Strategic positioning of IT in construction: the way forward

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Abstract

It is widely acknowledged that the UK construction industry has invested in IT as an integral part of its core business. However, there is also ample evidence to indicate that this investment has repeatedly and systematically failed to deliver the anticipated benefits. This in this respect, a high-level survey was conducted to gauge and assess the overall awareness and understanding of the UK construction industry’s leading Chief Executives and IT Directors on this issue – particularly, to envision a way forward. This survey covered three main areas of: strategic benefits of IT; critical elements that lead to the realisation of these benefits, and the drivers behind these investment decisions. Research results identify a clear paradigm shift in thinking, with respondents identifying that IT strategies are now being integrated into organisational business strategies, but, that IT investment was now being influenced by the ‘state of readiness’ of the organisation in order successfully leverage these investments.

Keywords: construction, IT investment, IT success, organisational readiness, strategy

1 Challenges facing the construction industry

The Construction Industry is one of the largest contributors of wealth creation to Europe’s business economy, accounting for 9.7% of gross domestic product (GDP) and almost 60% of gross fixed capital formation. In this context, sustainability, competitiveness and growth of this vital sector of the economy can only be sustained through the pursuance of knowledge and innovation. With respect to the latter, this has historically been driven by rapid developments in ICT, specifically, the ability to capture, store, analyse/manage and exchange data. Therefore, in a knowledge-based industry such as construction, it is vital to have early access to knowledge-based tools, together with an information and communication technology (ICT) infrastructure, which can handle media-rich services. Thus, in order to remain competitive, construction firms will need to fully embrace this technology (BERR, 2008). This was reinforced by a recent European task force study on ICT competitiveness and uptake (European Commission, 2006), which emphasised the importance of ICT based innovation in bringing productivity improvements and competitive advantage to industry. Whilst it showed a constant decline in labour productivity since the mid-1990s (which was mainly attributed to the lack of ICT related investment), evidence also suggested that higher productivity growth rates observed in the United States (US) and Europe’s other world trade partners benefitted from greater use and integration of ICT in all segments of the economy. Notwithstanding this, it is also important to
acknowledge that industries have not always been in a position to capitalise on the investment in terms of productivity growth (OECD, 2003).

In the context of ICT and the construction industry, whilst several success stories can be eulogised, particularly over the last ten years, it is apparent that ICT investment is still rather inward looking, with pockets of improvements failing to bring about competitive advantage to organisations. For example, Salah (2003) showed that 75% of ICT investment in construction did not meet the desired business objectives. Furthermore, some projects were abandoned, significantly redirected, or kept alive despite business integration failures. This led to a perceived dissolution of ICT’s strategic benefits, which deleteriously affected future ICT investment. At the same time, the development and delivery of IT-based services, and the ability to respond to the rapid evolution of markets, places a considerable premium on leadership and management skills (BERR, 2008). Here lies the conundrum. On one hand, executives understand the importance of ICT (technology and skills required to leverage success), are in a position to finance this; however, they have witnessed significant failures and missed opportunities. In this respect, there is an exigent need to assess all aspects of ICT which either directly or indirectly has an impact on the development of the required IT capabilities of the organisation. This will then place executives in a much better position to predict the level of change and resources needed to develop their target capabilities - specifically:

• the creation of an innovative working environment which is focussed on developing and sustaining a highly skilled and flexible workforce with the skills to continuously introduce improvements through better and more streamlined business processes enabled by advanced ICT;
• the achievement effective business process and improvement focussed on improving the organisation’s efficiency by directly integrating ICT with the corporate, strategic and operational needs to ensure ICT resources are ‘in line’ with business imperatives.

2. E-readiness

The “acceptable” level of IT that can be successfully utilised in an organisation, i.e. ensuring its business benefits are realised, depends on assessing a range of critical issues needed to ensure a balance between the organisation’s readiness (mainly factors required to adapt to the proposed change) against the level and complexity of the proposed IT (which often hinders or limit success). This balance often includes many issues such as: capital expenditure, resource availability, organisation’s maturity and readiness, culture and vision, and available IS/IT skills.

In this context, the term “e-readiness” is coined to measure the degree to which an organisation may be ready, prepared, or willing to obtain benefits, which arises from the digital economy. It is concerned with the organisational soft issues such as business processes, management structure, change management, people and culture. The importance of organisational e-readiness to successfully embrace IT into work practices is gathering pace both in academia and industry due to the large investments in IT over the past decade of which a large percentage have failed to meet their intended business objectives.

3. Research problem

In light of the aforementioned ICT challenges facing the industry, and in order to bring about construction IT-based innovation to contribute to the improvement of the industry’s productivity, it was crucial to identify the current gaps in the industry’s core decision makers – as these decision makers either directly, or indirectly have an impact on ICT investment. In this respect, it was also important to understand the needs for change and successful implementation of IT within these organisations, in order to “Assess the state of executive thinking towards IT investment for continuous improvement and competitive advantage”. Thus, the following objectives were identified:
1. To understand the evolving use and uptake of IT in relation to the industry’s past and current understanding of the value of IT to innovation and continuous improvement;
2. To identify the shift in executives’ thinking in terms of:
   - Understanding the role of IT for improving performance;
   - The impact of continuous innovation in technology on their enterprises;
   - Their awareness on the relationship between IT, process management and people.
3. To identify the difference in understanding of IT priorities between business executives and IT/innovation directors;
4. To determine disparities in IT awareness between contractors and consultants;
5. To identify future patterns in creating IT-based business core capabilities.

A questionnaire was developed to assess the awareness and understanding of key industry investment decision makers on the strategic benefits that IT could bring to their organisation. This questionnaire was developed with domain experts, with a specific remit of addressing the five core objectives. Therefore, the questionnaire construct was based on the relationship of decisions to critical elements and drivers of a business. The critical elements (IS/IT Strategies; Business Process Management and Reengineering, and IS/IT Skills), and drivers (E-readiness of organisations; Advanced Technology, and Financial Impact) were considered the units for investigation. These issues were then mapped to seminal literature, and confirmed through iterative consultation with industry stakeholders. From these sessions, 11 structured questions were formed under the following three headings: IT Investment (Information Technology investment and success), Critical Elements for Success (IT Strategies; IT and Business Process Reengineering; IT Skills and Competence) and Drivers (Drivers and Inhibitors for IT Investments; Impact of Advanced Technology; Financial Impact). Within the three broad headings, each question had five options describing the evolution of maturity levels using maturity concepts (Klimko, 2001). The criteria for each level were distilled to make it ‘palatable’ and ‘relevant’ to Chief Executives and IT Directors (Saleh and Alshawi, 2005; Alshawi, 2007), which was augmented through the following three scenarios: 1995 Thinking – How did the respondents see the answer to the question in 1995 (based on their experience); 2007 Practice – How did the respondents see the answer to the question under their current practice; 2007 Thinking – How the respondents wished to see the best answer to the question (which might be considered as indicative of future trends).

This design construct was used to help assess the progressive development of organisations, while at the same time being able to identify the gaps between the thinking of executives (awareness level), moreover, what was actually being practiced. For example, to measure how Executives thought about the role of ICT in bringing about innovation to their organisations, the following question was administered. This questionnaire was sent to the top 100 contractors by turnover (building.com, 2006) and top 100 consultant organisations (building.com, 2006a) in the UK, targeting both executives and IT (or innovation) directors. Respondents were divided into two major groupings: the contractors, and the consultants. For analysis and comparative purposes, the groupings were further separated into four different categories; contractor executives, consultant executives, contractor IT directors, and consultant IT directors. The survey received 109 responses [representing a 54.5% return rate], which was made up of 57 contractors and 52 consultants. The number of replies by executives was 37%, and IT/innovation directors 63%. Further disaggregation of these responses identified that around 20% were contractor executives, 32% contractor IT/innovation directors, 31% consultant IT/innovation directors, and the remaining 17% were consultant executives. Statistical analysis and hypothesis testing was applied to this data in order to verify its integrity, veracity and consistency. This was also conducted on the entire data set in order to check for congruence and adverse variance relationships. Furthermore, in order to fully ensure that this data could be interrogated to an ever-finer degree of granularity, a series of short interviews and discussions took place with a representative sample of four respondents to further validate these findings.
4. Findings

The results show that construction organisations today are: starting to evaluate IT success rather than failures; less critical of the financial impacts of IT investments; acknowledging the need of IT strategies; recognising the importance of aligning business strategies with IT strategies; declaring the importance of IT skills and competence; forging ahead towards IT investment drivers; and realising the impact of advanced technologies in their organisations. They are also acknowledging the strategic nature and significance of IT, both internally and externally, whereby IT systems are now considered at an organisational-wide scope, rather than at an individual application level. Furthermore, IT strategies are now slowly being integrated into organisational business strategies, and the impact of IT technologies is now being recognised for delivering competitive advantage for the future. This is a significantly positive sign that the industry is moving forward towards utilisation of IT; most importantly, with a similar set of thinking (contractors and consultants). On the other hand, construction organisations today are seeing their IT investments influenced by the state of readiness of their organisation to successfully receive new and future IT investments. The main research findings are divided into four categories (A, B, C, D), where A = IT Investment; B = Critical Elements for Success; C = Drivers; D = Other Findings.

4.1 IT investment

Although, the industry is aware of the strategic benefits of IT, it has not yet been attained. There is overwhelming evidence that the industry has moved away from investing in IT to reduce costs at an operational level. Industry executives are thinking towards delivering value to customers and/or achieving strategic business objectives – see Table 1. Although 100% of Contractors’ and Consultants’ CEOs believe that IT investments should aim to improve organisational performance, deliver value or contribute towards organisational strategic objectives, only 77% of them believe that this is currently implemented in today’s practices.

The industry is shifting from thinking of IT investment as being a “cost” endured at a project level, to being an “investment” at an organisational level – see Table 2. In this respect, 100% of respondents did not believe in project-oriented IT investments. In this context, Contractors’ CEOs and IT Directors seem to think alike (less than 2% variance), today and in their future thinking. However, both Consultants’ CEOs and IT Directors seem to vary in their thinking (14% variance), today and in their future thinking.

Although industry executives appear to be fully aware that IT-based innovations require IT/process management skills and competence across their organisations, the results indicate that this is not being practiced. In their 2007 practices, over 85% of respondents think that IT/process management skills and competences are essential elements for achieving IT-based innovation and competitive advantage.

4.2 Critical elements for success

Although the industry realises the importance of IT strategies to achieve innovations, this has not yet been achieved. Internal business improvement appears to be currently the main motive and driver for IT strategies – see Table 4. Where, 100% of respondents agreed that IT strategies must be considered in today’s practice. Furthermore, 88% of contractors’ CEOs and IT Directors believed that business and IT strategies must be aligned. The role of IT departments has been transformed from providing technical support to engaging in business improvement and strategy. In today practices, only 5% of Contractors’ saw no role for IT Departments in their organisations. Furthermore, contractors’ and consultants’ IT Directors (57% and 50%, respectively) appeared to be driving for Board representation. The importance of aligning IT with Business Process Management/Re-engineering was highly recognised, but was not yet being practiced. There was also strong evidence to suggest that industry Executives believed in the alignment of IT with Business Process Re-engineering. The industry recognised the need for IT skills and competence within organisations, but has not yet
utilised this for innovation. Industry executives seemed not only to recognise the need for IT skills across the organisation, but also the need to develop the necessary competence, especially if IT-based innovation and competitive advantage was to be realised.

4.3 Drivers

IT investments are predominantly driven by “value” but are inhibited by the state of readiness of organisations. Drivers for IT investments are mainly related to bringing value to products and services through the provision of advanced communication and working environments – see Table 8. In this context, it appears that IT investments in contracting organisations are currently driven by clients (53%), while 70% of consultants appear to be seeking to improve communication and working environments with business partners. The industry seems to be cautious in their investments in IT, and is very much influenced by the level of the organisational readiness to successfully absorb IT into their current practices, and not by the level of success of similar investments in the past (whether internal or external) – see Table 9. Past IT failures or lack of success appear to only constrain about 24% of Consultants’ CEOs; whereas, contractors’ CEOs (77%) and IT Directors (74%) believe that their IT investments are currently influenced by organisational “readiness”.

The industry strongly believes in investigating new technologies for competitive advantage, but has not yet taken advantage of this. There is also a clear shift in the thinking of industry from a technology push (mainly to satisfy clients’ needs at project level) to continuously self-investigating new technologies to deliver competitive advantage – see Table 10. In this respect, 95% of contractors’ CEOs thought that advanced technology is currently taken into consideration in new IT investments.

Financial return on IT investment was still being practiced in spite of industry Executives thinking otherwise. Furthermore, although industry executives’ thinking was pointing towards delivering corporate strategic goals, improving cost effectiveness was still dominant in practice – see Table 11. In addition, in today’s practice, more than 40% of contractors still believed that IT investment should only be considered if there are clear financial benefits. While the other 60% would only invest if it improves cost effectiveness or is driven by corporate goals.

5. Conclusion and way forward

The results from this questionnaire clearly demonstrate a polarised position regarding thinking between “what the industry thinks needs to be done” to achieve IT-based innovation and competitive advantage and “how best to achieve it”. With participation of over 100 respondents from the UK’s Top 100 Contractor and Consultants, this strategic study assessed the thinking of Industry Executives, Chief Executives and IT/Innovation Directors to report on the gaps that need to be addressed. The results from this questionnaire clearly demonstrate a polarised position regarding thinking between “what the industry thinks needs to be done” to achieve IT-based innovation and competitive advantage and “how best to achieve it”. This gap is significant and needs to be addressed. From an investment perspective, investments in IT over the past decade have raised serious concerns about its contribution to the performance of organisations. These concerns have generated a growing prerequisite to more robustly link IT investments with organisational business objectives; furthermore, to measure the contribution IT has to businesses. In this context, there is a need to better understand the current status of industry towards IT investments – specifically, to identify the gaps that could hinder or act as a barrier to IT-based innovation and competitive advantage.

The construction industry is progressively maturing over time in its understanding of the strategic benefit of IT investment towards business improvement and link with achieving competitive advantage. This is evidenced by the shift in focus from a short-term project-orientated approach to one that is more business-wide with a more strategic remit. Organisations are therefore concentrating on longer-term business improvements and realising the strategic benefit across the organisation, i.e.
taking a more strategic approach to their business and IT investments that is more progressive and visionary. Furthermore, in terms of IT strategies, the focus is currently on business/process improvement, moving towards the strategic alignment of IT with business and recognition of the impact of IT Board level representation on core organisational strategic decision making. The awareness of business process management and reengineering, and the benefits of aligning this with IT is clearly shown through the shift towards a process-driven approach for improvement. Further evidence is the migration towards business-wide employee competence and skill building, creating the intellectual capabilities needed to realise the full benefits of IT investment in order to fully leverage business improvement and more towards achieving competitive advantage. It is also recognised that there is a need for organisations to be ready (organisational readiness) in order to realise the full strategic benefits from IT prior to investment, i.e. organisational e-readiness.

This survey presented for the first time a strategic study into the thinking of Industry Executives; Chief Executives and IT/Innovation Directors, on their perception of investment for IT-based innovation and competitive advantage. In particular, this study identified an industry-wide recognition of the strategic importance of IT investments towards competitive advantage. However, core research findings identified that a ‘gap’ exists between current thinking and actual practice in terms of ‘what needs to be done’ and ‘how best to achieve it’.

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