Introduction

Generally discussed as a separate discipline to IST strategy literature, the systems development and implementation knowledge has a crucial role to play in any initiative as it is the mechanism by which the IST is implemented. Although the IST strategy literature highlights the importance of systems development and implementation, it does lack in providing critical insights and linkages into the key aspects of systems development and implementation. However:

“The major challenge in achieving successful strategic change is in articulating and managing implementation.” Beaver (2003: 1)

Discussion

Systems development is the means by which the chosen applications identified during SISP will be designed, developed and implemented within the organisation. In this paper a number of key aspects of systems development will be discussed and also used as a basis for further discussions about the location of IST resources, and IST infrastructure and architecture in the subsequent papers. It must be noted at this point that this paper is not concerned with discussing the most desirable systems development methodology or issues such as the most appropriate project management techniques, but is concerned with presenting some of the more general key issues of systems development and implementation.

As previously discussed (within this series of papers) the IST strategy knowledge generally accepts as a given the implementation of the strategic intent through systems development activities. However, literature from other domains – business strategy for example – demonstrates that implementation processes are subject to many influences. Ward and Peppard (2002) recognised this and argue that the reality of IST strategy implementation is not as simple as first understood. Delivery of intent is not necessarily guaranteed, so the plans may need revising and refocusing to incorporate updated needs, demand priorities, the infrastructure lag and mechanisms for monitoring internal/external and business/IST aspects. These influences can thus impact on the development of the desired systems – illustrated in Figure 1:

Figure 1: Systems Development Influences (Ward and Peppard, 2002 p. 131)

There are numerous sources of systems development material available and detailed insights are provided by authors such as Lewis (1994); Yeates, Shields and Helmy (1994); Clifton and Sutcliffe (1990) and Curtis (1995). Although Lewis (1994) provides insights into the major complexities of systems development, the general literature mainly covers the more technical, methodological aspects of systems development and implementation. However, IST projects do have particular uncertainties that affect their development, including that: design and development frequently takes place in an environment that is technologically dynamic; new problem solving methods are being developed as technology appears on the marketplace; planning and implementation
have to embrace a large variety of technical, social and economic factors that may lead to political behaviour caused by the project; and finally, that firms are constantly seeking solutions and solutions are seeking firms (Mumford and Pettigrew, 1975).

These seminal findings by Mumford and Pettigrew in 1975 where made at least ten years before the main raft of IST strategy and systems development literature started to mature. In fact, these observations made by Mumford and Pettigrew are still critical to this field of enquiry. Taking into account these aspects, a wider conception of systems development must be considered to include organisational, economic and technical issues. Generally, the perspective taken towards systems development is one that follows a linear model incorporating four key stages: formulisation of the business model, conceptual design of the IS model, detailed design of the new IS model and the implementation of the new IS model (Brumec, 2001). This perspective tends to adopt a linear compartmentalised approach to systems development whereby the IST strategic intent (and therefore systems development) is clearly dictated by the business model. However, as discussed earlier, the nature of organisational existence and the influence of IST could mean that a more integrative, iterative approach to systems development is required. In fact, over the last couple of decades there have been considerable changes in how Information Systems (IS) are developed and implemented.

Due to continuous business changes there is now a tendency to not undertake multi-year single release projects. Systems development has become more incremental in nature and incorporates varying releases throughout the development lifecycle (Ambler, 2001). Ambler argued that too much planning would be too restrictive to achieve an effective systems implementation, as detailed plans cannot be developed at the beginning simply because we do not know the full architecture and scope of the project until it starts to unfold. Therefore, only high-level plans can be adopted throughout the systems development lifecycle. Additionally, Mumford and Pettigrew (1975) argued that change (even small change) will introduce instability, which will in turn create uncertainty. To overcome this, strategists tend to plan in more detail, which attempts to create an element of certainty. The paradox faced by organisations is that there is a need to plan to enable control, but that planning can lead to a too rigid structure and therefore restrict systems development activities.

Furthermore, over the last ten years two major technical innovations have been extensively adopted within organisations – the internet and Enterprise Resource Planning (ERP) systems. Both of these technologies have led to huge strategic and systems development impacts on organisations. With the advancement of internet technologies, which are now becoming a standardised technology in many organisations in many industries, strategists can utilise them to offer an alternative way of conducting business. With the advent of e-business a whole raft of practitioner guides became available (for example see Lientz & Rea, 2001; Willcocks & Sauer, 2000 and Downes & Mui, 2000). In essence, these guides present new ways of competing and importantly the need to redefine the organisation’s ‘interior’ (Downes and Mui, 2000) – especially how IST is developed. With e-business technologies IST dependent business models are now in existence. However, in the world of e-business, change and adaptation to change unfolds rapidly:

“...at the same time the providers are convinced that the window of opportunity is only relatively short...shorter timescales may introduce higher risks than in traditional business. There is less time to learn and to correct a possibly wrong strategy.”
Timmers (2000: 167)

This dependence on speed of change and the extension of the value chain outside the organisation enabled by internet technologies (Rayport and Sviokla, 1996) means that an organisation’s traditional approaches to systems development may require reorientation. However, not only is speed important but the ability to be responsive, have global and virtual reach, engage in collaboration and integrate with partners is
also crucial (Moore and Ruddle, 2000). This means that an organisation’s technical capabilities and the mechanisms needed to translate these technical capabilities into viable solutions will also need to change. In this sense, the technology for some organisations is now in fact the central driver of the business economy (Downes and Mui, 2000). As we are navigating un-chartered waters we not only need ways to orchestrate conversations, but the approach to systems development must also be attuned to flexibility (Venkatraman, 2000). For this to occur, systems development planning must be kept to a minimum to allow for change and adaptation, with a focus on the delivery of the IST and the high-level implementation issues (Lientz and Rea, 2001). This dual approach should ensure a degree of formalised high-level planning to enable control and intentions to be realised but also ensure that the systems development activities incorporate a degree of flexibility to accommodate change.

Enterprise Resource Planning (ERP) Systems continue to pervade into many large organisations and have taken business process re-engineering to new extremes. Organisational-wide IS are now being developed and implemented by dedicated ERP organisations such as SAP. However, these IS can have a huge impact on an organisation:

“Overall, whatever the particular type of enterprise system, the main difference from more traditional IS developments are the ambitious intentions, the application complexity and cross-functional scope, the range of different stakeholders involved, and extent of business and organisation changes needed to accommodate the new business models inherent in enterprise systems. Oh! and the possibility of bringing the business to a grinding halt if it fails!” Ward and Peppard (2002: 544)

In fact, ERP systems not only impact on systems development approaches but also on an organisation’s IST strategy:

“Companies are radically changing their information technology strategies by purchasing pre-packaged software instead of developing IT systems in-house.

Holland and Light (1999: 30)”

And:

“ERP systems are now the most common IST strategy for all organizations” Holland and Light (1999: 35)

Development and implementation of such systems is generally more complex due to the level of scope and the need to integrate/replace legacy systems. However, there are also other more social aspects to consider such as a dominant culture, management of schedules and plans through fast implementation and openness to change (Holland and Light, 1999). Essentially, one of the key areas of ERP applications is their ability to deliver organisational integration as the enabler of financial, technical, managerial and strategic benefit (Singletary et al, 2003). However, the sheer size of the task – caused by complexity, turbulent business environments, short application lifecycles and rapid technological change – has the potential to cause many problems and issues for organisations attempting to adopt such systems. To overcome some of these problems, Holland and Light (1999) presented a critical success factors model covering both the strategic and tactical factors involved in ERP implementation. These factors – illustrated in Table 1 – combine established IST factors with ERP specific factors to devise a model that is customised for ERP implementation.
Table 1: ERP Success Factors (Adapted from Holland and Light, 1999)

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<tr>
<th>Success Factors</th>
<th>Specific Factors</th>
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<td>Strategic</td>
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<td>Business Vision</td>
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<td>ERP Strategy</td>
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<td>Top Management Support</td>
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<td>Project Schedule and Plans</td>
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<td>Tactical</td>
<td>Client Consultation</td>
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<td>BPC and software configuration</td>
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Clearly, the successful development and implementation of an ERP system relies on both a continuous strategic and tactical focus specific to the organisation’s own situation.
References


