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Issues and Strategies to Apply Knowledge Management in Construction Industry

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Abstract- Nowadays, almost all organizations often cite the staff as their greatest asset but they do not have adequate systems for managing the knowledge or intellectual capital that their staff have. Due to the importance of Knowledge Management, businesses put some effort to formulate strategies and invest in mechanisms that enable them to manage their corporate knowledge. This is a relatively new concept in construction industry, which has a fundamental need to manage knowledge as they move from one project to another, working with different partners and supply chains. This paper examines the issues involved in formulating an appropriate knowledge management strategy for construction organizations. Basic definitions of knowledge and knowledge management are discussed. Insights from ongoing research are used to define the context for knowledge management in construction, and the role of information technology (IT) as an enabler for knowledge management. The concluding section of the paper formulates guidelines that will enable construction organizations to more appropriately develop knowledge management strategies that will help them to boost the performance of their company.

Keywords- *Information Technology, Construction Management, Knowledge Management*

I. INTRODUCTION

Knowledge management (KM) is the process of creating, sharing, using and managing the knowledge and information of an organization (Ungerer and Uys, 2005). It refers to a multidisciplinary approach to achieving organizational objectives by making the best use of knowledge (Gholami et al., 2013). An established discipline since 1991, KM includes courses taught in the fields of business administration, information systems, management, library, and information sciences. Other fields may contribute to KM research, including information and media, computer science, public health and public policy (Zheng et al., 2010). Several universities offer dedicated master's degrees in knowledge management. It is applied to different majors as well; Chu et al applied their strategies in oil and gas industries (Chu, Sasanipour, Saeedi, Baghban, & Mansoori, 2017), whereas some other researchers used KM strategies to predict energy production in wind turbines (Torabi, Kiaian Mousavy, Dashti, Saeedi, & Yousefi, 2018).

Many large companies, public institutions and non-profit organizations have resources dedicated to internal KM efforts, often as a part of their business strategy, IT, or human resource management departments. Several consulting companies provide advice regarding KM to these organizations (Zheng et al., 2010). Knowledge management efforts typically focus on organizational objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration and continuous improvement of the organization (Ungerer and Uys, 2005). Hessami et al. applied KM in construction of highways, which enabled them to identify several critical areas in which common practices were falling short of optimal practices (Hessami, et al., 2017). These efforts overlap with organizational learning and may be distinguished from that by a greater focus on the management of knowledge as a strategic asset and on encouraging the sharing of knowledge(Daft and Weick, 1984). KM is an enabler of organizational learning.

II. LITERATURE REVIEW

Knowledge management as one of the components of intellectual capital (IC), is concerned with human capital and how the organizations capture the tacit knowledge of individuals or teams and turn it into explicit knowledge (Gholami et al., 2013), then disseminate this knowledge into the firm and make it an organizational asset. In a firm that considers human capital as an element of intellectual capital, knowledge plays a vital role in the human capital resources; which, includes the stocks of knowledge available in an organization. Knowledge management is finding a way to transfer knowledge resides within the organization from people to people or from people to a KM software, in addition KM is about the wisdom of an organization about its operational and management processes; so in this organizations knowledge considers to be a key resource (Baron and Armstrong, 2007). Knowledge management is the process or practice of acquiring, storing, sharing and using the knowledge inside the organization to enhance firm's performance (Scarborough et al., 1999). As Blake (1998) explained the aim of knowledge management is to acquire and diffuse knowledge throughout

the firm to keep organizations competitive. Scarborough et al. (1999) believed that organizations should be able to deploy different types of knowledge and embed them in human capital management (HCM) issues such as competency management, individual and collective learning (King, 2009) or individual approach. Therefore, Knowledge management is essential in the process of developing human capital so it considers being one of the key components of HCM. Organizations need to enable their knowledge management capacity to let knowledge related to human capital flow within the firm (Ungerer and Uys, 2005). As such, HCM approach to knowledge management is about systematic and integrative management and leverage the stocks of knowledge in the organization (Tan, 2000). Successful implementation of Knowledge management will enhance the organizational effectiveness and competitiveness (Zheng et al., 2010). In doing so, it is important to know that, organizations preserving institutional knowledge even though the individuals alter (Daft and Weick, 1984), or like Fitz-Enz (2000) expressed, employees leave the institutional knowledge behind when they resign or take on new jobs. Prahalad and Hamel (1994) Believed that effective management of knowledge as the most strategic resource of the organization (Grant, 1996) is a source of competitive advantage.

III. Knowledge Management in Construction

Kelleher and Levene (2001) highlighted some good practice examples of KM adoption; industries that benefited from KM adoption include consultancy, consulting firms, financial services and oil companies. A study conducted by Ernst and Young in 1997 among 431 US and European companies found many reported benefits from having organized KM programs (Koenig and Srikantaiah, 2003). They include increased innovativeness, enhanced efficiency, better decision-making, faster responsiveness, enhanced flexibility, improved quality, reduced duplication of effort and greater employee empowerment.

The construction industry delivers large, expensive, custom-built facilities at the end of a construction process. This is a strong, knowledge-based industry that relies heavily on the knowledge input by different participants in a project team (Carrillo et al., 2004). Earlier one, Robinson et al. (2001) found that only a relatively small proportion of construction organizations have implemented KM systems. Carrillo et al. (2003) noted that in a recent survey of construction organizations, about 40% already have a KM strategy and another 41% plan to have a strategy within a year; 81% perceived KM as having the potential to provide benefits to their organizations, and some have already appointed a senior person or group of people to implement their KM strategy.

IV. Project Management

Project management is key for obtaining improvements in business processes, and most organizations that are not performing well in it have demonstrated a high failure rate of projects (Covey, 2004). Key stages of a project are the Initiating, Planning, Executing, Controlling and Closing stages. Each stage has their unique characteristics, and these stages may overlap one another, which is more obvious for large-scale projects, in which re-planning works are highly possible within the entire project duration. As engineering projects increase in complexity, the benefits of project management become ever clearer (AMEC, 2005).

There are success factors identified to help achieve project success. One of the examples of success factors for project management is summarized by Quarry (2004). He stated that successfully project planning includes availability of written specifications on outcomes, budget, timeline documented and agree, choice of best structure, obtaining required authority, estimation of cost & resources realistically, learning from previous experience and risk assessment with contingency plans. According to Mawdesley et al. (1997), activities as monitoring and record keeping are important in providing vital information for project control, but they are often seen as chores and are not carried out as systematically or as thoroughly as they should be. Masterman (2002) noted that usually the constraints are physical and he listed many sources of risk when implementing construction projects. They include changes from client, government regulatory authorities, project funding and other financial matters, design, local conditions, construct. In conclusion, dissemination and usage of existing knowledge is critical and the success of projects depends heavily on the right combination of knowledge and experiences (Disterer, 2002).

V. Organizational Implications

In recent times, the UK construction industry has been forced to critically examine its performance. The Latham and Egan Reports (Latham, 1994; Egan, 1998) have both highlighted the plight of the UK construction industry. Client's dissatisfaction, low profitability, and over-capacity are a few of the many ills described. The industry is beset with solving short-term problems. Historically, financial indicators were seen by many as the key performance indicator. However, the signs are that there may be a cultural shift. Senior construction executives are becoming more aware of management principles and the philosophy of a holistic approach to performance through the use of Key Performance Indicators (KPIs) is gaining acceptance.

Knowledge Management fits comfortably amongst KPIs being advocated. It forms an integral part of Kaplan and Norton's Balanced Scorecard (Kaplan and Norton, 1996) 'Internal Business' perspective, as well as the 'Learning and Growth' perspectives. It fits into EFQM's Excellence Model criteria for 'People' as well as 'Partnerships and Resources'. KM also fits in well with the UK Construction Best Practice Program's KPIs for project performance.

VI. Need for Organizational Strategy

Organizational strategies provide a framework for decision making (Boseman and Phatak, 1989). Without such a strategy

KM may be approached in a haphazard manner without any boundaries defined. Construction companies have been practicing some form of knowledge management for some time. It is only in doing so that they, and the professional teams that operate within them, have developed national and international expertise in certain areas of work. The term 'Knowledge Management' is relatively new to construction organizations and there continues to be a debate on whether it is a passing management fad or whether it forms a permanent company asset. Informed companies realize it is an important non-monetary asset to the organization and can assist in maintaining competitive advantage. There are a few companies interested in the concept; some have appointed knowledge management officers but others see KM as limited to the use of Intranets.

However, it is evident that Knowledge Management complements many of the initiatives being promoted to improve the construction industry. An organizational strategy on KM will allow a framework in which companies may operate, establish timeframes, and allocate an appropriate agenda.

VII. Development of a Strategy

Implementing Knowledge Management in a structured manner is a major undertaking for an industry that is not geared to responding quickly to new ideas. A strategy will determine what major plans are to be undertaken and allocate resources to them (Cannon, 1968). Aaker (1984) also suggested assigning people or groups of people the responsibility for analysing new issues, such as KM and developing responsive strategies. A strategy for implementing Knowledge Management within an organization should set out clear goals and how these are to be achieved within a specified timeframe. For a construction company, there are a number of considerations. For example, which part of the construction process may obtain maximum benefit, which section of the company will be able to benefit most from a KM strategy, how large a problem should be identified, what medium will be used (IT or individuals), how is the system to be evaluated etc. Other considerations include:

- Prepare a business case of introducing KM in the organization;
- Map the organization's business processes to identify one small area that could bring tremendous benefit to the users of such a system;
- Consider appointing a champion;
- Talk to front-line staff and find out what information they need for their work;
- Allocate adequate resources (financial and non-financial) for a prototype;
- Start with a small problem which relies on in-house knowledge before moving onto large projects involving the supply chain;
- Map out clearly the methodology for the knowledge lifecycle from capturing data to knowledge retirement;
- Identify a strategy for dealing with obstacles such as limited time and data validation;
- Evaluate progress and obtain feedback from front-line staff on a regular basis; and
- Review the strategy and achievements periodically for possible revision.

One good way of developing a strategy is to learn from others who are at a more advanced stage of implementing knowledge management systems.

VIII. Impact on Structure and Working Practices

The construction industry does not have a strong record of valuing its employees and their individual and collective contributions. This, therefore, makes it more difficult to share knowledge. Tacit knowledge tends to be regarded as personal property rather than organizational property. Hierarchical organizational structures and multi-disciplinary teams also make it more difficult to share knowledge. The introduction of new management structures to deal effectively with knowledge management may be viewed with suspicion. Likewise, radical changes in work practices are not desirable. Any task that is seen as requiring more effort will not be widely accepted. Knowledge Management will have to become an integral part of the way individuals work if it is to succeed.

IX. Conclusion

This paper has discussed the key issues that have a bearing on the formulation of a knowledge management strategy for construction organizations. It first introduced the concept of knowledge management and then discussed the organizational implications, including the considerations in formulating a KM strategy, the impact on structure and working practices, and the cultural and other barriers. The role of IT as an enabler for KM is also covered and the requirements for an IT system to support knowledge management outlined.

By the discussion so far, it is obvious that construction is an industry that needs to manage its knowledge resources in a better manner to improve business processes and satisfy its clients. However, several IT and contextual issues highlighted in this paper need to be addressed in order to make sure the development of an effective KM strategy. In particular, construction organizations need to:

- Recognize the importance of harnessing and managing their knowledge resources;
- Formulate a KM strategy that is proactive and has built-in mechanisms for ensuring that it results in improved business performance;
- Understand the impact of KM on the organizational structure and working practices of a real or virtual organization;
- Develop appropriate strategies for overcoming the cultural and other barriers that inhibit knowledge management. For

example, it may be necessary to implement incentive/reward systems that encourage people to share knowledge;

- View IT as an enabler, which should be part of an integral multi-faceted KM strategy;
- Develop and implement an IT infrastructure for KM which is tailored to suit the needs of the organization;
- Implement an appropriate training program that educates the organizations employees on the benefits of KM, and in the use of any supporting IT systems.

In conclusion, it is important to state that knowledge management is not an end in itself and is of limited value if it is not geared towards improved business performance. Construction organizations need to manage their knowledge assets in a better way if they want to remain competitive in the new Millennium. This paper has set out the key issues that need to be solved in this regard.

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