Investigating The Stakeholders' Attitudes Towards Prioritizing Agile Project Management Strategies as A Change Management Tool in Construction Projects

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Abstract: Construction projects face several problems in order to achieve their goals (time – cost – quality) especially since it has many inputs such as materials, labor and machinery. Measuring these goals in the money language is the key to their integration, so reducing costs is an important aspect of any project. One of the ways to reduce costs is to focus on how to avoid implementation problems and the financial implications of it. Several factors including irregular financial flows, poor management due to the lack of programs that support the administrative awareness of projects, financial and administrative instability, poor control and supervision, unskilled labor, insufficient machinery, inappropriate timing for the arrival of materials, changes in the construction conditions, lack of clarity of specifications, insufficient preparation during the pre-implementation stages, imposed regulations and laws, and other factors that contribute to problems in the implementation of major national projects. This study aimed to enhance the general understanding concerning the factors that affect the adoption of APM strategies in construction industry. The research relied on the inductive-analytical approach through conducting a questionnaire among stakeholders to analyze major development construction projects which can be benefited from applying the concept of agility to reduce project failure, then presenting and analyzing results of the survey questionnaire conducted with a sample of Egyptian design and construction firms to investigate their perception and application of prioritizing agile project management strategies as a change management tool in construction. The results of the thesis suggested that the Agile methodology is likely to yield significant benefits, primarily characterized by enhanced client engagement. The Agile approach significantly encourages increased customer engagement in the project as opposed to the current scenario. Additionally, it has the potential to reduce uncertainty and enhance risk management. The implementation of time management techniques and regular meetings is advantageous in monitoring the development and status of the project.

Keywords: Agile Contracting, Agile Project Management, Traditional Project Management, Constructions Industry, Agile Capabilities in Construction.

1. INTRODUCTION

Construction projects are transitory entities that depend on collaboration and the exchange of information among different supply chain organizations. These entities include both internal stakeholders inside the sector, such as subcontractors, major contractors, and employer consultants, as well as external stakeholders such as suppliers, agencies, and local authorities [1]. Efficient and effective information transmission and communication are vital elements in creating and sustaining these links, particularly in the context of large-scale megaprojects [2]. However, many traditional procurement approaches have led to hostile relationships between the contractor and client, requiring a substantial shift towards more collaborative project management approaches to reduce conflict and enhance project success.

The traditional method of managing construction projects has been in use for almost 50 years and remains the fundamental basis for the functioning of the construction sector. Nevertheless, there has been a shift in the manner in which projects are being implemented [3].

The gap between conventional approaches to construction project management and modern execution methods creates a feeling of uncertainty and apprehension among the organization and its staff. Construction industry professionals sometimes acknowledge that their work practices diverge from the mandated managerial perspective, resulting in confusion [4].

By adopting a more flexible and adjustable approach throughout the planning and design phase, it is possible to enhance communication among different stakeholders engaged in a project. This technique is expected to result in a more sophisticated prototype and design that achieves consensus among all stakeholders. Having a prototype with fewer flaws before starting production can help limit the chances of expensive adjustments during the production phase. Optimizing the efficiency and simplifying the planning and design phase are essential to achieve a faultless prototype that can smoothly move into production. The primary reason for this is the cost-effectiveness and simplicity of making alterations during the early phases of a project.

There are several methodologies available to improve and optimize the design phase of construction projects, which require attention and action. This research study seeks to analyze the reasons for technology implementation failure, how to mitigate these failures and the role change management plays in the construction industry in Egypt. Moreover, it aims to investigate the possible benefits of implementing the Agile project management approach to improve the efficiency of constructing projects and investigate the stakeholders' attitudes and readiness towards adopting the conceptual Agile Project Management framework in major development construction projects in Egypt.

The main research question arises as follows:

What are the perceptions and potential barriers towards applying the Agile management framework on major development construction projects in Egypt?

2. LITERATURE REVIEW

2.1. An Approach to Project Management

PMI (2013) defines project management (PM) as the application of knowledge, skills, tools, and procedures to strategize and carry out a project with the aim of fulfilling its specific needs. This is achieved by executing and combining the several procedures involved in implementing the project [5]. Turner [6] defines project management methodology as a systematic and well-defined approach to project delivery that effectively manages projects of all types. Matos and Lopes [7] assert that establishing a series of activities is an essential approach for overseeing the progress of projects and managing tasks.

Project management encompasses various components and procedures that contribute to the successful achievement of the project's objectives. These typically include project initiation, project planning, project execution, project monitoring and control, and project closing [8]. Project initiation encompasses a variety of essential tasks that are vital for the successful initiation of a project. These actions encompass delineating the project's goals, identifying the pertinent stakeholders, conducting thorough feasibility studies, and determining the project's scope and limitations [9].

Project monitoring and control is the continuous assessment of project performance, where the actual progress is methodically compared to the intended schedule and budget. Following that, suitable corrective measures are taken to ensure that the project is maintained on schedule. This phase also includes the management of risks, the resolution of disputes, and the guarantee of quality control. Project closure includes the finalization of all project activities, the delivery of the final product or service, the execution of project assessments, the documentation of new information, and the termination of contracts and financial records. This stage involves the official handover of the project to the client or end-users [9].

Figure 1: Stages of Construction Projects

2.2. Evolution of Project Management Methodologies

The evolution of project management methodologies has experienced significant advancement throughout the years, mostly driven by the need to efficiently manage complex construction projects. The construction industry has experienced the development and implementation of several project management methodologies due to its unique characteristics and inherent challenges [10]. This section analyzes the evolution of project management technique in construction projects, focusing on important milestones and improvements that have had an impact on the industry's project management practices.

The project management triangle, also referred to as the three constraints, has been in existence since the 1950s [11]. The concepts it includes are as follows:

• The quality of the work is constrained by the project's characteristics, such as its scope, schedule, and available resources.

• The project manager possesses the capacity to engage in negotiations and make strategic tradeoffs among the three constraints.

• Any changes to one constraint will unavoidably need matching changes to the other two constraints. Initially, this triangular structure was associated with a theoretical concept referred to as the "big bang" paradigm. The extensive range was presented as a single entity. However, project managers started acknowledging the potential risks linked to employing a big-bang approach, which led them to develop alternate strategies. An approach was adopted to reduce the scope and carry out numerous deliveries in order to mitigate the impact of a potentially high-risk scenario. The implementation of this specific approach was marked by lower levels of uncertainty, enabling the team to successfully address any changes in the project's scope. A further evolution took place when the triangle experienced inversion [11].

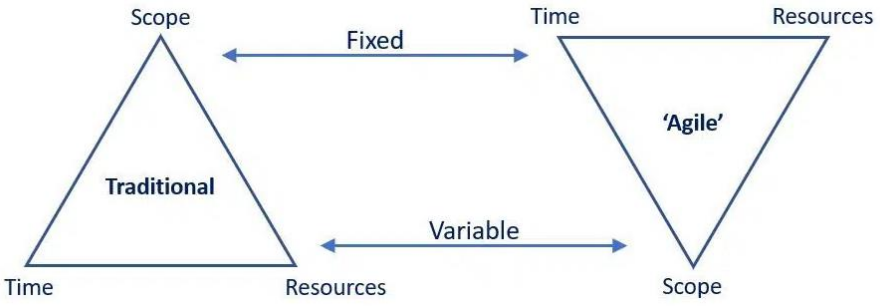

Figure 2: Traditional Iron Triangle vs. Agile Triangle

In order to attain success in any given project, it is imperative for team members to effectively manage the project in a manner that guides it towards successful outcomes. The endeavor to reduce the time of construction projects typically amplifies the intricacy of the project, hence presenting tangible challenges for the project team. The Agile technique is commonly employed to enhance the efficiency and effectiveness of various projects and processes. However, its implementation in the construction industry is relatively novel in the context of Egypt [12].

2.3. Agile VS. Traditional Project Management Methodologies

Construction projects have traditionally utilized standard project management methodologies, such as the Waterfall methodology. These approaches follow a linear and sequential method, where each phase is completed before moving on to the next phase. While this methodology provides a well-organized and transparent framework, it often lacks flexibility and adaptation, making it challenging to successfully handle changes and uncertainties that arise throughout construction projects [13].

In the 1950s, project management advanced with the Critical Path Method (CPM). CPM project management emphasizes crucial route identification. The critical path is the sequence of actions that determines project duration. CPM helps project managers plan and allocate resources by examining job interdependencies, improving efficiency and reducing delays [14].

Programme Evaluation and Review Technique (PERT) was created alongside the CPM. PERT was originally used for huge defense and aerospace projects and later adapted for construction projects. The PERT methodology uses probabilistic analysis to address project scheduling and resource allocation uncertainties. This strategy helps project managers assess how risks and uncertainties affect project outcomes, improving decision-making and risk management [15].

In the 1990s, Lean Construction arose as a proactive approach to construction waste and inefficiencies. Lean Manufacturing Inspired Lean Construction. It emphasizes eliminating non-value-added procedures, optimizing workflow, and improving stakeholder participation in a building project. This methodology emphasizes productivity, waste reduction, and continual improvement, resulting in better project outputs and client satisfaction [16].

Although Building Information Modelling (BIM) is not a project management approach, it has greatly impacted construction project management. Building Information Modelling (BIM) is a computerized depiction of a building's physical and operational attributes that facilitates project collaboration. This platform helps stakeholders share information, coordinate work, and make educated decisions. Building Information Modelling (BIM) improves communication, coordination, and visualization in construction projects, improving results and reducing risks [17].

Agile Project Management (APM) is becoming more common in various industries, including construction. Agile software development methodologies emphasize iterative and incremental development, improving adaptability and responsiveness to dynamic changes. APM encourages stakeholders to collaborate, communicate, and interact throughout the project's life cycle. This methodology is crucial in construction projects, where changes and uncertainties are common and stakeholder engagement is crucial [18].

Arefazar et al. [19] created a hierarchy of agile enablers for building project change management. To achieve the goal, 60 Iranian first-grade consultant and contractor organizations in the building industry were surveyed to identify the most important changes. After that, 12 building project change management experts were selected for semi-structured interviews. These interviews determined the best ways to address priority adjustments. The results show that agile change management strategies like continuous resource monitoring and enhancement, adaptable workflow, client involvement, facilitated communication, and requirement incorporation throughout the project work best. A recurring

and progressive procedure based on continuous learning and short-term planning accelerated change responsiveness.

Mohammed and Jasim [20] examined Agile project management and its impact on construction projects and identified its basic values and principles that might be applied in the Iraqi construction sector. The goal was to introduce Agile construction project management to Iraq. The researchers reviewed relevant scholarly literature to comprehend Agile project management, its methodology, and its impact on construction projects. The researchers next administered a questionnaire to a representative sample of expert engineers from the beneficiary, supervisory entity, designer, and contractor participating in the building project. The assessment showed that Iraqi construction projects may use Agile project management's four values. Additionally, eleven of the twelve Agile project management concepts can be used to Iraqi construction projects.

Lee et al. [21] proposed a quality and change management framework to mitigate the main risks associated with concurrent design and construction, iterative cycles caused by unanticipated errors and changes and their effects on project performance. In the dynamic planning and control methodology (DPM) system dynamics model, the proposed framework was integrated to assess the negative consequences of mistakes and alterations on construction performance. The Treble Cove road bridge in Massachusetts shows that DPM can be used for design and construction planning. Practitioners and scholars benefited from this since it addressed design and construction errors and changes.

Agile project management employs an iterative approach that facilitates the elucidation of clients' needs and requirements. The Agile methodology is well-suited for projects of a complicated nature, wherein the upfront specification of the product is challenging. The iterative process of testing and refining a prototype is commonly employed to ascertain consumer requirements. In the construction industry, a similar principle is applied whereby objectives are modified to align with the clients' requirements at any given point during the project's execution phase [22].

Agile processes and approaches have improved project management skills, productivity, quality, and business satisfaction. However, the agile approach's claims about rework and reversible development modifications may not be viable in some construction project phases. Team success depends on planning and managing complex relationships between design professionals, owners, users, and construction staff. APM-wise, this concept is inefficient. Agile techniques emphasize small, collaborative multi-disciplinary teams and good communication [21].

Customer communication can be facilitated through the implementation of agile management practices, which enable clients to swiftly utilize the product. Additionally, it affords the consumer the flexibility to alter their decision at any stage of the construction process. The Agile framework facilitates the resolution of difficulties during the execution phase by employing a flexible approach [23].

It is imperative to acknowledge that the utilization of Agile project management in construction projects remains a developing field of study. Although potential benefits exist, additional research is required to investigate the efficacy, scalability, and applicability of this approach across various construction projects. Furthermore, it is imperative to take into account practical factors such as contractual frameworks, client expectations, and industry norms during the implementation of Agile methodologies in the construction sector.

3. METHODOLOGY

3.1. Research Design

The study utilized a mixed-methods approach, inductive-analytical approach, combining both quantitative and qualitative methods for data gathering and analysis. This approach enhanced a comprehensive understanding of the subject of study and allowed for the validation of research conclusions through cross-validation. The study focused on important stakeholders involved in major development construction projects in Egypt, such as project managers, contractors, consultants, and clients.

3.2. Population and Sampling

The researchers utilized a purposive selection strategy to rigorously choose participants who had substantial expertise and experience in both the construction industry and Agile project management. The study included professionals from the construction sector, including Architects and Quantity Surveyors, who have experience in project management within the field.

3.3. Data Collection Tools

The questionnaire aimed to gather data regarding the key components of the Agile Project Management. This encompassed an analysis of its impact on costs, timeframe, and quality management, an investigation of the perceived benefits and challenges, an evaluation of stakeholders' attitudes and readiness, and the determination of recommended methods for achieving successful execution. The questionnaire comprised of closed-ended inquiries to collect both qualitative and quantitative data. (See appendix 1)

The questionnaire was distributed via online platforms or in person, with consideration given to the practicality and convenience for the participants. Clear instructions were provided to ensure the completion of the questionnaire. The duration of the data collecting period was decided by taking into account the intended sample size and the availability of possible participants.

- **Validity and Reliability**

The researchers calculated the reliability coefficient for each axis and the overall reliability coefficient for the questionnaire, as shown in the following table:

Table 1: The reliability coefficient of each dimension and the overall reliability of the questionnaire (Cronbach's alpha)

	Questionnaire topics	Cronbach's alpha	No. of items
1	**Barriers and Challenges in Traditional Project Management Framework**	**0.842**	**10**
2	Perceived Effectiveness of Agile Project Management Framework	0.878	7
3	**Stakeholders' Attitudes and Readiness towards Agile Project Management Framework**	**0.741**	**6**
4	Interactions over applying APM values	0.874	9
5	**Perceived Benefits and Challenges of Agile Project Management Implementation**	**0.853**	**9**
6	Strategies for Overcoming Implementation Barriers	0.782	6
Total		**0.973**	**47**

From the previous data, it is clear that the questionnaire has a high degree of reliability, as the Cronbach's alpha value for the questionnaire as a whole was 0.973, while the value of the reliability coefficient within the questionnaire's axes ranged between 0.741 to 0.878, and this makes it have a high degree of credibility.

3.4. Data Analysis

The data collected from the questionnaire underwent analysis using both qualitative and quantitative methodologies. The quantitative data was analyzed using statistical approaches, including descriptive statistics, frequencies, and correlations. The qualitative data was examined using theme analysis.

The researchers employed the Statistical Package for the Social Sciences (SPSS) to manipulate the study data. Descriptive statistical indicators were utilized for the analysis of the study data.

3.5. Ethical Considerations

The research procedure included ethical considerations such as maintaining participant confidentiality and obtaining informed permission. In terms of ethical considerations, the researchers implemented efforts to guarantee that all participants granted informed consent before to their participation in the study. The researchers scrupulously upheld the principles of secrecy and anonymity, using procedures to safeguard the participants' data. Moreover, the research was carried out in compliance with ethical norms, encompassing the principles of autonomy, non-maleficence, beneficence, and justice.

4. RESULTS

4.1. Analysis of Demographic Data

The sample consists of the project manager category at a rate of 18.5%, the percentage of Architect designer was 16.9%, the percentage of Civil Engineer was 17.7%, the percentage of Contractor/Sub-contractor was 13.7%, and the percentage of Consultant was 16.9%, and the categories The other category rate was 16.1%, as shown on the following table.

Table 2: Distribution of the sample according to the Job position variable

Job position	Frequency	Percentage %
Project manager	23	**18.5 %**
Architect designer	21	**16.9 %**
Civil engineer	22	**17.7 %**
Contractor/ Sub-contractor	17	**13.7 %**
Consultant	21	**16.9 %**
Other	20	**16.1 %**
Total	124	**100%**

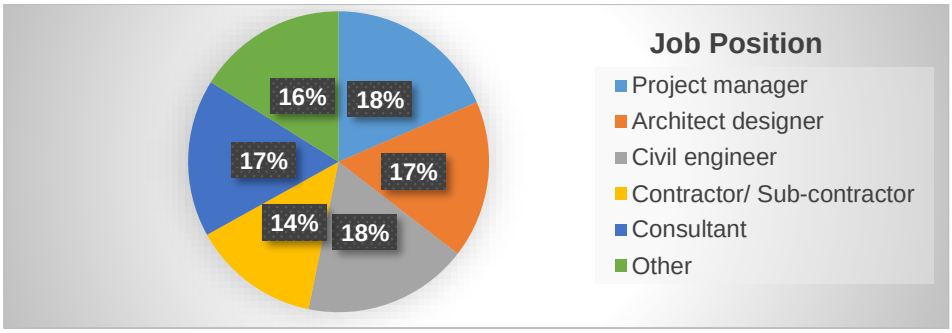

Figure 3: Distribution of the sample according to the Job position variable

It appears from the following table and figure that those with 1-5 years of experience had a percentage of 22.6%, those with 6-10 years of experience had 26.6%, those with 11-15 years of

experience had a percentage of 32.3%, and those with more than 15 years of experience. One year their percentage was 18.5%.

Table 3: Distribution of the sample according to the experience variable

Experience	Frequency	Percentage
1-5 years	28	**% 22.6**
6-10 years	33	**% 26.6**
11-15 years	40	**% 32.3**
More than 15 years	23	**% 18.5**
Total	124	**100%**

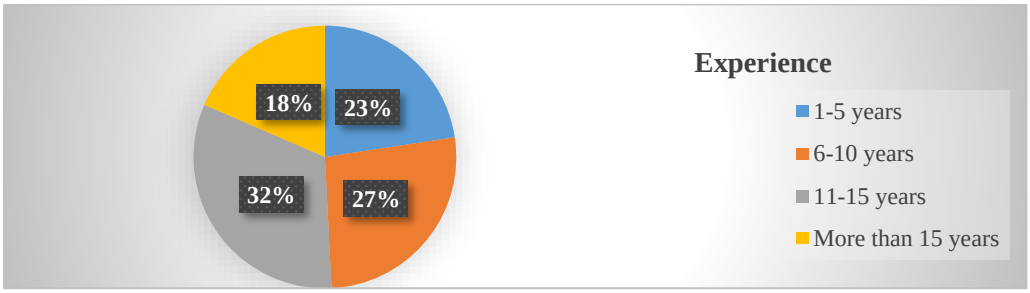

Figure 4: Distribution of the sample according to the experience variable

It appears from the following table and figure that the types of construction projects were 18.5% Residential, 19.4% Commercial, 23.4% Industrial, 16.9% Infrastructure, and 21.8% Others.

Table 4: Distribution of the sample according to the Types of construction projects variable

Types of construction projects	Frequency	Percentage
Residential	23	**18.5 %**
Commercial	24	**19.4 %**
Industrial	29	**23.4 %**
Infrastructure	21	**16.9 %**
Other	27	**21.8 %**
Total	124	**100%**

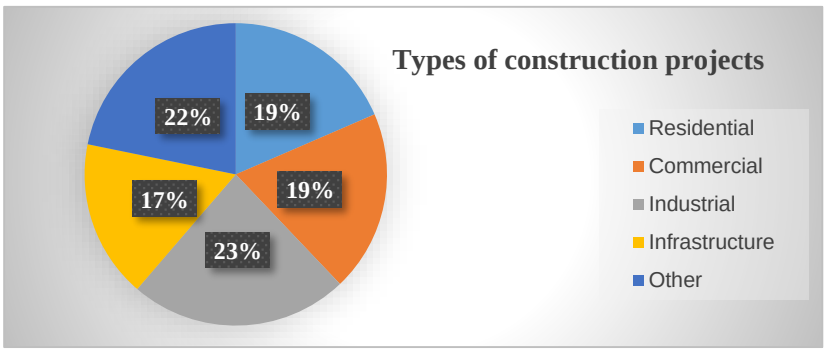

Figure 5: Distribution of the sample according to the Types of construction projects variable

4.2. Analysis Questionnaire axes

- **Section 1:** Barriers and Challenges in Traditional Project Management Framework

It is clear from the table (5) that statement No. 2 was at the first level with the highest average of 4.27 and a standard deviation of 0.827. The direction of the sample members' answers to this statement was strongly agree, and statement No. 7 was at the second level with an average of 4.24 and a standard deviation of 0.726.

The trend and the responses of the sample members to this statement was "I agree." Statement No. 8 was at the third level of MEAN with a mean of 4.22 and a standard deviation of 0.739. Statement No. 3 was at the fourth level with an average of 4.18 and a standard deviation of 0.875. Statement No. 10 was at the fifth level with an average of 4.17. And a standard deviation of 0.824. Statement No. 4 was in the sixth level with a mean of 4.15 and a standard deviation of 0.726. Statement No. 9 was in the seventh level with a mean of 4.14 and a standard deviation of 0.714, While statement No. 6 was in the eighth level with an arithmetic mean of 4.11 and a standard deviation of 0.838, and statement No. 1 was in the ninth level with an arithmetic mean of 4.04 and a standard deviation of 1.031, and finally statement No. 5 was in the tenth and last level with an arithmetic mean of 4.03 and a standard deviation of 0.762.

The arithmetic mean for this axis was 4.1540 and the standard deviation was 0.53714. The general trend of this axis was "Agree".

Table 5: Barriers and Challenges in Traditional Project Management Framework

S.	Mean	Standard deviation	Direction	Ranking
1	4.04	1.031	Strongly Agree	9
2	4.27	0.827	Strongly Agree	1
3	4.18	0.875	Agree	4
4	4.15	0.762	Agree	6
5	4.03	0.962	Agree	10
6	4.11	0.838	Agree	8
7	4.24	0.726	Agree	2
8	4.22	0.739	Agree	3
9	4.14	0.714	Agree	7
10	4.17	0.824	Agree	5
Total	4.1540	0.53714	Agree	

- **Section 2:** Perceived Effectiveness of Agile Project Management Framework

It appears from the next table that statement No. 12 came in first place with an arithmetic mean of 4.36 and a standard deviation of 0.714, and the direction of the study sample's answers was strongly agreeing, while statement No. 13 was in the second level with an arithmetic mean of 4.30 and a standard deviation of 0.686, and the direction of the sample's answers to this statement was agree. Statement

No. 11 came in third place with an arithmetic mean of 4.22 and a standard deviation of 0.728, and the trend of the sample's answers was agreeing.

Statement No. 17 came in fourth place with an arithmetic mean of 4.15 and a standard deviation of 0.813, and the trend of the sample's answers to this statement was agree, Paragraph No. 16 also came in fifth place with an arithmetic mean of 4.14 and a standard deviation of 0.810, and the trend of the sample's answers in this paragraph was AGREE, and phrase No. 15 was ranked sixth with an arithmetic mean of 4.14 and a standard deviation of 0.830, and the trend of the individuals' answers in this phrase was AGREE, and finally, phrase No. 14 was in It ranked seventh with a mean of 4.05 and a standard deviation of 0.873, and the direction of the sample members' answers to this statement was agree.

In general, the arithmetic mean for this axis as a whole was 4.1924 and its standard deviation was 0.59366, and the direction of the individuals' answers to this axis was agree.

Table 6: Perceived Effectiveness of Agile Project Management Framework

S.	Mean	Standard deviation	Direction	Ranking
11	4.22	0.728	Agree	3
12	4.36	0.714	Strongly Agree	1
13	4.30	0.686	Agree	2
14	4.05	0.873	Agree	7
15	4.14	0.830	Agree	6
16	4.14	0.810	Agree	5
17	4.15	0.813	Agree	4
	4.1924	0.59366	Agree	

- **Section 3:** Stakeholders' Attitudes and Readiness towards APM Framework

It is clear from the next table that statement No. 21 came in first place with an arithmetic mean of 4.27 and a standard deviation of 0.827, and the trend of individuals' answers to this statement was strongly agree, while paragraph No. 22 came in second place with an arithmetic mean of 4.18 and a standard deviation of 0.875, and the trend of individuals' answers to This statement is agree, and statement No. 23 was in third place with an arithmetic mean of 4.15 and a standard deviation of 0.762, and the direction of the individuals' answers to this statement was agree, while statement No. 18 was in the fourth level with an arithmetic mean of 4.08 and a standard deviation of 0.861, and the direction of the sample members' answers was agree, as Item 20 came in the fifth level with a mean of 4.04 and a standard deviation of 1.031, The trend of the sample members' answers was strongly agree, while statement No. 19 was at the sixth level with an arithmetic mean of 3.98 and a standard deviation of 0.915, and the sample members' answers trend was agree.

In general, the arithmetic mean for the axis as a whole was 4.1142 and the standard deviation was 0.58256, and the general trend of the sample members' answers was agreeing.

Table 7: Stakeholders' Attitudes and Readiness towards Agile Project Management Framework

S.	Mean	Standard deviation	Direction	Ranking
18	4.08	0.861	Agree	4
19	3.98	0.915	Agree	6
20	4.04	1.031	Strongly Agree	5
21	4.27	0.827	Strongly Agree	1
22	4.18	0.875	Agree	2
23	4.15	0.762	Agree	3
Total	4.1142	0.58256	Agree	

Section 4: Interactions over applying APM values.

It is clear from the following table that statement No. 31 came in the first level with an arithmetic mean of 4.36 and a standard deviation of 0.714, and the trend of the sample members' answers to this statement was strongly agree. Statement No. 32 was in the second level with an arithmetic mean of 4.30 and a standard deviation of 0.686, and the trend of the sample members' answers to this The statement is "Agree." Statement No. 26 came at the third level with an arithmetic mean of 4.24 and a standard deviation of 0.726, and the trend of the answers of the members of this sample was "Agree," while paragraph No. 27 came at the fourth level with an arithmetic mean of 4.22 and a standard deviation of 0.739, and the trend of the answers of the sample members was agreeing to this statement. Also, statement No. 30 in the fifth level came equally with the arithmetic mean of item No. 27, which was 4.22 and with a standard deviation of 0.728, and the trend of the sample members' answers to this statement was agree.

Statement No. 29 came at the sixth level with an arithmetic mean of 4.17 and a standard deviation of 0.824, and the trend of the sample's answers to this statement was agree, while statement No. 28 came at the seventh level with an arithmetic mean of 4.14 and a standard deviation of 0.714, and the trend of the sample's answers in this statement was agree, and statement No. 25 in the eighth level, with an arithmetic mean of 4.11 and a standard deviation of 0.838, and the direction of the sample members' answers to this statement was agree. Finally, the first paragraph came in last place with an arithmetic mean of 4.03 and a standard deviation of 0.962, and the direction of the sample members' answers to this statement was agree.

In general, the arithmetic mean for this axis was 4.1989 and the standard deviation was 0.54677, and the general trend of the sample members' answers on this axis was AGREE.

Table 8 Interactions over applying APM values

S.	Mean	Standard deviation	Direction	Ranking
24	4.03	0.962	Agree	9
25	4.11	0.838	Agree	8
26	4.24	0.726	Agree	3
27	4.22	0.739	Agree	4
28	4.14	0.714	Agree	7
29	4.17	0.824	Agree	6
30	4.22	0.728	Agree	5
31	4.36	0.714	Strongly Agree	1
32	4.30	0.686	Agree	2
Total	4.1989	0.54677	Agree	

- **Section 5:** Perceived Benefits and Challenges of Agile Project Management Implementation

It is clear from the following table that statement No. 40 came at the first level with a mean of 4.27 and a standard deviation of 0.827, and the direction of the sample members' answers to this statement was strongly agree. Statement No. 41 came in the second level with a mean of 4.18 and a standard deviation of 0.875, and the direction of the sample members' answers to this statement was "I agree." Statement No. 36 came in the third level with a mean of 4.15 and a standard deviation of 0.813, and the direction of the answers of the members of this sample was "I agree," while paragraph No. 35 came in the fourth level with a mean of 4.14 and a standard deviation of 0.810, and the direction of the answers of the sample members was agreeing towards this statement. Statement No. 34 is at the fifth level with

a mean of 4.14 and a standard deviation of 0.830. The direction of the sample members' answers to this statement was in agreement.

Statement No. 37 came at the sixth level with an arithmetic mean of 4.08 and a standard deviation of 0.861, and the trend of the sample's answers to this statement was agreeable, while statement No. 33 came at the seventh level with an arithmetic mean of 4.05 and a standard deviation of 0.873, and the trend of the sample's answers to this statement was agreeable, and statement No. 39 At the eighth level, with a mean of 4.04 and a standard deviation of 1.031, and the sample trend, the members' answers to this statement were strongly agree.

In general, the arithmetic mean for this axis was 4.1120 and the standard deviation was 0.59211, and the general trend of the sample members' answers on this axis was agreeable.

Table 9: Perceived Benefits and Challenges of Agile Project Management Implementation

S.	Mean	Standard deviation	Direction	Ranking
33	4.05	0.873	Agree	7
34	4.14	0.830	Agree	5
35	4.14	0.810	Agree	4
36	4.15	0.813	Agree	3
37	4.08	0.861	Agree	6
38	3.98	0.915	Agree	9
39	4.04	1.031	Strongly Agree	8
40	4.27	0.827	Strongly Agree	1
41	4.18	0.875	Agree	2
Total	4.1120	0.59211	Agree	

- **Section 6:** Strategies for Overcoming Implementation Barriers

It is clear from the following table that statement No. 45 came at the first level with a mean of 4.24 and a standard deviation of 0.726, and the direction of the sample members' answers to this statement was agreeable. Statement No. 46 came in the second level, with a mean of 4.22 and a standard deviation of 0.739, and the direction of the sample members' answers to this statement was "I agree." Statement No. 42 came at the third level with an arithmetic mean of 4.15 and a standard deviation of 0.762, and the trend of the answers of the members of this sample was "I agree," while paragraph No. 47 came at the fourth level with a mean of 4.14 and a standard deviation of 0.714, and the trend of the answers of the sample members was toward This statement is AGREE, while statement No. 44 is at the fifth level with an arithmetic mean of 4.11 and a standard deviation of 0.838. The direction of the sample members' answers to this statement was consistent, Statement No. 43 came in the sixth and final level with a mean of 4.03 and a standard deviation of 0.962, and the direction of the sample members' answers to this statement was AGREE.

In general, the arithmetic mean for this axis was 4.1478 and the standard deviation was 0.54978, and the general trend of the sample members' answers on this axis was agree.

Table 10 Strategies for Overcoming Implementation Barriers

S.	Mean	Standard deviation	Direction	Ranking
42	4.15	0.762	Agree	3
43	4.03	0.962	Agree	6
44	4.11	0.838	Agree	5
45	4.24	0.726	Agree	1
46	4.22	0.739	Agree	2
47	4.14	0.714	Agree	4

Total	4.1478	0.54978	Agree

5. DISCUSSION AND CONCLUSION

5.1. Discussion of the main Findings

The construction industry is characterized as a very dynamic and competitive sector, with a consensus among nearly all respondents. The presence of a substantial number of stakeholders and parties involved in the construction process poses challenges in project management. As the world evolves, the management of projects must also adapt, particularly when faced with increasing degrees of complexity. We must effectively handle the changes that occur in the external environment. Each project possesses its distinct characteristics, as previously said. Acquiring a novel management style that embraces and effectively handles change is a commendable endeavor. The majority of projects include some degree of change; therefore, it makes perfect sense to consider it [24].

There is a strong, statistically significant relationship at the significance level ($\alpha \geq 0.05$) between stakeholder attitudes and readiness towards the agile project management framework and interactions around the application of APM values, so it can be said that applying agile project management attracts stakeholders to prepare towards the project management framework and interactions around Apply APM values unlike traditional project management. This signifies a positive shift in how stakeholders perceive the situation, in contrast with prior findings. Prior research may have indicated a gap between stakeholder perspectives and their readiness to adopt APM principles [21-23]. This indicates a significant shift in stakeholder attitudes and readiness, possibly impacted by an increasing recognition of the advantages of APM in the construction sector.

There is a strong, statistically significant relationship at the significance level ($\alpha \geq 0.05$) between the perceived benefits and challenges of implementing agile project management and strategies for overcoming implementation obstacles, which indicates that there are many benefits that can be realized when applying agile project management, which are based on modern strategies that help in overcoming obstacles in contrast to traditional project management. Prior findings may have suggested a stronger emphasis on the obstacles and challenges related to implementing agile methodologies, with less attention given to the potential advantages and approaches to tackle these challenges [26,27]. The results of the present study indicate the importance of adopting a more balanced viewpoint, acknowledging the advantages and implementing proactive measures to address challenges.

The findings underscore the changing environment in the construction sector, specifically concerning project management methodologies. The increasing convergence of stakeholder attitudes and readiness for APM, along with a more balanced comprehension of the advantages and challenges of agile approaches, signifies a rising acceptance and integration of agile principles in construction projects. The evolution is likely influenced by a more profound comprehension of the potential benefits of agile project management and a proactive strategy for tackling implementation obstacles.

CONCLUSION

The adoption and adaptation of agile methods might be a substantial challenge due to the time commitment involved. The adoption of a collaboration culture has greatly enhanced the capacity to function in an agile manner. The shift from Traditional Project Management to Agile Project Management takes place when the team acquires a thorough comprehension of efficient project development methodologies and builds a structure for effectively handling fluctuating customer requirements.

Implementing agility in building projects normally necessitates a time period of around three to four years. The architectural integrity of the building remains unchanged, while changes are made to the

project's amenities to suit their approach. Agile can be understood as a cognitive framework. To summarize, this study has successfully defined the core principles of traditional project management and agile management, and has analyzed their practical application in the context of construction projects.

LIMITATIONS

The study appropriately recognized the inherent limitations of the research, such as the sample size and the potential biases that may have influenced the findings. It is important to mention that the study used a rather small sample size, which may raise issues about how well it represents the greater community. Furthermore, the study exclusively focused on development construction projects in Egypt, limiting the generalizability of the findings to other contexts. Furthermore, the research relied on self-reported data, which could have introduced biases and mistakes.

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APPENDIX

Appendix (1): Questionnaire: 5-likert Questionnaire

Section A: Gathering demographic data

1. Please provide your role within construction projects (e.g., project manager, architect, engineer).

- Project manager
- Architect designer
- Civil engineer
- Consultant
- Contractor/ Sub-contractor
- Other (Please Specify _____)

2. Years of professional experience in the construction industry

- 1-5 years
- 6-10 years
- 11-15 years
- More than 15 years

3. What types of construction projects have you been involved in? (Select all that apply)

- Residential
- Commercial
- Industrial
- Infrastructure
- Other (please specify _____)
-

[27] Note: The 5-Likert scale ranges from "1= Strongly disagree" to "5 = Strongly agree", depending on the question.

S.	Sentence	1	2	3	4	5
Section 1: Barriers and Challenges in Traditional Project Management Framework						
	The traditional project management framework is inflexible in adapting to changing project requirements					
	Communication and collaboration among project teams and stakeholders are inadequate in the traditional project management framework.					
	Managing and controlling project scope and requirements is challenging within the traditional project management framework.					
	The traditional project management framework struggles to respond to unexpected changes or disruptions during the project.					
	Estimating and managing project costs and budgets is difficult within the traditional project management framework.					
	Resource allocation and utilization are inefficient within the traditional project management framework.					
	There is resistance to change and a traditional mindset towards project management methodologies within the traditional framework.					
	Risk management and mitigation strategies are ineffective within the traditional project management framework.					
	Transparency and visibility into project progress and performance are limited within the traditional project management framework.					
	The traditional project management framework struggles to meet evolving customer or stakeholder expectations and demands.					
Section 2: Perceived Effectiveness of Agile Project Management Framework						
	I have a good understanding of Agile project management concepts, principles, and practices					
	Agile project management can bring significant benefits to construction projects.					
	I have previous experience or exposure to Agile methodologies in construction projects					
	Agile project management can improve cost control in construction projects					
	Agile project management can improve project duration control and scheduling in construction projects					
	Agile Project Management framework is effective in integrating time, quality, and cost in construction projects.					
	Agile Project Management framework is likely to enhance overall project quality and reduce defects.					
Section 3: Stakeholders' Attitudes and Readiness towards Agile Project Management Framework						
	I am open to adopting Agile Project Management practices in construction projects.					
	I feel confident in my ability to adapt to Agile Project Management methodologies.					
	I believe that other stakeholders in the construction industry are receptive to Agile principles.					
	To give both the employee and the employer a sense of joint responsibility for the completion of the project affect the success of the construction project					
	The presence of a multi-functional team and skills and competencies in the construction project with the authority to work collectively and in a cooperative way, helps to complete the construction project within the specified period and prevents the delay when compared to working individually					
	I am willing to invest time and resources in learning and implementing Agile Project Management.					
Section 4: Interactions over applying APM values						
	Focusing on the importance of the staff working on the construction project and their interactions will lead to help to succeed the tasks of project management more than focusing on items of work and tools only					
	Focusing on enabling the staff working on the construction project to perform their work and encourage them to work collectively will reduce delay					
	Processes and tools are developed to increase and facilitate interaction between project workers to accomplish their work, not to replace them					
	The use of modern software in project management, electronic documentation, build a database, etc. will help make smart and correct decisions fast by the construction project manager					
	Following an administrative approach depends on the completion of the basic requirements only in the contracting stage and developing the required details with the project progress, will help complete the project within specified time and cost when compared with the traditional approach.					

	The use of an administrative approach based on the spirit of trust and partnership between the project team and its beneficiaries will ensure the success of the construction project					
	Following an approach that responds to changes during the construction project execution by making flexible alternative plans, which are pre-agreed to deal with these changes ensure the project's success					
	Dividing the project's work activities into repetitive processes that contains specific objectives and time, and all obstacles are discussed at the beginning of each process, will lead to accomplish the work very quickly and avoid the errors that occur in each process					
	The existence of a flexible design so that changes can be made during the execution phase of the construction projects, affects the success of the construction project					
Section 5: Perceived Benefits and Challenges of Agile Project Management Implementation						
	Implementing Agile Project Management has potential benefits in construction projects in Egypt.					
	Agile Project Management can significantly improve project outcomes in the construction industry.					
	Agile Project Management has the potential to revolutionize project management practices in Egypt.					
	Agile Project Management can lead to better collaboration and communication among project stakeholders.					
	I anticipate challenges in implementing Agile Project Management in the construction industry.					
	Contractual frameworks in construction projects are potential obstacles to Agile implementation					
	The organizational culture in construction projects is a potential barrier to implementing Agile project management					
	Stakeholder resistance could impede the adoption of Agile methodologies in construction projects					
	I am concerned about the adaptability of the Agile approach in traditional construction practices.					
Section 5: Strategies for Overcoming Implementation Barriers						
	Clear communication and education are essential for successful Agile Project Management implementation.					
	Providing adequate training and support for project teams is crucial for Agile adoption.					
	Addressing resistance to change is necessary for successful Agile implementation.					
	Promoting a culture of continuous improvement is important for Agile Project Management success.					
	Having an integrated risk management plan that is expected to occur in the construction project will help to success the construction project					
	Setting time periods in the construction project during each period can conduct a review of project operations and take prompt corrective actions when necessary, helps the success of the construction project within the required time, cost and quality					

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