Exploring Top Management Support for the Introduction of Enterprise Information Systems: A Literature Review

JOHN A. LOONAM*
AND JOE McDONAGH*

ABSTRACT

This paper argues for the need for greater inquiry into the field of top management support for the introduction of enterprise information systems. An extensive review of this literature and the information systems management literature is provided within this paper to sustain the contention that top management support is the most important factor for ensuring successful system implementation. Similarly, top management support is recognised as a critical factor for ensuring project success. However, despite its importance, there is a lack of empirical evidence to clarify the area. Rhetoric comment far outweighs a comprehensive understanding of the reality. Such a review of the literature provides a detailed roadmap of top management support for the introduction of enterprise information systems and the paper concludes with a call for urgent empirical inquiry into this topical and crucial field.

INTRODUCTION

Organisations have introduced enterprise information systems (EISs) to reduce problems associated with legacy systems, cope with year 2000 challenges, offer the firm greater competitive advantages, compete globally and assist the company achieve a single 'integrated' technological platform. With organisations stressing the need for greater supply chain integration, these systems offer the first glimmer of hope to achieve such integration. Continued technological

*School of Business Studies, Trinity College, University of Dublin

advances 'extend' current EIS packages along the supply chain, with future systems focusing on the penultimate goal, i.e. inter-enterprise integration. Despite such promises, however, these systems are experiencing serious implementation challenges. Some studies cite up to 90 per cent failure rates. EIS implementation literature, particularly studies on critical success factors, point to top management support as a fundamental prerequisite for implementation success. Indeed, more generally, studies on information systems (IS) management equally endorse top management support as the most important factor for ensuring the effective introduction of EIS in organisations. Existing literature on top management support tends to focus primarily on IS strategy and the role of the chief information officer, while the nature of such support remains rather opaque and ill-defined at best.

Nature of Review

This paper, therefore, seeks to explore how top management support the introduction of enterprise information systems. This topic has received little attention in the EIS literature (Brown and Vessey, 1999; Davenport, 2000; Esteves and Pastor, 2000; Loonam and McDonagh, 2004; Nah, 2001; Smyth, 2001; Stewart, 2000; Umble et al., 2003), with no specific empirical inquiry. Moreover, the more general information systems (IS) management literature (Adler and Ferdows, 1990; Applegate and Elam, 1992; Benjamin et al., 1985; Currie and Glover, 1999; Earl, 1996; Garrity, 1963; Lyles, 1979; Raghunathan and Raghunathan, 1989; Watson, 1990; Weiner and Girvin, 1985) clearly indicates the importance of top management support for the introduction of IS but provides little insight into what this actually means.

IS management literature suggests that 'top management' embraces the twin roles of the chief executive officer (CEO) and the chief information officer[1] (CIO). 'Support' is said to come about through executive (CEO/CIO) participation and involvement (Diebold, 1969; Dong, 2001; Jarvenpaa and Ives, 1991; Kanter, 1986; Thong et al., 1996). More generally, support is deemed to embrace long-term funding and resource commitments (Earl and Fenny, 1994; Kanter, 1986; Nath, 1989), developing project coalition groups and steering committees to meet new changes (Feeny et al., 1991; Ives and Olsen, 1981; Maruca et al., 2000; Rockart, 1979), sharing the vision with the organisation (Dong, 2001; Earl and Fenny, 1994; Enns et al., 1997; 2001; Nath, 1989), developing a strategy (Galliers, 1987; Lederer and Mendelow, 1986; Tan, 1995), communicating the change vision (Dean, 1968; Stewart, 2000; Watson, 1990), encouraging positive attitudes towards change in the organisation (Ginzberg, 1981; Thong et al., 1996) and finally ensuring new changes are accepted as part of the organisational culture.

The literature's understanding of what support is and how it is enacted is not clear. Much of the aforementioned IS management literature is of a prescriptive nature. The majority of this literature informs us as to what top management *should* be doing but does not facilitate our understanding of what top

management *are* doing. Further inquiry is therefore required. Such inquiry demands an understanding of how top management support the introduction of enterprise information systems.

Enterprise Information Systems

Davenport (2000) believes that overcapacity and reengineering, globalisation and dealing with constant change are some of the prime reasons many organisations are implementing EISs into their firms. EISs are software packages that integrate an organisation's business processes. They are also referred to as enterprise resource planning (ERP), enterprise-wide information systems (EWIS) and enterprise systems (ES). Debate exists in the literature as to the specific name of these packages. Davenport, however, tells us that the name of these packages is not so important; instead an EIS should be defined by its ability to 'seamlessly integrate business processes and information flows up and down, and perhaps more importantly from now on, across value chains' (2000: 3). The 'enterprise information systems' literature tells us that an EIS package is fundamentally a software system responsible for the organisational and technological integration of a firm (Adam et al., 2000; Al-Mashari, 2003; Davenport, 1998; 2000b; Klaus et al., 2000; Kumar et al., 2000; Loonam and McDonagh, 2004).

To understand fully the nature of EISs, it is important to place them in context with information systems development. According to Ward and Griffiths (1996) information systems have experienced three eras since their deployment in organisations. The first era is data processing (DP). This era allowed organisations to improve operational effectiveness by automating information-based processes. The second era is management information systems (MIS). During the 1970s, this era allowed firms to increase management effectiveness by satisfying their information requirements. Finally, with the development of end user computing, the 1980s witnessed the emergence of the third phase – the strategic information systems (SIS) era. The objective of this phase, according to Ward and Griffiths (1996: 11), was to improve competitiveness by changing the nature and conduct of business. The history of information systems illustrates the evolutionary nature of the field, i.e. its move from centralised computing to end-user computing. This transition grew out of the need for greater organisational-wide integration. Initially centralised information systems from the 1960s and 1970s were deployed by organisations to assist in single application functionality, such as manufacturing or accounting systems. However, from the 1980s onwards, added pressures from information systems to deliver greater strategic and competitive advantages meant that typical business applications had grown exponentially (typical business applications grew by 5,400 per cent) (Slee and Slovin, 1997). What started out as 'islands of automation' (McKenney and McFarlan, 1982), i.e. applications running separately from each other, were by the 1980s often part of a single system to manage and centralise data better. This event is often

referred to as technical integration or alternatively as 'spaghetti integration' (Slee and Slovin, 1997).

This type of 'spaghetti integration' created its own problems. Connecting different functional areas was not easy and required huge amounts of programmed computer code to allow the different functional databases 'talk to one another'. In turn this amount of programming often resulted in system errors, inconsistent information flows and, perhaps most worrying from an organisational point of view, the need for huge resource commitments, from both a human and financial perspective. By the late 1980s and early 1990s organisations were therefore experiencing large IS integration problems. Something new, less costly and less labour-intensive was needed. In response software vendors began to launch single application tools that could host a number of different functional areas from a shared database. These new software packages became known as Enterprise Resource Planning systems (ERP) (Lopes, 1992). The objective of these packages was to bring the IS needs of the company under the umbrella of a single software system.

Characteristics of an EIS

Comprehending the nature of these vendor packages and their promises requires consideration of the generic characteristics that make EIS packages distinct from other IS investments. From a study conducted by Markus and Tanis (2000c), the authors found that there were five characteristics specific to EIS, which help us to understand what they are, what they can do and how they differ from other large IS packages. These distinct characteristics are integration, the nature of the EIS package, best practices, assembly requirements and the evolutionary nature of these systems. A brief review of each of these characteristics is now offered.

From an *integration* perspective, one of the core functions of an EIS, in comparison to all previous integration technologies, is its promise to 'seamlessly integrate' all information flowing throughout the organisation' (Davenport, 1998). This characteristic is further supported by the EIS literature. EISs are commercial software *packages* bought from market vendors. They differ from previous integration tools in the sense that they are not developed in-house by organisations, but instead can be customised to the enterprise's own specific needs. Another characteristic unique to EIS is the suite of *best practices* afforded to implementing organisations. EISs are built to support generic business processes that may differ substantially from the way the implementing organisation does business. They are built to 'fit' the generic needs of many organisations. Some *assembly requirements* may be necessary during implementation. For example, some firms use bolt-on tools or an amalgamation of EIS vendors in order to achieve their version of seamless integration. Finally, like all information systems, EIS are constantly *evolving* and changing. During the 1980s, systems were developed to run on mainframe architectures; current EIS packages are running on client/server architectures (Nezlek et al., 1999).

Future EIS suites will need to extend enterprise integration to inter-enterprise integration, where the integration focus will not just be confined to the boundaries of the enterprise but aim to integrate up, down and across industry-wide value chains.

Implementation Issues

Implementing EISs can cost millions of euro and it can take from six months to three years for full implementation to be achieved. Despite such costs, AMR Research predicted that the EIS market would be worth more than $60 billion by the end of 2003 (Callaway, 2000). This projection has been somewhat shy of the mark, with the Arc advisory group predicting global EIS sales to be worth nearer to $100 billion by 2008 (2004). In Ireland alone, many pharmaceutical, manufacturing and hi-tech sector companies, financial services, government departments and offices, European and US based multinationals, educational institutions, hospitals and an increasing number of small to medium-sized companies are adopting, or have adopted, EISs as a means of resolving their organisational and technological integration problems.

Yet despite such interest in and uptake of these packages, reports of poor outcomes abound. From a survey conducted in December 2000 called 'EIS Post Implementation Issues and Best Practices', 117 firms across 17 countries were surveyed on their satisfaction with EIS implementation projects. Only 34 per cent of the organisations were 'very satisfied' with their EIS investments (McNurlin, 2001: 1). Sammon et al. (2001) believe that over 90 per cent of EIS implementations are late or more costly than first anticipated. According to Crowe et al., research conducted by the Standish Group International shows that 40 per cent of all EIS installations achieved only partial implementation; nearly 28 per cent were scrapped as total failures or never implemented; and only 25 per cent were completed on time and within budget (2002: 3).

EIS Critical Success Factors

In an effort to overcome such poor implementation performances, the EIS literature focuses on the development of critical success factors (CSFs). Studies rank factors that are critical to the successful implementation of the system (Al-Mashari, 2000; Al-Mashari and Zairi, 2000; Bingi et al., 1999; Brown and Vessey, 1999; Esteves and Pastor, 2000; 2001; Kraemmergaard, 2000; Nah, 2001; Rosemann et al., 2000; Somers and Nelson, 2001a; Sumner, 1999). While studies vary in relation to CSFs, some of the most frequently cited and highly ranked CSFs are now discussed.

1 Top Management: Top management support is one of the most often cited CSFs among the EIS literature (Al-Mashari, 2000; Brown and Vessey, 1999; Davenport, 2000a; Esteves, 2000; Nah, 2001; Smyth, 2001; Stewart, 2000; Sumner, 2000). According to Holland (1999) executives

must be willing to allocate valuable organisational resources and must have the credibility to 'build strong/strategic partnerships with functional areas' (Willcocks and Sykes, 2000: 35). While Sarker and Lee state that 'EIS implementations can be successful only if there is strong and committed leadership guiding the initiative' (2000: 416).

2 Project Champion: Much of the literature suggests that a project champion is important to drive project implementation (Al-Mashari and Zairi, 1999; Esteves, 2001; Nah, 2001; Parr and Shanks, 2000a; 2000b; Sedera et al., 2001; Smyth, 2001; Willcocks and Sykes, 2000). The project champion often plays a fundamental role in change management efforts throughout the implementation life-cycle (Brown and Vessey, 1999). Sumner (1999) further suggests that the champion should be a business leader in order to offer the project a constant business perspective.

3 User Training and Education: The lack of user training and failure to understand how enterprise applications change business processes frequently appear to be responsible for EIS problems and implementation failures (Al-Mashari, 2000; Davenport, 1998; 2000a; Esteves, 2000; 2001; Somers and Nelson, 2001a; 2001b; Sumner, 1999). Bingi et al. (1999) believe that training and educating employees is often a hidden cost during project implementation, while Sumner states that many of her researched companies had to increase their technical personnel and skills expertise, particularly in application specific modules, due to project implementation demands (2000: 322).

4 Management of Expectations: Often company expectations are far greater (or even sometimes far less) than what is realistically possible from the EIS system. It is vital therefore that the vendor does not 'oversell' the system to the organisation and its users, while it is equally important for management to keep realism part of the overall implementation strategy (Somers and Nelson, 2001a). Davenport (2000a) believes that it is the role of senior management to portray positive expectations from the new system, but they also need to be sensitive to the needs of the eventual users.

5 Project Management: Project management activities span the life of the project from initiation to completion (Somers and Nelson, 2001a). Esteves (2000) says that proper management of scope is critical to clarify the goals properly and ensure they run in tandem with the overall organisational mission and strategy. Nah (2001) believes that the role of project management is to avoid schedule and budget overruns, forcing the project team to stick to planned events and cost targets. Another important factor of project management is to deliver early measures of success (Nah, 2001), where the organisation sees real and more importantly early benefits for its investment.

6 Steering Committee: For an EIS implementation to succeed it is vital to have a core group of 'superusers' (Davenport, 2000a; Sumner, 1999). These are typically middle-level employees or managers from the business functions or departments that will be affected by the EIS project. Their role during implementation is to determine how the system will affect

their particular part of the organisation, to recommend system configuration and design details, to serve as typical users during testing and to train others who have jobs similar to their own (Davenport, 2000a). A steering committee, comprised of such superusers assists top management to directly monitor progress and adjust any problems that may arise before they are embedded into project implementation.

7 Use of consultants: Many organisations bring external consultants in during the implementation process to assist in getting the project up and running. Esteves (2000) believes that the usage of external consultants will depend upon the internal knowledge that the organisation has regarding the new system. Consultants offer external knowledge on previous projects they have worked upon and can assist in training internal system users with this know-how (Davenport, 2000a).

8 Business Process Reengineering (BPR): An EIS system on its own cannot improve organisational performance unless an organisation aligns its core business processes to the system (Al-Mashari and Zairi, 1999; Bingi et al., 1999; Brown and Vessey, 1999; Davenport, 1998; 2000; Koch, 2001a; Kraemmergaard, 2000; Nah, 2001; Norris et al, 2000; Robey, 2001; Somers and Nelson, 2001a; 2001b). One way of aligning the core business processes of an organisation to the new EIS package is through the re-engineering or redesign of the business processes or through, as Davenport and Short (1990) coined it, 'business process re-engineering' (BPR). According to Hammer and Champy, BPR is defined as 'the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed' (1993: 32, in Al-Mashari and Zairi, 2000). BPR allows organisations to align their business processes with the enterprise information system, thereby customising the company's business process needs to the new system.

9 Dedicated Resources: Dedicating the proper resources is also vital to EIS success. Dong suggests that a top management commitment to resources is vital to ensure project continuance and success (2001). According to Somers and Nelson, proper allocation of resources – human, financial and time – and the attention to the management of scope, allows critical EIS benefits to be realised (2001a).

10 Change Management: EISs introduce large-scale change that can cause resistance, confusion, redundancies and errors (Somers and Nelson, 2001a). In terms of the implementation of an EIS, Al-Mashari refers to change management as involving all human, social-related and cultural change techniques needed by management to ease the transition to, and minimise organisational resistance for, the new system (2000). Change management receives a lot of attention within the EIS literature (Aladwani, 2001; Al-Mashari and Zairi, 1999; Brown and Vessey, 1999; Davenport, 1998; 2000a; Esteves, 2000; 2001; Kraemmergaard, 2000; Nah, 2001; Norris et al., 2000; Parr and Shanks, 2000b; Somers and Nelson,

2001a). According to Brown and Vessey pre-planned communications and training are vital considering the amount of organisational learning associated with the implementation of an EIS (1999). Al-Mashari and Zairi (1999) believe that effective communication, revising reward and motivation systems, empowerment, human involvement, training and education, creating an effective culture for organisational change and stimulating the organisation's receptiveness to change are the core elements necessary for a successful change-management strategy.

Top Management Support

The CSF literature recognises top management support as the most important factor for ensuring EIS implementation success (Al-Mashari, 2003; Brown and Vessey, 1999; Davenport 2000a; Dong, 2001; Esteves and Pastor, 2000; Nah, 2001; Smyth, 2001; Stewart, 2000). From an historic perspective, the IS management literature has also reinforced the importance of top management support (Bassellier and Reich, 2001; Doll, 1985; Garrity, 1963; Schein, 1992; Willoughby and Pye, 1977). Equally, IS implementation literature (Ginzberg, 1981; Watson and Brancheau, 1991) and general top management literature (Finkelstein and Hambrick, 1996; Hambrick and Mason, 1984) recognise its importance.

Yet despite such acclaims, there is a dearth of empirical study exploring this theme within the EIS literature. The literature cites top management support as critical to project success, yet there is no understanding as to what it is or, indeed, how it is enacted. A review of the IS management literature offers little release. This literature tends to be prescriptive, empirically weak, predominantly US-private-sector-company focused and theoretically lacking, with research dichotomised between rhetoric (what top management *should* do) and reality (what top management *actually* do). Gaps are therefore paramount, with the CEO and CIO caught between knowing what to do and actually doing it. Only through understanding top management support can this gap between rhetoric and reality be addressed.

In order to address these issues, support must be understood from the CEO and CIO perspectives. As the EIS literature does not answer these questions, a review of general IS management literature becomes necessary. This literature set states that certain factors influence an executives' support of IS. Studies note how executive values, attitudes and perceptions (Jarvenpaa and Ives, 1991; Mykytyn and Harrison, 1993; Tallon et al., 2000) and cognitive abilities (Earl and Fenny, 2000; Schein, 1992a; 1992b) affect support for IS. Other studies state that education (Applegate and Elam, 1992; Fenny et al., 1992; Skyrme, 1996), age and length of tenure (Gottschalk, 1999; Gupta, 1991) and background experiences (Earl, 1996; Ross and Fenny, 2000) will affect the level of support given to a project. The IS management literature lacks coherence in terms of explaining what top management support is, from either a CEO or CIO perspective.

The IS management literature is equally fragmented in explaining how support is enacted. Some studies advise that the CEO can support IS by hav-

ing a good relationship with the CIO (Feeny et al., 1991; Ives and Olsen, 1981; Maruca et al., 2000; Rockart, 1979), providing necessary vision for IS projects (Dong, 2001; Earl and Fenny, 1994; Enns et al., 1997; 2001; Nath, 1989), building an IS strategy that is part of the corporate strategy (Galliers, 1987; King and Teo, 1996; Lederer and Mendelow, 1986; McFarlan, 1984; Tan, 1995) and communicating all visionary intentions to everyone in the organisation (Dean, 1968; Stewart, 2000; Watson, 1990).

Equally, the CIO must be seen as a business executive (Fenny and Willcocks, 1998; Rockart, 1988), acting as a bridge between IS and business (Grindley, 1992; Maruca et al., 2000; Synnott, 1987). This business executive persona will result in better relationships with other executive members of the top management team and more importantly with the CEO. Movizzo and Howe believe that 'the CIO's role is one of trusted consultant, visionary, an architect of enabling technology, a partner with business executives and process owners, an active change agent and innovator' (1995: 28). The CIO is now in a position to educate the CEO, and other top management team members, as to the benefits and values of the IS initiative. This is reflected in the IS strategy, which becomes part of the corporate strategy (Fiegener and Coakley, 1995; Gottschalk, 1999; O'Connor and Smallman, 1995; O'Riordan, 1987). Communicating a positive business image for IS is key for the CIO (Black and Trippi, 1990; Fiegener and Coakley, 1995; O'Connor and Smallman, 1995; O'Riordan, 1987), ensuring all new changes become part of corporate culture.

A View from the Top

The reality, however, is somewhat different. IS management studies often reveal that the CEO views the CIO, and invariably IS, as the 'poor relation' (Enns et al., 1997; Fenny et al., 1992; Katzenback, 1997). Previous negative experiences with IS projects, or indeed the CEO's inclination not to view IS as a strategic resource but merely a functional utility, do not help the relationship. Differences in occupational groups also create a 'them against us' attitude, where business and IS are often two sub-cultures within the same organisation (Schein, 1996). The CEO's vision is therefore affected (Currie and Glover, 1999; Jones and Arnett, 1994), resulting in the development of a dormant IS strategy (Carlyle, 1988; Galliers, 1992; Lederer and Mendelow, 1987; 1988), which is plagued by weak business and IS alignment and a lack of CEO commitment to resources and, unfortunately, project longevity. This is alleged to result in poor top management support for IS initiatives, an allegation clearly evident in many EIS implementations (Brown and Vessey, 1999; Davenport 2000; Mabert, 2003; Nah, 2001; Smyth, 2001; Stewart, 2000).

For the CIO, confusion continues to exist over how they perceive their position, technical expert or business leader (Donovan, 1988; Ives and Olsen, 1981; Skyrme, 1996; Stephens et al., 1992) and the influence they have in the

organisation (Grover et al., 1993). The CIO is often distanced from the top management team and CEO (Fiegener and Coakley, 1995), left sitting uncomfortably in an environment of constant IS outsourcing (Currie and Glover, 1999). Distance from the top and poor relations with the CEO result in inadequate IS strategy attention (Karimi et al., 1996; Raghunathan and Raghunathan, 1989; Stephens et al., 1995) and differences in opinions concerning the IS vision for the organisation (Earl and Fenny, 1994; Watson, 1990). The outcome is often one of high CIO turnover (Applegate and Elam, 1992; Currie and Glover, 1999; Karimi et al., 1996), poor communication between CEO and CIO (Applegate and Elam, 1992; Earl, 1996) and less than satisfactory IS performances (Earl and Fenny, 1994; Ross and Fenny, 2000).

Rhetoric versus Reality

In applying the IS management field's understanding of top management support, a number of important observations can be made. Firstly, the IS management literature does not clarify what top management support is. Instead a plethora of studies inform us about possible factors that may influence executives' support for an IS project. These 'influencing factors' may or may not be accurate. Therefore understanding what top management support is remains to be explored. Secondly, the IS management literature appears to be paralysed by the rhetoric/reality dichotomy: the literature informs us what top management *should* be doing but does not facilitate our understanding of what top management *are* doing. Subsequently, the question of how top management support an IS project also needs to be explored. Finally, from an empirical perspective, the IS management field is still rather prescriptive. There are few cumulative studies. The area is theoretically lacking, with rhetoric comment far outweighing comments of actual relevance. Therefore, the lessons learned from the IS management literature offer little in terms of understanding top management support for the introduction of enterprise information systems.

The Research Case

This study focuses on the Health Service in the Republic of Ireland. Recent large-scale public sector investment in information systems, a planned government programme for organisational-wide health service reform and the ongoing implementation of Western Europe's largest EIS project (Deloitte and Touche, 2004) have contributed to research interest in the Irish health service. To date, the 'commission on financial management and control systems' estimate that more than €60 million has been spent on the implementation of the health services' EIS package (DoHC, 2003c). The initiative launched in 1995 is expected to be fully completed by 2007, making it the largest health service IS investment in the history of the state.

CONCLUSIONS

This paper focuses on the EIS literature. This review reveals that despite EIS promises to deliver seamless integration of all systems across the organisation, significant challenges face implementation. Indeed, some studies cite up to 90 per cent failure rates with the introduction of such systems. The literature points to the development of CSFs in order to assist with implementation. Top management support is ranked as the most important CSF. An in-depth review of the EIS literature and the wider information systems management literature reveals that this field of inquiry, despite its significance, is poorly represented. Within the EIS literature, apart from the constant rhetoric, there is a lack of clear empirical inquiry. Similarly, the IS management literature further illustrates the lack of empirical knowledge within the field. The objective of this paper is to call for an academic research into top management support during implementation of EISs within industry.

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1 CIO may also be referred to as Chief Technology Officer, Information Systems Director, Information Technology Director, Information Services Director (Grover, 1993).

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