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**Evaluating the Impact of Organizational Learning on Organizational
Performance through Organizational Innovation as a Mediating Variable:
Evidence from Iranian Construction Companies**

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Evaluating the Impact of Organizational Learning on Organizational Performance through Organizational Innovation as a Mediating Variable: Evidence from Iranian Construction Companies

Abstract

Construction companies are bedevilled with several profound challenges that hamper the efficient performance and operation of the organizations. Extant studies have reported on organizational learning as an effective strategy for improving organizational performance. However, there is a dearth of studies in the construction industry context, especially from the perspective of developing countries where construction companies are on the disadvantaged side of the digital and economic divide. Thus, this paper aims to investigate the impact of organizational learning on organizational performance through the mediating variable of organizational innovation in construction companies based in Iran. Data was collected via a mixed approach, which involved an empirical questionnaire survey and a Delphi survey. Descriptive and inferential statistics were employed for data analysis, and a PDCA (Plan-Do-Check-Act) model was proposed for execution. The study revealed that organizational learning has an impact on organizational performance, organizational innovation affects organizational performance, and organizational learning directly affects organizational performance in the study context. It presents an empirical model to demonstrate that the right innovations and their appropriate applications can improve the organizational performance and operational efficiency of organizations, which would be of profound benefit to various key stakeholders engaged in the construction industry.

Keywords: Construction Companies; Iran; Organizational Innovation; Organizational Learning; Organizational Performance.

1. Introduction

In the past, organizations were in a stable environment, and future events were almost predictable, so managers could plan in a safe environment. But today the environment is drastically changing (Sarvari et al., 2021). Rapid and tangible changes in various fields of

science and technology are increasingly affecting the processes of human society and only flexible organizations can adapt for survival (Khoshfetrat et al., 2022). Previous studies corroborated that organizations that failed to adapt to environmental and global trends tend to lose out of the competitive edge. (Hongal & Kinange, 2020). Organizations with traditional structures lack the ability and flexibility to cope with the peripheral changes resulting from the globalization of the economy and the complexities that result from it, they must restructure themselves or equip themselves with the tools to cope with global developments. One of the most important tools is the creation of a "learning organization" and the institutionalization of the learning process in the organization (Stewart, 2005).

Today, learning is seen as a source of competitive advantage in business. Peter Drucker, a prominent management thinker, believes that knowledge is the key to organizational success (Rianto et al., 2021). Because value is created through innovation and production, both depend on knowledge application. In other words, knowledge is an important determinant of effectiveness in organizations, but it should be kept in mind that the advantage of business competition is in the context of competitive economic activities; in a competitive environment, competitive advantage lies in having a competitive edge (Haseeb et al, 2019). Thus, since the 1990s, learning has emerged as a potential for development. Competitive advantage depends not only on the characteristics of each organization but the employees of each organization and their knowledge which certainly play a decisive role in this direction. In other words, learning is the main source of competitive advantage (Chinowsky et al., 2007).

Senge (2006) opines that only a learning organization can claim to be able to make the most of the capabilities, commitment and learning capacity of individuals at all levels of the organization. Organizations, including construction companies, need to continually improve their learning and innovation levels to succeed in increasing performance to maintain themselves in today's dynamic and changing environment. The necessity to transform an

organization into a learning organization stems from the increasing uncertainty in the organizational environment as the complexity and speed of environmental change increase. Organizations need greater knowledge and awareness of environmental factors to adapt to environmental change (Reiter et al., 2018).

Construction companies have been severely criticized due to their inability to solve many problems and the loss of competitive opportunities in the current dynamic environment (Tavassolirizi et al., 2022). In response to these criticisms, concerted efforts have been made to implement organizational learning so that construction companies can improve their performance (Wong et al., 2008). Studies have shown that in the current competitive environment, construction companies with human capital who are eager to learn and innovate will be able to increase their organizational performance (Chinowsky et al., 2007; Garcia-Morales et al., 2007). This increase in performance is directly related to employees and workers who can proffer solutions by using knowledge and information (Chinowsky et al., 2007). Kululanga et al. (2002) believe that construction organizations should take organizational learning seriously to improve their situation in the business environment. Organizational learning can be the basis of innovation and as a result, performance improvement in construction companies. However, despite the mentioned importance of the necessity of learning in organizations, it has not been well explored in the construction industry. Although Mohammad (2019) opines that in recent years, the issue of organizational learning in construction companies has received more attention. However, there is a dearth of studies from the perspective of construction companies in developing countries which are lagging in becoming a learning organization. Thus, this study aims to evaluate the impact of organizational learning on organizational performance in construction companies in the developing country of Iran through organizational Innovation as a Mediating Variable. The findings of the study would provide effective pragmatic solutions for improving organizational

performance and implementing innovations needed to increase organizational performance. Also, it would be useful in making better-informed decisions by construction company managers toward creating an efficient learning organization and developing strong knowledge culture in their companies.

2. Research Background

2.1. Organizational Learning

Organizational learning, from 1960 to 1990s when Weick and Roberts (1993) proposed a new definition, has been the subject of revision by management experts. The authors have provided different definitions of organizational learning. Jensen (2005) expresses organizational learning as a set of interactions between individual and group adaptations and organizational level adaptation. Aranda et al. (2017) described organizational learning as the development of new knowledge and insights that potentially impact behavior. Jaspersen and Montibeller (2020) stated that organizational learning is the adaptive behavior of the organization over time. Huber (1991) stated that an agent or entity learns if its potential behaviors change through information processing. An organization learns if each of its units acquires knowledge, which is a very useful capability for any organization. In his research, he notes that organizational learning comes from four interrelated structures, namely knowledge acquisition, information dissemination, information interpretation, and organizational memory. Nonaka (1994) believes that organizational learning results from the repetition of internalization and externalization processes. According to Kim and Mauborgne (1999), the organizational learning process refers to the ability of the organization to transform and integrate information and develop experiences across different segments of the network so that information can be widely available to all individuals and can be an introduction to create a new position.

Chopin et al. (2010) article posit that 'Learning Organizations, is an Inevitable Need for Maintaining Organizational Competitive Advantage'. Although learning is an inevitable necessity for organizations and their members, they argue, it is only one side of the coin, and on the other, far more important, and necessary is the context for learning that is learned only in learning organizations. Chopani et al. (2010) also examine the concept of the learning organization and its related concepts, its necessity for today's organizations to maintain their competitive advantage in a changing environment, the characteristics of training and research in these organizations the duties and functions of training managers in learning organizations.

2.2. Organizational Performance

Due to the importance of productivity, many firms have become interested in the idea of organizational performance (Rafiq et al, 2020). A job's level of achievement, compliance with organizational rules and requirements, or the fulfilment of each employee's tasks are all measured by organizational performance, which is sort of the outcome after the work is over (Campbell, 1990). However, research has revealed that organizational performance is a multifaceted phenomenon and that the social structure of the organization impacts its standing in relation to its rivals (Perez Lopez et al, 2005).

Additionally, the organization's improvement can be seen in measurable, objective aspects like the organization's financial and economic performance (Faridi Zingir et al, 2020). According to Yasa et al. (2020), a company's performance is justified by its capacity to satisfy and keep customers, which also demonstrates its level of profitability (Sopa et al, 2020). Organizational performance, in general, is the process of describing the level of effectiveness and efficiency of previous acts (Neely et al, 2002). The performance management system guides activities in accordance with strategic goals serves as a useful tool for making decisions about human resources (such as pay, promotions, retention, and motivation), and offers useful data for the development of human resources by identifying the strengths and weaknesses of

employees, talents, and skills. It provides helpful documentation for reassessing selection criteria and techniques, identifies personnel, and highlights training gaps (Armstrong, 2017). Of course, it should be remembered that the performance management system needs to cover all of the organization's positions, and be pertinent, precise, applicable, reasonable, objective, systemic, standard, and ethical, while also having validity, clarity, and reliability. The actual experience of prosperous businesses and organizations has demonstrated the various advantages of performance management. First, people gain a better understanding of themselves, and managers gain a better understanding of their subordinates and forge stronger bonds with one another. Additionally, it inspires workers, and past triumphs serve as the catalyst for future successes. Third, giving honest and trustworthy feedback raises a person's self-respect, self-esteem, and confidence. Fourth, promotions and awards are provided according to justice and merit, and the distinction between people who work hard and take a lot of time is made. Fifth, the field for increasing performance and skills in line with corporate goals, the satisfaction of superiors and customers is supplied. Organizational goals and expectations from each position are stated (Thomas & Bretz, 1994).

2.3. Organizational Innovation

Today, predicting ways to meet possible needs in the future that may appear following possible changes is considered a necessity for every organization (Sarvari et al., 2021). This means that if creativity and innovation are considered comprehensively and completely in thought and action, it can lead to the growth and improvement of the organization's productivity (Chatman, 1989).

The importance of innovation was raised when organizations wanted to gain a higher competitive advantage over their competitors, and this caused organizations to change their goals, methods and structure in order to use creativity and innovation and provide a creative environment. guide (Banmairuoy et al., 2022).

Quinn (Year ???) defines innovation as the first transfer and transformation of an idea into action in culture. In addition, Amabile (1988) defines organizational innovation as the implementation and successful implementation of creative ideas in the organization. In today's complex world where there is intense competition for access to technology and resources, the life of organizations is not possible without innovation. Innovation allows organizations to change in line with environmental changes. In other words, innovation is a strategic factor to respond to the new challenges of a changing and uncertain environment (Montes et al., 2005).

2.4. Relationships between organizational learning, organizational performance and organizational innovation

Learning injects new ideas into the organization, increases the capacity to understand and understand new ideas, and improves the ability to discover new opportunities. Different models of organizational learning have been successful in using the innovation process, and companies are increasingly moving in this direction to give a new meaning to innovation as an organizational learning process. One of the factors influencing the level of innovation in organizations is the amount of information and knowledge in the organization because an environment rich in information is a factor that facilitates creativity and innovation (Tajeddini et al., 2006) In fact, innovation is tied to the concept of learning. Therefore, creating a culture in which learning and knowledge are important is very important (Montes et al., 2005). Landry (2000) considers organizational learning to be a fundamental factor for creativity and innovation, and Brown (2005) considers learning to be a bridge between work and creativity.

Hurley & Hult (1998) investigated the effect of organizational characteristics (including structural and process characteristics, and cultural characteristics) on organizational results (including capacity for innovation and performance). The studacknowledged that learning is considered an important factor in creating a culture that is willing to accept innovation. Similarly, Huber (1998) investigated the relationship between organizational learning and

innovation. The results show that there will be creative and innovative organizations that are especially skilled in creating, preserving and maintaining organizational environments where the acquisition, distribution and collective interpretation of information is one of their general and general processes (Calantone et al., 2002) Therefore, organizational learning will be an effective factor in innovation. The results of the research confirm that learning orientation has a positive effect on the ability to accept organizational innovation and organizational performance.

According to Therin (2003), environmental threats cause the environment to not have a statistically significant effect on organizational learning and have a negative effect on innovation. Ng (2004) also states that in order to develop a really innovative organization, people must create a common vision for innovation. They should work together and create synergy in teams, because a team is much stronger than the sum of individuals.

Kontoghiorghes et al. (2005) have introduced open communication and information sharing, risk-taking and acceptance of new ideas, support for learning, teamwork, rewards for learning and new ideas, and knowledge management as characteristics of a learning organization. Aragón-Correa et al. (2007) has shown in his research that leadership style is one of the important factors affecting the organization's innovation. Studies confirm that, it has been shown that organizations that focus on technology strategy, idea quality, idea generation, technology acquisition, and its exploitation, compared to organizations that emphasize on teamwork, learning organization, and management participation in Achieving innovation capacity will be more successful (Koc & Ceylan, 2007).

Ghorbanizadeh & Habibi (2012) investigated the relationship between two variables of organizational learning and organizational performance. The findings of this study indicate that the direct effect of intellectual capital on organizational performance is not strong, but this variable has a significant effect on the performance through the moderating variable of

"organizational learning process". The impact of intellectual capital on the organizational learning process has also been confirmed in this research. Orsard et al. (2010) investigated the relationships between three variables of innovation, organizational learning, and corporate performance. The results indicate that both organizational learning and innovation variables positively contribute to business environment efficiency. It concluded that innovation and organizational learning will have a positive impact on performance.

The early conceptions of organizational learning were linked with identifying and correcting errors. However, studies investigating organizational learning practices in construction have sought the extent of these narratives (e.g., Al Rfoa et al., 2021; Oyewobi et al., 2019). Current understanding and application of organizational learning concepts in construction settings lack congruence as divergent and analogous domains are prevalent (Ekung et al., 2022). Ekung et al., 2022 stated that organizational learning serves as the reference point for competitive advantage in construction companies. The study also suggested that the absence of organizational learning could lead to business failure. On the other hand, a learning organization achieves innovation through effective learning. When innovation is also viewed as a dimension of organizational learning, systemic thinking becomes creative thinking and will seek continuous improvement in the organization's performance (Wang & Ahmed, 2003). Therefore, evaluating the effect of organizational learning and innovation on the performance of construction companies is essential.

Rajapathirana & Hui (2018) came to the conclusion by looking at insurance businesses in Sri Lanka that innovation capabilities can significantly affect the performance of insurance companies and that innovation can result in increased performance of insurance companies. Organizational learning has a substantial positive link with organizational performance, according to Sari & Sukmasari (2018), who set out to explore the relationship between organizational learning, innovation, and performance in the banking industry of a developing

country. Additionally, organizational learning significantly and favorably impacts innovation. According to research by Garca-Morales et al. (2012), transformational leadership enhances organizational performance through learning and organizational innovation. Organizational learning has a favorable impact on organizational performance both directly and indirectly through organizational innovation, as well as on organizational innovation itself. Wang & Wang (2012) conducted research on high-tech firms in China and discovered that the organization's operational effectiveness is influenced by both the quality and speed of innovation. The impact of organizational learning on creativity was examined by Hung et al. in 2011. In their study, which was titled "The effects of organizational learning on the performance of innovation in major enterprises," they came to the conclusion that organizational learning has a direct and favorable impact on how well innovation performs inside the organization. Organizational learning thereby improves organizational effectiveness by creating new knowledge-based skills. Gunday et al. (2011) examined manufacturing firms in Turkey and discovered that various types of innovation have a favorable impact on inventive performance. Organizational learning is one of the fundamental elements that impacts organizational innovation, according to Aragón-Correa et al. (2007). On the other hand, the aforementioned researchers think that organizational learning also affects and improves organizational performance. Numerous studies have demonstrated that cultures that support organizational learning enhance learning at the individual, team, and organizational levels, ultimately raising the performance of the organization.

3. Research Methodology

This study is not methodologically driven by a quantitative approach or by a purely qualitative approach but rather by a combination of quantitative and qualitative approaches to enrich and deepen the understanding of the subject under study. The present research is descriptive

research with an emphasis on the correlational relationships. The study aims to evaluate the Impact of Organizational Learning on Organizational Performance in construction companies in the developing country of Iran through Organizational Innovation as a Mediating Variable. To achieve this a set of hypotheses was established: (i) Organizational learning affects the organizational performance of construction companies; (ii) Organizational innovation affects the organizational performance of construction companies; (iii) Organizational learning affects the organizational innovation of construction companies; and (iv) Organizational learning through organizational innovation affects the organizational performance of construction companies.

The researcher-made questionnaires (on organizational learning, organizational performance, and organizational innovation) were utilized in this study to gather data. Under the supervision of ten specialists, including managers and senior experts from the engineering system organizations, these questions were completed in three Delphi rounds. The Iranian construction enterprises were chosen using the snowball sampling approach. The major factors in choosing these individuals were their university degree graduates in civil engineering or construction management, as well as work experience of at least 10 years for managers and at least 15 years for senior experts. It should be mentioned that the preliminary study questionnaire identified and consolidated the variables of organizational learning (nine items), organizational performance (ten items), and organizational innovation (nine items). A five-point Likert scale was used to measure the level of effect in the questionnaire. The experts were asked whether they believed the identified factors had an effect on organizational learning, organizational performance, and organizational innovation in Iranian construction companies. Only items with an importance score of three or above were chosen since each item's importance was graded from one to five. This criteria has been suggested by Fink et al. (1984) for the members' agreement on different items and their inclusion or exclusion in the Delphi

method. In accordance with this criterion, 5 items were eliminated from the questionnaire in the first round of the Delphi technique, including 2 items from the organizational learning questionnaire (i.e., (i) construction companies respond to the uncertain and variable environment with an emphasis on organizational learning; and (ii) obtaining operational consultations and effective in the organization with the aim of growth and development of the organization), one item from the organizational innovation questionnaire (i.e., the development of the culture of innovation in the country's construction sector leads to organizational innovation) and two items from the organizational performance questionnaire (i.e., (i) due to the different rights and benefits of private companies compared to government companies, as well as the lack of liquidity and proper and timely allocation of budgets, the human resources in terms of quantity, quality and efficiency in private companies are weakened; and (ii) documenting and reviewing the past projects of the company is a rich source of information for managers and future decision-makers of the company, while strengthening and eliminating weak points and improving performance). In the second round of the Delphi technique, the revised questionnaire was re-distributed to the experts. Another item from the organizational innovation questionnaire was eliminated after collecting the results of the second round of the Delphi technique since it received an average score of less than 3. (i. e., it is necessary to invest in technological and innovative projects to increase organizational innovation). After revisions, the experts received the questionnaire for the third round. At this round, all experts have given their approval to the items of the questionnaire including 7 items in organizational learning, 8 items in organizational performance, and 7 items in organizational innovation. Table 1 shows the confirmed items of the questionnaire.

Kendall's agreement coefficient has been utilized to determine the level of consensus among experts. In the third round of the Delphi technique, Kendall's agreement coefficient was found (0.543), indicating a reasonable level of agreement among the experts. Table 2 presents

the findings of the calculation of Kendall's agreement coefficient. The degree of coordination and agreement between various rating categories associated with N items or people is measured using Kendall's agreement coefficient. In fact, it is possible to determine the rank correlation between K rank sets using this scale. A scale like this is very helpful in research on inter-judge validity. According to Kendall's agreement coefficient, people who have organized several categories according to their relevance essentially utilized the same standards to determine the significance of each category and concur with one another in this regard (Schmidt, 1997). This scale's value, which goes from 0 to 1, represents the level of agreement reached by the Delphi panel (very strong consensus: $W = 0.9$, strong consensus: $W = 0.7$, moderate consensus: $W = 0.5$, weak consensus: $W = 0.3$, and very weak consensus: $W = 0.1$). W coefficient's significance is insufficient to halt the Delphi procedure. Even relatively tiny values of W for panels with more than 10 members are meaningful (Schmidt, 1997). Figure 1 shows the overall research process of the study.

Please, insert Table 1 about here

Please, insert Table 2 about here

Please, insert Figure 1 about here

3.1. Statistical population and sample size

The statistical population in this study is the list of construction companies based on the Isfahan Construction Engineering Organization (ICEO) website with 400 companies. The sample size was obtained through Morgan's table which is found as 196. Simple random sampling was

used in this study to select 196 construction firms at random from the ICEO website, which contains information on all contracting and consulting companies. random sampling is used when the population size is large. Also, the target community should be homogeneous around the category under investigation. Considering that the statistical population of the present study met the two conditions, and the researchers have chosen this method for sampling. To select 196 companies using the random sampling method, the researcher used a systematic random method. The procedure was illustrated as follows:

1. Each company was assigned a code (from 1 to 400). Then, a constant number (K) was obtained by calculating the ratio of the population to the sample size.

$$K = N/n$$

$$K = 400/196 = 2$$

2. Then, the position of the first person in the P1 sample between the numbers 1 and 9 was determined by lottery (The number 8 was chosen in the lottery and was chosen as the first example of a company that had the code 8) (P1 = 8).

3. The formula $P_n = P (n-1+K)$ was used to determine the series of next companies.

$$P_n = P (n-1+K)$$

$$P_2 = P_1+K = 8+2 = 10$$

$$P_3 = P_2+K = 10+2 = 12$$

$$P_4 = P_3+K = 12+2 = 14, \dots\dots\dots ,$$

$$P_{196} = P_{195}+K = 396+2 = 398$$

Finally, 196 companies were selected from the population. After selecting and identifying the desired companies, the questionnaires were distributed in person and collected after completion. Also, in coordination with the communication unit of some companies, a blank questionnaire was sent to the managers of those companies through email, and a few other research questionnaires were completed in this way.

3.2. Reliability and validity of survey questionnaire

Face validity was used to assess the accuracy of indices and items for each variable and to validate the whole questionnaire. According to Yurdugül (2008) and Bujang et al. (2018), the minimum sample size required to calculate the Cronbach's alpha value is 30 individuals. Therefore, 30 potential experts were picked up as a sampling pool, so the reliability of the developed questionnaire could be determined after reviewing and analysing their viewpoints. Thus, a total of 10 Delphi experts and another 20 experts with equivalent requisite qualifications (i.e. university degree graduates in civil engineering or construction management, 10 years of work experience for managers or 15 years of work experience for senior experts) were considered to be the essential selection criteria during the selection process. The concept of validity answers the question of to what extent the measuring instrument measures the desired characteristic. Without knowing the validity of the measuring instrument, the accuracy of the data obtained cannot be assured (Chan et al., 2021). The measuring instrument may be valid for the measurement of a particular attribute, even though it has no validity to measure the same attribute in another population. Reliability is one of the characteristics of the measuring tool (questionnaire or interview or other tests) that uses terms such as reliability, consistency, and validity. The above concept deals with the extent to which the measuring instrument yields the same results under the same conditions (Ebrahimzadeh, 2005).

The reliability of a test can vary from one situation to another and from one group to another. Various statistical methods are used to calculate the reliability coefficient of measuring instruments, including the test-retest, Equivalent test, Split-half, Kuder-Richardson, and Cronbach Alpha. Although each of these methods faces some problems, for example, in the test-retest method, the results of the retest can be affected by the subject's training (experience) and memory and ultimately lead to a change in the reliability of the measurement tool (Webb

et al., 2006). In the Equivalence method, measurement errors and the lack or absence of similarity between two equivalent forms of the test (differences in questions or their content) reduce reliability (Kristof, 1963). The Split-half method is usually used for two-state variables where code zero is given to wrong answers and code one to correct answers. In this method, the content and difficulty of the questions must be similar, and since the number of instrument questions is divided into two parts, the correlation coefficient method must be used (Webb et al., 2006). The Kuder-Richardson method includes two tests, which are tests of homogeneity and stability between questions, which consider the ratio of correct and incorrect answers in each question or test and are useful for tests whose answers are expressed as true or false (Cook & Beckman, 2006). Cronbach's alpha reliability method is the most common reliability coefficient of internal consistency tool that is used in most studies, and it represents the appropriateness of a group of items that measure a construct (Helms et al., 2006). Therefore, in the present study, this method was used to calculate the reliability of the research questionnaires. To assess the reliability of the independent and dependent variables and the whole questionnaire, at first 30 questionnaires were evaluated as a pilot. Data were analyzed by the SPSS program using Cronbach's alpha reliability test. Cronbach's alpha coefficient covers the range of zero to one. Less than 0.5 indicates low reliability. An alpha value between 0.5 and 0.7 indicates good reliability but still needs to be corrected. It is high and acceptable if the alpha level is above 0.7 (Sarmad, 1997). The results of Cronbach's alpha for the organizational learning variable with 7 items had a reliability of 0.83, the organizational innovation variable with 7 items had a reliability of 0.82, and the organizational performance variable with 8 items had a reliability of 0.88. The reliability of all three variables is above 0.7 and indicates that the variables have high reliability and are appropriate the specified items are suitable for the variables in question. After evaluating the reliability in the first stage, a final questionnaire was prepared, and data were collected.

4. Data Analysis and Analytical Results

In this section, using the Frequency and Relative Distribution Tables, Mean, Variance, and Charts, we discover and describe the data model. Table 3 shows the frequency distribution of respondents by type of company or organization of employment. According to the data in the table, respectively, 40.7% of the respondents work as contractors, 30.5% as consultants and 28.8% as technical and employers.

Please, insert Table 3 about here

Table 4 also shows the frequency distribution of respondents in the field of responsive activity. According to the table data, respectively, 40.33% of the respondents are in the field of buildings, 27% in the field of facilities, 17.3% in the field of water and 15.3% in the field of road.

Please, insert Table 4 about here

Statistical inferences are used to evaluate the generalizability of the results of the sample analysis to the statistical population (Sarmad, 1997). Statistical inference such as regression analysis and Structural Equation Modeling (SEM) method were used to investigate the proposed research hypotheses. On the basis of the 196 completed surveys that were collected, regression and SEM analyses were carried out.

4.1. Hypothesis 1: Organizational learning affects organizational performance

Regression was used to investigate the effect of organizational learning on organizational performance, both of which are at the level of distance measurement. The R and Beta values in the table equal to 0.74 indicate a strong correlation between positive and positive

organizational learning and organizational performance. A significance level (sig = 0.000) less than 0.05 also indicates that organizational learning has an impact on organizational performance. Consequently, the first hypothesis is confirmed.

Table 5 shows the effect of organizational learning on organizational performance between employers and technical offices. The amount of R and beta obtained in the table is 0.603, indicating a strong and positive correlation between organizational learning and organizational performance. The significance level (sig = 0.000) indicates that organizational learning affects organizational performance. As a result, the first hypothesis is confirmed for this group of employers and technical offices.

Table 5 also shows the effect of organizational learning on organizational performance among consultants. The amount of R and beta obtained in the table is 0.55, which indicates a positive correlation between organizational learning and organizational performance. The significance level (sig = 0.001) also indicates that organizational learning affects organizational performance. As a result, the first hypothesis is confirmed for consultants.

The effect of organizational learning on organizational performance among contractors is shown in Table 5. The amount of R and beta obtained in the table is 0.55, which indicates a strong and positive correlation between organizational learning and organizational performance. The significance level (sig = 0.000) also shows that organizational learning influences organizational performance. As a result, the first hypothesis is also confirmed for contractors.

Please, insert Table 5 about here

4.2. Hypothesis 2: Organizational innovation affects organizational performance

Regression analysis was used to investigate the effect of organizational innovation on organizational performance, both of which are at the distance measurement level. Table 6 shows that the obtained R and beta values of 0.77 indicate a strong correlation between organizational innovation and organizational performance. The significance level (sig = 0.000) less than 0.05 also indicates that organizational innovation affects organizational performance.

The effect of organizational innovation on organizational performance for employers and technical offices is shown in Table 6. The obtained R and beta values of 0.71 indicate a strong and positive correlation between organizational innovation and organizational performance. The significance level (sig = 0.000) indicates that organizational innovation has an impact on organizational performance. As a result, the second hypothesis is confirmed for employers and technical offices.

Table 6 also shows the impact of organizational innovation on organizational performance for consultants. The mean R and Beta values were 0.66, indicating a strong and positive correlation between organizational innovation and organizational performance. The significance level (sig = 0.000) indicates that organizational innovation affects organizational performance. As a result, the second hypothesis is also confirmed for consultants.

Table 6 also shows the impact of organizational innovation on organizational performance for contractors. The obtained R and beta values were 0.78, indicating a strong and positive correlation between organizational innovation and organizational performance. The significance level (sig = 0.000) indicates that organizational innovation has an impact on organizational performance. As a result, the second hypothesis is also confirmed for contractors.

Please, insert Table 6 about here

4.3. Hypothesis 3: Organizational learning affects organizational innovation

Regression was used to investigate the effect of organizational learning on organizational innovation, both of which are at the level of distance measurement. As can be seen in Table 7, the obtained R and beta values were 0.76, indicating a strong correlation between the two variables of organizational learning and organizational innovation. Also, the significance level (sig = 0.000) which is less than 0.05 indicates organizational effectiveness on organizational innovation. Consequently, the third hypothesis is also confirmed.

Table 7 illustrates the impact of organizational learning on organizational innovation between employers and technical offices. As can be seen in the table, the obtained R and beta values are 0.72, indicating a strong and positive correlation between the two variables of organizational learning and organizational innovation. The significance level (sig = 0.000) indicates the effect of organizational learning on organizational innovation. As a result, the third hypothesis is confirmed for employers and technical offices.

Table 7 also shows the effect of organizational learning on organizational innovation among consultants. As can be seen in the table, the obtained R and beta values are 0.76, indicating a strong and positive correlation between the two variables of organizational learning and organizational innovation. Also, the significance level (sig = 0.000) indicates organizational effectiveness in organizational innovation. Consequently, the third hypothesis is also confirmed for consultants.

The effect of organizational learning on organizational innovation among contractors is also visible in Table 7. As can be seen in the table, the obtained R and beta values are 0.84, indicating a strong and positive correlation between the two variables of organizational learning and organizational innovation. Also, the significance level (sig = 0.000) indicates the effect of organizational learning on organizational innovation. As a result, the third hypothesis for contractors is also confirmed.

Please, insert Table 7 about here

The R and beta values in all cases were greater than 0.50, indicating a strong and positive correlation between organizational innovation and organizational performance and organizational learning. The significance level (sig = 0.000) indicates that factors all influence each other. As a result, all the hypotheses considered are confirmed.

4.4 Hypothesis 4: Organizational learning through organizational innovation affects organizational performance

Figure 2 shows the main model presented in this research. All the values of the evaluation indexes of the fit of the model reported in Table 8 indicate that the fit of the model is appropriate. In general, the lower the calculated χ^2/df ratio, the better because this test shows the difference between the data and the model (Wheaton et al., 1977). In the studied model, this ratio is equal to 1/847, which indicates the appropriateness of the model fit. The value of GFI, AGFI, NFI, and CFI should be more than 90% (Hooper et al., 2008), which in the current research model is GFI = 0.857 and AGFI = 0.823, NFI = 0.843, and CFI = 0.92, which indicates the appropriateness of the model. The lower the RMR value, the better, because it is a standard index for the average difference between observed data and model data (Hu & Bentler, 1999). In the present study, the value of RMR = 0.066, indicates the appropriate fit of the model.

Please, insert Figure 2 about here

Please, insert Table 8 about here

On the other hand, the results of examining the hypothesis of organizational learning influence organizational performance with the mediating role of organizational innovation are reported in Table 9. The findings presented in Table 9 show that the mediating role of organizational innovation in the relationship between organizational learning and organizational performance is significant. This means that organizational innovation plays a mediating role in the relationship between organizational learning and organizational performance ($\beta=0.662$). According to the coefficient of determination (r^2), 43.8% of the variance of organizational innovation was shared and explained in the relationship between organizational learning and organizational performance. Moreover, Table 10 shows that the direct effect of organizational learning on organizational performance is (0.302) and its indirect effect is (0.662). Therefore, the research hypothesis that organizational innovation plays a mediating role in the relationship between organizational learning and organizational performance is confirmed.

Please, insert Table 9 about here

Please, insert Table 10 about here

5. Discussion of Survey Findings

The findings of this study revealed that organizational learning affects organization's performance which aligns with extant studies. For instance, Yeo (2003) confirmed that organizational learning has impact on organization goal as the learning would impact on the individual and enhance their performance. It implies that organisations that encourage learning regardless of whether they are clients, or consultants or contractors organization will benefit

from it as supported by the findings of this study. Hernaus et al., (2008) corroborated the strong relationship between organizational learning and organizational performance. However, Zgrzywa-Ziemak (2015) in an extensive review of literature reported that although there are empirical evidence to support the relationship between organization learning and (financial) performance, the link is neither obvious or clear in all scenarios. In the case of this study, the organizational performance is not measured solely with organizational performance but with different metrics – financial performance inclusive. As such, it could be deduced that there is a strong link between construction organization learning and organization performance. Interestingly, studies from different economies supported the assertion such as Yeo (2003) in the Singaporean context, Hernaus et al., (2008) in the Croatian context and Oh et al (2020) in the Korean context. This could suggest that regardless of the context of the organization, learning would influence its performance.

Results from this study also supported the relationship between innovation and performance in the construction companies and the relationship between learning and innovation. It implies that organisations that innovates are more likely to have improved performance compared to their counterparts. Bekar & Sinkula (1999) showed that the effect of learning orientation on innovation increases organizational financial performance. Per Calantone et al. (2002), organizations need a strong learning orientation to gain a competitive advantage. Per Bates & Khasawneh (2005), organizational learning culture is a factor that facilitates learning and changes, predicts the conditions of learning transfer, and both influence influences innovation. García-Morales et al. (2006) showed that the link between organizational learning and innovation promotes entrepreneurship, and it also increases competitive advantage. As construction companies in developing countries including Iran are bedevilled with challenges such as financial problem, time overrun on projects, and lack of expertise in human resources and other problems, it is of importance for them to prioritise learning and innovation viable

means to improve performance. This assertion is supported by Walker (2004) and Yamin et al (1997) in the Australian context. It follows that companies will fail if they cannot adapt to the unstable and highly variable environment by leveraging learning and innovation. Organizational learning is achieved through shared vision, mental patterns and knowledge and is based on experience and knowledge and previous events. On the other hand, to achieve higher competitive advantages over competitors, construction companies need to direct their goals, methods and structure to use creativity and innovation and provide a creative environment, in addition to paying attention to organizational learning. In this way, not only to achieve a competitive advantage but also to improve organizational performance. In addition, construction companies that are learning organization could easily benefit from bottom up innovation approach. This approach enables the organization to learn, codify and transfer innovative practices from one projects to another thereby improving the organization performance and prevents reinvention from scratch on new projects (Winch, 1998).

Extant studies in the AEC literature also corroborated the link between organizational innovation and performance. Innovation does not necessarily need to be an entirely new approach, idea or concept, but should be new in the application context and add value. Studies have reported on the significant benefits of the application of BIM, AI, modular construction, circular economy and other innovations on productivity in the AEC industry which improves organizational performance (Saka et al., 2022; Oluleye et al., 2022). This align with the findings of this study on the effect innovation on performance and holds true for client, consultant, and contractors. Although, some studies have highlighted that the size of firms could have effect on the organisation's innovation, however, this was not evaluated in this study. As such innovation in construction organization has a strong relationship with performance.

Lastly, Organizational performance is the final structure resulting from the organization's activities, which is measured using various performance measurement factors and measured in

different dimensions, including the degree of achievement of organizational goals, profitability, rate of return on investment, job satisfaction and productivity of employees, quality of services and products, and Organizational innovations. In addition to these innovations, innovation has a very strong tendency to knowledge, expertise, commitment, and organizational learning as key inputs in the value creation process. Since knowledge and knowledge assets and organizational learning are the basic requirements of organizational innovation, it can be concluded that by increasing and improving the capabilities based on organizational learning and their proper management, it is possible to develop pragmatic ideas and improve organizational performance.

6. Conclusions

The main purpose of this research was to investigate the effect of organizational learning on organizational performance through the mediating variable of organizational innovation. For this purpose, first, the research questionnaires were developed with the help of the Delphi survey technique and after measuring and confirming their validity and reliability, they were distributed within the target population. The collected data were analyzed using SPSS and AMOS software programs and all research hypotheses were tested and confirmed. Finally, a model was presented to show that creating innovation and appropriate application in construction companies can improve organizational performance and increase the operational efficiency of the organizations. This developed model, abbreviated as PDCA, shows that according to the roadmap and plan in question (“Plan”), strategies and policies (“Do”) should be developed to achieve the best performance before the final implementation. However, the solutions considered need to be evaluated and reviewed (“Check”) and then approved by experts to be implemented (“Act”). If the solutions identified at the evaluation stage are found to be inadequate, they will be re-evaluated for further in-depth review, and their implementation will be postponed slightly to be re-evaluated after remediation and

improvement. “Plan” options are based on the items that reached the third round of the Delphi survey considering the opinions of experts and managers. “Do” options that include executable solutions to plan for implementation. The stages of operationalization of the research model are shown in Figure 3; also, the definitions for each code are given in Table 11.

Please, insert Figure 3 about here

Please, insert Table 11 about here

What has been presented in this study as the necessity of implementing organizational learning in the current competitive environment for construction companies, has been an attempt to examine, explain and provide a viable solution to create innovation and improve organizational performance and increase the operational efficiency of construction companies, to optimize resources. Organizations that do not plan for executing the important learning process may face organizational difficulties. Some of the consequences of this misconception include the inactivity and indifference of employees to the fate of the organization, the stabilization of the status quo, and the lack of dynamics in the long run. The thinking brain or think tank of the organization, while it may not be worth it, is to expect other employees to execute their commands and opinions without question. Finally, the inactive spirit of the consequences of underestimating learning causes some employees to be conservative and resistant to any change. As a result, adequate attention to the topic of innovation, motivation and creativity for individuals is one of the most important development goals and effective issues in the current organizational environment. Lastly, organizational learning affects organizational performance in two ways. The first is direct and without the intervention of another variable, and the second is mediated by the third variable, called organizational

innovation, which improves performance in the end. The following are some of the implications of this study for business development and operation of the companies for implementation:

- Holding specific staff training workshops and periodic meetings that can improve the performance of the organization.
- Increasing the expertise of consultants and strict control over the design process can prevent the loss of capital.
- The necessity of developing an effective management plan to complete the semi-finished projects and start new ones.
- Review of past completed projects for better and more efficient management of future projects.
- Using more high-calibre experienced personnel who can help improve the operational performance of the organization.
- Increasing employee salaries and creating reasonable welfare systems for employees to be more motivated to do better and faster.
- Balancing and comparing financial performance as one of the biggest goals of the organization should be evaluated periodically.
- All employees engaged in the organization must be committed to the collective decision-making process.
- In a company, organizational goals must be clearly stated so that they can be matched between individual and organizational goals.
- The need to have a periodic analytical report on the development status of the company and the opportunities and threats that the company has encountered.
- Using contemporary quality control standards in the organization.

- Providing more recognition to middle-level managers because of their major leading role played in the organizational learning process.
- Using the proposed model to mitigate potential problems and enhance the learning effectiveness and performance level of the company.
- Organizations' managers should support learning culture as far as possible so that staff can improve their learning habits and attitude.
- The most important principle in collective learning is the principle of dialogue, and the managers must provide the ground or rationale behind achieving this principle.

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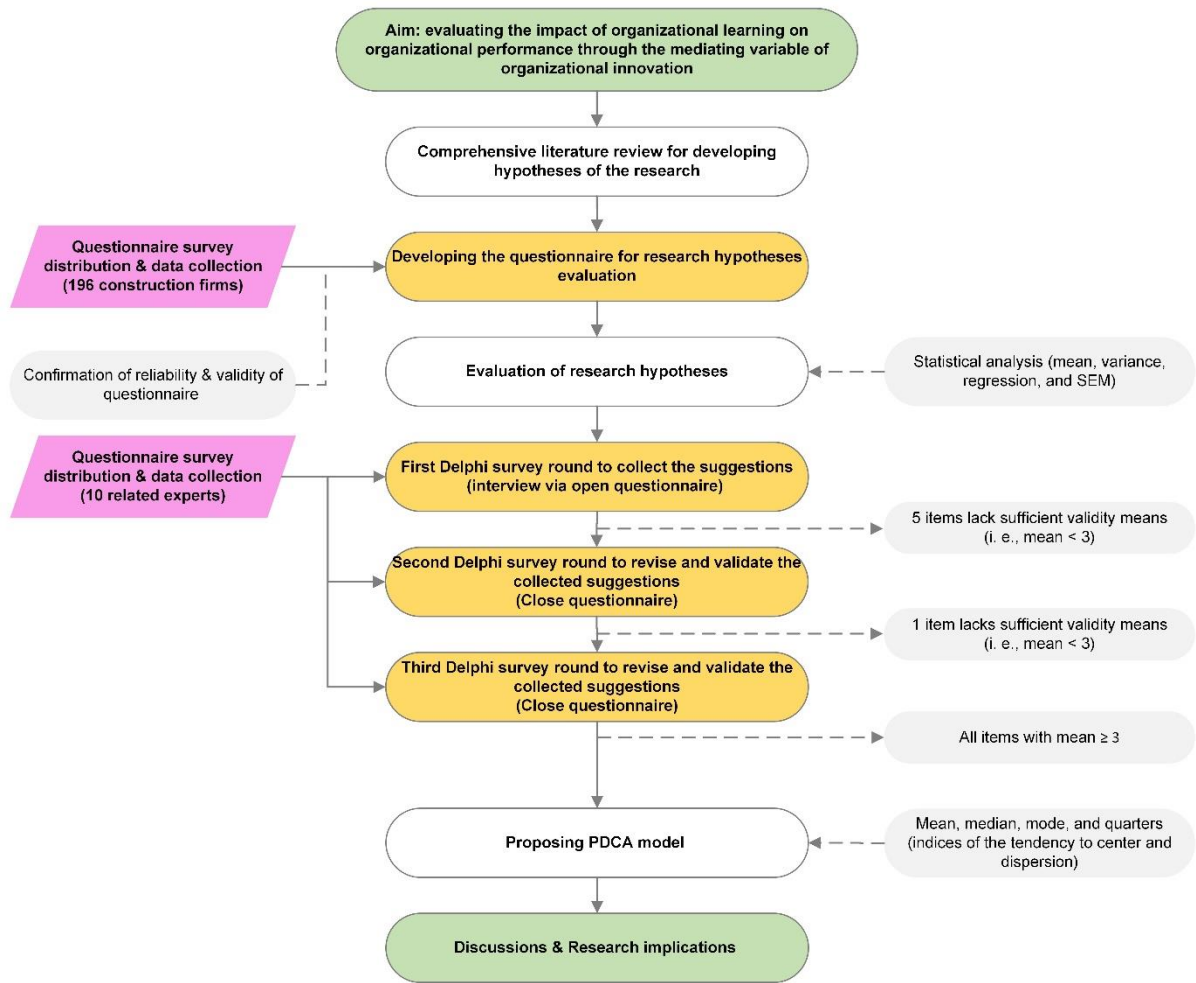


Figure 1. The overall research design of the study

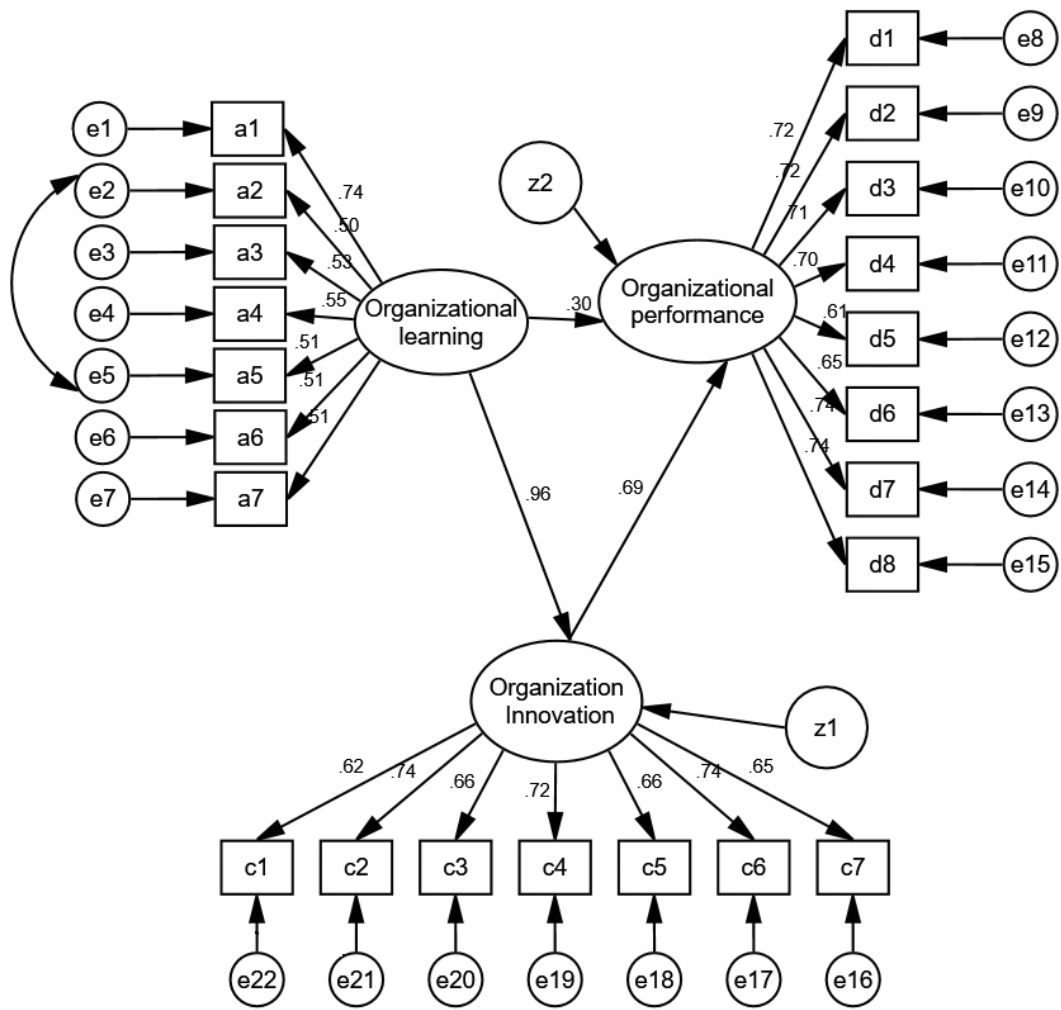


Figure 2. The main model of the mediating role of organizational innovation in the relationship between organizational learning and organizational performance

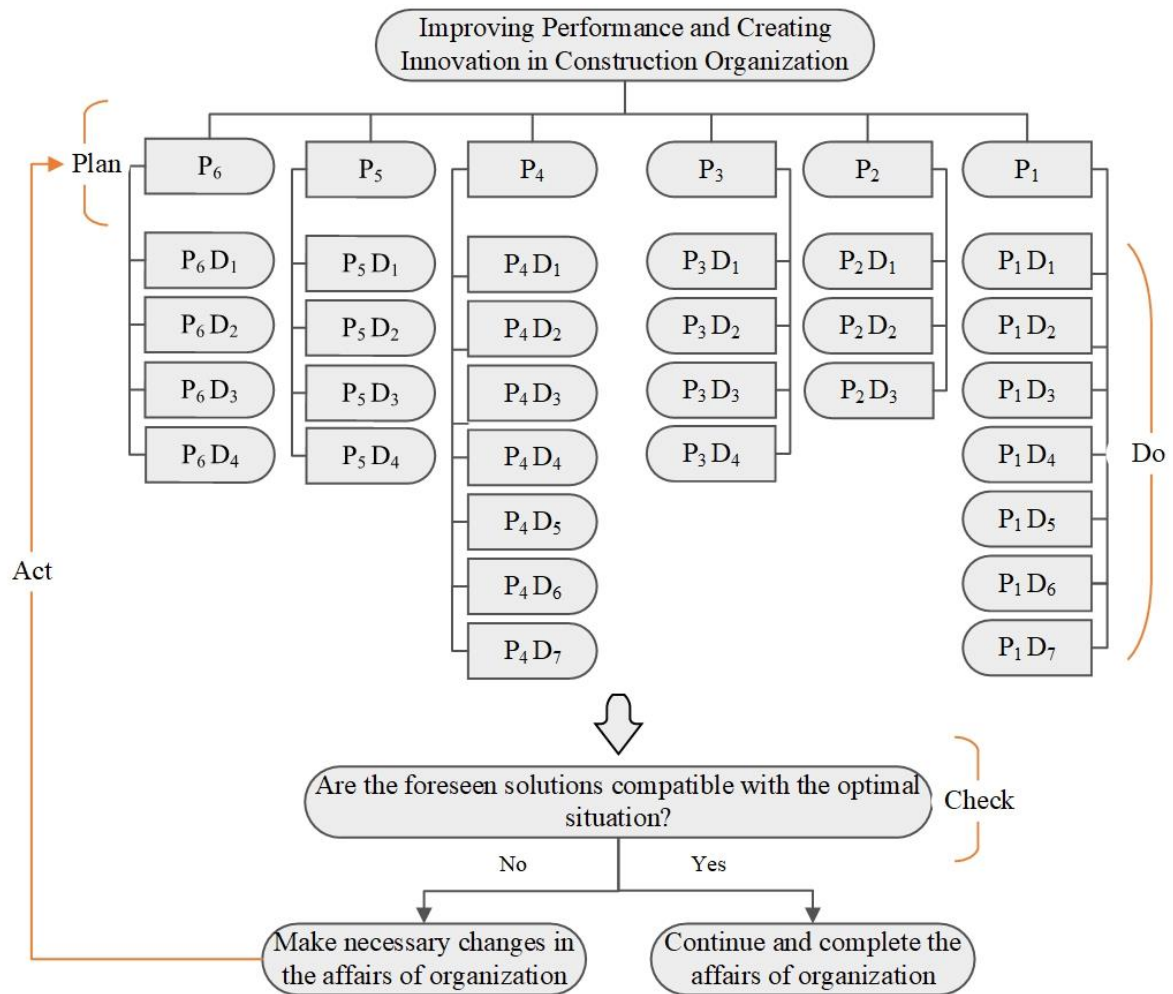


Figure 3. The stages of operationalization of the proposed Plan-Do-Check-Act (PDCA) model for achieving the best organizational performance

Table 1. Research questionnaire questions (organizational learning, organizational performance, organizational innovation)

No.	variable	Identified indicator
1	Organisational Learning	The business values and encourages individual learning among its staff members (via conferences, in-service training, etc.).
2		The organization employs strategies like having meetings and utilizing information technology in order to boost employees' motivation to share knowledge and earn expertise.
3		The business has meetings to draw on the lessons learned from previous projects (successful and unsuccessful).
4		The business picks up knowledge from affiliated businesses (contractors, joint investors, consulting companies, and competitors).
5		The business strives for growth and advancement in its respective industries.
6		To apply them in its projects, the company researches innovative building techniques and materials.
7		The organization hires professionals and experts in that subject depending on the needs of each project.
8	Organizational Performance	During particular times, the company must accomplish a specific level of cost-effective revenue growth, continual profitability, and cost reduction.
9		If the business meets the objectives that have been set for it, its performance is effective.
10		Construction quality is always taken into account, and the organization places a high priority on raising quality.
11		The business should be able to accomplish its objectives with the fewest resources possible.
12		To prepare for potential possibilities and risks, the business should boost all of its capabilities.
13		The business has made a successful move in attaining the clients' and customers' happiness.
14		Employee satisfaction at the organization is at its highest level.
15	Organizational Innovation	Innovation is carried out in the areas of building techniques, materials, and project management techniques.
16		The company's culture now includes all employees in the idea that organizational innovation may be created.
17		The relationship between corporate education, learning, and innovation fosters entrepreneurship.
18		Organizational innovation is a significant and effective component in enhancing this company's reputation.
19		Organizational innovation in the corporation has been greatly influenced by the wealth of information and human knowledge.
20		The emphasis on taking risks has recently led to an increase in the company's degree of innovation.
21		The business places a strong emphasis on increasing private sector investment in the development of technology advancements.
22	The company emphasizes the use of information and communication technologies to gain access to current knowledge and innovative new ideas (email, computer networks (LAN or WAN), intelligent systems and remote control, system automation, etc.).	

Table 2. Results of Kendall's coefficient of concordance (W) analysis

N	Kendall's coefficient (W) ^a	Chi-Square value	df	Asymp. Sig. (p-value)	Result
10	0.543	114.086	21	0.000	Medium consensus

Table 3. Frequency distribution of survey respondents by organization type of employment

Organization	Number	Percentage
Contractor	80	40.7
Consultant	60	30.5
Client	56	28.8
Total	196	100

Table 4. Frequency distribution of survey respondents by type of project work

Type of Work	Number	Percentage
Building	79	40.3
M&E	53	27
Water	34	17.33
Road	30	15.33
Total	196	100

Table 5. Test Results of Hypothesis 1: The Impact of Organizational Learning on Organizational Performance (Independent Variable: Organizational Learning)

Test	R	R ²	F	Sig F	B	Beta	Sig
The Impact of Organizational Learning on Organizational Performance for Clients	0.603	0.360	18.29	0.000	7.490	0.603	0.000
The Impact of Organizational Learning on Organizational Performance for Consultants	0.550	0.300	14.65	0.001	0.690	0.550	0.001
The Impact of Organizational Learning on Organizational Performance for Contractors	0.850	0.720	118.59	0.000	0.960	0.850	0.000
The Impact of Organizational Learning on Organizational Performance	0.740	0.550	152.30	0.000	0.800	0.740	0.000

Table 6. Test Results of Hypothesis 2: The Impact of Organizational Innovation on Organizational Performance (Independent Variable: Organizational Innovation)

Test	R	R ²	F	Sig F	B	Beta	Sig
The Impact of Organizational Innovation on Organizational Performance for Clients	0.710	0.530	32.46	0.000	0.770	0.710	0.000
The Impact of Organizational Innovation on Organizational Performance for Consultants	0.660	0.430	26.00	0.000	0.650	0.660	0.000
The Impact of Organizational Innovation on Organizational Performance for Contractors	0.780	0.610	71.10	0.000	0.940	0.780	0.000
The Impact of Organizational Innovation on Organizational Performance	0.770	0.590	290.40	0.000	0.870	0.770	0.000

Table 7. Test Results of Hypothesis 3: The Impact of Organizational Learning on Organizational Innovation (Independent Variable: Organizational Learning)

Test	R	R ²	F	Sig F	B	Beta	Sig
The Impact of Organizational Learning on Organizational Innovation for Clients	0.720	0.510	33.60	0.000	0.530	0.720	0.000
The Impact of Organizational Learning on Organizational Innovation for Consultants	0.760	0.570	45.50	0.000	0.960	0.760	0.000
The Impact of Organizational Learning on Organizational Innovation for Contractors	0.840	0.710	111.47	0.000	0.790	0.840	0.000
The Impact of Organizational Learning on Organizational Innovation	0.760	0.580	270.10	0.000	0.740	0.760	0.000

Table 8. Examining the appropriateness indices of the model

Index	The index value of the model	The standard value of the index	Result
ψ^2/df	1.847	-	The model fits well.
p-value	0.001	> 0.05	The model fits well.
GFI	0.857	> 0.9	The model fits well.
AGFI	0.823	> 0.9	The model fits well.
NFI	0.843	> 0.9	The model fits well.
CFI	0.920	> 0.9	The model fits well.
RMR	0.066	< 0.1	The model fits well.

Table 9. The effect coefficient of the mediating role of organizational innovation on the relationship between organizational learning and organizational performance

Predictor variable	Organizational learning* Organizational innovation				
	β	r ²	t	Significance level	Result
Criterion variable: organizational performance	*0.662	0.438	2.383	0.027	Confirm

P<0.05

Table 10. The direct and indirect effect of organizational learning on organizational performance

Variable	Direct effect	Indirect effect	Total effect
Organizational learning > Organizational performance	0.302	0.662	0.964

Table 11. Definitions for each code of the Plan-Do-Check-Act (PDCA) operational model

Code	Definition
P ₁	Management based on meritocracy and the use of experienced people and avoidance of tastes
P ₁ D ₁	The need for people's commitment to collective decision making
P ₁ D ₂	The need for managers' attention to influence their decisions on other parts of the organization
P ₁ D ₃	The Importance of Managers to Have a Comprehensive and Comprehensive View in Their Decisions
P ₁ D ₄	Assign decision-making power to middle managers
P ₁ D ₅	The need to rationalize people with issues
P ₁ D ₆	The need for managers and employees to pay attention to changes in the external environment
P ₁ D ₇	The Importance of Organization Managers Using System Thinking in Planning and Decision Making
P ₂	Educate day-to-day knowledge and institutionalize learning through new tools and methods
P ₂ D ₁	The Importance of Group Training (Team)
P ₂ D ₂	Need to gain day-to-day knowledge and create the ground for creativity in personnel
P ₂ D ₃	The need to exchange information in decision-making by individuals and to share experiences with other personnel
P ₃	Investigating past projects and efforts to address weaknesses and strengthen the organization by relying on rich information resources
P ₃ D ₁	The necessity to understand abilities and backgrounds to improve performance and develop employee skills
P ₃ D ₂	Review the results of the group performance
P ₃ D ₃	Continuous study of problems and their simultaneous attention to their causes and complications to eliminate organizational weaknesses
P ₃ D ₄	Avoiding insistence and fanaticism on past imperfections
P ₄	The application of new technologies and the use of intelligent information systems
P ₄ D ₁	Effective use of the benefits of e-mail, portals, etc.
P ₄ D ₂	Using intelligent systems and remote control
P ₄ D ₃	Use of materials with optimum performance (high-performance concrete, composite materials, etc.)
P ₄ D ₄	Using simulation and modeling
P ₄ D ₅	Implement a video conferencing system between headquarters and workshop sites
P ₄ D ₆	Increase the share of design contracts and TOB
P ₄ D ₇	Using project management and control system
P ₅	Strengthening the solidarity between individuals and motivating and empowering the committed staff and management in the organization
P ₅ D ₁	Identifying and recruiting capable and committed individuals with the required expertise
P ₅ D ₂	Use appropriate motivational programs and tools to increase employee attachment and loyalty to the organization
P ₅ D ₃	To develop a tendency to do unconventional things
P ₅ D ₄	Adherence to laws, regulations, and regulations of the organization
P ₆	Correct organizational goal setting and periodic review of goals and achievement
P ₆ D ₁	The pursuit of common organizational goals by all persons
P ₆ D ₂	The alignment between individual and organizational goals
P ₆ D ₃	Collaboration with individuals to achieve the organization's goals
P ₆ D ₄	The need for clarity and transparency in the vision and organization's goals