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Assessing Innovation Practices in Project Management: The case of Palestinian Construction Projects

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ABSTRACT: Project management is regarded as one of the most important tools that have been used to maximize the probability of having a successful project. Nevertheless, most projects fail to achieve their goals, and this is to the detriment of the organizational competitive advantage. In this dilemma, innovation practices have become the engine through which methods, relationships, and processes of project management can be enhanced to increase project successfulness and competitive advantage. The purpose of this study is to investigate the innovation practices in the construction project management process in the Palestinian construction sector. A mixed methods methodology has been used in this research using semi-structured interviews with key project managers and questionnaire deployment. A total of 365 questionnaires were conducted in the consulting and contracting firms that operate in the construction projects sector in Palestine, with an overall response rate of 52.4.%, allowing the testing of a number of theoretical hypotheses. The analysis of the results showed that there is a statistically significant relationship at a significant level ($\alpha \leq 0.05$) between five innovation practices: (1) Strategic Management, (2) Internal Innovative Working Environment, (3) External Innovative Working Environment, (4) Stakeholders Management, and (5) Project Management. The value of this research is the identification of the main innovative practices being used in the construction projects in the context of a developing country like Palestine, and the extent to which these practices are being applied.

KEYWORDS: Project Management; Innovation; Construction Industry; Palestine; Mixed Methodology.

1 INTRODUCTION

Nowadays, the construction industry has been built on the need of the world's inhabitants to provide shelter, harness energy, and create public access [1]. The Construction industry is that part of the economy that deals with the design, construction, maintenance, and utilization as well as with the modulation, modification and demolition or deconstruction of constructs[2]. Construction is a unique environment and by definition is a creative industry [3]. It is a powerful sector that provides jobs and stimulating growth for other construction-related economic activities, such as: factories of ready mix concrete, stone saws, brick, and tiles. However, it is a tough business with a very demanding and stressful process [4]. It is often viewed as being stubborn, risk averse and old-fashioned [5]. It is also characterized by having many players of multiple disciplines who are brought together at various stages throughout a single project [6]. Compared to most other industries, construction projects involve relatively intensive labor use, and consume large amount of materials and physical tools [7]. They are also subject to a variety of laws and regulations that aim to ensure public safety and minimize environmental impacts [8]. All these characteristics suggest that this industry is confronted by "wicked problems" [9].

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Construction plays a significant role in developing countries, including the Palestine's economy. According to PCBS [10], it contributes around 15.4% to Palestine GDP and it constitutes about 14.9% of its workforce. However, like the construction industry in other developing countries, where projects are highly uncertain, and operate in a highly unstable, unpredictable and poorly resourced environment [7], the construction industry in Palestine is in a crisis and challenged by many problems, such as: the stakeholders are less experienced in project management and strategic management, lack of internal and external innovative working environment, construction workers are almost unskilled and with little education, no social security benefits for workers, and the connectivity of Palestine's economy to the Israeli economy that is a fatal threat to the industry.

The local construction industry is one of the main economic engine sectors that supports the Palestinian national economy. Nevertheless, the construction sector has long been suffering from its lack of innovation that has negative effects on project management, capability of organizations and creativity of the employees. This research inquiry is based on the hypothesis that the construction project management, when integrated with innovation, can offer potential solutions to construction wicked problems and can, at the end, lead to really successful construction projects, from a point of view of all stakeholders involved to complete a specific project. Thus, the overall aim of this study is to explore the innovation practices used in the Palestinian construction project management, and then assessing to what extent these practices are being implemented. Such evaluation is very important to assist firms in understanding their strengths and weakness, and to enhance their ability to move from survival strategies to innovative culture with a long- term sustainability.

In response to this, Tushman and Nadler [11] stressed that organizations can gain competitive advantage only by managing effectively for today while simultaneously creating innovation for tomorrow. Moreover, Hamel [12] stated, while not every innovation practice will result in competitive advantage, it is not an excuse not to innovate because the more you are innovative, the greater the chance of reaping a huge return.

The desire for innovation in the construction has been recognized by different authors. Barrett et al. [13] remarked that successful innovation enables construction firms to better satisfy the aspirations and needs of society and clients. Eaton [14] declared, without innovation a business does not have a rational source of competitive advantage in construction. In addition, Gann [15] stated that construction firms need to improve their capabilities in managing innovation if they are to build reputations for technical excellence that set them apart from more traditional players. According to Blayse and Manley [16],organizations need to innovate to win projects. However, a major dilemma is how innovation can be stimulated in the construction sector.Kavanagh and Naughton [17] argued that project management can drive a nation's capability of innovation. Project management is one of the most important tools that have been used to maximize the probability of having a successful construction project. It plays important roles in planning, coordination, control and execution of construction projects, and it has provided efficient tools and many techniques for engineering and construction firms.

2 INNOVATION PRACTICES IN CONSTRUCTION PROJECT MANAGEMENT

Project management today is a matter of survival for many organizations. Today, organizations do not have the choice whether or not to adapt project management approach, but on how well project management is implemented [20]. Project management involves the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholders' needs and expectations from a project [21]. According to Hendrickson [22], the Project Management Institute focuses on nine distinct areas requiring project manager knowledge and attention: (1) *Project integration management* to ensure that the various project elements are effectively coordinated, (2) *Project scope management* to ensure that all the work required (and only the required work) is included, (3) *Project time management* to provide an effective project schedule, (4) *Project cost management* to identify needed resources and maintain budget control, (5) *Project quality management* to ensure functional requirements are met, (6) *Project human resource management* to development and effectively employ project personnel, (7) *Project communications management* to ensure effective internal and external communications, (8) *Project risk management* to analyze and mitigate potential risks, and (9) *Project procurement management* to obtain necessary resources from external sources. The summary of the nine areas form the basis of the Project Management Institute is shown in Fig. 1. From a construction industry perspective, Casey [23] defined construction management as delivering a product according to specification and stakeholder expectations. While, Walker [24] defined construction management as the planning, co-ordination and control of a project from conception to completion on behalf of a client requiring the identification of the client's objectives in terms of utility, function, quality, time and cost, and the establishment of relationships between resources, integrating, monitoring and controlling the contributors to the project and their output, and evaluating and selecting alternatives in pursuit of the client's satisfaction with the project outcome.

1. Integration Management 1.1 Project Plan Development 1.2 Project Plan Execution 1.3 Integrated Change Control	**2. Scope Management** 2.1 Initiation 2.2 Scope Planning 2.3 Scope Definition 2.4 Scope Verification 2.5 Scope Change Control	**3. Time Management** 3.1 Activity Definition 3.2 Activity Sequencing 3.3 Activity Duration Estimating 3.4 Schedule Development 3.5 Schedule Control
4. Cost Management 4.1 Resource Planning 4.2 Cost Estimating 4.3 Cost Budgeting 4.4 Cost Control	**5. Quality Management** 5.1 Quality Planning 5.2 Quality Assurance 5.3 Quality Control	**6. HR Management** 6.1 Organizational Planning 6.2 Staff Acquisition 6.3 Team Development
7. Communications Management 7.1 Communications Planning 7.2 Information Distribution 7.3 Performance Reporting 7.4 Administrative	**8. Risk Management** 8.1 Risk Identification 8.2 Quantitative Risk Analysis 8.3 Risk Response Planning 8.4 Risk Monitoring and Control	**9. Procurement Management** 9.1 Procurement Planning 9.2 Solicitation Planning 9.3 Solicitation 9.4 Source Selection 9.5 Contract Administration 9.6 Contract Closeout

Fig. 1.PMI's Nine Project Management knowledge Areas

Unfortunately, management in the construction industry has been characterized as being weak, insufficient, nebulous, backward and slow to react to changing conditions [25].Thus, the project management need to be more dynamic and flexible to cope with challenges. As mentioned by Newton [26], construction innovation may become a fourth performance dimension in the future in addition added to the traditional dimensions of cost, quality and time.

When defining innovation it is necessary to recognize that innovation is not invention [27]. Invention is a new product, innovation is a new customer benefit, invention is the conversion of cash into ideas and innovation is the conversion of ideas into cash. Projects are vehicles of the transition from invention to innovation [28]. Galbraith [29] defines innovation as the application of a new idea to create a new process or product that can differentiate a company and maintain it fit as environmental forces and competitors' strategies change. Drucker [30] explained that innovation is the process that creates markets that nobody before even imagined. Zuckerman Committee [31] defined innovation as a series of technical, industrial and commercial steps. Whereas Pinchot and Pinchot [32] enlarged the scope of the term by relating it to the methods, relationships and processes of the organization. In general, DOC [33] defined innovation as the design, development, and implementation of new or altered products, services, processes, organizational structures, and business models to create value for the customer and financial returns for the firm practicing innovation. In order to stimulate innovation in construction sector, it is important to recognize that innovation in construction is not confined to new technological inventions [34]. According to CERF and Washington [35], innovation in construction is perceived as: *"The act of introducing and using new ideas, technologies, products and/or processes aimed to solve problems, viewing things differently, improving efficiency and effectiveness, or enhancing the standard of living".*

An increased interest has been placed on understanding which practices affect more substantially the innovation capability of the company [36]. Based on experiences in innovation consulting for different branches, Kearney [36] has developed the "House of Innovation" model. This model depicts the most important building blocks of successful innovation management. It tests innovation practices, according to four dimensions: (1) An innovation strategy that is aligned with the business strategy, (2) An organization that drives innovation by its structure and culture, (3) A product-life-cycle process that continually develops the capabilities for idea generation, and (4) Enabling factors for innovation management. In the same context, Neely and Hii [38]posit that the innovation capacity of a firm regards three interrelated perspectives: (1) culture, (2) internal processes and (3) external environment.

From a construction perspective, Seaden and Manseau[39] argued that innovation in construction regards the linkages between four important factors: (1) business environment, (2) business strategy, (3) innovative practices, and (4) business outcomes. While, Dikmen et al. [40]argued in their conceptual framework that innovation in construction regards the linkages between other four distinguished factors that are: (1) objectives, (2) strategies, (3) environmental barriers/drivers, and (4) organizational factors. According to the extensive literature review, and as shown in Table 1, 26 factors that may affect innovation in construction were identified. Factors of similar nature were grouped together; giving rise to four main

groups, that are: (1) Strategic Management, (2) Internal Innovative Work Environment, (3) External Innovative Work Environment and (4) Stakeholder Management. It is assumed that organizations wanting to enhance project management competencies and improve their innovation performance should consider adopting similar practices.

Table 1. Innovation Practices in the Construction Project Management

Strategic Management	**Stakeholder's Management**
1. Establishing a vision which embraces innovation 2. Establishing SMART objectives 3. Formulating Strategies 4. Conducting internal audit "Strength & Weakness" 5. Conducting external audit "Opportunities & Threats"	1. Identifying Stakeholders 2. Exploring stakeholders' needs and constraints to projects 3. Analyzing conflicts among stakeholders 4. Ensuring effective communication between stakeholders 5. Evaluation the stakeholder satisfaction 6. Stakeholder involvement in decision-making 7. Keeping and promoting an ongoing relationship with stakeholders
Internal Innovative Work Environment	**External Innovative Work Environment**
1. Employee motivation and job satisfaction 2. Provide appropriate internal conditions for workers in terms of ventilation, lighting, services, tools, etc. 3. Provide innovative culture in the organization 4. Dynamic, open minded and supportive top management 5. Provide rewards and recognition for creative work 6. Workloads are managed to ensure staff have sufficient time to pursue innovation 7. Provide training for employees	1. Responding to change in customer needs 2. Utilization of new technology 3. Dealing with social and environmental variables 4. Dealing with the economic and political variables 5. Collaborate and communicate with competitors 6. Collaborate and communicate with suppliers 7. Reacting to market changes and consequently competitiveness

2.1 STRATEGIC MANAGEMENT

Strategic management consists of the analysis, decisions, and actions an organization undertakes in order to create and sustain competitive advantages [41]. Strategic management consists of two parts of the analysis: the analysis of strategic goals and the analysis of the internal and external environment of the organization. To make strategic analysis, this requires managers to define the corporate vision & mission, specify SMART objectives and develop realistic strategies. Without a vision of where the company is going, often there can be limited success in innovation [42]. While the identification of a clear mission for a project is widely considered essential for the effective management of stakeholders [43]. In addition, objectives should be stated as action verbs and appropriate strategy is needed to state how the organization will achieve its objectives. On the other side, to make environmental analysis, SWOT (Strengths, Weaknesses, Opportunities and Threats)analysis is the most important environmental scanning technique [44]. A good SWOT analysis can help a company cope with change in both external and internal environments. The above is articulated more formally in the following hypothesis:

H1: There is a positive relationship between strategic management and project management.

2.2 INTERNAL INNOVATIVE WORK ENVIRONMENT

Prather [45] agrees that human factors are critically important in the innovation process, but adds that they need the right work environment. Innovation needs a good atmosphere in which to develop [42]. Innovation cannot flourish in a climate of job dissatisfaction where people do the minimum to keep their jobs [46]. For innovation to flourish, people need to be intrinsically motivated to perform [45]. There are a number of key internal factors to the construction firm that influence innovation, including the organizational climate for innovation, skills and capabilities of the workforce, availability of resources, top level commitment, and company strategy [47]. According to Ahmed [48], organizational culture is a major determinant of innovation. While Hana [49] stated that innovations could only turn out to be successful if they are supported by top management and if an innovative creative team is developed and composed of people that may be considered knowledge employees. In addition, Baldwin [42] argued that the better everyone in the company understands the goals and objectives of the company, the better this process of innovation should be. Based on this, the following hypothesis has been formulated:

H2: There is a positive relationship between internal innovative work environment and project management.

2.3 EXTERNAL INNOVATIVE WORK ENVIRONMENT

A critical component of successful innovation is the ability of a firm to exploit and utilize external knowledge from different sources of innovation [50]. The generation and utilization of knowledge depend on the frequency and density of the interactions with external sources of innovation and the firm's openness to external knowledge [51]. Organizations that do not recognize the impact of various innovations and have not adapted to changing environments have justifiably been forced out of the mainstream of construction activities [22].

Milliken [52] argued that the environmental uncertainty arises from the organization's inability to predict its environment, or in other words, to predict the factors that characterize its environment. According to Bourgeois [53], these factors are usually classified into two groups, general and task external business environment factors. The general environment is typically composed of factors such as social values, educational, political, economic, legal, behavioral, demographic, natural environment, natural resources, and technological [54]. Asheghian and Ebrahimi [55] argued further that the task environment is the closest environment of the organization and the elements that made it is influencing the organization directly. This environment is made up of factors such as consumers, competitors, suppliers, labor market, industrial and financial resources.

The construction literature provides insight into a number of possible variables from the external environment. According to Hana [49], in the process of innovation, knowledge is an essential element to help gain an advantage over other organizations. Gann [15] stated that government has a key role to play in promoting and supporting innovation in the production of the built environment. While Tatum [56] argued that development and effective use of new technology can provide important competitive advantages for engineering and construction firms. Articulated more formally as:

H3: There is a positive relationship between external innovative work environment and project management.

2.4 STAKEHOLDER MANAGEMENT

Project Management Institute [57] defined project stakeholders as individuals and organizations who are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or successful project completion. The checklist of stakeholders in a construction project is often large and would include the owners, project managers, designers, contractors, subcontractors, legal authorities, employees, suppliers, competitors, banks, etc. [58]. To ensure a successful project, the project team must identify the stakeholders, determine their requirements and expectations, and manage their influence in relation to the requirements [59]. An increasing number of studies have identified the importance of stakeholder management in construction projects. Freeman et al. [60] stated that identifying stakeholder interests is an important task to assess stakeholders and they also consider analyzing the conflicts and coalitions among stakeholders is an important step for stakeholder management. In the same context, Walker et al. [61] considered identifying stakeholder, prioritizing stakeholders, visualizing stakeholders, engaging stakeholders, and monitoring effectiveness of communication as the basic steps for stakeholder management. The leads to formulating the following hypothesis:

H4: There is a positive relationship between stakeholder management and project management.

The conceptual model, shown in Fig. 2, has been used to identify research hypotheses. In addition to the above four hypotheses, another five hypotheses were developed based on literature review presented above, to explore the relationships among the four practices that are:

H5: There is a positive relationship between strategic management and internal innovative work environment.

H6: There is a positive relationship between internal innovative work environment and external innovative work environment.

H7: There is a positive relationship between external innovative work environment and stakeholder management.

H8: There is a positive relationship between strategic management and external innovative work environment.

H9: There is a positive relationship between internal innovative work environment and stakeholder management.

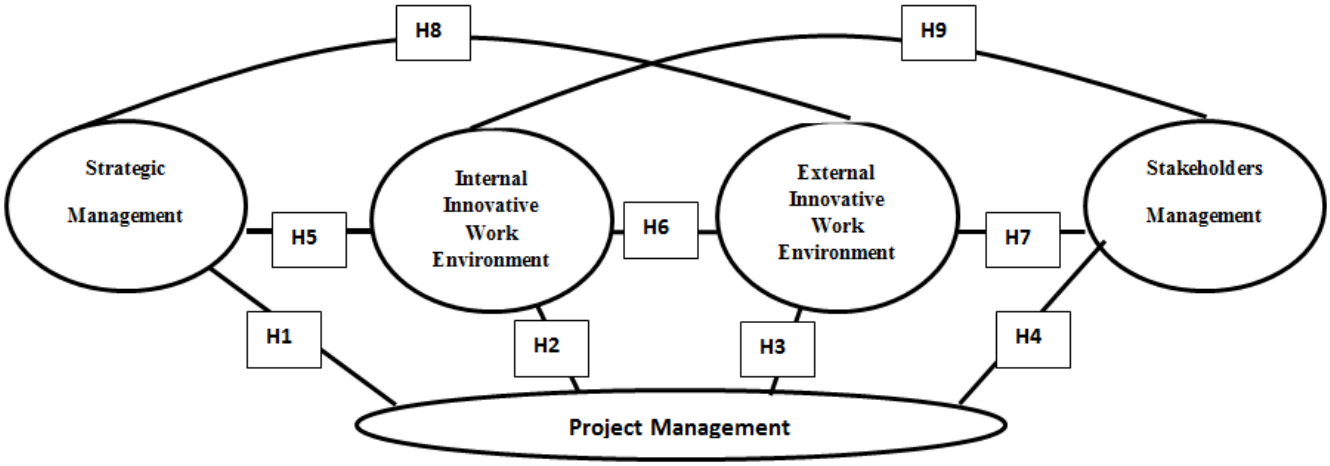

Fig. 2.Research Conceptual Model

3 RESEARCH METHODOLOGY

An exploratory research inquiry was used to identify and analyze the practices related to innovation in construction project management. Mixed methodology that combines both qualitative and quantitative data collection methods was used exploiting two different tools for data collection; questionnaire and semi-structured interviews. The questionnaire was used to get valid data needed to complete the quantitative analysis, and the semi-structured interviews were conducted with experts to generate themes of available practices of innovation in an effort to strengthen the findings of one data by using findings from the other.The target population of this study was the consulting and contracting firms that operate in Palestine. The selected contracting firms had a valid registration according to the Palestinian Contractors Union (PCU) under the 1st and 2nd classes. The selected consultanting firms consist of all consulting offices that had a valid membership of the Engineering Association in Palestine. According to the targeted area, the total number of available population is 697 (220 construction firms and 477 consulting firms). To obtain statistically representative sample size of the population, the following equation was used:

$$n = \frac{m}{1 + \frac{m-1}{N}}$$

Where

- n = correction for limited population
- N= population
- m = sample size, m, is calculated by using the following equation:

$$m = \frac{z^2 * p * (1-p)}{\varepsilon^2}$$

Where

- Z = value related to the confidence level (e.g. 1.96 to 95% confidence level)
- P = degree of variance between the elements of population (0.5)
- ε = maximum error (0.05)

Based on the results of sample size computation, the study needed 360 participants to complete the survey. For this study, more than 1000 postal and electronic questionnaires were distributed among managers of the participating organizations. However, the total number returned and useable was only 365 questionnaires. This represented a valid response rate of 52.4%.

At a first stage, data was collected from a focus group of seven experts working in the construction industry and have an experience in their companies ranging from 20 to 25 years. This method was used for eliciting ideas, thoughts and perceptions from experts and also to understand the problems they are facing during managing their construction works. The collected ideas were then used, in addition to literature review findings, in formulating the questionnaire. After conducting the second stage of data collection through questionnaires, explained below, a final stage of data collection comprised of

semi-structured interviews to verify and investigate the level of innovation in construction project management. For this purpose, seven interviews were conducted with professionals working in construction and engineering firms to explain and verify the results. Notes have been made during each interview and patterns were matched with quantitative data analysis.

The questionnaires were comprised of two major parts. Part one was mainly designed to obtain general information regarding the participants' gender, type of organization, years of experience, and respondents' position. Part two of the questionnaire illustrates the factors influencing innovation practices. This part asked the respondents to rate their organization's performance in implementing these practices. All items in this section were measured with a five-point Likert scale ranging from 1 (not at all) to 5 (very large extent).The structure validity test was used to evaluate the validity of the questionnaire. Table 2 clarifies the Spearman correlation coefficient for each item of the practices and the total of the field. The P-values are less than 0.05, so the correlation coefficients are significant at $\alpha = 0.05$. Therefore, it can be said that the data are consistent and valid to be measured.

Table 2. Correlation Coefficient

Item	Number of Items	Spearman Correlation Coefficient	P-Value (Sig.)
Strategic Management	5	0.828	0.000*
Stakeholders' Management	7	0.848	0.000*
Internal Innovative Environmental work	7	0.853	0.000*
External Innovative Environmental work	7	0.729	0.000*
Project Management	9	0.852	0.000*

For ensuring the internal consistency of Likert scale of the questionnaire, Cronbach's Alpha test was used as shown in Table 3. For most purposes, the reliability coefficients above 0.7 are considered satisfactory [62]. The total reliability of the questionnaire is 0.939 that is excellent. As well as the values of the Cronbach's Alpha for all the variables are ranging between 0.732 and 0.943, which is good.

Table 3. Cronbach's Alpha Test

tem	Number of Items	Spearman Correlation Coefficient	P-Value (Sig.)
Strategic Management	5	0.905	Excellent
Stakeholders' Management	7	0.902	Excellent
Internal Innovative Environmental work	7	0.918	Excellent
External Innovative Environmental work	7	0.902	Excellent
Project Management	9	0.943	Excellent
Total	35	0.939	Excellent

4 DATA ANALYSIS AND RESULTS

Analysis of the questionnaire generated a number of insights about the construction industry and their project management in Palestine. Gender distribution confirms that the Palestinian construction industry is traditionally male-dominated sector, (66.6%) survey participants were men and (33.4%) of the participants were women. Moreover, 60% of the respondents have been working in consulting organizations while 40% have been working in contracting organizations. Also, 62% of the respondents have more than 15 years of experience, and only 3% of the respondents have less than 5 years of experience, while 14% have between 5 and 10 years of experience and 21% have between 5 and 10 years of experience. The results also show that 21% of the consultant participants are engineers, 18% are project managers, and 61% are firm managers. On the other hand, 13% of the contractor participants are engineers, 23% are project managers and 63% are firm managers. Thus, this is an indication that the questionnaire respondents are key persons in their firms. As shown previously in Fig. 2, the research conceptual model consists of nine hypotheses. These hypotheses were tested in two sets of correlations. The first one tests the correlation among the four innovation practices, presented in Table 1, and the second

one tests the correlation between project management and each one of the innovation practices. The bivariate correlations were calculated using the Spearman's correlation coefficient test. This test is based on assuming the null hypothesis (Ho) of existence of no significant relationship between the different groups.

Table 4. Correlation Coefficient among innovation practices

Innovation Practices	Spearman's Correlation	Strategic Management	Stakeholders' Management	Internal Innovative Work Environment	External Innovative Work Environment
Strategic Management	Correlation Coefficient	1.000*			
	P-value (Sig.)	0.000			
Stakeholders' Management	Correlation Coefficient	**0.705***	1.000*		
	P-value (Sig.)	0.000	0.000		
Internal Innovative Work Environment	Correlation Coefficient	**0.634***	**0.697***	1.000*	
	P-value (Sig.)	0.000	0.000	0.000	
External Innovative Work Environment	Correlation Coefficient	**0.529***	**0.568***	**0.542***	1.000*
	P-value (Sig.)	0.000	0.000	0.000	0.000

* Spearman's Correlation is significant at the 0.05 level

4.1 TESTING THE CORRELATION AMONG THE INNOVATION PRACTICES

This section discusses the first set of correlations that describes the relationship among the four innovation practices: (1) strategic management, (2) internal innovative work environment, (3) external innovative work environment and (4) stakeholder management. As shown in Table 4, all of the P-values are below$\propto = 0.05$, which means the rejection of (Ho) and the existence of significant relationships among the four innovation practices. Furthermore, the results show that "strategic management" and "stakeholders' management" have the greatest correlation (0.705). This result was also verified by Morrison and Wilson [63]. They argued that to create a favorable future, organization's stakeholders must be involved in envisioning the most desirable future and then in working together to make this vision a reality. Morrison and Wilson [63] also mentioned that the key to strategic management is to understand that people communicating and working together will create this future, not some words written down on paper.

4.2 TESTING THE CORRELATION BETWEEN PROJECT MANAGEMENT AND INNOVATION PRACTICES

This section discusses the second set of correlations that describes the relationship between project management and each one of the innovation practices. Kavanagh and Naughton [64] also addressed the link between innovation and project management. The finding entails that increasing levels of project management positively correlate with increasing level of innovations, that effectively supporting an existence of a link between innovation and project management. However, after a certain threshold, very high levels of project management become negatively correlated with innovation. As an explanation of this phenomenon, Kavanagh and Naughton[17] suggest that formal methods of project management can facilitate exploitation of existing knowledge, but hinder the exploration of new one. As shown in Table 5, all of the P-values are below$\propto = 0.05$, which means the rejection of (Ho) and that all innovation practices are positively related to project management. Moreover, the results show that "stakeholder management" and "project management" have the greatest correlation (0.661), which means that successful project management requires effective controlling and alignment with stakeholder management, especially in the construction sector. Both "Guidelines to the Project Management Body of Knowledge" [21], and "Guidelines to Quality in Project Management" [64] have also emphasized the importance of identifying and managing all relevant stakeholders in order to ensure the success of a project.

Table 5.Correlation Coefficient among innovation PM practices

Innovation Practices	Spearman's Correlation	Project Management
Strategic Management	Correlation Coefficient	0.629*
	P-value (Sig.)	0.000
Stakeholders' Management	Correlation Coefficient	0.661*
	P-value (Sig.)	0.000
Internal Innovative Work Environment	Correlation Coefficient	0.641*
	P-value (Sig.)	0.000
External Innovative Work Environment	Correlation Coefficient	0.550*
	P-value (Sig.)	0.000

* Spearman's Correlation is significant at the 0.05 level

In general, the correlation coefficients reported for both sets of correlations indicate the significance of innovation practices and project management. Therefore, the nine proposed hypotheses in the research conceptual model are accepted and their results are summarized in Fig. 3.

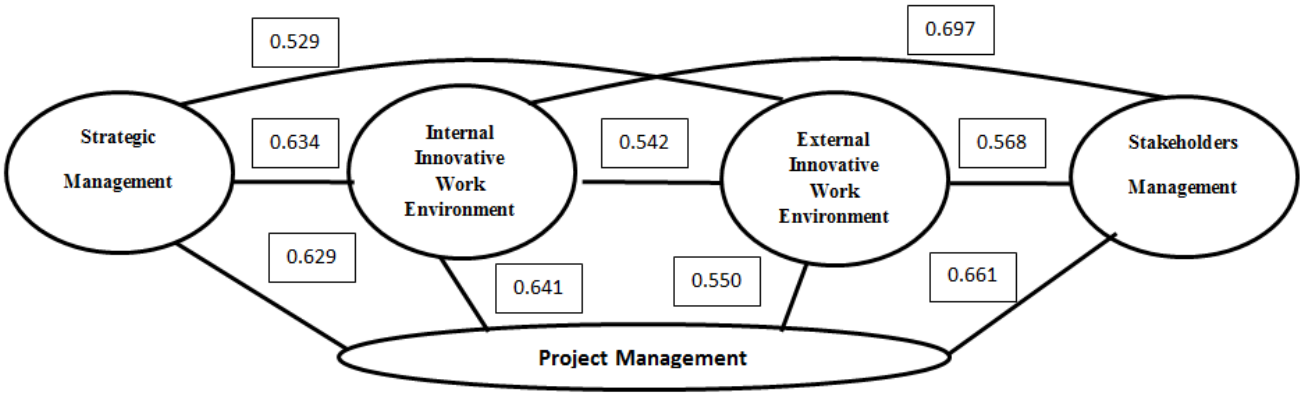

Fig. 3.Hypotheses Testing Results

5 INNOVATION ASSESSMENT

To assess to what extent do construction and engineering firms apply the innovation practices in Palestine, respondents were asked to rank the degree to which each survey item was practiced at their companies using a five- point likert scale. Respondents chose one of each of the following responses for each survey item: (1) not at all, (2) to a slight degree, (3) to a moderate extent, (4) to a great extent, and (5) to a very great extent. As shown in Table 6, descriptive statistics as well as Mann Whitney U statistic were used to show if there is a significant degree of agreement among the construction and engineering firms. In light of the above analysis, it can be noticed that the total average response to the innovation is (3.60) out of (5.00) which is considered high. Therefore, we can say that there is a high degree of innovation in the construction industry in Palestine. All the five (5) practices are incidentally accepted since they all have mean scores greater than (3.4) on a 5-point Likert scale. The findings reveal that the practice for which companies are most appropriate for the implementation is "stakeholders' management". Followed in order by "external innovative working environment", "project management", "strategic management", and "internal innovative working environment". Unfortunately, the findings show that the factors that contribute most to the causes of lack of innovation are internal work environmental related, such as: innovative culture, top management support, training for employees, motivation and reward systems. As a result, creating the appropriate conditions for employees is one means by which innovation can be fostered in organizations. By the interpretation of the P-values, it is observed that the P-values for all practices are greater than $\alpha = 0.05$, except the P-value of "stakeholders

management", it is smaller than α = 0.05. Thus, there is sufficient information to accept the Null Hypothesis and to declare that there is almost no difference between the two groups in terms of applying innovation practices in Palestinian construction sector.

Table 6. Application Degree for Innovation Practices

Rank	Innovation practices	Mean	Standard Deviation	Application Degree	P-Value (Sig.)
1	Stakeholder Management	3.78	0.767	High	(0.002)
2	External Innovative Working Environment	3.69	0.732	High	0.157
3	Project Management	3.60	0.897	High	0.613
4	Strategic Management	3.52	0.888	High	0.121
5	Internal Innovative Working Environment	3.42	0.971	High	0.700
	Total	3.60	0.704	High	0.119

Table 7 outlines the means of the all practices under their related groups. These practices were selected in order to measure the innovation behavior of the construction and engineering firms. From the findings, it can be observed that the top five practices that have been applied in Palestinian construction sectors are: (1) Dealing with social and environmental variables, (2) Identifying stakeholders, (3) Ensuring effective communication between stakeholders, (4) Evaluation the stakeholders' satisfaction, and (5) Exploring stakeholders' needs and constraints to projects. It can be noticed that most of these factors are related to stakeholders' management group. On the other side, the least five practices have been applied in Palestinian construction sectors are: (1) Dynamic, open minded and supportive top management, (2) Conducting internal audit "Strength & Weakness", (3) Conducting external audit "Opportunities & Threats", (4) Provide rewards and recognition for creative work, and (5) Provide training for employees. It can be noticed that the least five practices are related to both strategic management and internal innovative work environment groups.

Based on the results of the semi-structured interviews, most of interviewers argued that the degree of application of innovative practices is to some extent low and the state of project management in the construction needs to be strengthened. This is because construction industry has complexity in its nature and contains a large number of stakeholders. As well as, the construction industry consistently scored poorly against standard practices of innovation that may enhance the process of construction project management. All interviewees agreed that there is a strong relationship between project management and innovation. Moreover, they argued that high level of innovation would lead to reduce deficiencies in construction project management. Further, most of the interviewers commented that internal innovative work environment, especially top management support as the most powerful practice for innovation. On the other side, some found that strategic management is the most critical factor for the successful construction projects. All interviewees argued that strong cooperation between the engineer, contractor and construction client is recognized as important to facilitate innovativeness and that construction client is perceived as having the greatest influence on innovativeness. They also argued that through training and development, employees could acquire the knowledge and skills needed for doing their particular job. It also increases their commitment, motivation, job satisfaction and reduced employee turnover.

Table 7. Application Degree for Innovation Practices

Innovation Project Management Practices	
Strategic Management	**Mean**
Establishing a vision which embraces innovation	3.81
Establishing SMART objectives	3.62
Formulating Strategies	3.84
Conducting internal audit "Strength & Weakness"	3.36
Conducting external audit "Opportunities & Threats"	3.35
Total	**3.52**

Internal Innovative Working Environment	Mean	External Innovative Working Environment	Mean
Provide rewards and recognition for creative work	3.17	Dealing with economic and political variables	3.81
Dynamic, open minded and supportive top management	3.38	Responding to change in customer needs	3.64
Provide innovative culture	3.52	Utilization of new technology	3.56
Provide appropriate internal conditions for workers	3.61	Dealing with social and environmental variables	3.95
Provide training for employees	3.16	Communicate with competitors	3.61
Workloads are managed	3.46	Reacting to market changes	3.58
Employee motivation and job satisfaction	3.64	Collaborate and communicate with suppliers	3.69
Total	**3.42**	**Total**	**3.69**

Project Management	Mean	Stakeholder's Management	Mean
Integration Management	3.84	Identifying Stakeholders	3.90
Quality Management	3.71	Exploring stakeholders' needs and constraints to projects	3.82
Cost Management	3.73	Analyzing conflicts among stakeholders	3.66
Time Management	3.66	Ensuring effective communication	3.85
Scope Management	3.54	Evaluation the stakeholder satisfaction	3.84
Communication Management	3.51	Stakeholder involvement in decision-making	3.69
Procurement Management	3.68	Keeping and promoting an ongoing relationship with stakeholders	3.67
HR Management	3.55		
Crisis Management	3.53		
Total	**3.60**	**Total**	**3.78**

6 DISCUSSION AND FRAMEWORK DEVELOPMENT

Based on this research findings and literature reviews, a framework for enhancing innovation practices in the construction industry has been devised. The framework is intended to be an effective management tool for supporting innovation in construction project management. It gives the potential for the managers to enhance their project management process and enables them to cope with change and development in external and internal environments. To stimulate innovation in the construction project management, successful innovation requires more than just putting creative people in a room and hoping they come up with valuable new products or processes [65]. So as shown in Fig. 4, the framework rests on a foundation of five building blocks comprise four main levels for achieving innovation in construction project management. These levels are explained below.

Level 1: Strategic Management

At the beginning, each organization, whatever its business, should focus on specific areas of interest by making strategic management. Without a clear vision, mission and objectives, organizations cannot survive in such turbulent environment, especially the construction environment. Therefore, organizations need to have a clear vision that embraces innovation besides defining the optimal desired future state to what an organization is focused on achieving in five, ten, or more years.

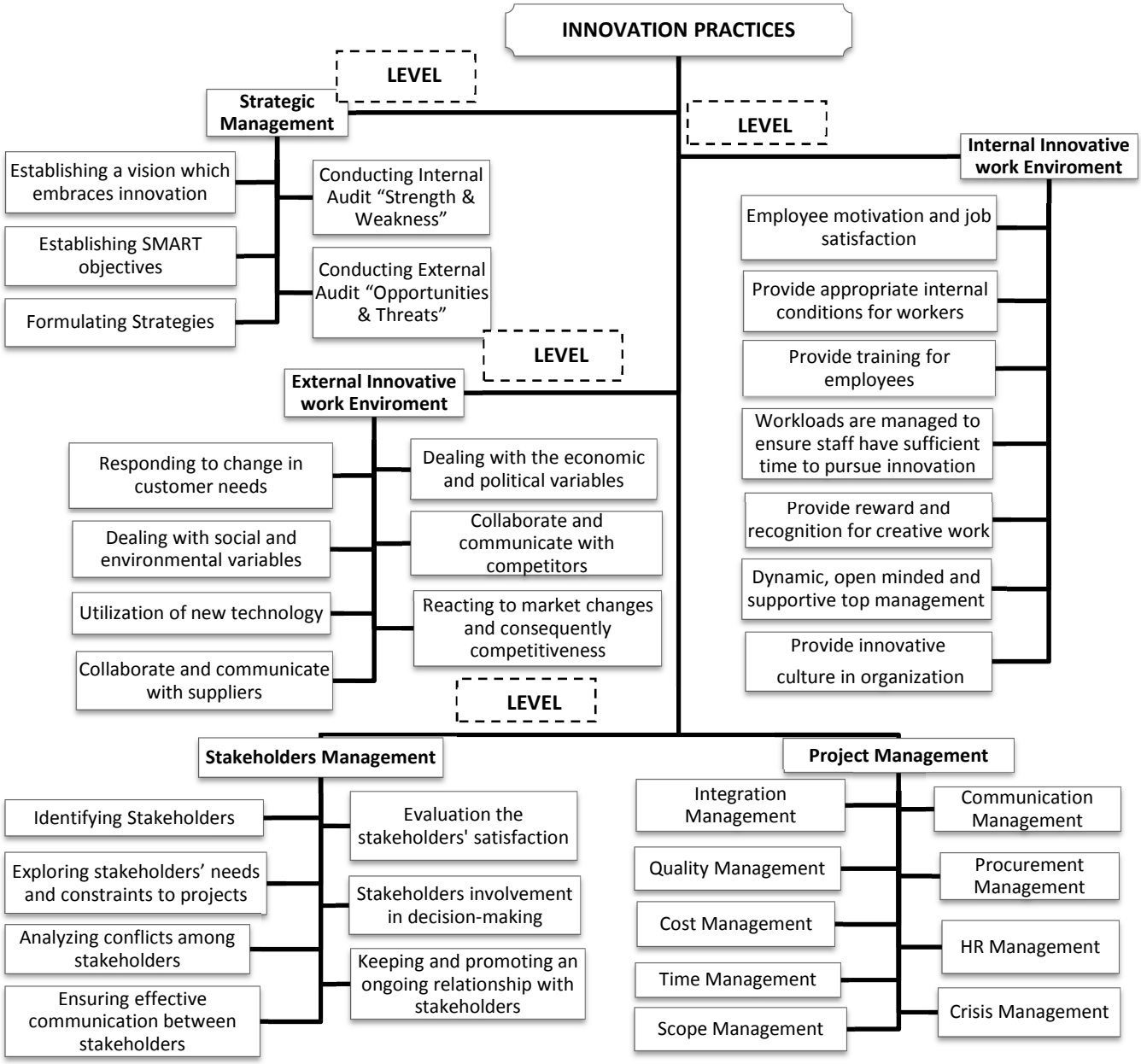

Fig. 4. Conceptual Framework for Project Management Innovation

Level 2: Internal Innovative Work Environment

After doing strategic management and before looking for enhancing the external environment, top managers have to provide an internal innovative work environment for all individuals within the organization. Research has shown that enhancing construction industry requires a good internal atmosphere and innovative culture to motivate staff to think in creative ways and requires also open minded and supportive top management to create the challenge and push people to think out of the box. Moreover, for continuous improvement, organizations need to provide reward and recognition for creative work besides offering the sufficient requirements and training for their employees.

Level 3: External Innovative Work Environment

To make tangible improvements and to be competitive in the market, where technology is changing fast and customers become more sophisticated; companies need to create external innovative work environment. They need continually to cope with change and react to the external forces of change, such as customers, competitors, suppliers, technology, economic, social, environmental and political variables.

Level 4: Effective Stakeholder Management and Project Management

Project management and stakeholders' management must be working in an integrated manner to ensure success. Project managers must have a capability in managing both in parallel. Project management provides project managers with the capabilities needed to manage the scope, time, cost, quality, risk and procurement necessary to accomplish all interrelated tasks. It also provides a guide for integration management, as well as human resource management and communications management to identify the most suitable approach to complete projects. However, project success is tied to effectively communicate and managing relationships with the various stakeholders of the project. This makes stakeholder management an important issue in project management [66]. Effective communication creates a bridge between diverse stakeholders involved in a project, connecting various cultural and organizational backgrounds, different levels of expertise, and various perspectives and interests in the project execution or outcome [67]. Thus, in order to ensure the success of construction projects, challenging project management, including innovation, should be integrated with effective stakeholder management.

7 CONCLUSIONS

The main aim of this paper was to explore the implementation of innovation practices in the construction project management in Palestine. The findings of the study present four practices that can be combined with project management, that are: (1) Strategic Management, (2) Internal Innovative Working Environment, (3) External Innovative Working Environment, and (4) Stakeholders Management. The current research inquiry shows that innovation needs a true involvement of all stakeholders in a construction project. Thus, top managers must be aware about the positive impacts of innovation and actively participate in its implementation rather than resist it. In addition, to make tangible improvements, organizations need to develop an innovative strategy and recognize that improving innovation requires both internal and external innovative environmental work. It is also necessary for organizations to continually evaluate their level of innovation. Such evaluation is very important to assist them in understanding their strengths and weakness.

One of the main limitations of this research was the lack of prior research studies on innovation practices in construction project management, which is considered relatively new to the construction industry. This presents an important opportunity for other researchers interested in the subject to explore more innovation practices in other countries and in other industries where comparisons can then be made. In addition, the assessment of innovation was limited to the selected sample of the private consulting and contracting firms. It is recommended that future researches expand the study for projects conducted in the public sector.

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