possibilities. In example, mega construction projects are crucial drivers of both economic development and urbanization (Flyvbjerg B., 2014). However, these initiatives are distinguished by their complexity, significant stakes (Shenhar A. J, Dvir D, Levy O, & Maltz A. C., 2002), and one-of-a-kind obstacles; hence, the success of the project and the performance of the team are essential to the entire profitability of these endeavors.

There has been a significant amount of research conducted on successful construction teams, and this has brought to light the necessity of understanding the characteristics that drive the success of projects across megaprojects (Mir, F. A., & Pinnington, A. H., 2014). The drivers which contribute to the success of a team are essential to the accomplishment of project objectives, such as adhering to schedule, cost, and quality restrictions (Kerzner H., 2009), as well as assuring stakeholder collaboration and satisfaction (Olander S. & Landin A, 2005). In addition, these aspects help reduce the dangers that are inherent to building projects and cut down on the likelihood of unfavorable results, such as budget overruns, schedule slips, and quality problems (Zou P. X. W. Zhang, G & Wang J. , 2007).

It is become crucial for managers of projects, construction professionals, as well as policymakers to understand and implement the drivers for the team's performance and success with regard to megaprojects. Doing so provides valuable insights toward best practices and strategies that optimize project outcomes (Papadakis I. Karlos V. & Tsironis L. , 2018).

Therefore, here below the factors that have an effect on the performance of construction teams: the agility of the project manager, the dynamics and cooperation of the team, and the usage of technology and innovation within the project team (Mok K. Y. Shen G. Q. & Yang R. J. , 2015). These success factors have been identified as crucial components that must be optimized in order to maximize the performance of the construction team and have a substantial influence on the results of the whole project.

In order to give a complete knowledge of the impact that these performance factors have in the success of construction teams, this literature review will integrate current research and ideas linked to these performance drivers:

Agility of a Project Manager: In the context of the construction industry, the ability of a project manager to respond effectively to changes, make decisions quickly, and adapt their management style to suit the dynamic nature of construction projects is referred to as "agility" (Conforto, E. C., Salum, F., Amaral, D. C., da Silv, 2014); (Dingsoyr T Nerur S Balijepally V & Moe N, 2018). According to (Muller R, & Turner R. , 2007) and (Mok, 2015), an agile project manager is better able to handle the difficulties and uncertainties that are inherent in construction projects. As a result, this contributes to enhanced team performance and results for the project. In this literature study, the idea of project manager agility will be investigated, and the many facets of this performance driver as well as their influence on the accomplishments of construction teams will be investigated.

Team Dynamics and cooperation: According to (Baiden, B. K., Price, A. D., & Dainty, A. R. , 2006), (Chinowsky P. S.& Rojas E. M., 2003), and (Tuckman B W , 1965), team dynamics, which include communication, trust, and cooperation among team members, have a substantial influence on construction team performance. According to (Hoegl M. & Gemuenden H. G. , 2001) and (Salas E Sims, D. E & Burke C. S, 2005), a team that is cohesive and works together well may more effectively handle the complexity and problems of a project, leading to enhanced project results. The purpose of this literature review is to highlight the relevance of team dynamics and cooperation in construction team success, as well as the numerous elements that might influence these essential components of team performance.

Utilization of Available Technology and Introduction of New Innovations: The effective utilization of available technology and the introduction of innovations within a construction project team can enhance team performance by improving communication, coordination, and the overall efficiency of the project (Azhar S., 2011), (Chua D K. Kog Y. C. & Loh P K, 2003), (Love, P. E., Edwards, D. J., & Irani, Z. , 2010). This can be accomplished by improving overall project efficiency. According to (Sacks R Koskela L Dave B. A & Owen R, 2010) and (Succar B, 2009), cutting-edge technology like Building Information Modeling (BIM), which helps streamline information exchange and decision-making processes, may have a substantial influence on the building process. This has the potential to eventually contribute to the overall

success of the team. This literature study will investigate the impact that the usage of technology and innovation play in the success of construction teams. Specifically, we will investigate the numerous technologies and innovations that may be utilized to improve the overall performance of a team.

2.2.1 Theoretical framework RBV.

In this study, will employ the Resource-Based View (RBV) theory as a theoretical framework to link the independent variable, optimizing the construction team's success (comprising the three primary factors: project manager's agility, team dynamics, and utilizing technology), with the dependent variable, team performance. This will allow us to link theoretically the factors of optimizing the construction team's success, with the team performance. The RBV theory, which was initially proposed by (Wernerfelt B. , 1984) and later developed by (Barney, 1991) and others, posits that organizations can achieve a sustainable competitive advantage by leveraging their one-of-a-kind resources and capabilities, which are valuable, rare, inimitable, and non-substitutable (VRIN). The utilization of VRIN resources has the potential to enhance the performance of construction teams, thereby establishing a competitive edge that is consistent with the tenets of the Resource-Based View (RBV) theory.

The utilization of the Resource-Based View (RBV) theory can serve as a valuable theoretical framework for the present study. The present study focuses on three key factors, namely project manager's agility, team dynamics, and utilization of technology, which can be perceived as vital resources that facilitate the exceptional performance of construction teams in accordance with the tenets of the Resource-Based View (RBV).

The resource of project manager agility is considered distinct within the Resource-Based View (RBV) framework. According to (Conforto E. C.. & Amaral D. C., 2016), the ability to respond quickly to changes and make effective decisions in complex project environments is a significant advantage. The aforementioned skill is a scarce commodity and challenging to duplicate, as it relies heavily on the project manager's expertise, competencies, and personal qualities (Andersen E S & Jessen S. A. , 2013). Agility presents a competitive advantage that is potentially difficult to replicate and substitute.

The second factor, team dynamics, is considered a valuable resource within the framework of the Resource-Based View (RBV). According to (Hoegl, M., & Gemuenden, H. G., 2001), the attainment of project success is heavily reliant on the establishment of high-caliber team dynamics, which encompasses proficient communication, collaboration, and conflict resolution skills. Similar to agility, these dynamics are arduous to replicate and replace, owing to their foundation in the distinct interpersonal connections and ethos of a particular team.

Finally, the utilization of technology in construction endeavors represents a valuable asset. According to (Azhar S., 2011), the proficient application of technology can lead to increased efficiency, decreased errors, and improved communication. The degree of its benefit is contingent upon its implementation and utilization within the team, rendering it uncommon and potentially challenging to replicate.

So, the application of RBV theory to the context of construction team performance is particularly suitable because it acknowledges that the unique combination of resources and capabilities within a construction team, such as an agile project manager, effective team dynamics, and innovative technology utilization, can lead to improved performance and competitive advantage ((Barney, 1991); (Grant R M, 1991)). This is particularly suitable because RBV theory acknowledges that the unique combination of resources and capabilities within a construction team can lead to improved performance and competitive advantage. The RBV gives a thorough knowledge of how internal resources and competencies may be leveraged to maximize team performance in the construction industry by concentrating on these three elements. This enables the RBV to serve as an effective management tool.

Examining the ways in which the three primary components contribute to the construction team's precious, uncommon, inimitable, and non-substitutable resources and skills is one way to develop a relationship between the independent and dependent variables when using the RBV theory. This link may be formed by looking at how the theory is used. For example, an agile project manager can bring valuable leadership skills, adaptability, and the ability to make quick decisions to the team. Effective team dynamics can foster trust, collaboration, and a shared understanding of project objectives, which creates an environment for success that is rare and difficult to imitate. In a similar vein, the exploitation of cutting-edge technology and

the introduction of innovations are both capable of enhancing the non-substitutable capabilities of the team in terms of efficiency, communication, and coordination.

2.2.2 Influence of project manager agility on team performance.

The efficacy of a construction project frequently hinges upon the nimbleness of the project manager, a pivotal determinant of team productivity. The capacity to adjust and respond flexibly to changes, known as agility in project management, is a critical attribute that has been demonstrated to have a significant impact on project success ((Alzoubi, 2011); (Falance, 2012); (Singh, 2011)).

The agility of a project manager can be characterized by their capacity to exhibit flexibility and adaptability in response to changes in the environment, as well as their ability to expeditiously modify strategies and tactics in accordance with the requirements of the project (Cohn, 2005). This characteristic involves comprehending the interrelationships within the team, facilitating efficient exchange of information, and cultivating an environment that stimulates ongoing enhancement and the aspiration for superiority. (Schwaber, K., & Sutherland, J., 2017) posits that the principles of agility in project management prioritize valuing individuals and interactions over processes and tools, responding to change over following a plan, and emphasizing customer collaboration over contract negotiation.

The agile project management approach has been progressively embraced by the construction industry, prioritizing flexibility, communication, and collaboration. According to (Aziz, R. F., & Hafez, S. M., 2013) research, the implementation of agile project management methodologies can result in notable improvements in the performance of construction projects.

Moreover, the agile project manager assumes a pivotal function in guiding the agile project management approach. According to (Almarri, 2019), the agile project manager is responsible for facilitating efficient teamwork, ensuring timely project delivery, and achieving client contentment. Research has demonstrated that the implementation of agile project management methodologies has a favorable impact on the efficacy of construction projects, specifically in

terms of improving project quality, cost management, and time management ((Osei-Kyei, R., & Chan, A. P. , 2015); (Almarri, 2019)).

According to (Serrador P. & Pinto J. K. , 2015), the agile project manager must maintain a balance between project requirements and team needs, exhibit effective communication with stakeholders, and exhibit prompt responsiveness to changing project circumstances. The success of a team is influenced by the level of trust and transparency within the team, as well as the degree of autonomy granted to team members. These factors also impact the relationship between the agility of the project manager and the team's success, as noted by (Sopian, 2023) and (Serrador, 2015).

To summarize, the efficacy of a project manager in the construction industry can be greatly improved by their ability to be agile, which is characterized by their capacity to adapt and be flexible when faced with changes and obstacles in a project. This, in turn, can lead to better performance and success for the construction team. Thus, the following hypothesis is proposed:

H.1. Project manager's agility increases team performance and success

The literature review emphasizes the pivotal significance of project manager agility in determining the success of construction teams. Numerous studies have thoroughly examined the three distinct independent factor essential influencing the main independent variable (Optimizing team success), uncovering intricate connections among them and the team's performance. The present study has synthesized the primary insights obtained from a comprehensive review, and as a result, we have compiled a list of essential measures that have been derived from the conceptualization of this factor. Its offer significant insights into the measures that influence the achievement of project objectives. The objective of integrating the measure into the study inquiries is to acquire a comprehensive and diverse comprehension of the respondents' encounters in overseeing extensive construction undertakings. The objective is to make a valuable contribution to the current knowledge base and provide practical recommendations for improving the performance of construction teams and the overall success of projects. The subsequent section will delve deeper into the analysis of these hypotheses.

Measure of project manager agility;

- **(Decision-making)**: The speed of taking decision: (Dingsøyr T.Nerur S Balijepally V & Moe N, 2018), agile project manager make quick, informed decision, allowing the team to adapt and respond to change effectively more than normal practice (Müller, 2010).
- **(Flexibility)**: Adaptability and responsibility: (Tripathi P. & Anantatmula V. S., 2020), agile project manager open to change more than the tradition leader and always adapt his plans to meet evolving project needs (Conforto,, 2014).
- **(Effective)** communication: (PwC. , 2012), agile project manager always allows for open and transparent communication and exchanging information and feedback (Dingsøyr T.Nerur S Balijepally V & Moe N, 2018).
- **(Empowerment)**: Strong leadership and management: agile leader should empower his team by granting them autonomy and trust, which will boost their motivation an innovation (Hass, K. B., 2007).
- **(Improvement)**: Continuous learning: agile project managers cultivate a culture of learning, which facilitates ongoing enhancement and innovation among team members (Serrador P. & Pinto J. K. , 2015).

2.2.3 Team Dynamic and collaboration influence their performance.

The performance of a construction team is significantly impacted by team dynamics and collaboration. According to (Levi D., 2017), the concept of "team dynamics" pertains to the psychological factors that impact the conduct and efficacy of a team. According to (West M A. , 2012), team dynamics encompass various aspects such as team leadership, communication patterns, conflict resolution, decision-making processes, and roles and responsibilities.

Conversely, collaboration entails the act of individuals working in unison and pooling their resources towards a shared objective. According to (Lee P Gillespie N Mann, L & Wearing A. , 2005), a team that is highly collaborative demonstrates characteristics such as open communication, mutual trust, shared vision, and constructive conflict resolution.

The achievement of success in construction project management is contingent upon the effective implementation of team dynamics and collaboration. It is common for project teams to consist of members from diverse fields, who possess distinct abilities, backgrounds, and

viewpoints (Serrador, 2015). Facilitating successful collaboration among a heterogeneous group necessitates adeptly managing dissimilarities and fostering a harmonious collective, which is largely contingent on the team's dynamics.

Numerous research studies have indicated that favorable team dynamics and proficient collaboration are linked with superior project results. (Salas E Sims, D. E & Burke C. S, 2005) conducted a study which revealed that teams exhibiting favorable dynamics and efficient collaboration demonstrated superior performance, enhanced decision-making processes, and improved conflict resolution skills. The likelihood of project deadlines being met, budgetary constraints being adhered to, and stakeholder expectations being fulfilled or surpassed was higher among these teams.

In addition, the Agile project management methodology places significant emphasis on collaboration, a crucial element that has gained traction in the construction sector (Aziz, R. F. & Hafez, S. M., 2013). The Agile project management approach prioritizes the significance of individuals and their interactions, as opposed to processes and tools, and emphasizes the need to respond to change rather than adhering to a rigid plan (Schwaber, K., & Sutherland, J., 2017). Consequently, it places significant emphasis on the importance of teamwork and collaborative dynamics.

Furthermore, cooperation facilitates the augmentation of knowledge and information exchange, a critical aspect in the management of construction projects (Goh S C Goodman P S & Weingart L. R. , 2013). Effective collaboration among team members enhances the likelihood of sharing crucial project information, thereby resulting in superior decision-making and enhanced project outcomes.

To conclude, the performance of a construction project team is significantly influenced by team dynamics and collaboration. Project outcomes are more likely to be improved when teams demonstrate positive dynamics and effective collaboration. The present study posits a hypothesis based on the findings of the literature review:

H.2. Team dynamics increase team performance and success.

Similarly, here, it is very important to summarize the measure of this factor to come up with valuable contribution to the current knowledge base and provide practical recommendations

for improving the performance of construction teams and the overall success of projects. The subsequent section will delve deeper into the analysis of these hypotheses:

- **(Trust)** and collaboration: The cultivation of trust within a team promotes optimal collaboration and cooperation, ultimately resulting in heightened levels of performance (DeChurch L. A & Mesmer Magnus J. R., 2010).
- **(Responsibility)** Clear rules and responsibility: Well-defined roles and responsibilities foster accountability and guarantee that team members comprehend their contributions to the project (Sundstrom, E De Meuse K. P. & Futrell D. , 1990).
- **(Conflict)** resolution: (Alonso R. Vivanco, M. Rodriguez Perez, R. & Ma, 2018)The implementation of efficient conflict resolution strategies facilitates the constructive handling of issues within teams, thereby enhancing both the cohesion and performance of the team.
- **(Vision)** Shared vision and goals: Fostering a collective vision and mutually agreed-upon objectives among team members facilitates cooperation and dedication towards the project (Banihashemi S. Hosseini M. R. Golizadeh, H., , 2017).
- **(Communication)** Open Communication: (Hoegl, M., & Gemuenden, H. G., 2001) The promotion of open communication among team members has been found to facilitate the exchange of information, mitigate the occurrence of misinterpretations, and augment collaborative efforts.

2.2.4 Utilizing technology influence the team performance.

In recent years, there has been a growing interest in investigating the critical area of the role of technology in facilitating team performance within the construction industry. The emergence of a swift technological revolution has revealed numerous inventive instruments and prospects, which possess the capability to enhance the productivity and proficiency of construction crews.

Building Information Modeling (BIM) represents a crucial technological paradigm within the construction industry. According to (Succar B., 2009), Building Information Modeling (BIM) is an essential means of technological advancement within the construction industry. According to (Eastman C Teicholz P Sacks R & Liston K., 2011) research, Building Information Modeling (BIM) has the capability to enhance team collaboration and

communication by providing a digital representation that encompasses both the physical and functional complexities of a structure. According to (Azhar S., 2011) empirical findings, the implementation of BIM can enhance the performance of construction teams by facilitating prompt decision-making, reducing errors, and improving overall productivity.

The integration of project management software and systems is a crucial aspect of technology within the construction sector. According to (Ghosh S. Yazdani S. Bhattacharjee S , 2012), the implementation of such systems has the potential to enhance communication, optimize processes, and furnish up-to-date information regarding the status of a project. (Alnuaimi A. S. Taha R. A & Moon S, 2010) propose that the utilization of these systems can enhance team performance by increasing productivity and reducing project delays, thus supporting this concept. Apart from software and systems, novel construction methodologies that include prefabrication, modular design, and sustainable building techniques have the potential to enhance team performance. According to (Gibbs D. J. Yost B. & Johnson N. , 2014), the implementation of these techniques can act as enablers for enhanced team performance by reducing time and cost overruns, as well as promoting sustainability and workmanship quality. The aforementioned observations serve as a robust basis for the upcoming hypothesis.

The utilization of technology in the context of project management in construction enhances the performance of the team.

The hypothesis is supported by empirical evidence presented by (Marzouk M & Hisham M., 2011), which demonstrates a positive correlation between the utilization of technology and the performance of teams. The research conducted by the authors demonstrated that the incorporation of 4D Building Information Modeling (BIM) led to improvements in the accuracy of project scheduling, cost control, and construction quality. (Zhang, X. Wu Y Shen L. & Skibniewski M. J., 2017) provided further support for these results by confirming that the adoption of Building Information Modeling (BIM) had a beneficial impact on both project performance and advancement, as well as team cooperation.

The principles of lean construction, which prioritize the elimination of waste and ongoing process improvement, have been found to have a positive correlation with improved team performance (Salem O. Solomon J. Genaidy A. & Minkarah I, 2006). In addition, novel methods of construction, such as modular construction, have been linked to improvements in project performance by decreasing construction time and expenses, while simultaneously

upholding high standards of quality and sustainability (Nadim W & Goulding J. S, 2011). (Ling F. Y., Y Luo, X W. & Cai H. W, 2014) have concluded that the utilization of Information and Communication Technology (ICT) has a positive impact on team performance. This is primarily due to its facilitation of superior interaction, coordination, and information dissemination among team members.

Based on the preceding theoretical frameworks and empirical evidence, it is reasonable to put forth the subsequent hypothesis:

H.3. Utilizing Technology increases team performance.

The aforementioned hypothesis encompasses the capacity of technology to bring about significant changes in the construction sector. Through the utilization of novel tools and strategies, construction teams have the potential to enhance their performance and attain superior project results. Further empirical investigation of this hypothesis is necessary due to its potential implications for both academic discourse and practical application in the construction industry.

The identification of the measure of this factor is paramount, as they provide substantial contribution to the existing knowledge base, offer particular recommendations for performance improvement, and pave the way for the success of construction project.

- **(Automation)**: Adoption of digital technologies (Bughin J Catlin T Hirt M & Willmott P. , 2016), The integration of automated processes has the potential to enhance operational efficiency, mitigate the occurrence of human errors, and optimize time management within construction projects.
- **(Integration)** of BIM systems (Azhar S., 2011), The utilization of technology optimizes the process of project design, coordination, and management, thereby enhancing the overall performance of the project.
- **(Enabling)** and collaboration tools: Implementation of lean construction practices (Ballard G & Howell G , 2003), Collaboration tools that are enabled by technology facilitate instantaneous communication and the exchange of information among members of a team, thereby augmenting coordination and teamwork.
- **(Technique)** and mobile technology: Use of advanced materials and techniques (Liu, H GolparvarFard M & Stump G., 2017), The utilization of mobile devices and applications

in construction sites has been found to improve access to project information, thereby enhancing the efficiency of team members and facilitating better decision-making.

- **(Systems)**, Monitoring and tracking systems: Sophisticated monitoring and tracking systems, such as sensors and Internet of Things (IoT) devices, furnish contemporaneous data on project advancement and efficacy, thereby facilitating improved decision-making and resource allocation. Automation and robotics in construction (Moon H Dawood, N & Kang L., 2017).

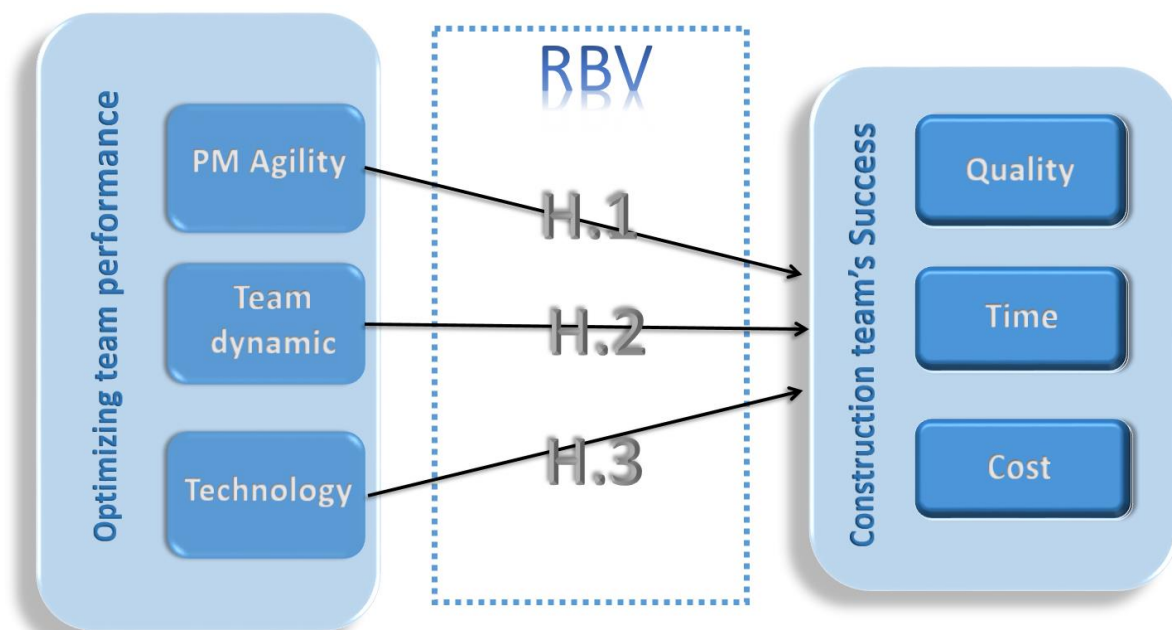


Figure 1 Research model

CHAPTER 3: METHODOLOGY

The purpose of this study is to look at how agile project managers affect the overall efficiency of construction teams. Several facets of agile project managers, especially team dynamics, communication, adaptation, and decision-making processes, will be examined in the research.

3.1. Philosophy

This study will employ a positivist methodology in its investigation of the connection between optimizing the construction team's success and construction team performance. The construction team's success is comprised of three essential factors: the agility of the project manager, the dynamics of the team, and the usage of technology. (Bryman A. , 2012) The principles of positivism, which argue that knowledge is based on observable and measurable facts, offer an appropriate framework for this research since they propose that knowledge is based on these types of phenomena.

This study aims to objectively evaluate how project manager agility, team dynamics, and technology use impact construction team performance (Crotty M. , 1998). The positivist approach maintains that reality is objective, a stance that is well-aligned with the goal of this research to objectively examine how these factors affect construction team performance. It proposes that reality may be measured and recorded by empirical indicators, a method that is in harmony with the purpose of this study, which is to statistically examine the influence of these three components on team performance (Bryman A. , 2012).

Furthermore, the positivist philosophy places an emphasis on cause-effect relationships (Saunders M Lewis P & Thornhill A, 2009). This echoes the intention of this research, which is to determine whether or not there is a potential causal link between the three key factors that contribute to the success of the construction team and the performance of the team as a whole.

In conclusion, the positivist philosophy provides an appropriate framework for this study. It does so by encouraging an examination that is objective, empirical, and quantitative into the

link between the factors that influence the optimization of construction team success and the performance that results from that optimization.

3.2. Approach

This study will employ a deductive approach in order to investigate the effects that our previously identified elements have on the performance of construction teams. According to (Saunders M Lewis P & Thornhill A, 2009), one of the defining characteristics of this methodology is its emphasis on developing and experimentally evaluating hypotheses that are drawn from pre-existing theoretical frameworks. For the purpose of this investigation, we have formulated the three hypotheses in line with the Resource-Based View (RBV) theory: 1) an increase in the flexibility of the project manager leads to an increase in the performance of the team, 2) an improvement in the dynamics and cooperation within the team leads to an increase in team performance, and 3) an efficient use of technology leads to an increase in team performance.

The decision to use a deductive approach is beneficial for a number of different reasons. In the first place, it gives researchers a methodical and organized framework within which to investigate the connections between the different factors. This study adheres to the positivist philosophy, which places an emphasis on objectivity and the quantifiability of phenomena (Bryman A. , 2012). Because of this, we are able to conduct an objective evaluation of how the agility of the project manager, the dynamics of the team, and the usage of technology impact team performance.

Second, the deductive method is appropriate for the purpose of the study, which is to investigate the cause-and-effect linkages that exist between the identified elements and the performance of the team (Saunders M Lewis P & Thornhill A, 2009). Our research starts with a theoretical framework (the RBV theory), and from this framework, we draw several hypotheses about the influences of a project manager's agility, team dynamics, and technology use on the performance of a team. These assumptions are going to be put to the test experimentally by employing quantitative data, and the results of those tests are going to tell us whether the hypotheses should be accepted as is, modified, or abandoned altogether.

Finally yet importantly, according to (Bryman A. , 2012), using a deductive methodology makes it possible to generalize the conclusions of study. This is especially important to keep

in mind in this specific setting, since the findings of this research will provide insightful information about the performance of construction teams in a variety of projects and settings, so adding to a more comprehensive knowledge of how the three most important aspects may be maximized for success.

In conclusion, the deductive method is an excellent choice for this line of inquiry because it makes it possible to conduct an organized and methodical analysis of the correlations between the elements that influence the optimization of construction team success and the performance that is achieved by the team as a whole.

3.3. Research strategy

The present investigation utilized a contemporary and effective methodology for the study, specifically an online Likert-scale survey. The survey was disseminated via easily accessible workgroups on both WhatsApp and email platforms, thereby ensuring convenient and widespread participation among the respondents. The utilization of contemporary technology in the process of data collection facilitates a seamless and efficacious approach. Subsequently, the gathered data was subjected to analysis through the utilization of the sophisticated and accessible statistical software, SPSS. The utilization of this software facilitated a proficient handling and analysis of the data, thereby enabling a more exhaustive comprehension of the interconnections among the variables being examined in this research. Through the utilization of sophisticated tools and methodologies, a significant level of precision and comprehension was attained regarding the elements that contribute to the effective performance of construction teams.

The respondents were able to conveniently access and accomplish the survey via commonly available workgroups on WhatsApp and email, thereby reducing any probable hindrances in the process of data gathering. Upon completion of data collection, the process of transferring the data to the statistical software, SPSS, was executed with ease and simplicity.

The advanced functionalities and user-friendly interface of SPSS facilitated a streamlined and effective data coding and analysis process. The utilization of the software facilitated the expeditious identification of patterns, trends, and correlations within the amassed data. The utilization of this approach facilitated the acquisition of a more profound comprehension of the

interconnections among the variables being examined, thereby enabling the derivation of significant inferences from the conducted analysis.

In addition, the simplicity of data transfer and coding mitigated the possibility of potential errors that may occur during manual input and analysis, thereby guaranteeing a greater level of precision and dependability in the results. Through the utilization of contemporary technology and effective data gathering techniques, the process of data collection, analysis, and interpretation was optimized, culminating in an enhanced and all-encompassing comprehension of the elements that contribute to the achievement of successful construction team performance.

3.4. Method of data collection:

A quantitative survey was the research methodology that involved collection data online questionnaire to study and explore the impact that an agile leader has on the success of a construction project.

A quantitative analysis technique been used, which is deemed advantageous in this study due to its ability to yield numerous benefits, particularly in the investigation of team performance and the specific contextual factors of construction projects. Several notable benefits can be derived from the utilization of quantitative analysis in this particular study.

- The utilization of quantitative analysis facilitates the acquisition of objective data, which in turn empowers researchers to draw accurate and dependable conclusions (Creswell J. W. , 2014). The importance of objectivity cannot be overstated in the study of construction team performance, as it serves to mitigate potential biases and subjective interpretations of the findings.
- The concept of generalizability pertains to the quantitative method, which is characterized by the utilization of larger sample sizes. This particular feature of the method enhances the capacity of the results to be applicable to a wider population, as noted by (Bryman, A. , 2016). The significance of this matter is notable within the realm of construction undertakings, given that the outcomes could potentially affect a diverse

array of interested parties, such as project supervisors, construction crews, and customers.

- The utilization of quantitative research enables the application of diverse statistical methodologies to scrutinize the gathered data, including but not limited to regression analysis as well as descriptive data analysis (Field A. , 2013). The aforementioned tools facilitate the identification of patterns, trends, and inter-variable relationships, thereby enabling a comprehensive comprehension of construction performance among teams and the factors that exert an impact on it.
- Quantitative research facilitates the testing of precise hypotheses, thereby furnishing unambiguous evidence either in support of or against the postulated associations among variables (Punch, K. F., 2013). Within the framework of this study, this approach facilitates a meticulous analysis of the interconnections among project manager agility, collaborative dynamics, technology utilization, and the performance of construction teams.

The employing of quantitative analysis in this study can provide significant insights into the determinants of construction team performance, thereby enabling the formulation of evidence-based recommendations and tactics to improve project outcomes.

The online questionnaire was disseminated via relevant official emails and WhatsApp work groups. The data collection process took place over the course of one month, and a total of circa 50+ filled-out questionnaires were obtained. The data collected from the survey was kept private and confidential since it was maintained on a protected site. The questionnaire had three distinct components, which were as follows:

Demographics: In the section under "Demographics," information regarding the participants' histories, such as their roles, levels of experience, and the scope of the projects in which they have participated, was obtained.

Individual Agility: this section created from the core of agility project manager conceptualization based on the factors which directly impact this independent.

Teams' dynamic: around seven Likert-Scale questions creating to test the level of team collaboration and dynamic between themselves.

Utilizing technology: Similar to the above questionnaire style, this section was created to assess the level and way of using technology and introducing innovations to the process of construction management, which shall be utilized by the team.

Construction Team Performance: In this section, the participants' perceptions regarding the construction team's performance were evaluated, taking into consideration cost, time, quality, and the level of satisfaction felt by stakeholders. The participants were asked to score the extent to which they agreed with a variety of statements using a Likert-scale that included five points, normally by comparing the achieved level to other teams performance in previous projects or other projects which can be considered a bench mark in their opinion.

The present study employed established and validated standardized questionnaires, which were developed by esteemed scholars in the field. The questionnaires utilized in this study were meticulously chosen based on their pertinence to the particular variables being examined, thereby guaranteeing a dependable and uniform assessment of each factor.

When conducting this research, I made use of validated, standardized questionnaires. This was done for a number of reasons, but especially so that we could collect statistical data with which to test the hypotheses I had previously discussed. According to (Bryman A. & Bell E. , 2015), these well-established instruments have been designed by knowledgeable researchers and have been put through rigorous validation procedures to verify their reliability, precision, and consistency when assessing the constructs of interest.

To begin, using standardized questionnaires is one way to assist improve the reliability of the data that is gathered. Reliability is the degree to which a measurement delivers consistent findings over time (Cozby P. C & Bates S. C. , 2015). By using validated questionnaires that are intended to capture the core meaning of the primary components for each variable, it is possible to verify that the data gathered is reliable and free from random measurement mistakes. This finally results in an improvement to the overall quality of the research and a boost in trust about the findings that were reached from the study (Field A. , 2013).

Second, using standardized questionnaires allows us to retain construct validity, which is the extent to which a measure reliably evaluates the constructs for which it was designed (Bryman A. & Bell E. , 2015). This is made possible by the use of standardized measures. I am able to guarantee that the data we have collected correctly depicts the phenomenon that is the subject

of the inquiry by making use of tools that have been developed particularly for the purpose of measuring the variables that are of interest to us. This is of the utmost importance when producing statistical figures for the purpose of testing a hypothesis since doing so enhances the foundation for the interpretation of the findings and the conclusions that follow (Field A. , 2013).

Finally yet importantly, the employment of standardized questionnaires makes it possible to more easily compare the results of one study with those of other studies conducted in the same area (Cozby P. C & Bates S. C. , 2015). This is because these instruments are often well-known and utilized in comparable research settings. This not only helps us have a better grasp of the interactions between the variables we're interested in, but it also gives us the ability to place our results within the context of the larger body of knowledge that already exists (Bryman A. & Bell E. , 2015).

Concisely, the use of validated, standard questionnaires in my research not only helps to assure the dependability and validity of our findings but also improves the overall quality of the investigation and makes it possible to make relevant comparisons with findings from other studies. These advantages, in the end, lead to an assessment of our hypotheses that is more robust and to a greater knowledge of the interactions between the variables that are the subject of the inquiry.

Project manager level of agility:

To evaluate the degree of agility among project managers, we utilized the survey instrument created by (Cyfert, S. Szumowski, W, Dyduch W, Zastempowski, M, 2022). The utilization of this established tool facilitated the efficient assessment of project managers' agility in the specific setting of large-scale construction projects.

- The respondent has been asked to rate their own level of agility based on the below items and factors from 1 to 5.

Table 1 measures for project manager agility

Symbol	Questions
Agl1	From 1 to 5, rate your speed of developing new skills and competencies.

Agl2	Up to what extent do you consider yourself quick in innovating management skills?
Agl3	Up to what extent you consider the skill of acquiring new management skills to be fast
Agl4	Rate your flexibility in moving between projects from 1 to 5.
Agl5	On a scale of 1–5, rate your support level for the introduction of new management systems and methods.
Agl6	From 1 to 5, rate your effectiveness in cooperating across functional boundaries.
Agl7	Rate your skill level in training and empowering your construction team staff to achieve goals in an ethical, respectful, and relatively intelligent manner.

Dynamic and collaboration of construction team

The questionnaire developed by (Ling, F. Y. Y. Low S. P Wang S. Q. & Lim H., 2014) was utilized to assess the dynamics of the construction team. The instrument in question was specifically devised to capture the fundamental facets of team dynamics in the construction sector, thereby enabling us to evaluate the interplay and cooperation among team constituents.

- The participant been asked to assess the construction team dynamics, Participants can rate each statement on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Table 2 measures for team dynamic factor

Symbol	Questions
Dyn1	Team members communicate openly and honestly with each other
Dyn2	Our team is able to resolve conflicts effectively
Dyn3	Our team members are committed to supporting each other.
Dyn4	Team members trust each other to fulfill their responsibilities
Dyn5	Our team is adaptable and flexible when facing changes in the project.
Dyn6	Our team shares knowledge and information effectively.
Dyn7	Team members feel comfortable offering suggestions and ideas for improvement

Utilizing the available technology and introduce innovation:

The questionnaire devised by (Rogers, E. M., 2003) was employed to assess the employment of technology and innovation. The aforementioned tool has been extensively employed in research endeavors investigating the uptake and proliferation of technology, furnishing a dependable mechanism for evaluating the degree to which construction crews are adopting and executing contemporary methodologies.

- The participant been asked to assess the utilizing of innovation and technology in their project by the construction team and themselves, Participants can rate each statement on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Table 3 measures for utilizing technology

Symbol	Questions
Tech1	Our team regularly explores new technologies to improve construction processes.
Tech2	We actively use innovative construction methods to improve project outcomes.
Tech3	Our team is open to adopting new technologies to enhance communication and collaboration.
Tech4	We invest in training and development to ensure the team is skilled in using the latest technology.
Tech5	Our project management approach encourages experimentation with new technologies and techniques
Tech6	Our team actively seeks out best practices and innovative solutions from other industries
Tech7	We continuously evaluate the effectiveness of the technology and innovations used in our projects

Construction team success:

Finally, in order to evaluate the achievement of the construction team, we employed the questionnaire formulated by (M.C Jones, A. W & M.C Jones, A.W Harrison, 1996). This all-encompassing instrument facilitated the assessment of construction team's general performance with regards to their capacity to achieve project objectives, quality of output generated, compliance with timelines, and efficacy, among other significant variables.

- The Participant were asked to rate the following items relative to other teams 1-5

Table 4 measures for team performance

Symbol	Questions
Scss1	To what extent do you believe your team has the ability to meet the project goals? 1 not-ability to 5 high-ability, compare to another construction team in a different project.
Scss2	On a scale of 1–5, rate the amount of work produced within the designated period.
Scss3	On a scale of 1–5, rate the quality of the work achieved or produced compared to the given standard and compare it to other teams in different projects.
Scss4	In your opinion, rate your construction team regarding their adherence to schedules. 1 high to 5 low
Scss5	On a scale of 1–5, rate your team's efficiency in terms of operation processes and mechanisms compared to other teams.
Scss6	In your opinion up to what extend you consider your construction team can be considered in their operation as fast team, compare to other project's team.
Scss7	Commercially rate your team's adherence to the project budget. 1: always over budget; 5: strict with budget with some proposal for value engineering; 4: only within budget; please compare to other projects' teams.

Control variable

The following control factors, which also fall under the category of demographic variables, were included in the research as extra variables. Starting from the place where samples been collected, as all samples collected from the UAE by having the similar technology exposure and construction atmosphere in terms of team authority coverage, speed of development, logistics, and safety, as well as in the organization's hierarchy, length of time spent in management, age, and gender.

So, here below the questionnaire table which been generated to examine the three hypothesis.

Table 5 questionnaire list with variable factors

Variable	Factors	Measures	Question	Ref
Optimizing team performance	Individual Agility	The respondent has been asked to rate their own level of agility based on the below items and factors from 1 to 5.		(Cyfert, S. Szumowski, W. Dyduch W, Zastempowski, M, 2022)
		Improvement	From 1 to 5, rate your speed of developing new skills and competencies.	
			Up to what extent do you consider yourself quick in innovating management skills?	
		Decision-making	Up to what extent you consider the skill of acquiring new management skills to be fast	
		Flexibility	Rate your flexibility in moving between projects from 1 to 5.	
		Empowerment	On a scale of 1–5, rate your support level for the introduction of new management systems and methods.	
		Effective	From 1 to 5, rate your effectiveness in cooperating across functional boundaries.	
		Empowering	Rate your skill level in training and empowering your construction team staff to achieve goals in an ethical, respectful, and relatively intelligent manner.	
	Dynamic	The participant been asked to assess the construction team dynamics, Participants can rate each statement on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).		(Ling F. Y. Y. Low S. P. Wang S. Q. & Lim H., 2014)
		Communication	Team members communicate openly and honestly with each other	
		Conflict	Our team is able to resolve conflicts effectively	
		Responsibility	Our team members are committed to supporting each other.	
		Trust	Team members trust each other to fulfill their responsibilities	
		Vision	Our team is adaptable and flexible when facing changes in the project.	
		Communication	Our team shares knowledge and information effectively.	
		Trust	Team members feel comfortable offering suggestions and ideas for improvement	
	Technology	The participant been asked to assess the utilizing of innovation and technology in their project by the construction team and themselves, Participants can rate each statement on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).		(Rogers, E. M., 2003)
		Enabling	Our team regularly explores new technologies to improve construction processes.	
		Automation	We actively use innovative construction methods to improve project outcomes.	

		Integration	Our team is open to adopting new technologies to enhance communication and collaboration.	
		system	We invest in training and development to ensure the team is skilled in using the latest technology.	
		system	Our project management approach encourages experimentation with new technologies and techniques	
		Technique	Our team actively seeks out best practices and innovative solutions from other industries	
		Integration	We continuously evaluate the effectiveness of the technology and innovations used in our projects	
Construction teams' success	The Participant were asked to rate the following items relative to other teams 1-5			(M.C Jones, A. W & M.C Jones, A.W Harrison, 1996)
	Quality	Goal-achievement	To what extent do you believe your team has the ability to meet the project goals and high standards? 1 not-ability to 5 high-ability, compare to another construction team in a different project.	
		Standards	On a scale of 1–5, rate the quality of the work achieved or produced compared to the given standard and compare it to other teams in different projects.	
	Time	Skilled & Efficiency	On a scale of 1–5, rate your team's efficiency in terms of operation processes and mechanisms compared to other teams.	
		Speed	In your opinion up to what extend you consider your construction team can be considered in their operation as fast team, compare to other project's team.	
		Program	In your opinion, rate your construction team regarding their adherence to schedules. 1 high to 5 low	
	Cost	Productivity	On a scale of 1–5, rate the amount of work produced within the designated period and budget.	
		Efficiency	Commercially rate your team's adherence to the project budget. 1: always over budget; 5: strict with budget with some proposal for value engineering; 4: only within budget; please compare to other projects' teams.	

3.5. Method of data analysis –Multiple regression analysis.

AMOS IBM SPSS statistic software was used, and the analysis began with the use of descriptive statistics to summarize demographic data. Then, inferential statistical Multiple regression were utilized to determine the correlations that exist between the variables. Specifically, the correlation between project managers' level of agility on his construction team performance. By employing multiple regression analysis, a causal link could be established between agile management practices and the level of performance achieved by construction teams. (Field, E. H, 2018) The level of significance was set at $p < 0.05$ for all tests.

3.6. Ethics.

Considerations of ethics are essential components of every research project, and this one is not an exception to that rule. Throughout the whole of the research, we will adhere strictly to the values of honesty, impartiality, integrity, cautiousness, openness, respect for intellectual property, confidentiality, responsible publishing, legality, and respect for colleagues (Resnik D B. , 2015).

Before the online Likert-scale questionnaire is made available to participants, I will first get their agreement as part of our commitment to conducting research that adheres to ethical standards. According to (Mertens D. M. & Ginsberg P. E , 2008), all participants been informed about the objective of the research, how the data will be used, and their ability to withdraw their involvement at any moment without incurring any consequences if they so choose.

In addition, all of the information obtained from the survey will be scrambled and kept in a safe location in order to protect the participants' right to privacy and keep their anonymity. According to (Mertens D. M. & Ginsberg P. E , 2008), the use of data that has been anonymized helps to guarantee that individual replies cannot be connected back to individual participants, hence preserving the participants' identities.

When it comes to the analysis of the data and the reporting of the findings, the researchers are not going to engage in any kind of data tampering or deception. The results shall be provided in an exact and honest manner, presenting the data in the same format in which they were gathered and excluding any possibility of bias or change (Resnik D B. , 2015)

This study intends to maintain the highest standards of research integrity and respect for the rights, dignity, and welfare of the participants by adhering to these ethical principles and ensuring that they are adhered to during the course of the research.

CHAPTER 4: ANALYSIS

4.1 Sample characteristics

In order to prepare for the process of doing the analysis of multiple regression, descriptive statistics were first constructed for the demographic data. Around 80% of the participants comprised senior managers and project directors, and they had an average of 15 to 25 years of experience. There were 118 participants total. Every single responder has some level of experience working on megaprojects with budgets more than Dhs 500 million.

Here below frequency table describe the samples:

Gender				
	Frequency	Percent	Valid Percent	Cumulative Percent
Female	27	12.4	22.9	22.9
Male	89	40.8	75.4	98.3
Prefer not to say	2	0.9	1.7	100
total	118	54.1	100	

Experience				
10- 15 years	6	2.8	5.1	5.1
15 - 20 years	6	2.8	5.1	10.2
21- 25 years	49	22.5	41.5	51.7
26- 30 years	37	17.0	31.4	83.1
above 30 years	20	9.2	16.9	100
total	118	47.4	100	

Size of projects				
50 - 100 million	2	0.9	1.7	100
100 - 500 million	13	6	11	98.3
500 - 1 billion	40	18.3	33.9	87.3
above 1 billion	63	28.9	53.4	53.4
total	118	54.1	100	

Position held				
Project Director	52	23.9	44.1	44.1
Senior PM	36	16.5	30.5	74.6
PM	24	11	20.3	94.9
Senior CM	6	2.8	5.1	100
total	118	54.1	100	

4.2 Reliability and Validity Analysis

4.2.1 Reliability

Table 6 Reliable analysis Table

Dimension		Cronbach's Alpha	F-test
Optimizing construction team success	Project manager agility	0.738	1.168
	Team dynamic		
	Utilizing technology		
Team Performance		0.798	1.056

SPSS is used to create a reliability examination, which is a statistical method used to assess the internal consistency or reliability of a collection of items measuring a single construct or variable. Reliability analysis is a statistical technique used to evaluate the dependability of a group of items measuring a single construct or variable. It determines how closely linked a group of objects is to one another within each dimension, ensuring that the items give a reliable and consistent measure of the construct by determining how closely connected the items are to one another. Cronbach's Alpha (Cronbach L. J. , 1951) is one of the metrics of internal consistency that is used the most often.

The values of the Cronbach's Alpha index may vary anywhere from 0 to 1, with higher values suggesting more internal consistency or dependability. According to (Nunnally, J. C. , 1978),

a value of 0.7 or above is generally accepted for the majority of research; however, the threshold might vary depending on the circumstances and the kind of study being conducted.

The F-Test using the Real Value 0 is, on the other hand, a statistical test that is used to evaluate and contrast the appropriateness of various models. It determines if a model that contains certain predictors offers a better fit to the data than a model that does not include those predictors, often known as a null model. In this instance, the F Test determines if a regression model that takes into account independent variables (such as the adaptability of the project manager, the dynamic of the team, and the use of technology), has a better fit than a null model that does not take into account any predictors. If the F Test results are statistically significant (for example, the p-value is less than 0.05), this indicates that the regression model is a better fit for the data, and that the independent factors contribute substantially to explaining the dependent variable (which in this case is the amount of success the team has had).

Within a given dimension or concept, the correlations that exist between different individual items are referred to as inter-item correlations. Examining the inter-item correlations may give insights into which items are more closely connected to each other, as well as which items would need to be updated or omitted to enhance the internal consistency of the scale (Clark, L. A., & Watson, D., 1995). This is done while doing a reliability study.

There are several advantages to employing reliability analysis, including the following:

1. Making ensuring that the pieces that make up a dimension or construct provide a reliable and consistent measurement of the construct (Nunnally, J. C. , 1978).
2. Locating items on the scale that might benefit from being modified or eliminated in order to enhance the instrument's internal consistency (Clark, L. A., & Watson, D., 1995).
3. Providing proof for the reliability of the measures employed in the study, that is necessary in order to draw reliable inferences from the outcomes of the research (Nunnally, J. C. , 1978).

With regard to the developed results for my investigation;

- 1- Cronbach's Alpha = **0.73** for the three factors Project manager agility level, Team dynamic and elaboration and Utilizing technology:
- 2- Cronbach's Alpha= **0.789** for the dependent (Team performance)

Using the values that were presented for Cronbach's α the reliability table illustrates that there is a high level of inner consistency for each of the three aspects that are related to Team Success:

1. Agility of the Project Manager, team dynamic and utilizing technology, these factor has an exceptionally high degree of internal consistency. This leads one to believe that the items used to measure the agility of project managers are very dependable and provide a good picture of the construct.
2. Same scenario with team performance, Cronbach's α showed high rate, which support the proposed relation by giving high consistency and trustworthy questions.

To summarize, each of the three facets demonstrates high levels of internal consistency and dependability in connection to the concept of team success. Team success as dependent factor (Cronbach's $\alpha = 0.798$). Due to the high values of Cronbach's Alpha, it seems that the scales that were used to assess each of these dimensions are trustworthy and give legitimate measurements of the constructs that are in concern.

4.2.2 Validity Analysis.

The Kaiser-Meyer-Olkin (KMO) Determine of adequate sampling is a statistical tool that assesses the extent to which fundamental causes may account for the variation in our factors. The aforementioned metric can be located within the KMO Assess of Sampling Adequacy. Typically, when numerical values approach 1.0, it may be advantageous to utilize factor analysis with the available data. If the obtained value is less than 0.50, it is improbable that the results of the factor study would hold any pragmatic significance. (Field A. , 2013).

KMO – Analysis

Table 7 The Kaiser- Meyer Olkin (KMO) Measure for team success dependent variable

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.900
Bartlett's Test of Sphericity	Approx. Chi-Square	393.548
	df	21
	Sig.	<.001

Table 8 KMO and Bartlett's Test - independent variable -

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.913
Bartlett's Test of Sphericity	Approx. Chi-Square	2017.675
	df	210
	Sig.	<.001

In this instance, a KMO measure of 0.864 is fairly high, which suggests that a significant amount of the variation in my variables may be explained by root causes, and that this proportion of variance is likely to be quite considerable. Because of this, factor analysis may be performed on it.

It may be deduced from the fact that the significance level (Sig.) is 0.000 that the correlations between the elements are noticeably distinct from zero. To put it another way, there is a link between the variables that is supported by statistical evidence, which lends credence to the use of component analysis (Field A. , 2013).

Rotated Matrix Analysis

One of the most important products of the factor analysis is called the Rotated Component Matrix. It does so by displaying the loadings of each variable onto each factor. These loadings show the correlation that exists between the variable in question and the factor in question. A variable's loading that has a high absolute value suggests that the variable makes a significant contribution to the factor.

After rotation, the factor loadings may be understood as the correlations that exist between the variable in question and the factor in question. According to (Comrey A L. & Lee H. B., 1992), loadings of 0.6 or greater are regarded to be suggestive of a component having a well-defined structure. This is the case in the social sciences. As a result, the fact that the majority of your results are within the range of 0.6 and 0.9 suggests that the items in question serve as reliable indicators of the relevant components.

The understanding of the factors is made easier by the use of the pattern matrix. The objective of the rotation is to arrive at a basic structure in which all of the variables have low loadings on all of the other factors but have high loadings on the component that they are loading onto. According to (Costello A B. & Osborne J. W., 2005), this indicates that the items that load onto distinct factors are statistically independent from one another.

Table 9 Component Matrix - Dependent variable - team Success

Component Matrix^a	
	Component
	1
Scss1	.747
Scss2	.850
Scss3	.693
Scss4	.743
Scss5	.810
Scss6	.804
Scss7	.779
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Pattern Matrix^a			
	Component		
	1	2	3
Aglty1		.761	
Aglty2		.754	
Aglty3		.780	
Aglty4		.713	
Aglty5		.823	
Aglty6		.821	
Aglty7		.760	

Dyn1			.855
Dyn2			.737
Dyn3			.771
Dyn4			.910
Dyn5			.851
Dyn6			.829
Dyn7			.817
U.tech1	.915		
U.tech2	.904		
U.tech3	.845		
U.tech4	.871		
U.tech5	.899		
U.tech6	.905		
U.tech7	.958		

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 10 Pattern Matrix - measures for the three factors - independent variable

Both the KMO test and the rotated component matrix are used to evaluate the data to determine whether they are suitable for factor analysis. This is the connection between the two. While the rotational component matrix offers information on the correlations between individual variables and factors, the KMO test determines whether or not the sample as a whole is enough for the factor analysis being performed.

The study guarantees that the factor analysis is founded on a strong foundation by performing both the KMO test and the rotational component matrix analysis. This helps to improve the credibility and interpretability of the results, which are both benefits of the research.

4.3 Hypothesis testing

A multiple regression examination has been carried out in order to investigate the possible connection between agility of project manage, team dynamic, using technology which comes under the main

Variable (optimization of team success) and test the relation with level of performance measured for the construction team. Individual agility, dynamic and utilizing technology was considered as factors influencing the main independent variable, while team performance was the dependent. The purpose of this investigation was to investigate whether any of the variability in the performance of construction teams might be attributed to the use of agile principles.

4.3.1 Assumptions.

Collinearity analysis

The statistical phenomenon known as collinearity occurs when two or more of the predictor variables in a multiple regression model are substantially associated with one another. This connection is a concern since in order for the model to perform effectively, the predictor variables should not be dependent upon one another in any way (Menard S. , 1995).

The Variance Inflation Factor (VIF) is a frequently employed metric for detecting multicollinearity. The VIF can be mathematically expressed as the inverse of the tolerance value. A VIF value exceeding 10 is generally regarded as indicative of substantial collinearity, which may pose a potential issue (Cohen J. Cohen P West S. G & Aiken L. S., 2013).

These assessments aid in disentangling the distinct impact of individual variables on the anticipation of the reliant variable. This feature facilitates the comprehension of whether a particular predictor retains its significance even after adjusting for the effects of other predictors.

Table 11: Coefficients table highlighting the Collinearity statistics VIF

Coefficients ^a												
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF

1	(Constant)	1.778	.506		3.516	<.001	.776	2.780					
	Aglyty	.573	.098	.472	5.836	<.001	.378	.767	.462	.480	.471	.997	1.003
	Dyn	-.119	.083	-.146	-	.152	-.283	.044	-.007	-.134	-.117	.637	1.570
					1.443								
	U.tech	.143	.057	.257	2.536	.013	.031	.255	.142	.231	.205	.635	1.574
a. Dependent Variable: Avr Scss													

VIF (Variance Inflation Factor): This indicates the degree of multi-collinearity. Generally, a VIF above 5-10 suggests high multi-collinearity. In the obtained results, all VIF values are well below this threshold, indicating that multi-collinearity is not a concern in my model (Field A., 2013).

Normality and residual Analysis

Residuals are the differences among the observed and foreseen values of the dependent variable. They are a measure of how well the regression line fits your data. The analysis of residuals plays a crucial role in validating the assumptions of the regression model (Pallant J., 2013).

Residual analysis includes several aspects, and one of them is the check for the normality of residuals. The assumption of normality suggests that the residuals should be normally distributed. This assumption is crucial for statistical testing. The residuals are normally distributed; it indicates that the chosen model is appropriate for the data (Pallant J., 2013).

Table 12 Normality and residual analysis table

Residuals Statistics ^a					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.383945703506470	4.579271793365479	4.125396825396827	.288830098688083	90
Residual	-1.712399721145630	1.473197221755981	.000000000000001	.550134671505086	90
Std. Predicted Value	-2.567	1.571	.000	1.000	90
Std. Residual	-3.060	2.632	.000	.983	90

a. Dependent Variable: T.Success

In this case, the mean of the residuals is 0.0000, which is a good sign because, ideally, the average of the residuals should be zero. This is an indication that the model is correctly specified.

The minimum and maximum values of the residuals, along with the typical deviation, give us a sense of the spread of your residuals. Since these values show a large spread, it indicates that this model isn't capturing some of the data's complexities.

The other statistics from the Residuals Statistics table, including the Predicted Value, provide useful information about the predicted team performance. Therefore, the model is reasonably well fitted to my data.

Shapiro – Wilk Test

Table 13 Shapiro - Wilk test

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Scss	.151	118	<.001	.897	118	<.001
a. Lilliefors Significance Correction						

From the above Shapiro test, we can see the P value significantly less than 5% that will allow us to reject the null hypothesis. Here, the null hypothesis is that my data is normally distributed.

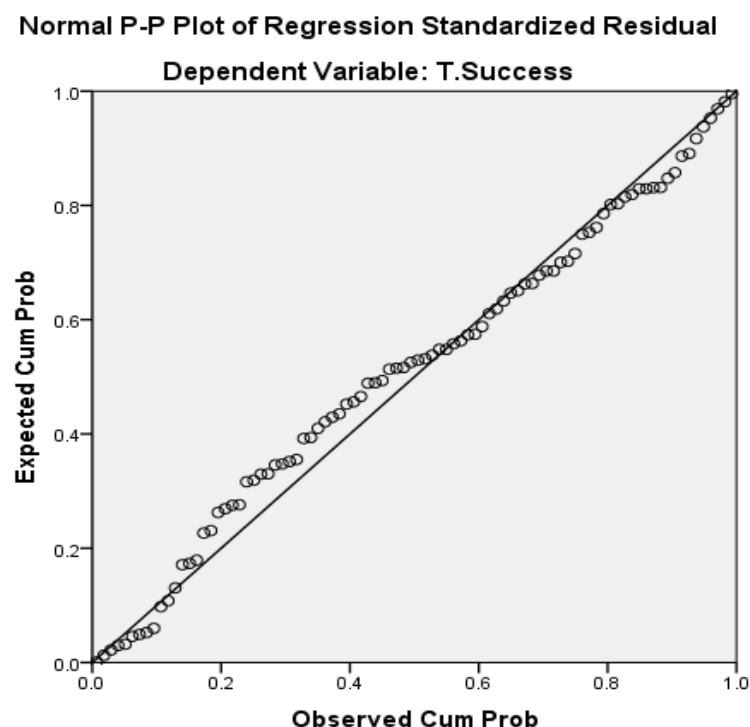


Figure 2 Dependent variable - residual test

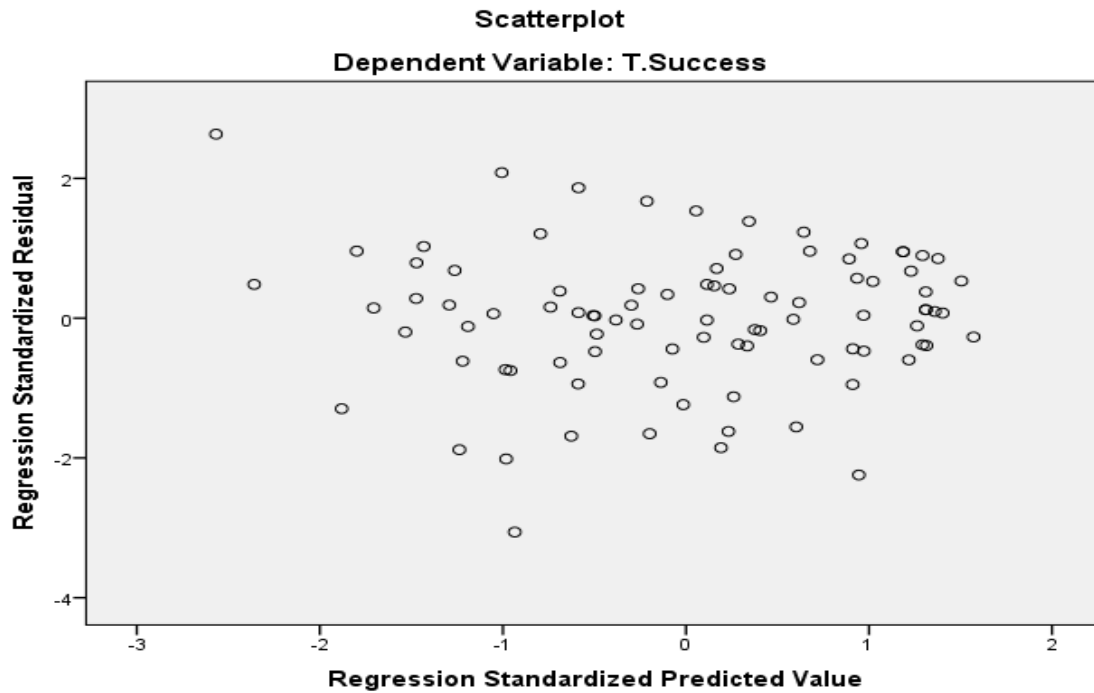


Figure 3: Scatterplot SPSS - Dependent variable

4.3.2 Hypothesis testing.

The Model Summary table presents an overview of the multiple regression model's efficacy in forecasting the dependent variable (i.e., construction team success) through the use of three factors of independent variables (project manager agility, construction team dynamic, and technology utilization) (Field, E. H, 2018).

Table 14 Model Summary Table for Multiple regression analysis

Model Summary^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.506 ^a	.256	.236	.566781204976802	.256	13.071	3	114	<.001
a. Predictors: (Constant), U.tech, Aglty, Dyn									
b. Dependent Variable: T.Scscs									

R square (R^2) = 0.256:

R^2 , at times referred to as the coefficient of determination, is a degree of the amount of variation in the dependent variable (in this case, the level of success achieved by the construction team) that can be attributed to differences in the values of the independent variables in the regression model (Field, E. H, 2018). In this particular instance, a value of 0.256 for R^2 shows that the three independent variables (utilizing technology, construction team dynamic, and agility of the project manager) may explain for about 25.6 % of the variation in the level of team's success.

To summarize, the findings presented in the Model Summary table demonstrate that the multiple regression model is statistically significant in predicting the success of construction teams, utilizing three factors of the independent variable (optimizing the construction team's success). Furthermore, this variable account for approximately 23.6% (adjusted R^2) of the variation in construction team success.

Additionally, the model illustrates that the agility of project managers, the dynamics of the construction team, and the collective utilization of technology have a noteworthy influence on the success of construction teams. The Model Summary table indicates that the trio of independent variables elucidates roughly 25.6% (R^2) of the fluctuation in construction team triumph.

It is imperative to recognize that despite the statistical significance of the model, there remains approximately 74% of the factors in the success of construction teams that is not explicated by the three independent variables included in the present model. This proposition implies that there may be additional variables that contribute to the achievement of construction teams. Subsequent investigations could examine these supplementary variables in order to augment the model's prognostic capability and furnish additional perspectives on the factors that contribute to the triumph of construction teams.

To sum up, the utilization of multiple regression analysis offers significant insights into the interconnections among project manager agility, construction team dynamics, technology utilization, and the success of construction teams in mega projects. The aforementioned discoveries may serve as a valuable resource for project managers, construction experts, and interested parties seeking to make well-informed choices and execute tactics that will improve team efficacy and yield favorable results in their respective projects.

Table 15 Analysis Of Variance Table ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.597	3	4.199	13.071	<.001 ^b
	Residual	36.621	114	.321		
	Total	49.218	117			
a. Dependent Variable: Avr Scss						
b. Predictors: (Constant), Avr U.tech, Avr Aglty, Avr Dyn						

The ANOVA table is a statistical tool utilized to evaluate the global significance of the multiple regression model, as stated by (Field, E. H, 2018). The provided information pertains to the explanatory power of the model with respect to the dependent variable, as determined by the inclusion of independent variables. The aforementioned tabular representation exhibits the subsequent numerical data:

The regression's Sum of Squares = 12.597.

According to (Field, E. H, 2018), the Sum of Squares for Regression denotes the extent to which the tested dimension (namely, project manager agility, construction team dynamic, and utilization of technology) account for the variation in the dependent variable (i.e., construction team success). The Sum of Squares for Regression in this instance is 12.597.

Mean Square (Regression) = 4.199.

According to (Field, E. H, 2018), The Mean Square for Regression can be computed by dividing the Sum of Squares for Regression by the amount of degrees of freedom. This statement indicates the degree of variation in the dependent variable that is likely to be explained by the dimensions tested in the model. The analysis conducted demonstrates that the Mean Square for Regression is derived through the division of the Sum of Squares, which has 12.597, by the degrees of freedom, which has a value of 3. This calculation yields a Mean Square for Regression of 4.199.

The F-statistic = 13.071.

According to (Pallant J., 2013), the F-statistic serves as an indicator of the overall significance of the regression model. According to (Field, E. H, 2018), the process of calculation involves

the division of the Mean Square for Regression by the Mean Square for Error. A higher value of the F-statistic denotes a greater level of statistical significance in the association between the independent and dependent variables. The F-statistic in this instance is 13.071.

Table 16 Coefficients table highlighting Beta Values for the three variables.

Coefficients ^a													
Model		Unstandardized		Standardized	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		Coefficients		Coefficients			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
		B	Std. Error	Beta									
1	(Constant)	1.778	.506		3.516	<.001	.776	2.780					
	Aglty	.573	.098	.472	5.836	<.001	.378	.767	.462	.480	.471	.997	1.003
	Dyn	-.119	.083	-.146	-1.443	.152	-.283	.044	-.007	-.134	-.117	.637	1.570
	U.tech	.143	.057	.257	2.536	.013	.031	.255	.142	.231	.205	.635	1.574
a. Dependent Variable: Avr Scss													

a. Dependent Variable: Avr Scss

Significance level, Sig. (Significance) = 0.000.

Indicates the likelihood of obtaining an F-statistic that is as extreme as, or more extreme than, the one derived from the analysis, under the assumption that the null hypothesis holds true. The null hypothesis posits that there is no association between the independent and dependent variables (Field, 2018). According to (Pallant J., 2013), a Sig. value that is lower, approaching 0, signifies a statistically significant relationship between the variables. Conversely, a value that is closer to 1 indicates a lack of statistical significance in the relationship. The statistical significance of the regression model in predicting construction team success based on the three independent variables is indicated by the Sig. value of 0.000, assuming a significance threshold of 0.05 or 5% (Field, 2018).

Beta (β) value and P-Value (Sig. <5%)

As per (Field, E. H, 2018), the Coefficients table of a multiple regression analysis displays the Beta values, also known as standardized coefficients, which indicate the magnitude and direction of the association between the dependent variable and each independent variable,

while accounting for the influence of other independent variables. The Beta values for the three independent variables in the research analysis are presented below.

If there is no real connection among the independent variable and the dependent variable, then the Sig. values, which are also known as p-values, in the Coefficients table reflect the likelihood of getting the observed Beta coefficients for each independent variable by chance. This is done on the assumption that there is no real connection between the two variables. A p-value of less than 0.05 is often regarded to be statistically significant, which indicates that there is a likelihood of less than 5% that the observed association happened because of random chance. (Field, E. H, 2018).

H.1 Project manager's agility increase team performance.

In this case $\beta = 0.472$ this mean that all other factors being equal, an increase in the project manager's agility increase the team success, especially when P-Value $0.001 < 0.05$ which support the string relationship by saying that there is a significant effect on the team's performance from the level of project manager's agility

H.2: Team's Dynamic and collaboration increase team performance and success.

To test this hypothesis, we turn to the coefficients obtained from our regression analysis. The beta coefficient ($\beta = -0.146$) represents the predicted change in the dependent variable (team performance) for a one unit change in the independent variable (team dynamics and cooperation), assuming that all other variables in the model are maintained constant. In this instance, the beta value is negative, which indicates that contrary to the hypothesis, there is a tendency for there to be a decrease in team performance whenever there is an increase in the amount of team dynamics and collaboration (Field A. , 2013).

However, the significance of a beta coefficient is not exclusively determined by its value; rather, it also takes into account the statistical significance of the coefficient. The p-value for the beta coefficient is used to test the null hypothesis that the coefficient is equal to zero, which would imply that there is no effect. If the p-value is lower than the chosen alpha level, which is typically set at 0.05, then the null hypothesis is rejected and the coefficient is regarded as having statistical significance. In this situation, the p-value is 0.152, which is bigger than 0.05, suggesting that the beta coefficient is not statistically significant at the customary 5% threshold (Pallant J., 2013).

Based on this dataset, we are unable to conclude that there is adequate evidence to refute the null hypothesis and concluded that there is not sufficient evidence to support the claim that team dynamics and collaboration significantly increase team performance. Consequently, we are unable to reject the null hypothesis.

H.3 utilizing available technology increase the team performance.

The obtained results indicate a beta coefficient of 0.257 and a statistically significant p-value of 0.013. The findings indicate that a rise of one unit in technology utilization is associated with an average increase of 0.257 units in team performance, holding all other variables constant. According to (Pallant J. , 2010) findings, the statistical significance of the effect of technology utilization on team performance is established at the 5% level, as evidenced by a p-value of less than 0.05. The null hypothesis is rejected based on the findings, indicating that team performance is positively and significantly influenced by the utilization of technology.

The examination of the three hypotheses and the evidence that supports or contradicts each one led to the formation of this test's conclusion. The results have provided support for the first hypothesis, which claimed that an increase in the adaptability of the project manager would result in an increase in the performance of the team. The statistical analysis shows that there is a significant positive relationship between the adaptability of the project manager and the performance of the construction team. The Beta coefficient for this relationship is 0.472, and the p value for this relationship is <0.001. This conclusion corresponds with the research that highlights the crucial role of agile leadership in creating team success (Conforto, E. C., Salum, F., Amaral, D. C., da Silv, 2014).

On the other hand, other idea did not received the same level of support. According to the second hypothesis, a rise in team performance may be attributed to improved team relationships and collaborative efforts. Yet, the study generated a negative $\beta = (-0.146)$ and a p-value of 0.152, which is more than the typical alpha limit of 0.05. This suggests that the association is not statistically significant, and moreover, this hypothesis is not supported by sufficient evidence from the data. It's essential to highlight that although cooperation and favorable team dynamics are generally acknowledged as critical for successful project results (West M. A. ,

2012), this study's unique setting or the metrics utilized could not have captured these benefits effectively.

The statistical evidence likewise of hypothesis supported one, the third hypothesis, which said that the use of technology would boost the performance of the team. The beta coefficient is determined to be 0.257 and the corresponding p-value is 0.013. The findings of this study indicate a strong indication of an interesting favorable influence of technology adoption on the performance of teams. The observation made by (Succar B., 2009) is highlighted by the emergence of digital technologies and the utilization of data-driven decision making within the construction sector. Research has indicated that the implementation of digital collaboration tools, and advanced materials and techniques can improve the efficacy, synchronization, and general proficiency of construction teams ((Azhar S., 2011); (Liu, H GolparvarFard M & Stump G., 2017)). The aforementioned discovery furnishes proof to refute the null hypothesis and corroborates the current body of literature and patterns concerning the noteworthy function of technology in contemporary construction undertakings.

In conclusion, these findings shed light on the complex nature of the factors that influence the performance of teams in the construction industry. The findings emphasize the importance of project manager agility and technology use, while emphasizing that additional study is required to better understand the roles of team dynamics in this context.

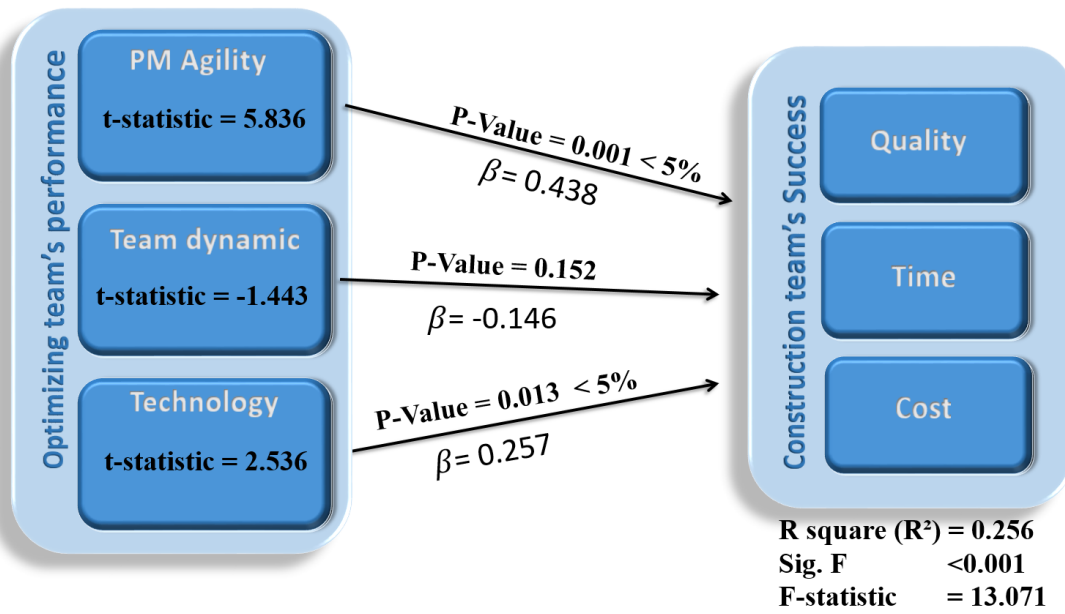


Figure 4: Graph for the three variable relation with the independent after the multiple regression analysis

CHAPTER 5: DISCUSSION

5.1 Critical discussion with empirical evidences:

The study's findings optimizing team's performance's factors on the success of their construction teams give useful insights into the advantages, possible bad consequences, unpredicted outcomes, and conflicts with earlier research into agile project management. The findings of this research provide credence to the idea that agile project managers have a useful impact on the success of the construction teams that they oversee (Mishra, D., Mittal, M. L., 2011), and they bring to light the significance of productive cooperation amongst team members (Eskerod, P& Jepsen, A. L., 2013).

However, the initial emphasis was placed on leadership, and subsequent data analysis validated a significant and favorable correlation between leadership and team performance ($\beta=0.472$, $p=0.001$). The aforementioned statement aligns with the findings of (Müller, R., & Turner, R., 2010) research, which stressed the significance of the skill sets possessed by proficient project managers and their influence on the results of projects. (Dainty, 2005) Emphasize the significance of proficient leadership in facilitating team cooperation, handling disputes, and advancing the overall success of a project. The findings of our study emphasize the importance of developing proficient leadership skills within the construction industry to enhance team productivity and ensure successful project outcomes.

Regarding the influence of team dynamics and collaboration, the examination produced a statistically insignificant outcome ($\beta=-0.146$, $p=0.152$). The presence of a negative coefficient implies a potential adverse impact, however, the lack of statistical significance raises concerns regarding the reliability and stability of this association. The present discovery is noteworthy in light of previous research such as (Hoegl M. & Gemuenden H. G. , 2001) investigation, which demonstrated a significant impact of team collaboration on team performance in innovation endeavors. (Baiden B K & Price A. D. , 2011) Discovered that team performance was significantly enhanced through collaborative efforts within construction projects. The potential variability in outcomes can be attributed to the complex and multifaceted aspects of team dynamics and collaborative efforts. (Salas E Cooke N J & Rosen M. A., 2008) suggest that collaboration's impact on team performance can be moderated by various factors, including the nature of tasks, the level of interdependence, and the cultural context. Henceforth, it is

recommended that forthcoming investigations delve into these intricacies in order to obtain a more all-encompassing comprehension of the ways and circumstances in which team collaboration influences the performance of construction teams.

The study findings indicate that the use of technology has a noteworthy and favorable influence on team performance, as evidenced by a statistically significant Beta coefficient of 0.257 and a p-value of 0.013. The present study corroborates the conclusions drawn by (Azhar S., 2011) and (Liu, J., & Love, P. E., 2019) regarding the advantages of Building Information Modeling (BIM) and mobile technologies, respectively, in enhancing project coordination and efficiency. This trend reflects the larger digital transformation sweeping across industries, with technological integration being identified as a key enabler of team performance (Manyika J Ramaswamy S Khanna D Sarrazin , 2016). It is imperative to take into account various factors such as technological preparedness, training, and change management methodologies while introducing novel technologies, as suggested by (Hosseini M R Martek I Zavadskas E K Aib, 2018).

The presence of contradictions with the empirical outcomes of research investigations pertaining to the factors that influence team performance within the construction sector has been a topic of discussion for a considerable period of time. The impact of team dynamics and collaboration, along with the integration of technology on project outcomes, is a salient observation.

With respect to team dynamics and collaboration, the outcomes of our investigation yielded results that were not statistically significant. At first glance, these findings may appear to contradict prior research. The significance of team collaboration as a driver of team performance in project-oriented work has been reported in a series of studies conducted by (Hoegl, M., & Gemuenden, H. G., 2001) and (Baiden B K & Price A. D. , 2011). (Salas E Cooke N J & Rosen M. A., 2008) Highlighted the significance of teamwork and collaboration in attaining exceptional project results.

Notwithstanding the above-mentioned discoveries, several other investigations have demonstrated inconclusive or non-significant outcomes comparable to our own, suggesting that the impact of team collaboration on team performance is a multifaceted matter. (Mathieu J Maynard M T Rapp T & Gilson L, 2008) Conducted a meta-analysis and discovered that the

impact of team process interventions, such as collaborative tools, exhibited significant variability across diverse teams, tasks, and contexts. According to (Pinto M B & Pinto J K., 1990) findings, team integration may not necessarily lead to enhanced project performance, especially in scenarios where task independence is significant or where the expenses associated with coordination surpass the advantages of collaboration.

As mentioned in the beginning, regarding the influence of technology employment on team productivity, our research results are consistent with the conclusions drawn by (Azhar S., 2011) and (Liu, H GolparvarFard M & Stump G., 2017), who emphasized the advantages of utilizing technologies. However, there exists a body of literature that expresses concern about the swift adoption of technology. According to (Harty C. , 2005) and (Söderlund J., , 2004), the implementation of novel technology has the potential to impede current work procedures and curtail team efficacy, particularly in the immediate aftermath. (Love P E D Simpson I Hill A and Standing, 2011) have advised that the implementation of technological advancements such as BIM necessitates a significant investment in training and support, which may not be immediately feasible for all organizations.

To summarize, the outcomes of this study make a significant addition to the current body of knowledge regarding team productivity within the construction sector. The established notion is that leadership and technology adoption play a significant role in enhancing performance. The intricate nature of team dynamics and collaboration warrants further investigation, thereby presenting opportunities for future research. In order to achieve success in construction project management, it is imperative to take into account a well-balanced consideration of these factors.

5.2 The Role of Project manager Agility:

According to the findings of this study, a substantial positive link ($\beta = 0.472$, $p < 0.001$) has been established between the agility of a project manager and the success of construction teams. This finding demonstrates that the agility of a project manager is a crucial factor in affecting the performance of construction teams. Agile project managers, who are distinguished by their adaptability, responsiveness, and flexibility, are better suited to negotiate the complex and dynamic terrain of the construction industry (Conforto E. C.. & Amaral D. C., 2016). Agile project managers are characterized by their capacity to adapt to new situations, respond to new

situations, and remain flexible. They have an increased ability to respond to unforeseen developments, which helps to establish a resilient atmosphere that is favorable to high performance and success. This is consistent with findings from prior study (Horney N Pasmore B & O'Shea T, 2010) that underline the crucial role that leadership agility plays in determining the performance of a team. This research presents persuasive data that emphasizes the significance of project manager agility in driving the success of construction team success, despite the fact that other studies have reached different conclusions (for example, (Müller, 2010).

5.3 The Role of team dynamic:

In contrast, the concept of team dynamics portrays a more intricate depiction. The statistical analysis conducted in this research indicates that the relationship between team dynamics and team success does not achieve statistical significance, as evidenced by a Beta value of -0.146 and a p-value of 0.152. The statement suggests that although team dynamics may have a certain degree of impact on the success of a team, their effect is comparatively less significant than that of the agility of the project manager. The present study's results differ from prior research that asserts the significance of robust team dynamics in achieving successful project outcomes (Hoegl, M., & Gemuenden, H. G., 2001). This indicates that certain factors, such as the unique attributes of the construction sector and specific project features, may influence this association. It is evident that the construction industry may pose distinctive obstacles where the mere presence of a functional team dynamic may not be adequate for attaining team triumph.

5.4 The Role of utilizing technology:

The present study highlights the significant impact of technology utilization and innovation introduction on the success of construction teams. The findings indicate a statistically significant association ($\beta = 0.257$, $p = 0.013$) between the implementation of innovative technology in construction projects and a favorable effect on team performance. The aforementioned results highlight the significant capacity of digital technologies and inventive

methodologies to modernize conventional procedures and reconfigure the terrain of the construction sector.

The utilization of technological solutions, such as Building Information Modelling (BIM), artificial intelligence (AI), and automation, can prove advantageous for construction projects due to their intricate processes and extensive information exchanges ((Azhar S., 2011); (Eastman C Teicholz P Sacks R & Liston K., 2011)). According to (Sacks R Koskela L Dave B. A & Owen R, 2010), the implementation of these technologies has the potential to optimize workflows, enhance the precision of information, promote effective communication, and facilitate informed decision-making, ultimately contributing to the success of teams.

In contrast, (Papadakis, S.,, 2020) posited a more tempered impact of technology on team achievement, acknowledging possible obstacles in technology implementation, such as reluctance to modify established practices and a deficiency in necessary competencies. However, our study provides support to research such as Moon et al. (2017) which highlights the substantial influence of technology adoption and innovation implementation within the construction sector.

The statement prompts a thorough examination of the effective integration of digital technologies and novel approaches in construction operations to enhance team productivity. The aforementioned has noteworthy ramifications for both industry professionals and scholars, as it underscores the urgent necessity for digital conversion in the construction sector and stimulates additional investigations into the mechanisms of effective technology assimilation.

5.5 Research's insight

During this investigation, I executed a comprehensive statistical regression analysis to scrutinize and elucidate the postulated associations among the extent of adaptability exhibited by project managers, the magnitude of collaboration within teams, the accessibility of technological resources, and the achievement of performance in construction teams. This inquiry augments the comprehension of the determinants that influence the efficacy of construction teams and proffers valuable insights for both practitioners and institutions aiming to enhance their construction project management methodologies.

The present study is situated in the domain of enhancing the efficacy of construction teams, with a specific focus on the impact of project manager agility on team performance. Therefore, this investigation offers innovative perspectives to the existing body of knowledge on team performance within the construction sector. The research thoroughly examined the distinct effects of diverse variables on the efficacy of construction teams, with a primary emphasis on the adaptability of project managers and their adeptness in employing technology.

It established the existence of an interesting and affirmative correlation between the agility of project managers and the success of construction teams. This finding is consistent with the observations made in earlier research conducted by (Jugdev K and Müller R, 2005) and (Buvik M P & Rolfsen M. ., 2015). This analysis revealed a significant finding that highlights the positive impact of project manager's agility on the performance of construction teams. Specifically, the ability of project managers to adapt, respond quickly, and make decisive decisions was found to be a key factor in enhancing team performance. The aforementioned evidence provides significant empirical support for the assertion that project managers who possess a considerable degree of agility have the ability to initiate a team environment that is more efficient, productive, and successful.

Furthermore, this study has validated a significant beneficial effect of technology adoption on the productivity of construction teams. The results are consistent with prior research conducted by the previous mentioned studies, which emphasized the significance of technology in enhancing team productivity, specifically the utilization of Building Information Modelling (BIM) and mobile technologies. The implementation of these technologies creates a favorable atmosphere for enhanced communication, coordination, and information retrieval, resulting in heightened efficiency, precision, and overall triumph of the project.

The distinctive contribution of our research resides in the comparison of two crucial factors that impact team performance: the adaptability of project managers and the employment of technology. The agile project manager's function emphasizes the human factor in team achievement, while technology employment highlights the significance of tools and systems. The results of the study provide a more intricate comprehension of the interplay between human abilities and technological resources in enhancing team performance in construction endeavors.

The findings derived from my study act as a bridge linking theoretical concepts and real-world applications. They offer an enhanced comprehension of the intricacies involved in achieving success within construction teams, and furnish pragmatic suggestions for project managers and professionals operating within the construction sector.

It is very important to highlight here that, the empirical assessment of the intricate interaction between agility of project manager, team cooperation, the adoption of technology, and team performance is a unique component of this research that contributes to the study's overall significance. The result show the relevance of fostering agile methods within construction teams by emphasizing the favorable influence that manager's agility has on the collaborative efforts of teams and their performance as a whole. However, we are also aware that the potential advantages of technology proofed as severely constrained in establishments that have established hierarchies that are difficult to alter.

If this is the case, then having agile project managers on hand may not be enough to get over the roadblocks that are presented by inflexible company cultures. A lack of adaptability at the level of the organization may be a barrier to the efficient use of technology, which in turn can reduce the positive influence that technology has on the performance of teams. This indirect impact highlights how important it is, when evaluating the elements that affect team performance, to take into consideration not just the individual agility but also the larger organizational environment.

My research contributes to a better understanding manager's agility might affect the performance of teams working in the construction sector by illuminating the complex interactions that exist between these factors. The results highlight how important it is to cultivate a culture that is agile and collaborative at the organizational level as well as the level at which projects are managed. They also emphasize the need for construction companies to carefully assess the possible ramifications of adopting new technology, particularly in the context of the organizational structures and procedures that are already in place.

In conclusion, the findings of this study provide practitioners and organizations who are looking to improve their manager knowledge's and agility level with significant insights by highlighting the need of agility procedure and technique, collaboration. In an industry that is becoming more complicated and dynamic, the results presented here might serve as a useful

guide for the creation of methods that are more successful at improving the efficiency of construction teams.

CHAPTER 6: CONCLUSION

To conclude, this study sheds light on the complex relationships between project manager's agility, technology adoption, and their combined impact on the performance of construction teams. This study employs rigorous quantitative analytical techniques to reveal noteworthy findings that have significant implications for the field of construction management and forthcoming research endeavors.

The results of the study offer compelling support for the first hypothesis. The Beta value of 0.472 highlights the significant correlation between project manager agility and team success, emphasizing the crucial role that agile leadership plays in guiding team performance. The low p-value (0.001) confirms the statistical significance of the association, highlighting the significant relevance of agile leadership in the context of successful construction team outcomes.

The research outcomes provide significant validation for Hypothesis 3. The Beta value of 0.257 indicates a significant correlation between the use of technology, particularly collaborative and enabling tools, and mobile technology, and the success of construction teams. This finding highlights the substantial impact of technology on the performance of construction teams. The statistical significance of the relationship between technology utilization and team success within the construction sector is highlighted by the lower p-value (0.013), indicating that technology utilization is a significant determinant of team success.

The aforementioned results indicate that project manager agility and technology utilization are significant factors that impact the success of construction teams. This study enhances the current knowledge in the field of construction management by conducting a thorough numerical and scientific analysis of the relationships between the variables. As a result, it establishes a solid basis for future investigations into these crucial factors.

However, Hypothesis 2 posits that the correlation between team dynamics and team success is characterized by a multidimensional interpretation. The observed correlation, represented by a Beta coefficient of -0.146, is discernible. However, the associated p-value (0.152) does not offer adequate statistical support to establish its significance. The aforementioned discovery implies that the correlation between the incorporation of Building Information Modeling (BIM)

systems and its effect on team triumph may exist, albeit less potent than the influence of project manager adaptability.

There could be various explanations that could justify this outcome. An inherent challenge in the integration of Building Information Modeling (BIM) systems and other technology into team dynamics is the complexity involved. The adoption of new technologies can pose a steep learning curve and initial resistance from team members, as noted by (Succar B., 2009). Moreover, technology and system are instruments that necessitate adept manipulation to attain maximum advantage, and the degree of expertise in operating these instruments can differ significantly among construction groups (Eastman C Teicholz P Sacks R & Liston K., 2011).

It is plausible that unquantified factors could be contributing to the efficacy of a team. Although technology and innovations have the potential to enhance project management and coordination, the success of a team is influenced by various factors such as leadership style, communication quality, team morale, and the existence of well-defined roles and responsibilities (Clarke, N. , 2010).

In summary, it can be inferred that although the incorporation of technology such Building Information Modeling (BIM) systems and other processes may have a certain degree of influence on team achievement, its impact is comparatively less significant when contrasted with the adaptability of project managers. Further investigation is required to gain a deeper comprehension of this correlation and to recognize additional potential factors that could be impacting team achievement within the construction sector.

6.1 Theoretical and practical implication.

Since its inception, the construction sector has kept a reputation for demanding projects, stringent timetables, and substantial dangers (Azhar S., 2011). In recent years, the issue of agile project managers has developed as a growingly popular strategy that has gained popularity as a means to handle these difficulties and enhance the performance of teams (Koskela, 2002). In the construction business, unique insights into the interaction between agility, collaboration, adoption of technology, and team performance have been contributed by the present research, which depends on a quantitative analysis using survey data from professional project managers

and directors. Here am exploring the ramifications of the study's results, both theoretical and practical, and provides advice for those working in academics as well as in business.

Basically, results of the first hypothesis are consistent with existing literature that highlights the impact of project manager agility on team success ((Conforto, E. C., Salum, F., Amaral, D. C., da Silv, 2014); (Doz Y L & Kosonen M , 2010)), thereby carrying significant theoretical implications. The authors of the study have contributed to the advancement of knowledge by providing a quantitative assessment of the impact of agile leadership in the construction industry. This evidence-based approach offers a strong foundation for further investigation into the mechanisms through which agile leadership operates in this context. Conversely, the third hypothesis presents a prospectively contentious discovery. Although there are varying perspectives on the impact of technology on team success, as demonstrated by (Papadakis, S.,, 2020), my research confirms the importance of technology in improving team performance.

This study offers practical implications that can enhance the efficacy of construction teams. The statement highlights the essential significance of project managers in propelling team achievement via agile methodologies. Therefore, it is recommended that organizations consider investing in training and development programs to foster agility among their project managers. The study confirms the efficacy of employing and utilizing cutting-edge technologies in construction sites. Notwithstanding the obstacles posed by resistance and the necessity for appropriate training ((Azhar S., 2011); (Taylor J, 2014)), the findings indicate that entities that utilize technology proficiently may attain a competitive edge by enhancing team efficacy and achieving project triumph.

Notwithstanding divergent theoretical perspectives, this study emphasizes the significance of comprehending the particular industry milieu within which these tools and practices are being operationalized. The study offers a more intricate comprehension of the variables that impact the triumph of teams in the construction sector. It brings to light that the individual traits of the project manager and the tactical implementation of technology may hold greater significance than what has been recognized in certain research works (Papadakis, S.,, 2020).

To summarize, the results of this study validate certain prior investigations while also presenting novel insights that question and broaden existing knowledge. This provides a more comprehensive and intricate comprehension of the factors that contribute to the triumph of

teams in the construction sector. Consequently, this research offers a significant foundation for forthcoming investigations to delve deeper into these dynamics.

Having further elaboration on the expected benefit from my reach and conclusion are explained in the below points;

1. The study's results suggest that incorporating agile project management techniques can significantly improve the success rate of construction teams. This highlights the importance of utilizing enhanced methods of project management. The aforementioned insights could prove beneficial to construction enterprises, as well as project managers and executives, in the event that they adopt agile principles and methodologies. The outcome of this approach would be the provision of projects that exhibit enhanced efficiency and efficacy.
2. The adoption of technology is a phenomenon that refers to the process of integrating new technological innovations into society. The study findings provide valuable insights into the correlation between technology utilization and team performance in the context of agile project management. The aforementioned may enable construction firms to make well-informed decisions with regards to the implementation of novel tools and techniques, guaranteeing their constructive impact on team success while avoiding any hindrance to project advancement caused by bureaucratic procedures or resistance to change. Stated differently, this can provide direction to construction firms in formulating judgments that have a favorable impact on the team's achievements.
3. The topic of discussion pertains to the development and training of talent. The findings of the study could potentially aid construction enterprises in designing customized training schemes and career advancement prospects for their project managers. It is imperative that emphasis be placed on the importance of adaptability, teamwork, and utilization of technology. The outcome of this phenomenon could potentially yield a workforce that possesses enhanced levels of competence and adaptability, rendering it more adept at addressing the dynamic challenges that are inherent to construction projects.
4. The study's findings on Organizational Agility and Culture have the potential to inspire construction companies to reevaluate their management practices and organizational culture, based on the innovative insights obtained from the research survey and multiple regression analysis. Organizations could potentially enhance their ability to respond to

evolving project requirements and external factors by adopting an agile approach and cultivating a collaborative environment. The eventual outcome of this would be an improvement in the competitive advantage of companies operating within the construction industry.

Broadly speaking, the pragmatic benefits that can be gleaned from this investigation are transferable to numerous aspects of the construction industry, encompassing techniques for managing projects, fostering collaborative teamwork, integrating technological innovations, and cultivating organizational norms. By leveraging the insights presented here, construction firms can enhance the efficacy of their projects, bolster their competitive advantage, and foster the overall growth and advancement of the construction sector.

6.2 Address the research objective

This study was successfully addressing the research objectives because it investigated the impact of three critical elements on construction team performance in the setting of mega projects: project manager agility, team dynamics, and technology use. The objectives of the research were successfully attained by leading a detailed review of the existing literature, emerging hypotheses, putting into practice a rigorous quantitative research methodology, and conducting a detailed examination of the results. This contributed to both the theoretical and practical understanding of the subject matter.

The primary determination of this study was to determine the characteristics that are responsible for the high performance and success of construction teams. The extensive literature review that was carried out at the beginning of the study (e.g., (Doloi H. Sawhney A. Iyer K. C. & Rentala S., 2012); (Todorova G Sauer C. & Bruins A., 2014); (Pinto J. K. & Rouhiainen P. , 2001)) provided a comprehensive understanding of the various factors influencing team success. This understanding allowed the study to focus on three primary independent variables: project manager agility, team dynamics, and technology utilization.

The next succeeding objective of this research was to investigate the links that existed between the parameters that were found and the level of success achieved by teams. The research led to the establishment of three hypotheses, which the study used to suggest the following relationships: (1) the agility of the project manager has a positive impact on the performance

and success of the team, (2) the dynamics of the team increase to the success of the team, and (3) the use of technology positively impact to the success of the team.

In order to achieve this goal of the study, a quantitative research strategy was used. This strategy included the application of a well-structured, online Likert-scale questionnaire that was modeled after standardized instruments used in earlier research (for example, (Cyfert, S. Szumowski, W, Dyduch W, Zastempowski, M, 2022); (Ling F. Y., Y Luo, X W. & Cai H. W, 2014); (Rogers, E. M., 2003); (Jones M C Todorova G. & Thomas G., 1996)) in order to collect data. Following the collection of data, it was examined using the statistical program SPSS by applying numerous regression analysis to investigate the suggested connections among the variables.

The findings of the study were able to effectively satisfy the fourth research aim, which was to provide helpful insights into the correlations between the variable and the level of success achieved by teams. According to the findings, the agility level of the project managers has significant positive impact on the success of the team as well as utilizing technology has less positive impact on construction team success.

By achieving these objectives, the research contributes to the theoretical knowledge of the elements driving construction team performance in mega projects. More specifically, it sheds light on the significance of leader's agility, the part of team dynamics, and the need for successful technology adoption. In addition, the results have practical significance for construction companies that are looking to enhance the outcomes of projects, especially in the context of projects that are complicated and big in size.

6.3 Acknowledge of the research limitation

Because there were only 118 people involved in the study, the sample size was limited and could be considered to be on the smaller side. This restriction may prevent the results from being generalized to a wider population. To better reflect the community of project managers working in the construction sector, any future study might stand to gain from using a sample that is both bigger and more varied.

Cross-sectional Design: The study used a cross-sectional approach, which may make it more difficult to determine whether there is a causal link between the variables being studied. More solid insights into the causal connections between levels of agility, team collaboration,

utilization of technology, and team performance could be obtained with a longitudinal research design that monitors project managers along with their construction teams across the course of time.

Data Reported by Participants: The research depended on the data participants reported about themselves, which might have introduced biases like social attractiveness or memory bias. In further investigations, it could be helpful to acquire more precise data on the degrees of adaptability possessed by project managers and the success of their teams by employing objective measurements or third-party reviews.

Limited The aim of the study was to examine the correlation between the level of adaptability exhibited by project managers and the degree of success achieved by their construction teams. Nonetheless, the efficacy of construction project teams can be impacted by diverse factors, including but not limited to the organizational culture, external milieu, and unique attributes of the construction projects. The examination of these supplementary criteria could potentially serve as a topic of investigation in the future, with the aim of cultivating a more comprehensive understanding of the determinants that impact the degree of achievement in construction endeavors.

The research was conducted within the construction sector, thereby potentially limiting the generalizability of the findings to other industries, given that the study's main emphasis was on a singular industry. Prospective investigations may examine the influence of agile project managers on the degree of accomplishment attained by their managed teams across diverse industries, with the aim of ascertaining the generalizability of the outcomes. So, the reader will have deeper understanding of the research's context and the result's limits if they are aware of these boundaries and acknowledge them. This information may also help lead future study to solve these constraints and further improve our knowledge of the effect that agile leaders have on their team's achievements.

6.4 Recommendation

Based on the findings obtained from the multiple regression analysis and the noteworthy correlations identified between the independent variables, namely project manager agility, team dynamics, and technology utilization, and the dependent variable, which is construction

team success, the subsequent suggestions are posited for leaders and decision-makers operating within the construction industry.

1. It is recommended to prioritize the improvement of one's agile project management competencies. The study revealed a noteworthy correlation ($\beta = 0.472$, $p < 0.001$) between the agility of project managers and the success of their teams. Therefore, it is recommended that construction companies prioritize the development of agile leadership competencies in their project managers. The development of agility and adaptive capacity in leaders through training and development initiatives is crucial in enabling them to effectively respond to shifts in the construction landscape and navigate challenges with greater proficiency. This has been highlighted by (Cyfert, S. Szumowski, W, Dyduch W, Zastempowski, M, 2022) and (Gill R, 2012).
2. The present study highlights the significant impact of technology on team success ($\beta = 0.257$, $p = 0.013$), despite the conflicting results in existing literature. It is recommended to prioritize the integration of innovative technologies. Therefore, it is imperative for construction companies to stay updated with technological advancements and incorporate innovative solutions that can enhance process efficiency and overall project performance, as stated by (Rogers, E. M., 2003).
3. In order to enhance the success of teams involved in construction projects, it is essential for organizations to establish effective performance evaluation mechanisms to regularly assess and analyze team performance. The implementation of such systems should take into account the critical success factors that were identified in the study conducted by (Jones M C Todorova, G & Thomas G. , 1996). These factors include the attainment of goals, the quality of work, compliance with schedules, operational efficiency, and adherence to budget. Regular monitoring and evaluation of team performance facilitates the identification of areas that require enhancement and enables prompt implementation of corrective measures by decision-makers.
4. It is recommended that further research and practical application be encouraged in the construction sector to investigate the influence of various factors on team success, as well as the interactions among these factors. The aforementioned research has the potential to augment the comprehension of the fundamental factors that propel team performance, and consequently, ameliorate the caliber of results in construction endeavors..

In addition, a thorough list of practical advice based on the positive connection that was identified between the amount of flexibility possessed by project managers and the efficacy in their construction teams:

5. Foster an agile mentality and culture in the business Businesses have to focus their efforts on fostering an agile mindset along with culture inside the organization. In order to do this, it is necessary to encourage adaptation, flexibility, and responsiveness to modifications. Encourage members of your team to accept responsibility for their work, reflect on what they have done in the past, and look for ways to continually improve. Establish a setting in which it is risk-free to experiment, explore new ideas, and gain insight from previous mistakes.
6. Make use of agile frameworks Businesses should think about incorporating agile frameworks like Scrum, Kanban, etc Lean into their procedures for managing projects. These frameworks have the potential to assist simplify procedures, improve team cooperation, and provide teams the ability to more easily adjust to changing project needs and priorities.
7. Development of agile leadership: Invest in leadership development programs to nurture agile leaders who are able to successfully guide and assist their teams through the completion of complex and dynamic projects. Agile leaders need to be able to make decisions, solve problems, communicate effectively, and negotiate, in addition to being able to cultivate a culture that values cooperation and is committed to continuous development.
8. Establish cross-functional teams: To ensure that all components of the project are covered, it is important to establish cross-functional teams that are made up of individuals who have a variety of talents and areas of experience. This helps break down silos and stimulates teamwork, which ultimately results in the implementation of projects that are more efficient and productive.
9. Short iteration cycles: When it comes to project management, you should encourage the usage of shorter iterative cycles since this will allow for quicker feedback, adaptation, as well as course correction. Because of this strategy, teams are able to effectively adapt to changing project needs and offer value to stakeholders in a more timely manner.

10. Regular reviews and retrospectives: It is important to conduct regular reviews and retrospectives of the project in order to evaluate its progress, identify areas in which it may be improved, and establish action items for the purpose of achieving continuous improvement. This method makes it easier for the team to learn new things and develop as a unit, in addition to ensuring that the project goals are kept in focus.
11. Make it easier to communicate effectively by putting in place communication tools and processes that encourage regular, open, and honest contact between stakeholders, teammates, and the project managers who oversee the endeavor. Some examples of these include regular stand-up meetings, digital communication platforms, and visual management tools like information radiators.
12. Place an emphasis on being customer-centric: Your primary goal should be to provide value to consumers by putting their wants and requirements first. Agile project managers are encouraged to maintain tight relationships with clients, end-users, and other stakeholders to achieve higher level of understanding for the needs and expectations of these parties, and subsequently to adjust the project's plans and procedures appropriately.
13. Continuous learning and development: project managers should be encouraged and supported to engage in continuous learning and improvement. Make available chances for training, credentials, and the development of skills in agile approaches as well as other areas that are important.
14. Encourage innovation by establishing a culture that recognizes, applauds, and promotes innovative problem-solving and new ways of thinking. When members of your team come up with innovative ideas, solutions, or methods that enhance the results of the project, reward them with incentives and recognition.

In order to evaluate the effectiveness of agile project management methodologies and their impact on team performance, it is crucial to employ appropriate metrics. Factors that could be considered include the duration of the product's time-to-market, the caliber of the product, and the level of employee morale.

By following these practical guidelines, enterprises can leverage the benefits linked with agile project management. Consequently, the collective efficiency of construction teams will be enhanced, culminating in the triumphant accomplishment of the project.

To conclude, this study highlights the significance of implementing a comprehensive strategy in the pursuit of enhancing the achievement of construction teams. The text provides an in-depth analysis of the complex effects of project manager agility, team dynamics, and technology utilization on team performance, presenting innovative perspectives on their diverse levels of influence. Nevertheless, the process of unraveling the complete range of elements that influence the triumph of construction teams does not conclude at this point. It is important to note that this research should not be regarded as conclusive, but rather as a catalyst for ongoing academic investigation.

The construction industry is subject to constant change and the emergence of novel technologies. As a result, there may be numerous unidentified factors, underlying influences, and possible moderators that remain to be uncovered. The intricate interaction among these variables requires ongoing investigation and repeated improvement of our comprehension. Consequently, it is imperative for both researchers and practitioners to continuously seek this information, iterating and enhancing the groundwork established by this study. As we traverse the intricate landscape of the construction sector, let this not mark the culmination, but rather a milestone towards more profound revelations, enhanced comprehension, and refined methodologies.

REFERENCES

- Abdel-Razek R. & Kamel H . (2020). Factors affecting construction team integration: Construction process perspective. . International Journal of Construction Management, 1-14.
- Agarwal, R. . (2020). Agile project management in construction: Benefits, challenges, and adaptation. . International Journal of Construction Management,, 20(2), 158-168.
- Aguirre, J., & Ledezma. (2017). Leadership skills in construction projects. Journal of management in engineering, 33(1), 04017005.
- Aibinu, A. A., & Jagboro, G. O. (2002). The effects of construction delays on project delivery in Nigerian construction industry. . International Journal of Project Management, 20(8), 593-599.
- Alan Griffith and Paul Watson. (2004). construction managment Principle and Practice. New York: PALGRAVE MACMILLAN.
- Ali, M. M. (2018). The impact of leader's agility on project success: Evidence from construction industry. International Journal of Construction Management. International Journal of Construction Management, 18(4), 332-343.
- Allen, I. E. (2007). Likert scales and data analyses. Quality progress,, 40(7), 64-65.
- Almarri, K. (2019). Agility in construction project management: A systematic review of empirical studies. International Journal of Construction Management,, 19(1), 1-16.
- Alnuaimi A. S. Taha R. A & Moon S. (2010). Causes of delay in the construction industry in the United Arab Emirates. . International Journal of Construction Management, 10(2), 53-73.
- Alomari, M. K. (2017). Agile project management in the construction industry. Journal of Engineering and Applied Sciences,, 12(14), 3618-3622.

- Alonso R. Vivanco, M. Rodriguez Perez, R. & Ma. (2018). Influence of trust, team building, and learning on construction team performance. *Journal of Construction Engineering and Management*, 144(11), 04018105.
- AlSehaimi, A., Koskela, L., & Tzortzopoulos, P. . (2013). Need for alternative research approaches in construction management: . case of delay studies. *Journal of Management in Engineering*, 29(3), 407-413.
- Alzoubi, A. E.-o. (2011). factors Associated affecting Organization Agility on Product Development. *International Journal of research and review in applied Science*, 9, 503-515.
- Anantatmula V. S.,. (2010). Project manager leadership role in improving project performance. . *Engineering Management Journal*, 22(1) 13-22.
- Andersen E S & Jessen S. A. . (2013). Project maturity in organisations. *International Journal of Project Management*, 21(6), 457-461.
- Andriani, P., & McKelvey, B. (2009). From Gaussian to Paretian thinking: Causes and. *Organization Science*, pp. 20: 1053- 1071.
- Atkinson R. . (1999). Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. . *International Journal of Project Management*, 17(6), 337-342.
- Atkinson, R. . (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6), 337-342.
- Azhar S. (2011). Building Information Modeling (BIM):. Leadership and Management in Engineering, 11(3), 241-252.
- Aziz, R. F & Hafez S., M.,. (2013). Applying lean thinking in construction and performance improvement. *Alexandria Engineering Journal*, 52(4), 679-695. Retrieved from <https://doi.org/10.1016/j.aej.2013.04.008>
- Aziz, R. F. & Hafez, S. M. (2013). Applying lean thinking in construction and performance improvement. *Alexandria Engineering Journal*, 52(4), 679-695. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1110016813000953>

- Aziz, R. F. (2013). Applying lean thinking in construction and performance improvement. . Alexandria Engineering Journal, 52(4), 679-695.
- Aziz, R. F., & Hafez, S. M. (2013). Applying lean thinking in construction and performance improvement. Alexandria Engineering Journal, . Aziz, R. F., & Hafez, S. M., 52(4), 679-695.
- B. J. Bruce J. Avolio. (2008). Bernard (Bernie) M. Bass (1925-2007). American Psychologist, <http://dx.doi.org/10.1037/0003-066x.63.7.620>.
- Baccarini, D. (1996). The concept of project complexity. International Journal of Project Management, 14(4), 201-204.
- Baiden B K & Price A. D. . (2011). The effect of integration on project delivery team effectiveness. International Journal of Project Management, 29(2), 129-136.
- Baiden B. K. Price A. D. & Dainty A. R. . (2006). The extent of team integration within construction projects. . International Journal of Project Management, 24(1), 13-23.
- Baiden, B. K., Price, A. D., & Dainty, A. R. . (2006). The extent of team integration within construction projects. . International Journal of Project Management, , 24(1), 13-23.
- Baker, B. N. (2018). Agile leadership in construction. Journal of Construction Engineering and Management, 144(10), 04018081.
- Ballard G & Howell G . (2003). Lean project management. . Building Research & Information,, 31(2), 119-133.
- Banihashemi S. Hosseini M. R. Golizadeh, H., . (2017). Critical success factors (CSFs) for integration of sustainability into construction project management practices in developing countries. . International Journal of Project Management.
- Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management,, 17(1), 99-120.
- Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. Journal of management, 27(6), 643-650.
- Bass B. M. & Riggio R. E. . (2006). Transformational Leadership (2nd ed.). (P. Press., Interviewer)

- Bass, B. M. . (1990). Bass & Stogdill's handbook of leadership: Theory, research, and managerial applications. New York: Free Press.
- Bass, B., M.,. (1990). From transactional to transformational leadership:. the Organizational Dynamics, 18(3) / 19-31.
- Beck, K. B. (2001). Manifesto for agile software development. USA Arizona: Originally published as a part of the 2014 PMI Global Congress Proceedings – Phoenix, Arizona, USA.
- Beck, K., Beedle, M., van Bennekum, A. (2001). Principles behind the Agile Manifesto. USA California : American Institute of Architects, AIA National, and AIA California Council. (2007).
- Beedle, L.S. (1988). Second century of the skyscraper. Van Nostrand Reinhold Company.
- Bertelsen, S. (2002). Bridging the gap–towards a comprehensive understanding of lean construction. Brazil: IGLC-10, Gramado, Brazil.
- Bertelsen, S., & Koskela, L. (2004). Construction beyond lean: a new understanding of construction management. this paper presented at the Proceedings of the 12 th annual conference in the International Group for Lean Construction.
- Blau, P. M. (1968). Social exchange. International encyclopedia of the social sciences, 7(4), 452-457.
- Boaz, N., & Fox, E. A. . (2014). hange leader, change thyself. McKinsey Quarterly.
- Boehm, B. W.; Turner, R. (2004). Balancing Agility and Discipline. Boston ; London.: Addison-Wesley.
- Bonabeau, E.; Meyer, C. (2001). a Whole New Way to Think About. London : Harvard Business Review, (May), pp. 107-114.
- Bryman A. . (2012). Social Research Methods. Oxford University Press.
- Bryman A. & Bell E. . (2015). Business research methods (4th ed.). Oxford University Press.
- Bryman, A. . (2016). Social research methods (5th ed.). Oxford University Press.

- Bughin J Catlin T Hirt M & Willmott P. . (2016). Six building blocks for creating a high-performing digital enterprise. . McKinsey & Company.
- Buvik M P & Rolfsen M. . (2015). Prior ties and trust development in project teams. *International Journal of Project Management*, 33(7), 1484-1494.
- C. E. (2014). Can Agile Project Management Be Adopted by Industries, Other than Software Development? , . *Project Management Journal*, 45(3), 21–34. Retrieved from <https://doi.org/10.1002/pmj.21410>
- Chan A P Scott D. & Chan A. P. . (2004). Factors affecting the success of a construction project. *Journal of construction engineering and management*, 130(1), 153-155.
- Chan, A. P. (2004). Key performance indicators for measuring construction success. *Benchmarking: an international journal*, 11(2), 203-221.
- Cheng, M. I. (2005). “Towards a Multidimensional Competency-based Managerial Performance Framework.”. *Journal of Managerial Psychology*, d vol. 20, no. 5, Emerald, Crossref, <https://doi.org/10.1108/02683940510602941>, 20(5), 380-396. Retrieved from *Journal of Managerial Psychology*, .
- Cheung, W. M. (2017). The impact of leader agility on project performance in the Hong Kong construction industry. *International Journal of Project Management*, 35(6), 930-942.
- Chileshe, N., & Haupt, T. C. (2010). An investigation into the impact of culture on construction project performance. . *Journal of Engineering, Design and Technology*, , 8(2), 106-126.
- Chinowsky P. S.& Rojas E. M. (2003). Virtual teams: guide to successful implementation. *Journal of management in engineering*, 19(3), 98-106.
- Chua D K. Kog Y. C. & Loh P K. (2003). Critical success factors for different project objectives. . *Journal of construction engineering and management*, 129(3), 142-150.
- Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. , . *Psychological Assessment*, 7(3), 309-319.
- Clarke, N. . (2010). Emotional intelligence and its relationship to transformational leadership and key project manager competences. *Project Management Journal*, 41(2), 5-20.

- Cobb, C. G. (2011). Making sense of agile projects management: Balancing control & agility. John Wiley & Sons.
- Cohen J. Cohen P West S. G & Aiken L. S. (2013). Applied multiple regression- correlation analysis for the behavioral sciences. Routledge.
- Cohen J. Cohen P. West, S. G & Aiken L. S. (2003). Applied multiple regression/correlation analysis for the behavioral sciences (3rd ed.). . In N. L. Mahwah.
- Cohn, M. (2005). Agile Estimating and Planning. Prentice Hall.
- Comrey A L. & Lee H. B. (1992). A first course in factor analysis. Psychology Press.
- Conforto E. C & Amaral D. C. (2010). Evaluating an agile method for planning and controlling innovative projects. Project Management Journal, 41(2) 73-80.
- Conforto E. C.. & Amaral D. C. (2016). Agile project management and stage,-gate model—,A hybrid framework for technology,-based companies. Journal of Engineering and Technology Management,, 40, 1-14.
- Conforto, E. C., Salum, F., Amaral, D. C., da Silv. (2014). Can agile project management be adopted by industries other than software development? , . Project Management Journal, 45(3), 21-34.
- Connell Hatch. (June 2006). Project excution plan for Major Civil Works, -REP-002 Rev 0 . BEE508-W.
- Cooke-Davies T & Arzymanow A. . (2003). The maturity of project management in different industries. International Journal of Project Management, 21(6), 471-478.
- Cooke-Davies, Cicmil, S., Crawford, L.,RichardsonK. (2008). Mapping the Strange Landscape of Complexity Theory, and Its Relationship to Project Mangement. Engineering Management Review, IEEE, 36(2), 5-21. .
- Cooke-Davies, T. . (2002). The “real” success factors on projects. . International Journal of Project Management, , 20(3), 185-190.
- Costello A B. & Osborne J. W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. Practical Assessment., 10(1), 7.

- Cozby P. C & Bates S. C. . (2015). *Methods in behavioral research* (12th ed.). . McGraw--Hill Education.
- Crawford, L. (2005). Senior management perceptions of project management competence. *International journal of project management*,, 23(1), 7-16.
- Creswell J. W. . (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.
- Cronbach L. J. . (1951). Coefficient alpha and the internal structure of tests., . *Psychometrika*, 16(3), 297-334.
- Crotty M. . (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage.
- Cyfert, S. Szumowski, W, Dyduch W, Zastempowski, M. (2022). The power of moving fast: responsible leadership, psychological empowerment and workforce agility in energy sector firms. , . *Heliyon*(ISSN 2405-8440), 8(10). doi:<https://doi.org/10.1016/j.heliyon.2022.e11188>
- D. Matt. (2014). Adaptation of the values stream mapping approach to the design of lean engineer-to-order production. *Journal of manufacturing Technology*, 25:334-350.
- Dainty, A. R. (2005). Competency-based model for predicting construction project managers' performance., . *Journal of Management in Engineering*, 21(1), 2-9.
- Dainty, A. R., Cheng, M. I., & Moore, D. R. (2003). Redefining performance measures for construction project managers:. *Construction Management and Economics*, 21(2), 209-218.
- DeChurch L. A & Mesmer Magnus J. R. (2010). The cognitive underpinnings of effective teamwork: a meta-analysis. . *Journal of Applied Psychology*,, 95(1), 32-53.
- DeChurch L. A & Mesmer Magnus J. R. (2010). The cognitive underpinnings of effective teamwork: a meta-analysis. . *Journal of Applied Psychology*, 95(1), 32-53.
- Demir, S. T. (April 2012). Re-conceptualizing Lean in Construction Environments–,the case for “AgiLean” Project Management“. Paper presented at the 48th ASC Annual International Conference Proceedings. Birmingham: Associated, UK.

- Dierickx, I. &. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35(12), 1504-1511.
- Dierickx, I. &. (1989). Asset stock accumulation and sustainability of competitive advantage. . *Management science*, 35(12), 1504-1511.
- Dikmen, I., Birgonul, M. T., & Anac, C. (2018). Investigation of agility implementation in construction industry. *Journal of Construction Engineering and Management*, 144(3), 04017112.
- Dingsoyr T Nerur S Balijepally V & Moe N. (2018). A decade of agile methodologies: Towards explaining agile software development. . *Journal of Systems and Software*, 85(6), 1213-1221.
- Dingsøyr T.Nerur S Balijepally V & Moe N. (2018). A decade of agile methodologies: Towards explaining agile software development. . *Journal of Systems and Software*, 85(6), 1213-1221.
- Dingsoyr, T Nerur, S Balijepally, V, & Moe N. (2012). A decade of agile methodologies: Towards explaining agile software development. *Journal of Systems and Software*, 85(6), 1213-1221. Retrieved from <https://doi.org/10.1016/j.jss.2012.02.033>
- Doloi H Sawhney, A Iyer K C & Rentala S. (2012). Analysing factors affecting delays in Indian construction projects. *International Journal of Project Management*, 30(4), 479-489.
- Doloi H. Sawhney A. Iyer K. C. & Rentala S. (2012). Analysing factors affecting delays in Indian construction projects. . *International Journal of Project Management*, 30(4), 479-489.
- Doz Y L & Kosonen M . (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. . *Long range planning*, 43(2-3), 370-382.
- Doz, Y., & Kosonen, M. (2008). *Fast Strategy*. Wharton School Publishing.
- Dulewicz, V. & Higgs, M. (2003). Leadership at the top: The need for emotional intelligence in organizations. . *The International Journal of Organizational Analysis*, 11(3), 193-210.

- Dvir T. Eden D. Avolio B. J & Shamir B. . (2002). Impact of transformational leadership on follower development and performance:. *Academy of Management Journal*,, 45(4), 735-744.
- Dvir T. Eden D. Avolio B. J. & Shamir B.,. (2002). The impact of transformational leadership on follower development and performance:. *Academy of Management Journal*,, 45(4) 735-744.
- Dyer J. H Dyer W. G. & Gardner R. M. (2011). Toward a theory of entrepreneurial teams. *Entrepreneurship Theory and Practice*,, 35(6) 1159-1179.
- Dyer, L. R. A. . (1998). Lessons from research on organizational agility. Ithaca, NY: Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies. (pp. CAHRS Working Paper #98-12). <http://digitalcommons.irl.cornell.edu/cahrswp/125>; Ithaca, NY: Cornell University.
- Dyer, L. R. A. (1998). From human resource strategy to organizational effectiveness:. Lessons from research on organizational agility, pp. CAHRS Working Paper #98-12.
- Dyer, L. R. A. (1998). From human resource strategy to organizational effectiveness: Lessons from research on organizational agility (CAHRS Working Paper #98-12). Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies, (CAHRS Working Paper #98-12).
- Eastman C Teicholz P Sacks R & Liston K. (2011). *BIM Handbook*. John Wiley & Sons.
- Eisenhardt, K. M. (2000). Dynamic capabilities: what are they?. *Strategic management journal*, 21(10-11), 1105-1121.
- Eisenhardt, K. M. (2000). Dynamic capabilities; What are they? *Strategic Management Journal*,, 21(10-11), 1105-1121.
- Elazouni A. (2018). Agile Construction Project Management: In *Construction Management*. Springer, Cham., 223-236. Retrieved from https://doi.org/10.1007/978-3-319-62371-9_9
- EMAAR development quarter report . (2022, june 30). *properties.emaar*. Retrieved from <https://properties.emaar.com>: <https://properties.emaar.com/en/properties/address-residences-dubai->

opera/?gclid=Cj0KCQjwwfiaBhC7ARIsAGvcPe4qCw31z_AG7b8V7Vuo5mWjLAd
SSnNhiglXe3mfqU7gAcMI1mqHdW4aAm4XEALw_wcB

EMAAR.Properity. Monthly Report Downtown . (2022). Mace-EMAAR/October Dashboard
monthly report 29October2022. Dubai : EMAAR .

Emuze, F., & James, A. . (2013). Investigating communication in construction projects in South
Africa. . *Acta Structilia*, 20(2), 89-104.

Eskerod, P& Jepsen, A. L., (2013). . Project stakeholder management: Past and present. , .
Project Management Journal, 44(6), 6-14.

Executive, Health and Safety. (1988). Blackspot Construction: A study of five years fatal
accident in the building and civil engineering industries HMSO. London: Executive,
Health and Safety.

Fabrigar L R & Wegener D T . (2012). Exploratory factor analysis. . Oxford University Press.

Falance, T. (2012). Cultivating Organizational Agility. The Columbia Group.

Fiedler, & Ralph N. (1968). A Theory of Leadership Effectiveness. *Administrative Science
Quarterly*, <http://dx.doi.org/10.2307/2391461>.

Field A. . (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). . In F. A.. SAGE
Publications.

Field A. . (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). . SAGE
Publications.

Field, E. H. (2018). A physics-based earthquake simulator replicates seismic hazard statistics
across California. *Science advances*, 4(8), eaau0688.

Flyvbjerg B. (2014). What you should know about megaprojects and why. *Project Management
Journal*, 45(2), 6-19.

Flyvbjerg, B., Holm, M. S., & Buhl, S. (2003). How common and how large are cost overruns
in transport infrastructure projects? . *Transport Reviews*, 23(1), 71-88.

Ghosh S. Yazdani S. Bhattacharjee S . (2012). Application of information technology in
construction industry. . *International Journal of Computer Applications*, 49(17), 41-47.

- Gibbs D. J. Yost B. & Johnson N. . (2014). Impacts of Innovation in Construction. *Journal of Construction Engineering and Management*, 140(6), 04014021.
- Gill R. (2012). *Theory and practice of leadership*. Sage Publications Limited.
- Giritli H Oraz G. T. & Sesen H. (2013). The role of leadership in construction industry change management. , . *Journal of Construction Engineering and Management*, 139(8), 948-957.
- Gittell J. H. (2002). Coordinating mechanisms in care provider groups: When it comes to performance impacts, relational coordination acts as a mediator, whereas input uncertainty acts as a moderator. *Management Science*, 48(11), 1408-1426.
- Gittell J. H. Seidner R. & Wimbush J. (2010). A relational model of how high-performance work systems work. . *Organization Science*, 21(2), 490-506.
- Glenn, M. (2009). *Organisational Agility: How business can survive and thrive in turbulent times*. The Economist.
- Goh S C Goodman P S & Weingart L. R. . (2013). Team innovation processes. *Small Group Research*, 44(2), 159-190.
- Goleman, D. (1998). . *Working with emotional intelligence*. . New York: Bantam Books.
- Golloway, J.,. (2017). The role of leadership in the success of construction project. *Journal of Management in Engineering*, 33(5), 04017043.
- Grant R M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. ,. *California Management Review*, 33(3), 114-135.
- Grewal, R. & Tansuhaj, P. (2001). Building organizational capabilities for managing economic. *journal of marketing* , 65: 67-80.
- H. K. (2018). *Project Management Professional Exam Study Guide*. John Wiley & Sons.
- H. Kerzner. (2013). *Project Management system approach for planning, scheduling and controlling*. 11th Ed Wiley 2013.
- Hair J. F Black, W. C Babin, B. J Anderson,. (2006). *Multivariate data analysis (6th ed.)*. , . In N. P. Hall., Upper Saddle River.

- Harraf, A. (2013). Strategic Agility: A Required Core Competency in New Normal. . Turkey, Istanbul: Eurasia Conference.
- Harty C. . (2005). Innovation in constructions,: sociology of technology approach. Building Research, & Information, 33(6), 512-522.
- Harty C. (2008). Implementing innovation in construction. ., Building Research & Information, 36(5), 504-512.
- Hass, K. B. (2007). The blending of traditional and agile project management. . PM World Today,, 9(5), 1-8.
- Hassan S. Bashir M. & Abbas S. M. (2017). Leader agility and project success. Journal of Management & Engineering Integration, 10-1/, 54-60.
- Hersey, P. &. (1969). Management of organizational behavior: Utilizing human resources. Prentice-Hall.
- Highsmith, J. (2009). Agile project management; Creating innovative products. . Pearson Education.
- Highsmith, J. (2010). Architects: Accelerators or Anchors to Organizational Agility. . SATURN 2010 keynote speech. Software Engineering Institute.
- Hijazi, A. A. (2021). Rationale for the integration of BIM and blockchain for the construction supply chain data delivery. Journal of construction engineering and management,, 147(10), 03121005.
- Hoda, R. (2018). The role of the Agile project manager: . A longitudinal case study. Journal of Systems and Software,, 137, 338-352.
- Hoegl M. & Gemuenden H. G. . (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. Organization Science,, 12(4), 435-449.
- Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. . Organization Science,, 12(4), 435-449.

- Hogg M. A. & Terry D. J. (2000). Social identity and self-categorization processes in organizational contexts. . *Academy of Management Review*, 25(1), 121-140.
- Holsapple, C. W. (2008, June 17). Understanding organizational agility: a work-design perspective. Retrieved from KENTUCKY UNIV LEXINGTON SCHOOL OF MANAGEMENT.
- Horney N Pasmore B & O'Shea T. (2010). Leadership agility: A business imperative for a VUCA world. *People & Strategy*, 33(4), 32-38.
- Hosseini M R Martek I Zavadskas E K Aib. (2018). Critical evaluation of off-site construction research. *Automation in Construction*, 87, 235-247.
- Hou, X. L. (2020). Towards agile power management in the microservice era. *International Conference for High Performance Computing, Networking*, In SC20: Storage and Analysis (pp. 1-14).
- Hughes, M., & Cotterell, S. (2002). *Software project management*. . McGraw-Hill.
- Ilgen D. R. Hollenbeck J. R. Johnson M. (2005). Teams in organizations. *Annual Review of Psychology*, 56, 517-543.
- Innolution, LLC & Kenneth Rubin. (2017, January 26). Agile Marketing for the AVL Industry. Retrieved from <https://www.ravepubs.com/agile-marketing-for-the-avl-industry/>: <https://www.ravepubs.com/agile-marketing-for-the-avl-industry/>
- Jha, K N. , & Iyer K. C. (2007). Critical factors affecting the quality performance in construction projects. . *Total Quality Management & Business Excellence*, 18(1-2), 57-71.
- Jones M C Todorova G. & Thomas G. (1996). Construction team success factors. . *Journal of Construction Engineering and Management*, 122(3), 245-253.
- Jones M C Todorova, G & Thomas G. . (1996). Using information and communication technology to support knowledge sharing by teams. . *Information Systems Journal*, 6(3), 217-239.
- Jones M. C Todorova G & Thomas G. . (1996). Construction team success factors. *Journal of Construction Engineering and Management*, 122(3), 245-253.

- Jugdev K and Müller R. (2005). A retrospective look at the evolving understanding of project success. *Project Management Journal*, 36(4), 19-31.
- Kerzner H. . (2009). *Project management*. John Wiley & Sons.
- Kerzner H. (2009). *Project management*. John Wiley & Sons.
- Kerzner, H. . (2013). *Project management: A systems approach to planning, scheduling, and controlling*. Hoboken, NJ: John Wiley & Sons.
- Kibert, C. J. . (2016). *Sustainable construction: green building design and delivery*. . John Wiley & Sons.
- Koskela, L. J. (2002). The underlying theory of project management is obsolete. In *Proceedings of the PMI research conference*, 293-302.
- Kouzes, J. M., & Posner, B. Z. . (2017). *The leadership challenge: How to make extraordinary things happen in organizations*. . Hoboken, NJ: John Wiley & Sons.
- Kwak, Y. H., & Anbari, F. T. (2018). Agile project management. *International Journal of Project Management*, 36(4).
- Ladas,C. (2014). Scrumban-Implementation of Kanban. *International Journal of Project Management*, 221, 37–44.
- Larson E W & Gray C. F. . (2018). *The managerial process (7th ed)*. In McGraw, *Project management*. Hill Education.
- Larson, E. W., & Gray, C. F. (2011). *Project management: The managerial process*. New York: McGraw-Hill.
- Le H & Le Q. . (2016). Critical success factors in international construction projects. *Procedia Engineering*, 164, 368-375.
- Lee P Gillespie N Mann, L & Wearing A. . (2005). Leadership and trust. *Management Learning*, 36(4), 473-491.
- LePine J. A Piccolo R. F. JacksonC. L. Mat. (2008). A meta-analysis of teamwork processes: Analyses regarding a multidimensional model including examinations of its linkages with criteria for successful teamwork. . *Personnel Psychology*, 61(2), 273-307.

- Levi D. (2017). Group dynamics for teams. . Sage Publications.
- Levine, M. K. (2018). Agile Leadership: A Leader's Guide to Orchestrating Agile Strategy,. Product Quality, and IT Governance. Auerbach Publications.
- Ling F. Y.. Y Luo, X W. & Cai H. W. (2014). Investigating the relationship between information and communication technology and team performance in construction projects. International Journal of Construction Management, 14(3), 193-209.
- Ling, F. Y. Y.Low S. P Wang S. Q. & Lim H. (2014). Key Project Management Practices affecting Singaporean firms' project performance in China. International Journal of Project Management, 22(4), 283-291.
- Liu, H GolparvarFard M & Stump G. (2017). Factorization of project performance and execution efficiency. Journal of Construction Engineering and Management, 143(5), 04016110.
- Liu, J., & Love, P. E. (2019). Transformational leadership in construction. Journal of Construction Engineering and Management, 145(3), 04018122.
- Love P E D Simpson I Hill A and Standing. (2011). Understanding the dimensions of information communication technology in construction. Engineering, Construction and Architectural Management, 18(1), 75-89.
- Love, P. E., Edwards, D. J., & Irani, Z. . (2010). Work stress, support, and mental health in construction. . Journal of Construction Engineering and Management,, 136(6), 650-658.
- M.C Jones, A. W, & M.C Jones, A.W Harrison. (1996). Project team performance: An Ampricial assessment . Information and Managment 1058, 57-65.
- M.J. Skibniewski. (August2011). AUTOMATION IN CONSTRUCTION Volume 20 issue 5. Honkong : ScienceDirect.
- Manyika J Ramaswamy S Khanna D Sarrazin . (2016). Digital globalization. McKinsey Global Institute.
- Marko, Pirinen, Fagerholm, Kettunen,. (2011). "On the Impact of Kanban on Software Project Work. IEEE, Vol.37, , pp. 305–314.

- Martek I. Hosseini M. R. Shrestha, A. Edwards. (2017). Critical Success Factors (CSFs) . International Journal of Project Management, 35(6), 1103-1119.
- Marzouk M & Hisham M. (2011). 4D visualization of highways construction projects. . Journal of Information Technology in Construction (ITcon),, 16(17), 293-312.
- Mathieu J Maynard M T Rapp T & Gilson L. (2008). Team Effectiveness 1997-2007: A Review of Recent Advancements & a Glimpse Into the Future. , . Journal of Management, 34(3), 410–476.
- McCaffer, R. (1993). Construction Management and Economics, volume 13. p. Article | Published Online: 28 Jul 2006 .
- Menard S. . (1995). Applied logistic regression analysis: Sage university series on quantitative applications in the social sciences. Thousand Oaks, CA: Sage.
- Meng, X. (2012). The effect of relationship management on project performance in construction. . International Journal of Project Management, 30(2), 188-198.
- Meredith, J. R. (2010). Meredith, J. R., & Mantel Jr, S. J. John Wiley & Sons, Inc.
- Meredith, J. R., & Mantel, S. J. . (2017). Project management: a managerial approach. . John Wiley & Sons.
- Mertens D. M. & Ginsberg P. E . (2008). The handbook of social research ethics. . Sage Publications.
- Miozzo M. & Dewick P. . (2004). Building competitive advantage: Innovation and corporate governance in European construction. . Research Policy, 33(8), 1261-1280.
- Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management. International Journal of Project Management, 32(2), 202-217.
- Mische, M. A. . (2000). Operational Excellence & Organizational Agility. USA california : University of Southern California.
- Mische, M. A. (2000). Operational Excellence & Organizational Agility. South California: University of Southern California.

- Mishra, D. Ostrovska, S. (2016). Impact of agility and collaboration on construction project performance. . *International Journal of Managing Projects in Business*,, 9(3), 537–558. Retrieved from <https://doi.org/10.1108/IJMPB-09-2015-0091>
- Mishra, D., Mittal, M. L. (2011). An empirical study on identifying critical success factors in agile project management. . *Journal of Industrial Engineering and Management*, 4(4), 671-694.
- Mok K. Y. Shen G. Q. & Yang R. J. . (2015). Stakeholder management studies in mega construction projects: A review and future directions. . *International Journal of Project Management*, 33(2), 446-457.
- Mok, K. Y. (2015). Stakeholder management studies in mega construction projects:. *International Journal of Project Management*,, 33(2), 446-457. Retrieved from <https://doi.org/10.1016/j.ijproman.2014.08.007>
- Moon H Dawood, N & Kang L. (2017). Development of workspace conflict monitoring and visualisation system using 4D BIM in a construction project. *Automation in Construction*, 84, 155-166.
- Mota, C., & Scott, L. . (2021). Agile project management in the construction industry . A systematic literature review. *Engineering, Construction and Architectural Management*,, 28(3), 485-501.
- MSc Eng., Piotr Nowotarski. (n.d.). Poznan University of Technology, Faculty of Civil and Environmental Engineering, ul. Poland: e-mail: piotr.nowotarski@put.poznan.pl.
- Muller R, & Turner R. . (2007). The influence of project managers on project success criteria and project success by type of project. *European Management Journal*,, 25..4 / 298-309.
- Müller, R. &. (2010). Leadership competency profiles of successful project managers. *International Journal of project management*,, 28(5), 437-448.
- Müller, R., & Turner, R. (2010). Leadership competency profiles of successful project managers. . *International Journal of Project Management*,, 28(5), 437-448. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0263786309001147>
- Nadim W & Goulding J. S. (2011). Offsite production in the UK. *Architectural Engineering and Design Management*, 7(1), 18-27.

- Nunnally, J. C. . (1978). *Psychometric theory* (2nd ed.). New York:: McGraw-Hill.
- Ogunlana, S. O. (2008). Reflections on leadership and project management. *International Journal of Project Management*,, 26(2), 193-200.
- Olander S. & Landin A. (2005). Evaluation of stakeholder influence in the implementation of construction projects. *International Journal of Project Management*, 23(4), 321-328.
- Olander, S & Landin A. (2005). Evaluation of stakeholder influence in the implementation of construction projects. *International Journal of Project Management*,, 23(4), 321-328.
- Olomolaiye, P. &. (2001). The success of construction projects:. A review of the UK evidence. *Engineering, Construction and Architectural Management*,, 8(4), 285-296.
- Osei-Kyei, R., & Chan, A. P. . (2015). Review of studies on the Critical Success Factors for Public–Private Partnership (PPP) projects from 1990 to 2013. *International journal of project management*, 33(6), 1335-1346.
- Owen, R. K. (2006). Is agile project management applicable to construction? Paper presented at the Proceedings of the 14th Annual Conference of the International Group for Lean Construction.
- Owen,R; Koskela, L;Henrich, G,Codinhoto, R. (2006). Is agile project management applicable to construction? Paper presented at the Proceedings of the 14th Annual Conference of the International Group for Lean Construction.
- Oyedele, L. O., Owolabi, H. A., & Adeyemi, A. Y. (2018). Building information modelling implementation and the influence of leadership practices on technology acceptance in construction projects. *Journal of Building Engineering*, 19, 495-505.
- Oyewobi, L. O. (2015). An empirical analysis of construction organisations’ competitive strategies and performance. *Built Environment Project and Asset Management*, vol. 5, no. 4,, pp. 417–431.
- Pallant J. . (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS*. (O. U. Press, Interviewer) Open University Press.
- Pallant J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (5th ed.). . Berkshire: Open University Press.

- Papadakis I. Karlos V. & Tsironis L. . (2018). Integrating soft skills in the project management framework. *Procedia computer science*, 130, 603-610.
- Papadakis I. Karlos V. & Tsironis L. . (2018). Integrating soft skills in the project management framework. *Procedia computer science*, 130, 603-610.
- Papadakis, S.,. (2020). Agile project management: A comprehensive literature review. . *International Journal of Managing Projects in Business*,, 13(7), 1553–1577. Retrieved from <https://doi.org/10.1108/IJMPB-08-2019-0206>
- Papadakis., I. P& Tsironis, L. K. . (2018). Technology management tools and techniques: Factors affecting their use and their impact on performance. *Journal of Engineering and Technology Management*, ., 47, 87-103.
- Pinto J K & Slevin D. P. . (1988). Project success: definitions and measurement techniques. *Project Management Journal*, 19(1), 67-72.
- Pinto J. K & Kharbanda O. P. (1995). *Successful project managers: Leading your team to success*. . Wiley.
- Pinto J. K. & Kharbanda O. P. . (1995). *Successful project managers*. John Wiley & Sons.
- Pinto J. K. & Rouhiainen P. . (2001). *Building customer-based project organizations*. . In Wiley.
- Pinto M B & Pinto J K. (1990). Project teams communications & cross-functional cooperation in new programs development. *Journal of Product Innovation Management*, 7(3), 200-212.
- PMI. (2107). *A guide to the project management body of knowledge (PMBOK guide) (6th ed.)*. Newtown Square, PA: Project Management Institute.
- Punch, K. F. (2013). Quantitative and qualitative approaches. In *Introduction to social research: (3rd ed.)*. . SAGE Publications.
- PwC. . (2012). *Insights and Trends: Current Programme and Project Management Practices*. PwC Global Project Management Survey.
- Ramírez, Y. W., & Nembhard, D. A. (2004). Measuring knowledge worker productivity: A taxonomy. , . *Journal of Intellectual Capital*, 5(4), 602-628.

- Resnik D B. . (2015). What is ethics in research & why is it important? National Institute of Environmental Health Sciences.
- Rice, D. B. (1996). Tall Building Structures. Chicago: a world review Council on tall buildings and urban habitat.
- Rocha, C. G. (October2013). Journal of Construction Engineering and Managemen Vol. 139 Issue 10 (October 2013). Brazil : Dept. of Civil Engineering (DECIV), Federal Univ. of Rio Grande do Sul (UFRGS), 99 Osvaldo Aranha Av., 3rd Floor, CEP 90035-190, Porto Alegre, RS, Brazil.
- Rogers, E. M. (2003). Diffusion of innovations (5th ed.). : Free Press.
- S. K. (2002). Agile, software development with Scrum. . Prentice Hall PTR.
- Sacks R Koskela L Dave B. A & Owen R. (2010). Interaction of lean and building information modeling in construction. ., Journal of construction engineering and management, 136(9), 968-980.
- Salas E Cooke N J & Rosen M. A. (2008). On teams, teamwork, and team performance: . Human factors, 50(3), 540-547.
- Salas E Sims, D. E & Burke C. S. (2005). Is there a “Big Five” in teamwork? Small Group Research, 36(5), 555-599.
- Salem O. Solomon J. Genaidy A. & Minkarah I. (2006). Lean construction . Journal of Management in Engineering,, 22(4), 168-175.
- Sánchez-Fernández, J. R.-A. (2019). The Role of leadership in the success of construction project. Journal of Managment in Engineering, 212, 880-892.
- Saunders M Lewis P & Thornhill A. (2009). Research methods for business students. Pearson Education.
- Saunders M Lewis P. & Thornhill A. . (2009). Research methods for business students. Pearson Education.
- Schein, E. H. . (2010). Organizational Culture and Leadership. . John Wiley & Sons.
- SCHERMERHORN, J. & CHAPPELL, D. S. (2000). Introducing management. New York: John Wiley& Sons Inc.

- Schwaber, K. &. (2017). The Scrum Guide. Retrieved from. Retrieved from <https://www.scrumguides.org/docs/scrumguide/v2017/2017-Scrum-Guide-US.pdf#zoom=100>
- Schwaber, K., & Sutherland, J. (2017). The Scrum Guide. . Scrum.org, ScrumInc.
- Serrador P. & Pinto J. K. . (2015). Does Agile work A quantitative analysis of agile project success. . International journal of project management,, 33(5), 1040-1051.
- Serrador, P. &. (2015). Does Agile work?—A quantitative analysis of agile project success. International journal of project management,, 33(5), 1040-1051.
- Shen, L. Y., Tam, V. W., Tam, C. M., & Ji, Y. B. (2010). Project feasibility study: the key to successful implementation of sustainable and socially responsible construction management practice. Journal of Cleaner Production, 18(3), 254-259.
- Shen, Y. &. (2017). Communication, collaboration and leadership in construction project success. International Journal of Project Management,, 35(1), 1-11.
- Shenhar A. J, Dvir D, Levy O, & Maltz A. C. (2002). Project success. Long range planning, 35(6), 699-725.
- Sheppard, J. M. (2006). Agility literature review: Classifications, training and testing. Journal of Sports Sciences, abstract page.
- Singh, J. (2011, August). Theorizing Capabilities of Organizational Agility: A Paradox Framework. pp. P7 - 25.
- Singh, V. (2017). Agile project management in construction. Journal of Industrial and Production Engineering, 34(6), 430-444.
- Söderlund J., . (2004). Building theories of project management: past research, questions for the future. International Journal of Project Management, 22(3), 183-191.
- Sopian, A. K. (2023). Enterprise Architecture on Moral-based School Education Information Systems. Sinkron: jurnal dan penelitian teknik informatika,, 8(1), 178-187.
- Stacey, R. D. (1996). Complexity and management: Fad or radical challenge to systems thinking. Routledge.

- StumpF S. A. . (2013). Developing leadership agility. *The Learning Organization*,, 20(5), 352-365.
- Succar B. (2009). Building information modeling framework: A research and delivery foundation for industry stakeholders. *Automation in construction*, 18(3), 357-375.
- Succar B. (2009). Building information modelling framework: A research and delivery foundation for industry stakeholders. *Automation in Construction*,, 18(3), 357-375.
- Sundstrom, E De Meuse K. P. & Futrell D. . (1990). Work teams: Applications and effectiveness. ,. *American Psychologist*, 45(2), 120-133.
- Sutherland, J. . (2014). *Scrum: The art of doing twice the work in half the time*. Crown Business.
- Tabish S. Z. S. & Jha K. N. (2011). Identification and evaluation of success factors for large construction projects.. *Construction Management and Economics*, 29(8), 809-823.
- Tajfel H. & Turner J. C. (1986). The social identity theory of intergroup behavior. . In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations*, 7-24.
- Tauranac, J. (1995). *The Empire State Building*. St. Martin's griffin.
- Taylor J. (2014). The impact of technological factors among information& communication technology (ICT) adoption in the construction industry. *Journal of Civil Engineering and Construction Technology*, 5(8), 179-185.
- the maturity of project management in different industries: . (2003). *International Journal of Project Management*, 21(6), 471-478.
- Thomas Streulea, Nino Miserinia. (2016). Implementation of Scrum in the Construction Industry. *Procedia Engineering* 164 (2016) 269 – 276.
- Todorova G Sauer C. & Bruins A. (2014). The cognitive-emotive model of project success: implications for learning and performance. ,. *Engineering Management Journal*, 26(2), 75-88.
- Tripathi P. & Anantatmula V. S. (2020). Agility in project management: Concept and framework. , . *International Journal of Managing Projects in Business*, 13(5), 957-981.

- Tripathi, A., & Mishra, P. (2020). Agile project management in construction . A review of current practices and future potential. *International Journal of Construction Management*, 20(6), 507-519.
- Tuckman B W . (1965). Developmental sequence in small groups. *Psychological bulletin*, 63(6), 384-399.
- Turk, Z. (2012). Agile methodologies in the construction industry: An exploratory study. *Engineering, Construction and Architectural Management*, , 28(7), 1674-1691.
- Turkan Y Kivrak S.& Sari S. . (2020). An integrated approach for developing agile project management competency.,. *International Journal of Managing Projects in Business*, 13(2), 366-385.
- Turner J R. (1999). *The handbook of project-based management: improving the processes for achieving strategic objectives*. . McGraw-Hill.
- Turner, J. R. . (1999). *The handbook of project-based management; Improving the processes for achieving strategic objectives*. . New York: McGraw-Hill.
- Walker. (2007). “James Walker Makes New Senior Appointments.” S,Crossref,. ealing Technology, vol. 2007, no. 6, Mark Allen Group,, p. 4. Retrieved from [https://doi.org/10.1016/s1350-4789\(07\)70269-6](https://doi.org/10.1016/s1350-4789(07)70269-6).
- Ward, C. (1994). What is agility. y. *Industrial Engineering*, 26(11), 14-&.
- Wernerfelt B. . (1984). A resource-based view of the firm. ,. *Strategic Management Journal*, 5(2), 171-180.
- West M A. . (2012). *Effective teamwork: Practical lessons from organizational research*. . John Wiley & Sons.
- West M. A. . (2012). *Effective teamwork: Practical lessons from organizational research*. John Wiley & Sons.
- Y. L. (2011). The association among project manager's leadership style, teamwork and project success. *International Journal of Project Management*, ., 29(3), 258-267.
- Yukl, G. (2012). . *Effective leadership behavior*,,. *Academy of Management Perspectives*, 26(4), 66-85.

- Zailani, S. &. (2020). Agile methodology in construction project management: A systematic literature review. *Journal of Engineering, Design and Technology*,. *Journal of Engineering, Design and Technology*,, 18(3), 883-909.
- Zhang, X. Wu Y Shen L. & Skibniewski M. J. (2017). A BIM-integrated system for on-site construction process monitoring. *Advanced Engineering Informatics*, 33, 366-381.
- Zou P. X. W. Zhang G. & Wang J. (2007). Understanding the key risks in construction projects in China. . *International Journal of Project Management*, 25(6), 601-614.
- Zou P. X. W. Zhang, G & Wang J. . (2007). Understanding the key risks in construction projects in China . *International Journal of Project Management*, 25(6), 601-614.
- Zou, P. X. (2007). Understanding the key risks in construction projects in China. *International journal of project management*,, 25(6), 601-614.
- Zou, P. X. (2007). Understanding the key risks in construction projects in China. *International Journal of Project Management*,, 25(6), 601-614.