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Rating of Knowledge Management Factors Affecting Construction Company performance

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Abstract: Construction industry uses project-based activities where project participants are considered as knowledge sources. This makes knowledge management as important factors in project management performance. Thus, this study presents a quantitative study on identifying knowledge management factors affecting Turner construction company performance in UAE. The study identified 32 factors and classified into 4 knowledge management groups namely knowledge leadership, knowledge culture, knowledge process and knowledge technology. A question survey was conducted to the employees of the company requesting them to gauge the influence of each factor to company performance using Likert scale. A total of 350 questionnaire sets were distributed and only 291 valid responses were used for the analysis. The results of the analysis found that in knowledge management leadership group, the most influential factor is KML5 which is *Has sufficient resources in project knowledge management activities*. For knowledge management culture, the most influential factor is KMC3 which is *Rewards employees who create, share, store and use knowledge to perform projects*. In knowledge process group, the most influential factor is KMP7 which is *Believe in sharing knowledge with others*. For the final group that is knowledge technology, the most influential factor is KMT8 which is *Responsible for creating project knowledge-sharing technology environment*. The result also found that the most influential group is knowledge management leadership group has attained the highest score. For cross tabulation analysis, it was found that leadership and culture related to knowledge management are more pertinent to senior respondents who are holding higher position in the company. This is logic as they need to manage the resources of the company holistically as compare to junior respondents. While junior employees/respondents are more inclined to knowledge management related to processes and technology. These findings are benefitted to the construction company in prioritizing the application knowledge management aspect.

Keywords: Knowledge management, construction company, cross tabulation

1. Introduction

Construction firms are becoming more competitive with low profit margins as the construction industry grows in importance as a result of rapid urbanisation in developing countries (Ali et al., 2018). Since construction organisations are thought to be information-intensive and experience-based institutions that depend on the sharing and incorporation of their professionals' accumulated expertise, knowledge management is increasingly being recognised as a vital

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capability for construction organisations to gain a competitive advantage (Oti et al., 2018). Since construction companies often use project-based activities, project participants are thought of as knowledge repositories. Turnover of team members causes a lack of project experience, raises the risk of reinventing the wheel, and, as a result, degrades project success (Ajmal et al. 2010; Yang et al., 2020). As a result, the transient existence of construction projects necessitates successful knowledge sharing, transition, and incorporation to address issues. Furthermore, since a construction project is complex and has several phases, it necessitates collaboration between cross-functional teams during project execution (Sun et al. 2018).

Knowledge management among members with various professional knowledge at various stages is extremely essential to ensure effective and smooth implementation (Takhtravanchi & Pathirage, 2018). Despite the importance of knowledge management being stressed in numerous reports, low profit margins and the conservative nature of construction firms still pose some challenges, including a lack of time and funding, a non - adherence to standard processes and facilities, a competitive organisational culture, and employee resistance (Yang et al., 2014). Due to the performance evaluation method, project managers prioritise project expense and time over the intangible potential benefits of knowledge management.

Despite the fact that some construction companies claim to study lessons at project closeout, there is insufficient documentation and ad-hoc distribution of results rather than a live process (Sun et al., 2018). Some construction firms are now attempting to implement knowledge management systems, but the possible advantages are not compelling to all stakeholders in the construction firm because implementation requires a significant amount of money and human capital, which are the firm's core competencies (Yang et al., 2014). Furthermore, distinct thinking worlds and a lack of shared knowledge among multidisciplinary members of the construction project team not only necessitate knowledge integration, but also present some challenges (Kyriazis et al. 2017). As a result, there is an urgent need to promote knowledge management, especially knowledge integration in construction projects with such limited resources.

Knowledge management is dependent on governance structures as well as knowledge processes (e.g., assimilation and incorporation of knowledge). Corporate governance structures such as organisational structure, rewards, and routine, according to knowledge management studies, can be strategically used to enhance knowledge-based processes of development, transition, incorporation, and sharing (Foss et al., 2010). As a result, it offers a method for improving knowledge management implementation. Furthermore, the incorporation of knowledge in an organisation is the essence of organisational capacity, which offers an inherent justification for the view of knowledge governance. As a result, project management skills, which are important organisational competencies in project-based construction organisations, can also be regarded as governance tools that can be used to improve knowledge alignment execution in construction projects (Demirkesen & Ozorhon, 2017).

2.0 Knowledge management factors in construction project performance

Project management is one of the most important dimensions in construction projects as it determines the goals, schedules, and strategic activities to mitigate risk and devote resources (Papke-Shields & Boyer-Wright, 2017). Knowledge management plays an important role in project management performance in several studies. The following is four of knowledge managements dimensions applied to this study.

2.1 Knowledge Process

According to Firestone and McElroy (2002), there are three basic knowledge processes which are information development, knowledge validation, and knowledge integration. Information development corresponds to knowledge generation, capture, and sharing because it entails the creation of new ideas and insights (creation), the accumulation of skills from the outside sources (capture), and interpersonal interaction (interaction) (sharing). While knowledge validation, is a transitional phase in the knowledge life cycle since it requires checking the value of knowledge in practise. The third dimension is knowledge integration where it involved codification and transition method. The knowledge integration is the implementation of knowledge in the organisation.

2.2 Knowledge Technology

Many organisations invest in technology to gain a competitive edge and increase their overall efficiency. However, the role of technology and its effect on project success are dependent on how an organization's technical systems are developed. Technology is not the only way to improve project efficiency but it gives several advantages to project managers that can be used to make the jobs easier. Thus, it needs to have knowledge management technology to improve the overall performance of the organisations. Even though while technology has provided managers with the ability to make sound hiring decisions, the human element still remains and has often resulted in prejudice (Anantatmula, 2008; Lindner, & Wald, 2011; Lundin & Lund, 2016; Kane, 2017).

2.3 Knowledge culture

According to Agamuthu and Fauziah (2011), there is a strong relationship between knowledge culture and project performance. The five components of information cultures which are empowerment, internal and external orientations, improvement orientation, and human resource orientation that support the dependencies of project management performance Van den Berg and Wilderom (2004). With knowledge culture it promotes proactive competition orientation, good challenger coordination, and professional information management are beneficial, and therefore the employees who achieve a competitive advantage are rewarded (Aliyu et al., 2015).

2.4 Knowledge leadership

According to Kiioh (2015), it is vital to have knowledgeable leadership to ensure the performance of information technology on projects is conducted successfully. There is significant correlation between project management progress and leadership in projects implementation where leadership having the greatest effect on project efficiency.

3.0 Methodology and Demography

Knowledge management factors affecting performance were identified through literature review and these factors were the main content in the questionnaire development. Respondents who are the employees of Turner Construction Company in UAE were requested to gauge or quantify each of the factors using 5-points Likert scale based on their individual experienced related to knowledge management factors in handling the company projects. This study selects common and simplest sampling method for selecting respondents to participate in the questionnaire survey. The sampling method is purposive or convenience sampling. It is also known as judgmental, selective, or subjective sampling. It is a form of non-probability sampling in which researchers rely on their own judgment when choosing members of the population to participate in their surveys. It need not be a random selection; indeed, a random sample may be imprudent. The company has 1500 employees and according to Krejcie and Morgan sampling table, it requires 306 samples size (Suen, et.al., 2014; Saim, et.al., 2019). A total of 350 questionnaire sets were distributed to the employees, however only 320 responses were valid for the analysis.

The demography of the respondents is that the majority of respondents which is 26.8 % are in their organisations as project managers. In this study, structural engineers represented 19.9%. Electrical engineers, in this survey, accounted for 18.9%. In 16.15% of the respondents, in this research, were mechanical engineers, while architects and quantity surveyors represented 15.4% and 2.74% respectively. In term of type of projects, it indicates that 32.9% of the respondents have experience in the handling of construction projects, 28.86% of respondents are engaged in the construction of infrastructure projects, 19.24% of respondents are engaged in the handling of industrial projects and 18.9% are engaged in the construction of residential projects. As regards to the qualification, large number of respondents which is 95.5 % received a bachelor's degree in engineering, followed by 3.7 % Master's and 0.68 % with Ph.D. certificates. Concerning about project experience, noticeably the percentage of respondents is 9.9% have being worked in the construction industry for less than 5 years and 15.1% have experienced of more than 5 years and less than 10 years, while 32.9% have experienced of more than 10 years and less than 15 years; the remaining 41.9% having experienced more than 15 years. These show that the respondents were adequately equipped and qualified to participate in the survey.

4.0 Descriptive analysis

This section presents the descriptive on the collected data which is the mean score for each factor in the group of knowledge management that are affecting the construction company performance and cross tabulation analysis where it gives insight perception of the factors based on the demography of the respondents (Almansoori, M.T.S et.al 2021).

4.1 Mean Score analysis

In this analysis, the collected data was analysed using mean function in the SPSS software. The score of each factor of knowledge management groups affecting the construction project performance from the respondents perceptive are as table 1.

Table 1 score of each factor of knowledge management

Code	Knowledge Management Factors	Mean	Rank
	1. Knowledge Leadership [KML] group		
KML1	Organisation encourages team members to participate in project knowledge management activities.	**3.55**	**5**
KML2	Organisation supports team members to participate in project knowledge management activities.	**3.40**	**8**
KML3	Provide necessary help and resources to participate in project knowledge management activities.	**3.63**	**3**
KML4	Are keen to see that the employees happy to participate in project knowledge management activities.	**3.43**	**7**
KML5	Has sufficient resources in project knowledge management activities.	**3.70**	**1**
KML6	Has sufficient financial resources for building an ICT system to manage project knowledge.	**3.44**	**6**
KML7	Has sufficient skilled project team members to perform project knowledge management activities.	**3.57**	**4**
KML8	Provides time for project team members to perform project knowledge management activities.	**3.68**	**2**
	2. Knowledge Culture [KMC] group		
KMC1	Provides tangible incentives to encourage participation in project knowledge management activities.	**3.80**	**2**
KMC2	Motivates employees to participate in project knowledge management activities.	**3.76**	**4**
KMC3	Rewards employees who create, share, store and use knowledge to perform projects.	**3.84**	**1**
KMC4	Having reward system to encourage more group to participate	**3.78**	**3**
KMC5	Values knowledge seeking and problem-solving.	**3.43**	**5**
KMC6	Has a high level of trust among employees for sharing project knowledge	**3.31**	**6**
KMC7	Encourages project team members to share mistakes about projects openly without the fear.	**3.21**	**7**
KMC8	Encourages collaboration among project team members.	**3.10**	**8**
	3. Knowledge Processes [KMP] group		
KMP1	Provide training/instruction as normal work practices to project team members.	**3.46**	**5**
KMP2	Processes for sharing lessons learned are widely accepted as part of normal work practices.	**3.42**	**6**
KMP3	Processes for documenting lessons learned are regularly improved and updated.	**3.53**	**4**
KMP4	Processes for searching for lessons learned are regularly improved and updated.	**3.33**	**7**
KMP5	Ability to provide knowledge that others need.	**3.54**	**3**
KMP6	Provide valuable knowledge for carrying out projects.	**3.24**	**8**
KMP7	Believe in sharing knowledge with others.	**3.63**	**1**
KMP8	Believe that most other employees can provide more valuable knowledge	**3.56**	**2**
	4. Knowledge Technology [KMT] group		
KMT1	Make use of technology to access knowledge in performing projects.	**3.46**	**4**
KMT2	Use project knowledge networks to communicate with others.	**3.42**	**6**
KMT3	Use technologies that allow them to share knowledge about projects within the organisation.	**3.54**	**2**
KMT4	Use technologies that allow to share knowledge about projects with others outside the organisation.	**3.33**	**8**
KMT5	Participate in knowledge management technology activities such as searching, creating and others.	**3.53**	**3**
KMT6	Actively share the project knowledge with others using available technology.	**3.45**	**5**
KMT7	Encourage other project team members to apply knowledge technology	**3.41**	**7**
KMT8	Responsible for creating project knowledge-sharing technology environment.	**3.55**	**1**

Table 1 shows that in knowledge management leadership group, the most influential factor is KML5 which is *Has sufficient resources in project knowledge management activities*. For knowledge management culture, the most influential factor is KMC3 which is *Rewards employees who create, share, store and use knowledge to perform projects*. In knowledge process group, the most influential factor is KMP7 which is *Believe in sharing knowledge with others*. For the final group that is knowledge technology, the most influential factor is KMT8 which is *Responsible for creating*

project knowledge-sharing technology environment. Subsequently, the mean values of each factor in the group are averaged to deduce as mean score for each group of the knowledge management as presented in figure 1.

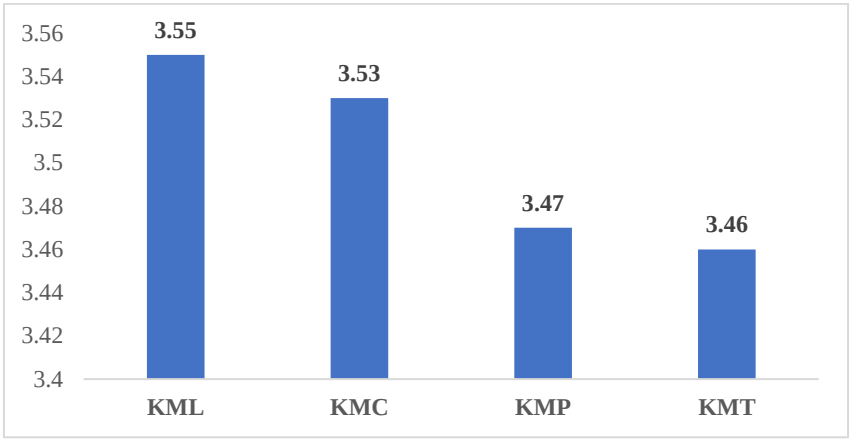

Figure 1 mean score of knowledge management group

Figure 1 shows that knowledge management leadership group has attained the highest score and followed by knowledge culture, knowledge processes and finally knowledge technology.

4.2 Cross tabulation analysis

Cross tabulation or contingency table is used to analyse categorical data where it allows researchers to draw precise, impactful insights from large data sets. Thus, this section presents the establishment of relationship between demography with the knowledge management factors affecting construction project performance (Csiszár, Gokhale & Kullback, 1980; Wermuth & Lauritzen, 1983). The first cross tabulation is based on the respondents' position or profession as figure 2

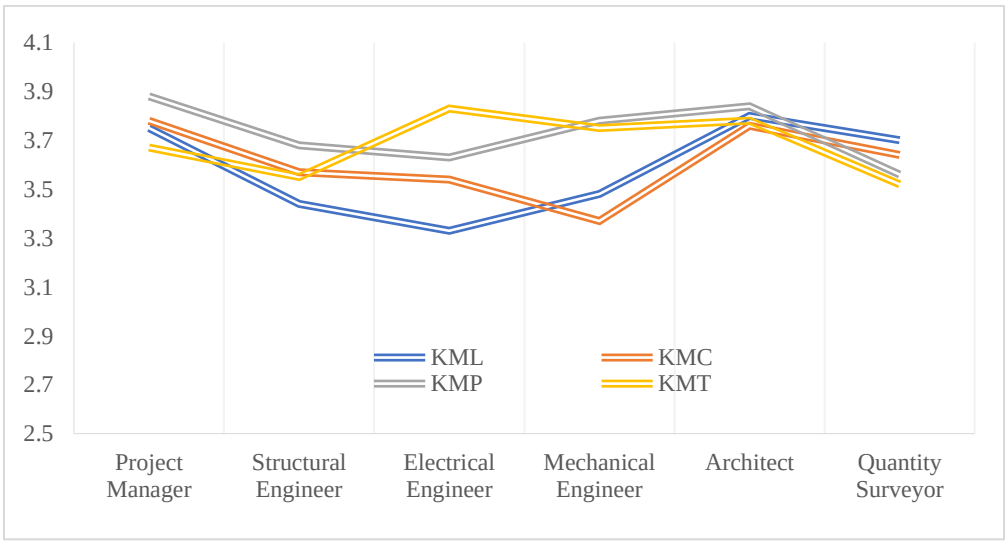

Figure 2 cross tabulation with type of profession

Figure 2 indicates that project manager and architect need knowledge leadership, processes and culture more as compared with other profession. While, mechanical and electrical engineers need more on knowledge of technology for project performance. The second cross tabulation is on working experiences as figure 3

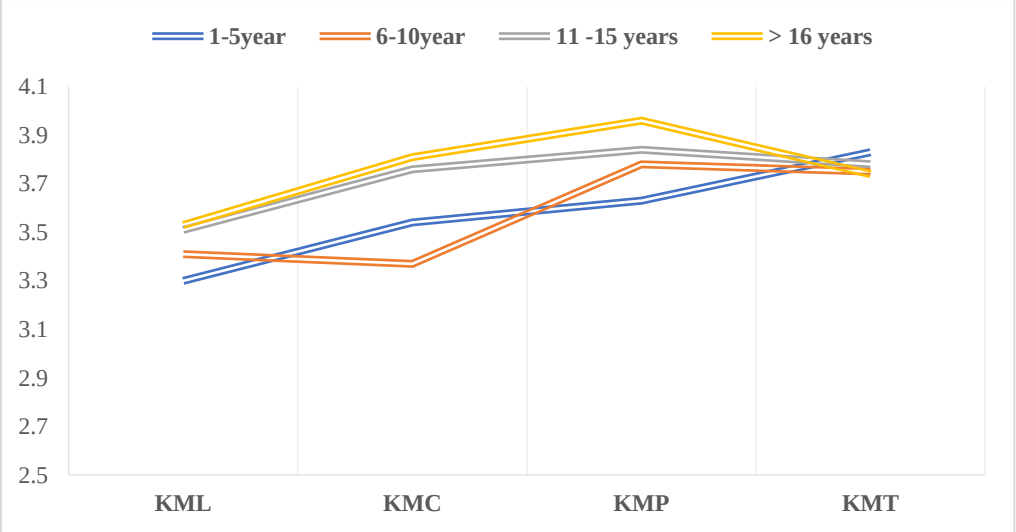

Figure 3 cross tabulation with working experiences

Figure 3 shows the relationship between working experience with knowledge management factors. It indicates that respondents having short working experience seem less concerned on leadership knowledge, culture and process while respondents having more working experiences are concerned with leadership, culture and processes. The following cross tabulation is the respondents with various qualification and the knowledge management group as table 4

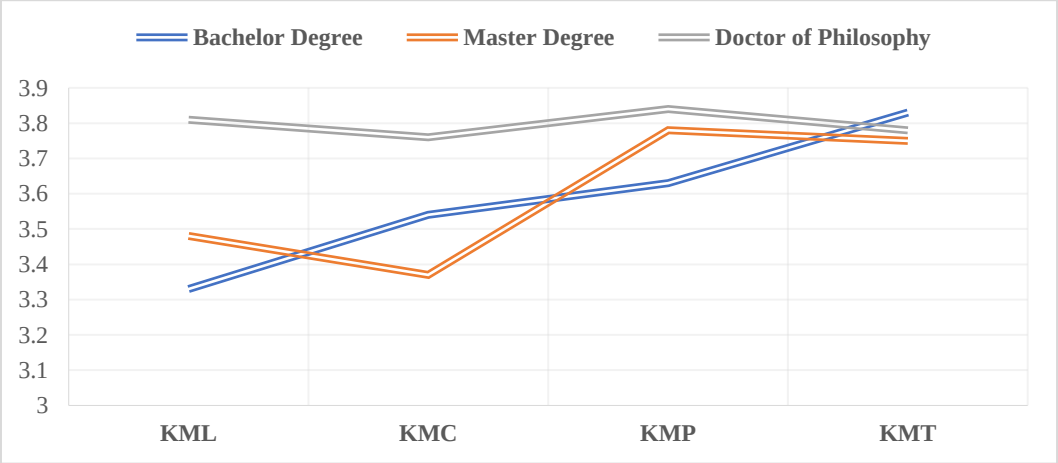

Figure 4 cross tabulation with qualification

Figure 4 shows the relationship between the respondents having various qualification and the knowledge management group. From this figure, it indicates that respondents having higher qualification see the importance of leadership and culture knowledge as compared with respondents having bachelor degree.

1. Conclusion

This paper presented a study on knowledge management factors that are deemed affecting a construction company from the view points of the company employees. Four main groups of knowledge management factors involved are related to leadership, culture, processes and technology. It was found that leadership and culture related to knowledge management are more pertinent to senior respondents who are holding higher position in the company. This is logic as they need to manage the resources of the company holistically as compare to junior respondents. While junior employees/respondents are more inclined to knowledge management related to processes and technology. These findings are benefitted to the construction company in prioritizing the application knowledge management aspect.

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