Barriers to effective digital leadership enactment in the construction industry

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Abstract

This study considers the role of leaders in driving digital transformation in their organisations. Considering that the construction industry is slow at adopting digital technology, the aim of the study was to explore the factors that inhibit leaders from driving digital transformation in their organisations. Data was collected through a qualitative questionnaire survey. Participants were asked to describe barriers to effective digital leadership in their organisations. The issues that hinder effective digital leadership were grouped under five themes: leadership characteristics, management and organisational issues, resource constraints, technological issues, and risk perceptions. The study shed light on the barriers to digital leadership enactment in the construction industry, an issue that has received limited attention in the existing literature. The findings are useful to business leaders, researchers, trainers and educators to develop measures to encourage leaders in the industry to be at the forefront of digital transformation in their organisations.

Keywords

1   Introduction

Construction is one of the prime sectors of the UK economy, contributing almost £90 billion to the local economy (or 6.7%) and comprising of over 280,000 businesses. Although described as the most complex and adverse, the industry accounts on average for about 3 million jobs, equivalent to 10% of total UK employment. The industry is globally set to grow by at least 4.3% until 2025, according to the 2025 strategy report (BIS UK, 2013). It is suggested that at the heart of the construction industry's future is the need for digitalisation.

Digitisation is driving rapid transformation in many sectors like healthcare, banking, manufacturing and finance (Hoar et al., (2017). However, this transformation is occurring at a much slower pace in construction (Boon and Prigg 2012). Business leaders and managers can play a crucial role in influencing their organisations to speed up digital transformation. Therefore, it is vital that leaders in the construction industry be seen to be at the forefront of their organisations' endeavours to digitalise. The influence of leadership in driving innovation in organisations is well documented. However, there have been limited studies dedicated to the role of leadership in driving digital innovation in the construction industry (Zulu and Khosrowshahi, 2021). Therefore, this research aimed to explore factors that impact digital leadership enactment in the construction industry.

The study is based on an exploratory qualitative study. Data was collected through a qualitative questionnaire survey to afford a relatively large sample size to provide free-text responses to several questions focusing on addressing the research purpose. Data were analysed using an inductive thematic analysis approach. The barriers to digital leadership enactment were grouped under five themes: leadership characteristics, management and organisational factors, resource constraints, technology, and risk perceptions. These are discussed in detail in the findings section.

2   Digital Leadership

It is projected that digitisation will influence the organisational process in 93 per cent of construction firms (Russo 2016). Oesterreich and Teuteberg (2016) opine that the influence in the construction industry will be driven by factors such as robotics, automation, integration of sensors and increased use of social media platforms in construction firms. For example, the one trillion sensors connected through the internet can allow for a significant digitisation escalation predicted for the next five years (World Economic Forum 2016).

Adesi et al. (2018) identified 12 drivers, including their perceived advantages that will arise with implementing these technologies. Results highlighted that companies were mainly motivated by process improvement and demands communicated by their customers. Similarly, a clear understanding of the factors influencing the implementation of digital technologies in construction is necessary; but has not been widely researched. However, executives might be interested in measuring the successes of digital initiatives. Without first understanding the awareness of what drives success factors forward, it will be challenging to influence success targets.

The term "digitisation" refers to the application of digital technologies to connect people, devices and data to improve and transform business processes (Bughin et al., 2017). Much misunderstanding, however, exists about the term "digital transformation". Initially, the term seems to have focused on an ultimate shift in the way organisations think, work, and manage digital trends responses in competitive markets (Kane, 2017). However, conceptualising digitization should be regarded as an ongoing process for growth and development that may help managers during digital adolescence (Kane, 2017). Gartner describes digitalization as the new era for enterprise IT, where IT and business innovation are more integrated and corporate IT shifts to digital from a legacy perspective— emphasizing the need for digital leadership. He further uses tenure to explain the process of using digital technology for enhancing business models and value-created opportunities to move to digital business (Gartner, 2016).

The role of leaders is considered to be critical in driving digitalisation, hence the term digital leadership. An increased level of engagement from those in transformation-specific roles and senior leaders has been pointed out as a critical determinant for success, according to the MIT (2014). Chung et al. (2005) and Qiping Shen et al.,2003) also highlighted that lack of management support is a significant barrier in the DT process. Based on previous studies, there is a clear requirement for what constitutes effective digital leadership, what capabilities are needed and how the fundamentals of digital leadership can be built upon and strengthened. El Sawy et al. (2016) defined digital leadership as "Doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem", borrowing concepts of Bennis (1989) definition of leadership that "leadership is about doing the right thing for the success of the organization, while management is about doing the thing right."

Hoar et al. (2017) argue that there is a real need for digital leadership in the Industry. Considering that the construction industry is slow at adopting digital technologies, the role of leaders should be

investigated. Furthermore, Accenture indicates that 75% of obstacles hindering digital transformation are non-technical factors (Accenture,2016), suggesting that DT is less about technology and more about transforming individuals. Similarly, Kane et al. (2019 and Anghel (2019:38) argue that digital transformation is less about technological aspects than it is about managing the transition, including effective leadership, acquisition of appropriate skills leaders, managers and employees to buy-in and integrate the organisation's systems with the new digital technologies.

Past research has centred mainly around describing the technical implications of digital transformation. Nevertheless, there is little research available that deals with digital leadership within the construction industry within the UK. Therefore, the purpose of this study was to explore factors that impact digital leadership enactment in the construction industry.

3 Research Methodology

Data was collected using a qualitative questionnaire survey, where respondents are asked open-ended questions and are required to respond with free textual data, are uncommon. Braun, Clarke and Gray (2017, pp 15) suggest that "the method is suitable for exploring people's experiences and their practices, perceptions and understandings about the research topic, and researching sensitive topics". This suited the present study, which sought employee perceptions of their leaders' attitudes towards digital innovation to avoid self-reporting bias if leaders were asked to evaluate themselves. A convenience sampling approach was adopted to identify suitable participants. The study involved asking students studying part-time construction-related master's courses at a university as a study population to complete the questionnaire. Convenience sampling in qualitative research is mainly used where study participants are conveniently accessible concerning access, location, time and willingness (Lopez and Whitehead, 2013).

The data were analysed using the inductive thematic analysis procedure described by Hayes (2000). There are two primary ways in thematic analysis for identification of themes within data. One can take either an inductive or 'bottom up' way or a theoretical or deductive (Haye, 2000). In distinguishing between the two approaches Braun and Clarke (2016) characterise an inductive approach as one where the coding of the data is data-driven and does not try to fit it into a pre-existing coding frame, while a deductive/theoretical approach as one which is driven by the researcher's theoretical or analytic interest in the area. An inductive approach was used in this study without considering the typical categorisation of leadership in general literature as the authors wanted to provide a characterisation of leadership based on first-hand experiences of employees. The analysis approach also followed Braun and Clarke's (2016) six phases of analysis which included: familiarizing oneself with the data, generating initial codes; searching for themes; reviewing themes, defining and naming themes; and reporting.

4 Findings and Discussion

4.1 Sample Demography

Considering the purpose of the study, it was an inclusion criterion that participants in the study should have experience working in a construction industry organisation for them to be able to indicate their perceptions of digital leadership. Table 1 below summarises the characteristics of the sample. As can be observed from the table, while most participants worked in quantity surveying and commercial management, the participants represented various professional roles. Almost 80% were classified as professionals, first-level managers and middle managers, with less than 25% represented by trainee level participants. This was also reflected in the participants' experience in the construction industry,

which shows that over three-quarters of participants had at least three years of experience in the construction industry, and a quarter had less than three years of experience. Thus, the data shows that the 38 participants were of a suitable profile and therefore were deemed suitable to inform the study of their perceptions of digital leadership in the construction industry. However, further analysis of data did not take into consideration the respondents' profiles.

Table 1: Sample Characteristics

Characteristic	Frequency	Percent	Characteristic	Frequency	Percent
Gender			*Years working in the construction industry*		
Male	14	37%	Less than 1 year	4	11%
Female	24	63%	1-2 years	5	13%
	38	**100%**	3-5 years	10	26%
			6-10 years	5	13%
Present Job Role			Over 10 years	14	37%
Director	2	5%		**38**	**100%**
Architecture and Design	8	21%	*Number of Employees in Company*		
Quantity Surveying & Commercial Management	16	42%			
Planning	1	3%	Less than 10	6	16%
Project & Contract Management	6	16%	Oct-50	6	16%
Engineering specialist	3	8%	50-250	9	24%
Other	2	5%	250-500	3	8%
	38	**100%**	Over 500	14	37%
Position in organisation Hierarchy				**38**	**100%**
Middle Managers	2	5%	*Company's Annual Turnover (Millions)*		
First Level Managers	5	13%	Less than £1M	7	18%
Professionals	23	61%	£1M-£2M	6	16%
Entry Level/Trainees	8	21%	£2M-£10M	9	24%
	38	**100%**	£10M-£50M	5	13%
Years in employment with company			More than £50M	11	29%
Less than 1 year	8	21%		**38**	**100%**
1-2 years	15	39%			
3-5 years	7	18%			
6-10 years	5	13%			
Over 10 years	3	8%			
	38	**100%**			

4.2   Barriers and enablers to digital leadership enactment

The purpose of the study was to determine the barriers and enablers to effective digital leadership in the construction industry from an employee's perspective. The analysed free-text responses using an inductive thematic analysis approach. Braun and Clarke's (2006) six phases of thematic analysis were followed in analysing the data and resulted in the identification of five themes. These include leadership issues, management and organisational issues, technological issues, resource constraints and risk perceptions. These themes provide an insight into the perception of participants of factors that

impact on the leaders in their organisations in driving digital innovation in their organisations. The five themes are presented below.

Theme 1: Leadership characteristic influences

This theme reflects comments that described the characteristics of the leader that can impact on digital transformation. It reflected the leaders themselves. It is reflected under the following sub-themes: lack of motivation and drive; lack of training; resistance to change and traditional mindsets; and lack of leadership buy-in.

Participants reflected on the lack of drive and or motivation by their organisational leaders. For instance, P15 indicated that *"The main barrier in my view is the lack of motivation from the company leaders to push innovation and invest the time needed to make it a success"* (P15), while P18 characterised leadership in their organisation as: "*There is no drive from the company leadership towards digital transformation"* (P18). Another participant reflected on the need to modernise and the need for conscious leadership to drive innovation: "*Not with that momentum, which should be based on conscious leadership, as it should be realized that some of the technology currently used are from past, and more effective solutions must be sought to keep pace with the huge technological developments*" (P32).

Some participants reflected on leaders' resistance to change: "D*irectors being resistant to change (P22); very resistant (P20).* Studies on resistance to change tend to focus on employees' resistance to change. However, the context here is that leaders can also be resistant to change even when employees are eager to change organisational practices and procedures. The traditional mindset is also seen to be a barrier to digital leadership enactment. For example, P24 commented: *"Traditional mindset takes time to adapt to changing circumstances",* while P14 stated. (there is) *"Old school management that sits at the top of the organisation".* The traditional mindset among leaders is not always universal across organisations. In some organisations with multiple departments or sites, this adoption of technology company-wide may be an issue. In some organisation, one department is eager and driving digital innovation, while in other departments, it is not the case. For example, P5 stated: *'Overall positive from leadership within the office. Within other offices, it appears that there is less of a drive to push the software'.*

Top management support is essential for successful change initiatives. Some of the responses reflected the lack of leadership buy-in. For instance, a participant indicated: "*Not every effective, there is a lack of buy-in from management"* (P21). P3 indicated, *"Our leaders have to be show more conviction in their leadership, there doesn't seem to be any drive-in digital transformation".* Others indicated a lack of drive from the top and that digital transformation initiatives are driven by staff.

Theme 2: Management and organisational factors

This theme reflected management issues and organisational design influences on the leaderships ability or disposition to drive digital innovation in their organisations. Four key barriers were identified. These include lack of strategic focus, lack of training, change management procedures, communication and engagement, human resource issues, and management structure. Participants noted the lack of strategic focus to drive innovation. It was common to see descriptions of leaders who were focused on the 'business as usual' practices with little consideration of digital innovation. For instance, P29 indicated: *"Focus on profit generation and limited capacity to concentrate on the future".* Others such as P7, P6 and P12 also reflected on management's focus on current achievement rather than the long-term investment.

Others reflected on the lack of training for both leaders and their team to drive innovation. For instance, P21 indicated "*Lack of training for the management and the rest of the firm*", while P26 reflected on the need for training: "*Need more training and more proactive to go with the trend*". Training can be an important factor to help leaders' transition from a traditional mindset to a new mindset fit for the digital age (reference). Effective change management processes were also noted as a barrier to digital leadership. For example, P4 was categorical in identifying this as a barrier to digital leadership: *One participant noted "lack of effective change management*" [P4]

A related concern was the inadequate or poor information flow within organisations. Some of the participant responses showed that management appeared not to have put in place a coordinated effort to digital innovation, as evidenced by poor communication. For example, one participant commented that *'... communication to people in non-leadership roles is poor. These people often don't find out about what's being introduced until it's happened, there are often many teething problems'.* [P16] while another: *'I find it is enforced with lack of understanding or direction leading to impatience and scepticism'.* [P25]. Internal communication is known to be a key factor in driving organisational innovation (Sklyar and Sokolova 2019). In particular, the quality of the information exchange can reduce the amount of uncertainty, improved organisational climate, and surrounding the project better cross-functional co-operation in organisations (Lievens, et al.,1999).

The organisation structure was also identified as a potential barrier to leadership enactment. For example, P3 indicated that *"The size of the organisation, budgetary constraints and too big a gap between the main people at the top and the day to day team leaders".* In some cases, the pace of digital technology adoption differs between departments within the same organisation. Form an entire organisation perspective; leaders fail to have a coherent approach to digital innovation. For instance,

> *Within my own organisation, there is a drive from some senior managers, but in the whole the digital transformation within the organisation is currently limited"* [P15]

Theme 3: Technological factors

Technological barriers related to three key issues including: leaders' understanding of technology know-how, organisational IT infrastructure and leaders' perception of the value of technology. The leaders' lack of understanding of the workings of digital technologies (technology know-how) was identified as a barrier to their ability to drive digital innovation in their organisations. For instance, P17 indicated that *"being of the older generation and doesn't really understand how the technology works" [p17].* The lack of understanding of how technology works is also seen to give leaders unrealistic expectations: *"Lack of their own understanding of the software giving them unrealistic expectations either in terms of deliverables or timeline" [P25].* Others pointed to the leader's lack of understanding of the value of digital technology. Some participants noted the need for an IT infrastructure to drive digital innovation. For example, P13 noted that *"We do not have an IT department, our Partners are Quantity Surveyors/Project Managers and, therefore, aren't always aware of the latest digital trend in the industry".* While P27 noted: *"Reasonably good, but we've struggled to move away from the use of xxx to xxx, generally most systems are online, run well the vast majority of the time, they did outsource IT support to an external company which hasn't gone too well".*

Theme 4: Resource constraints

This theme reflected the impact of financial and time pressures on the leaders' motivation to drive digital adoption. A related issue to cost pressures is the lack of investment capabilities within the organisations. The cost of the technologies was seen to be a factor influencing leaders to drive digital innovation. For example, P6 indicated: *Lack of understanding and the costs associated with a digital*

transformation [P6]. Others reflected on the limited investment capability of their organisations as a factor influencing leaders' efforts to digitalise their organisations. *"Financial constraints" [P34]* and *"Lack of capacity to invest" [P12]*are examples of sentiments provided by the participants in reflection of factors that influence leaders' drive towards digital innovation. Another resource constraint factor related to time pressures. P5 stated, *"Not enough time to dedicate to learning" [P5]* while P12 indicated *"Lack of time to focus on digital strategy" [P12]*

Theme 5: Risk perceptions and attitudes

The risk perceptions and attitudes of leaders also seem to play a part in influencing their ability to lead organisations to transform digitally. The leaders' attitudes towards risk were recognised as a barrier to leaders' drive for digital transformation. Sentiments such as *"(un)willingness to take risks" (P27) and "Risk aversion and unwillingness to experiment" [P4]* reflected leaders risk attitudes towards digital innovation. Risk perceptions were also reflected in leaders' perceptions of uncertainty in outputs from digital technologies considered for adoption. For instance, P32 indicated: *"The uncertainty in the form of the output that may result from the use of this technology".* Participants also reflected on the uncertainties in the return on investment (RoI). Below is an example comment from a participant:

> *"The main barrier in my view is the lack of motivation from the company leaders to push innovation and invest the time needed to make it a success. Understandably leaders need to see that any investment is commercially viable and until this is confirmed there will be a barrier to any development" [P15]*

5   Discussion

The use of the qualitative questionnaire enabled us to investigate the perceived barriers to leadership enactment required for digital transformation in the construction industry, an issue that has remained unexplored. The main findings are that the barriers to digital leadership enactment can be grouped into the five themes: leadership issues, management and organisational issues, technological issues, resource constraints and risk perceptions. Table 1 represents the key barriers to digital leadership based on the findings presented above.

Table 1: Barriers to digital leadership enactment

Categories of barriers	Factors
Leadership characteristics	Old school perspectives- resistance to change
	Leadership buy-in
	Lack of motivation and drive
	Ineffective leadership
Management and organisational barriers	Lack of strategic focus
	Change management
	Communication and engagement
	Human resources- training and skills
	Management structure- Management levels
Technological factors	Technology know-how
	IT infrastructure to drive innovation
	Lack of appreciation of value of DI
Resource constraints	Budgetary constraints
	Cost as an inhibitor- financial pressures
	lacking investment capability
	Time constraints
Risk attitudes and perceptions	Risk attitudes
	Uncertainty of outcomes
	Uncertainty- ROI

While we did not find a study that focused on barriers to digital leadership enactment in the construction industry, there are some similarities between our findings and issues identified in the literature on barriers to digital technology adoption. However, in these previous studies, the unit of analysis is mostly at an organisational level and not at the leadership level. We did not focus on leadership on an individual level but leadership as a collective from a distributed leadership context. In distributed leadership, rather than focusing on the work of individual leaders, it explores the interactions between a layer of leadership functions. Harris (2009) points out that distributed leadership recognises that there are multiple leaders and that leadership activity are widely shared within and between organisations. As such, distributed leadership focuses on the interactions, rather than the actions, of those in formal and informal leadership roles (Leithwood et al., 2007).

The characteristics of leaders is acknowledged in the literature as a vital element for innovation in organisations. See, for example, Cortellazzo et al. (2019), who concluded that leaders are key actors in developing a digital culture within an organisation. Studies such as Oberer and Erkollar (2018), Rukmani (2010) and Mkheimer (2018) have shown the impact of leadership characteristics on organisational processes and outcomes. The findings also identified the role of management and organisational factors that impact on the effectiveness of digital leadership enactment. The issues under this theme can be related to the elements in McKinsey's 7S model, which identifies seven organisational elements, including strategy, structure, systems, style, skills, staff and superordinate goals, where change can be evaluated. The idea is that organisational effectiveness stems from the interaction of the myriad of factors, some of which may not always be obvious. Waterman et al (1980) acknowledged the multiplicity of factors beyond mere consideration of structure and strategy. The McKinsey 7S model focuses on analysing organisational areas where change is expected to be made, while the other four models provide steps or processes required in managing organisational change. The McKinsey 7S model, therefore, lends itself well to be used as a basis for evaluating changes in the organisation as such was adopted for this study.

Technological barriers are have been shown to impact on digital technology adoption. For example, Somsen et al. (2019) identified lack of IT knowledge and dependencies of other technologies as barriers to BIM adoption. El Sawy et al. (2020) demonstrated a case study's analysis of the need for digital leadership to address five key elements, including business strategy, business models, enterprise platform integration, people mindset and skillset, corporate IT function, and workplace culture. The elements above include both organisational and technological issues. For example, Bradley et.al., (2015) in their study, contends that twenty-five per cent (25%) of executives believe that there are "high" barriers to digital disruption in their industries. Resources related factors are also commonly identified in the literature as contributing barriers to technology adoption. Studies on BIM adoption, for example, have identified resource issues affecting adoption including, cost (Hong et al. (2018), Ayinla et al.'s (2018), availability of capital (Khosrowshahi, F. & Arayici, Y., 2012), (Ayinla et al.'s (2018), and time pressures due to long lead time required for full-scale implementation (Ahuja, et al. (2018); Sunil et al. (2017).

For leaders, risk and uncertainty play a role in their decision making (Day, 2015). A leader's risk perception can be a crucial determinant of organisational success. For example, MacCrimmon, and Wehrung (1990), in their study of 500 executives, found that the most successful executives were the biggest risk-takers and that the most mature executives were the most risk-averse. Risk perceptions also have an impact on technology adoption. For example, Li et al. (2020) demonstrated that risk perception directly affects users' attitudes and intentions to use Alipay- a mobile payment platform. They argued that their results suggested that when users perceived that the risks of using Alipay are higher, they will hold a negative attitude about using Alipay and less likely to use Alipay. Therefore, it would be the cases that risk attitudes, uncertaininty of outcome and unternatity of return on

investment will play a part in leaders risk behaviour and, therefore, impact their ability to drive digital innovation in their organisations.

6   Conclusion and Recommendations

The study aimed to explore factors that impact on digital leadership enactment in the construction industry. The industry is characteristically slow at adopting technologies. The role of business leaders is considered vital to accelerate digital transformation. While there have been many studies on digital leadership in other research fields, there is a lack of research focused on the construction industry. This study was, therefore, timely as it considered digital leadership in the construction industry. The literature has argued that unless we know what hinders digital leadership enactment, the initiatives to encourage business leaders to lead the way may be limited. Therefore this study explored barriers to digital leadership enactment. The findings suggest that the barriers to digital leadership enactment can be grouped under five themes: leadership characteristics, management and organisational issues, technological factors, resources constraints, and risk perceptions. Leaders can target these areas when designing strategies to enhance their ability to accelerate digital transformation in their organisations.

The study had two key limitations, which may impact on the interpretation of the results. First, participants were selected from a continent sample group composed of part-time postgraduate students working in the construction industry. While they had the experience to respond to the questionnaire, the sample frame may be considered as homogenous and therefore may not represent views of the construction industry population in the UK. Second, qualitative questionnaires where participants write-in responses may result in less rich data than other qualitative methods such as interviews. However, the methodology employed enabled the researchers to obtain data from a larger sample size than would have been achieved using interviews. Considering that this was an exploratory study, there are opportunities for further research on barriers to digital leadership. The results from this study can be used to design a quantitative study to capture views from a large sample size and test the significance of the influence of the different variables identified. Separate studies could also focus on each construct to enable an in-depth analysis of barriers to digital leadership enactment in the construction industry.

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