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THE ROLE OF DIGITISATION IN THE STRATEGIC PLANNING PROCESS OF IRISH QUANTITY SURVEYING (QS) PRACTICES

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Digitisation is important to the transformation of many aspects of the construction industry such as strategic planning process in QS practices. Quantity Surveying (QS) Practices largely apply digital technologies in construction project delivery, while neglecting the use of digital technologies in the strategic planning process. The aim of this paper is to investigate the role of digitisation in the strategic planning process of QS practices operating in Ireland. The study adopts a quantitative research methodology which is the first phase of an ongoing research project, by administering survey questionnaires to senior management of QS practices in Ireland. The findings of the study provide valuable insights to senior management on the role of digitisation and the application of digital technologies in the strategic planning process of QS practices. Theoretically, the paper provides a new direction for digitisation studies in construction industry by demonstrating the usefulness, influence and value creation of digitisation in specific aspects of strategic planning process in quantity surveying firms.

Keywords: corporate strategy, quantity surveying, competitiveness, IT

INTRODUCTION

The World Economic Forum predicts a significant increase in digitisation by 2025 due to the connection of one trillion sensors through the internet (World Economic Forum 2016). According to Bughin *et al.*, (2017) digitisation involves the application of digital technologies to connect people, devices and data to improve and transform business processes. Digitisation is projected to influence organisational process in 93 per cent of construction firms (Russo 2016). The influence of digitisation in the construction industry is due to integration of sensors, robotics, automation and increased use of social media platforms in construction firms (Oesterreich and Teuteberg 2016). According to Hoar *et al.*,(2017) digitisation is driving rapid transformation in many sectors, however in the construction industry digitisation is occurring at a slower pace compared to other industries such as manufacturing, healthcare, banking and finance (Boon and Prigg 2012; Friedrich *et al.*, 2011). According to McKinsey and Company (2017) using traditional methods of doing business in competitive markets without digitisation and strategic planning process leads to low revenue and profit.

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Gajendran *et al.*, (2005) notes that digitisation in QS practices ensures the provision of services to clients at minimum cost, improved performance, profitability, growth and competitiveness. In addition, Hassan *et al.*, (2007) state that the competitiveness of QS practices depends on their ability to analyse the dynamic environment of the construction industry to gain enormous advantages over rivals, part of which may include digital technology. Shen and Chung (2007) recommend QS firms adopt digitisation to address the challenges of rapid changing and competitive market in the construction industry. Despite this recommendation, successive studies continue to largely focus on digital technologies for project delivery as demonstrated in studies such as Ibranke *et al.*, (2011), and Matipa *et al.*, (2009) where less attention is given to digitisation and strategic planning process in QS practices. Thus, the aim of this study is to investigate the role of digitisation in the strategic planning process of QS practices in Ireland.

LITERATURE REVIEW

The literature review provides both a conceptual and an empirical background to the study by focusing on digitisation in QS practices; digitisation in Irish context; and the strategic planning process.

Strategic Planning Process

The strategic planning process involves formal and informal human interactions in organisations to achieve strategic outcome (Lyles and Lenz 1982). The nature and scope of a strategic planning process in organisations depend on the size of firms (Barron and Chou 2017). Despite the nature and scope of strategic planning processes differ across organisations; however, there is general agreement within existing literature that the strategic planning process involves the combination of resources and dynamic process by firms in order to exploit opportunities (Reid 1989).

Generally, the strategic planning process comprises an analysis of the internal and external environment; formulation and selection of strategic alternatives; implementation of strategic decisions; and monitoring of strategic alternatives (Barron and Chou 2017; and Hopkins and Hopkins 1997). The success of the aforementioned stages of strategic planning process depends on the effectiveness of internal communication in organisations (Lorange and Vancil 1995; Andrews 1980). Again, Miller and Cardinal (1994) note that the strategic planning process provides better understanding of the competitive environment in which organisations operate, while Ansoff (1991) states that strategic planning process in organisations facilitates the identification of new opportunities. Digitisation is one of the areas that QS practices can utilise in strategic planning process to deliver services to clients in a competitive construction environment.

Digitisation in Irish Context

A number of publications have analysed the level of digitisation in the construction industry (Hore *et al.*, 2017). In a survey involving 100 leaders in Architecture, Engineering and Contracting (AEC) organizations in Ireland, Enterprise Ireland and CITA (2016) found 75 percent increase in demand for digital technologies. However, the study failed to highlight specific client requests for the use of digital technologies to address critical issues of clients such as collaboration in project and service delivery.

Recent publications by the Irish government focus on critical areas for the development of the country in particular its competitiveness at global level, which is

evident in the recently published National Development Plan 2018-2027, and National Planning framework: Ireland 2040.

In addition, the Roadmap to Digital Transition for Ireland's construction Industry launched by The National BIM Council (NBC) of Ireland focuses on using digital technologies for construction project delivery, a phenomenon consistent with existing scholarly works investigating the use of digital technologies to maximise the value of project and service delivery. The National BIM Council (NBC) of Ireland launched the 'Roadmap to Digital Transition for Ireland's construction Industry 2018-2021 in 2017 (NBC 2017). This document consists of seven key areas notably roadmap principles and philosophies; goals; key performance targets; digital transition and implementation; recommendations and outcomes. The roadmap is expected to provide strategic vision and leadership for digital technologies implementation; effective clients and stakeholder engagements; and digital alignment with the European Union (EU), central and local government regulations. Thus, the successful implementation of the roadmap should improve digitisation in QS practices. The aforementioned national publications demonstrate the commitment to investment over the next numbers of years, which includes factors shaping competitiveness, with digitization being a central component.

Digitisation in QS Practice

Digitisation is transforming the roles of the QS profession to improve the performance and economic use of resources in construction business (Reddy 2015; and Cartlidge 2011). However, the transformation of the roles of QS practices partly depends on the decision of senior management to use available tools of digitisation to transform the roles of the QS which have existed for over 170 years (Ashworth and Hogg 2007). Currently QS practices are using digital technologies to help with various activities such as the measurement of construction works to ensure precision and accuracy (Musa *et al.*, 2010; and Shen *et al.*, 2003). Existing studies on digitisation in construction and QS largely focus on project delivery (Alwan *et al.*, 2017) leading to paucity of discussion on strategic planning and digitisation. For instance, digitisation studies in QS hugely focus on Building Information Modelling (BIM) capabilities for QS practice (Ismail *et al.*, 2016); the potential to leverage BIM to increase efficiency in construction project and service delivery by QS practices (Smith 2016); and BIM opportunities for QS (Crowley 2013). Drawing from the above studies it is clear that there remains a paucity of empirical investigation into the relationship (and potential benefits) of digitisation and strategic planning process in QS practices. Although previous studies explore a number of success factors for collaboration in construction industry (Akintoye and Main, 2006; Leverick and Littler, 1993), these studies failed to investigate the critical role of digitisation in strategic planning process and the impact on collaboration. For instance, Akintoye and Main (2006) identify 'project planning with defined schedule' as a success factor for collaboration but failed to consider digitisation as a key driver of collaboration during strategic planning process and project planning in construction firms. Thus, the gap in existing knowledge in this regard is apparent. Collaboration is a mutual engagement of participants to solve a problem together in a coordinated manner (Roschelle and Teasley 1995).

The World Economic Forum (2015) notes that 25% of business revenue would be generated through collaboration and innovation by 2030. This implies that firms investing in innovation and collaboration through strategic planning process and digitisation would have the competitive advantage in generating 25% of their revenue

in the future. According to Asad *et al.*, (2005) innovation is fundamental to creation of competitive advantage in construction industry. This is equally the case within the context of Irish QS practices, giving rise to the need of the current study.

RESEARCH METHOD

This study adopts quantitative research approach, which is the first phase of an ongoing research project investigating strategic planning process in Irish QS practices. The focus of the paper examines the role of digitisation in the strategic planning process of QS firms in Ireland. Using purposive sampling, survey questionnaires were administered to 382 senior quantity surveyors registered with Society of Chartered Surveyors Ireland (SCSI) in top management positions of QS practices. A small research grant was provided by the SCSI in support of the research. One single key informant from each QS practice within the SCSI membership was target to respond. This ensured that the person was at sufficiently senior level to be in a position to respond with authority in relation to the strategic planning process. Furthermore, targeting one key informant eliminated the risk of double counting.

The questionnaire consisted of both closed-ended and open-ended questions focusing on the roles of digitisation adapted from the review and analysis of existing literature. In order to determine the level of digitisation in respondent firms, a 5- point Likert scale comprising 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, and 5= strongly agree were used to ascertain the level of agreement respondents placed on the various roles of digitisation in strategic planning process of QS practices in Ireland.

The questionnaire was pilot tested and amended based on feedback received from respondents. The administration of the questionnaire was internet mediated using an online survey tool.

One hundred and two (102) responses were received and analysed with an overall response rate of 26 per cent. According to Nulty (2008) online surveys yield much lower response rate than paper-based surveys. Again, Fincham (2008) states that online surveys with 25 to 30 per cent response is adequate for data analysis.

Ethical considerations are critical to ensuring professional conduct during research. Thus, the ethics of the institution were adhered to and anonymity of respondents was assured. Completed responses were stored using encrypted files. Early stage analysis utilised basic statistics for preliminary analysis to observe the underlying trends in the data followed by using Excel and SPSS for analysis using descriptive statistics.

The involvement of senior management in the study is an indication that the findings of the study were based on responses from valid and reliable participants.

DISCUSSION OF RESULTS

The analysis of data revealed four main roles of digitisation in strategic planning process of QS practices including:

- communication between participants and stakeholders during strategic planning process;
- collaboration between staff and other stakeholders during project and service delivery to clients;
- innovation in the organisation internally and externally; and
- collection of market and industry data for decision making.

The results of the study presented in table 1 below show the mean, ranking; and total number of valid responses (N) of each variable to provide a detailed insight into respondents' perception of digitisation in the strategic planning process.

According to Field (2005) a variable is important if it has a sample mean of 3.5 or more when Likert rating scale of measurement is used. Thus, variables with sample mean of 3.5 or more in table 1 below tend to be important. Furthermore, Field (2005) suggests that low standard deviations (SD) close to zero indicate that the sample mean is an accurate reflection of the population involved in a study.

Table 1: Role of Digitisation in Strategic Planning Process

Roles of digitisation in Strategic Planning Process	N		Std. Dev(SD)	Ranking	Missing	Total
	Valid	Mean				
1. Drives innovation in the organisation internally and externally	91	3.92	.71	2nd	11	102
2. Encourages collection of market and industry data for decision making	92	3.67	.72	4th	10	102
3. Ensures collaboration between staff and other stakeholders during project and service delivery to clients	92	3.79	.74	3rd	10	102
4. Improves communication between project participants and stakeholders	91	3.99	.71	1st	10	102

Respondents were asked to indicate their perception on the role of digitisation in strategic planning process in their organisation. Respondents' ranking show that digitisation in strategic planning process improves communication between project participants and stakeholders with a sample mean of 3.99, and SD of .71. Since the sample mean is greater than 3.5 and the SD is close to zero, the result is an accurate reflection of the target population of the study. The use of social media platforms such as WhatsApp, Twitter, Facebook, intranet create a channel of communication for stakeholders and employees in QS practices to provide suggestions, feedback and ideas to improve the strategic planning process. The application of social media platforms ensure participation and comprehensiveness of the strategic planning process. Participation in strategic planning process refers to the involvement of owners, suppliers, customers, local community, and employees in the strategic planning process (Papke-Shields and Boyer-Wright, 2017). Comprehensiveness is the inclusion of wide range of issues in the organisational environment into the strategic planning process (Campbell and Fainstein, 2003). Since the core business of QS practices involves projects and service delivery to clients, improved communication as a result of digitisation in QS practices would drive efficient communication between project participants and stakeholders. In addition to improving communication between project participants and stakeholders, digitisation in strategic planning process may result in greater efficiency in downward, upward and lateral communication in QS practices.

Collaboration is essential to the delivery projects and services in the construction industry (Rahman *et al.*, 2014), however, achieving a high level of collaboration during the strategic planning process in the construction industry remains a challenge to professionals such as the QS (Hai *et al.*, 2012). Respondents' ranking of digitisation improving collaboration in the strategic planning process of QS practices in table 1 above shows a sample mean of 3.79 with SD of .74. This variable with a sample mean above 3.5 shows that digitisation enhances collaboration during strategic planning process in QS practices. Again, the low SD of this variable shows less variability in responses indicating that the result is an accurate reflection of the study

population. Collaboration is critical to the success of strategic planning which involves interaction between people in an organisation. For instance, crowdsourcing provides digital toolkits (Amrollahi *et al.*, 2017; and Amrollahi *et al.*, 2014) for enhancing collaboration between employees and stakeholders in strategic planning process. Crowdsourcing is using the collective talents and wisdom of people within and outside the firm to perform organisational tasks such as strategic planning process (Pedersen *et al.*, 2013). Digital tools for crowdsourcing such as 99 Designs, X Prize and Quirky drive brainstorming; and encourage stakeholders and staff to collaborate in finding solutions to organisational problems and decision making during strategic planning process in QS practices.

Respondents' ranking of digitisation as a driver of innovation internally and externally during strategic planning process indicates a sample mean of 3.92 with SD of .71. This result demonstrates that digitisation is critical to innovation in strategic planning process of QS practices. The adoption of digitisation in the strategic planning process leads to internal and external innovation to mitigate the challenges of project and service delivery in QS practices such as increasing complexity of clients. Therefore, QS practices that adopt digitisation in the strategic planning process are able to innovate internally and externally to address the challenges confronting them in the construction industry. Digital technologies such as virtual reality (VR) play important role in the strategic planning process of QS practices through simulation of the various stages of the strategic planning process to top management and other stakeholders such as employees. For instance, VR has the potential of demonstrating the activities required at each level of strategy formulation in QS practices. QS Practices need to exploit market and industry data to enhance their decision making process for competitiveness in the construction industry.

Respondents' ranking regarding the role of digitisation in the collection of market and industry data for decision making in table 1 shows a sample mean of 3.67 with SD of .72 indicating digitisation in strategic planning process of QS practices is important to the collection of market and industry data for decision making. The availability of comprehensive market and industry data to QS practices enable top management to make realistic and reliable decisions for successful outcome. The use of digitisation to collect market and industry data enhances the development of new business models based on current situations in the construction industry by QS practices. Big data technologies such as internet of things (IoT) or machine-to-machine communication (MMC); cloud technologies; data visualisation; and deep machine learning are digital technologies for collection of industry and market data for strategic planning in QS practices. For instance, the use of dig data technologies to collect industry and market data for strategic planning process in QS practices has the potential of eliminating intuition from the decision making on key issues such as client acquisition and retention; market segmentation. Using digital technologies to collect industry and market data enable the senior management of QS practices to identify and predict opportunities in the business environment. In addition, big data technologies organise and process the unstructured data within QS practices to increase business intelligence of QS practices to improve their performance in client acquisition; and service delivery. Business intelligence is a process of turning information into knowledge that supports the strategic planning process for profitable business in organisations such as QS practices. Thus, QS practices using big data technologies have advantage

over their rivals in terms of key information on potential projects which enable them to prepare for procurement ahead of their competitors.

CONCLUSION

The aim of this study was to investigate the role of digitisation in the strategic planning process of quantity surveying practices in Ireland. The findings show digitisation in the strategic planning process drives key activities in quantity surveying firms. In addition, the findings suggests that digitisation in quantity surveying practices improves efficiency in project and service delivery; drives internal and external innovation; and ensures faster delivery of projects and services to clients. The findings provide valuable insights and understanding of top management in QS practices on the use of digitisation in strategic planning process to address the current situation where use of digitisation in the construction industry largely focus on its application in construction project delivery. In addition, QS practices are currently investing in technology would be able to innovate and digitise their strategic planning process to create competitive advantage for improved revenue generation and growth.

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