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VERDICT—An e-readiness assessment application for construction companies

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Abstract

In the recent years, the use of e-commerce tools in construction has been on the increase. The benefits of using these tools on construction projects have been well documented in research and industry publications. Studies have shown that the construction industry recognises the potential for the use of e-commerce. However, the use of these tools is still not common within the industry and the uptake of e-commerce technology in the UK construction industry has been relatively slow.

Implementation of any new technology such as e-commerce for achieving business targets requires major changes in an organisation, its current practices, systems, processes and workflows. Taking this into account, construction companies who are currently using, and those who have yet to use e-commerce tools need to take measures to successfully adopt and use this technology. It is important for companies that seek to adopt e-commerce tools to analyse their businesses to ensure a productive and beneficial implementation of these tools (i.e. measure their 'e-readiness' for adopting e-commerce tools). To address this need an e-readiness assessment model and a prototype application were developed. This paper describes the development and implementation of VERDICT, an e-readiness assessment prototype application for construction companies. VERDICT assesses the e-readiness of construction companies in terms of their management, people, processes and technology, and presents the readiness results in both textual and graphical formats. It also provides companies with the potential to compare their e-readiness against that of the 'best-of-breed'.

Keywords: Readiness assessment; E-readiness; Construction; E-commerce

1. Introduction

With the growing importance of the Internet, companies across several industries (including construction) are increasingly leveraging the Internet to achieve a competitive advantage [1]. The Internet has been a major catalyst for change in most industry sectors, including the construction sector. The need for construction to change its traditional working practices has been repeatedly expressed in government, industry, and academic publications [2,3]. Internet-based tools such as project extranets are being used to manage construction projects. Such tools can be used to monitor, control, manipulate and store project information and to make it available to all participants of the construction supply chain [4]. Examples of Internet-based tools include a computer-mediated tendering system for services or contracts, purchasing of materials via the Internet by a contractor, project extranets for project management and specifying products online by a manufacturer [5]. All these tools can be encompassed under a single banner of e-commerce tools for construction as they facilitate trading, exchange of data and information, and automation of the business processes and workflows [6].

The implementation of Internet-based technologies, such as e-commerce, for achieving business targets, bring about

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changes in an organisation, its current practices, systems, processes and workflows [7–9]. It is therefore important to evaluate the business process implications of adopting e-commerce in construction organisations. This was the main focus of the study of which this paper forms a part. The study evaluated, through a series of case studies, the extent to which end-user business processes are affected by the deployment of existing e-commerce applications. It established the importance of organisational readiness for the adoption of new technologies and led to the development of the e-readiness assessment tool (VERDICT), which is the subject of this paper.

The paper first presents the case for e-readiness assessment, discusses the methodology adopted in the development of an e-readiness assessment methodology and reviews related readiness assessment tools. This is followed by a detailed description of VERDICT—model, computer implementation, system operation, and detailed evaluation.

2. A need to assess e-readiness

The early stages of this research study established the possible benefits, barriers, and drivers for the adoption of e-commerce technologies within construction. This was done by conducting an industry-wide survey that explored attitudes, current usage, barriers and enablers of IT and e-commerce within the UK construction sector. Survey results indicated that the exact benefits of using e-commerce within the construction industry were not known and more needed to be done to establish the effects of incorporating e-commerce applications into construction business processes and to demonstrate the opportunities of e-commerce for construction.

To address this need a typical business process model that used the principles of business process re-engineering and demonstrated opportunities for e-commerce, was developed. Using this model it was possible to illustrate how, with the use of e-commerce applications, different members of the construction supply chain could derive business benefits and overcome some of the inefficiencies of the traditional process. In order to effectively adopt e-commerce technologies in construction, companies may have to re-engineer their current working methods, which could lead to a step change in their work practices. To facilitate such a step change it was essential to study and document the impact of specific e-commerce applications on their current end-user business processes. Case studies were conducted for this purpose. The companies interviewed are amongst the early adopters of this technology and have used it to improve business benefits and gain competitive advantage. Issues related to management buy-in and organisational culture were the main barriers to the wider use of e-commerce within the construction industry. For technology to be widely adopted it is essential to get buy-in from the early majority [10]. It is possible to encourage the early majority to adopt such tools when they see ‘visionaries’ and ‘market leaders’ such as those within these case studies, benefiting from the tool and leading the way to its wider adoption.

Taking this into account, construction companies who are currently using, and those who have yet to use, e-commerce tools need to take measures to successfully adopt and benefit from these tools. It is important for companies that seek to adopt e-commerce to assess their ‘e-readiness’ for adopting e-commerce tools to ensure a productive and beneficial implementation of these tools. To address this need an e-readiness model for construction organisations and a prototype application, VERDICT (Verify End-user e-Readiness using a Diagnostic Tool), that assess e-readiness were developed and implemented. The next section defines e-readiness and describes the adopted methodology. This is followed by a review of readiness assessment models and detailed description of the development and implementation of the VERDICT tool.

3. Methodology for e-readiness system development

E-readiness can mean different things to different people, in different contexts, and for different purposes [11]. Thus, it is important to define e-readiness in the context of this paper. E-readiness is defined here as ‘the ability of an organisation, department or workgroup to successfully adopt, use and benefit from information and communication technologies (ICTs) such as e-commerce’. It is important for companies that seek to adopt e-commerce tools to undertake an analysis of their businesses to ensure a productive and beneficial implementation of these tools (i.e. they need to evaluate their ‘e-readiness’). The methodology adopted in the development of an e-readiness assessment tool for construction organisations is presented below.

The triangulation methodology is adopted for the development of the e-readiness model that assesses the readiness of construction organisations for e-commerce technologies. A triangulation method involves the use of both qualitative and quantitative approaches. Using this method, theories can be developed qualitatively and tested quantitatively [12]. Triangulation increases the validity and reliability of the data, since the strengths of one approach can compensate for the weaknesses of another [13].

A systematic two-stage approach was adopted for assessing e-readiness. The first stage involved the development of an assessment model for gauging the e-readiness of construction organisations for using e-commerce applications. Using a qualitative approach, a review of existing literature on the subject matter (i.e. readiness assessment models and tools) was carried out. The best suited models in the context of this research study were then adapted to develop a model that assesses the e-readiness of con-