December 2001

IST and E-Business Strategy Development: An I-Space Perspective

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Abstract

IST strategic reorientation invariably involves large investments for organisations. Problematic development and implementation can have a major impact on an organisations future growth. With the development of the Internet, organisations now face yet another major strategic reorientation and IST strategy issue – the move to e-business. Ensuring effective reorientation is therefore a crucial element for success. This paper investigates IST strategy development within three UK-based organisations by analysing the information flows during the strategy development process. The I-space framework is used to map the evolution of information from the initial trigger to the embedding of new knowledge into the organisation. The results of this research illustrate that IST strategy development is a complex social process. Each of the three cases experienced different triggers for change and information flows. However, this is one study of three organisations and should be interpreted as such to provide the inspiration for further research.

Introduction

The strategic development of information systems and technology (IST) has proved a difficult task. The complexities involved are formidable. On the one hand the technical platforms, including the associated communications and operating software, are subject to continual change, both radical and incremental. And on the other the application systems are being increasingly deeply integrated into organisations' business and process models. Failures due to technology, poor application systems, or both can have major implications. In the U.K. the list of organisations that have suffered major IST disasters is a long one – The Stock Exchange, The Department of Vehicle Licensing and The Department of Health and Social Security – are just three high profile examples from recent years. But the U.K. is hardly alone in this; other countries have their own roll call of failed projects. A number of authors including Galliers (1991, 1998, 1999), Earl (1993) and Remenyi (1997) have reflected on the many issues concerning the difficulties of strategic development. In short the concepts underpinning the strategic planning of IST and its subsequent implementation are ill matched to the complexity of the task. It is against the above background that the development of internet enabled business needs to be viewed. Since the realisation of the Internet as a provider of new business models, online business continues to grow with projected sales expected to be on the region of £650 billion by the year 2002 (Financial Times, 2000). The challenges facing organisations are not solely concerned with new business models but equally with the strategic planning, development and implementation of IST to facilitate these new approaches. If we consider the main aspects of this challenge, which are the seamless integration of information technology (IT) and organisational processes in order to create a new business model - IST strategies will be fundamental. And yet, as we have already pointed out, the strategic planning of IST remains problematic.

This paper reports on a strand of completed research (itself part of a larger programme), which looks closely at the experience of three companies that have taken and implemented the strategic initiatives necessary to adopt e-business and the associated IST investment. To do this an understanding of the organisational processes (formal and informal) and of the information which informed these processes is necessary. Although the paper deals with both, our discussion focuses especially on the informational dimension since this is less well understood. Insights here have the potential to provide organisations with more effective IST provision. Boisot (1995, 1998) has provided a useful concept, the I-space framework, for the analysis of information flows and this has been adopted here. Three questions, therefore, have guided this paper. Firstly how, in organisational terms, was the

strategic reorientation to e-business triggered? Secondly, how did information from the initial idea evolve as the strategy formulation process unravelled? And thirdly, what are the implications for IST provision?

Following this introduction the paper seeks to tackle the context and intellectual framework of the research. This is then followed by an insight into the case organisations. The main discussion focuses on the utilisation of the framework to analyse the case organisations. The paper will be concluded by bringing together the key thoughts of the research and will provide ideas for further research.

Context

The move towards e-business is invariably a major strategic decision for organisations. The development of IST strategies will play a crucial role in ensuring the effective integration of IT and organisational processes for future growth. The mechanistic model of strategic thinking has had an immense influence on IST strategy development (Ciborra, 1994). As Ciborra notes, this model tends to be conscious, analytical, top-down and control oriented. He questions this model, because in practice, strategy development can be incremental and incorporates the softer organisational issues – such as culture and politics. Organisational uniqueness must also be considered, as this makes it difficult to have one prescriptive approach (Doherty, 1999). Galliers and Baets (1998) emphasise the need for a more evolutionary approach to strategy development, one that is more holistic and descriptive. The work of Earl (1989, developed in Galliers, 1991 and extended in Galliers, 1999) provides a high-level perspective of the role of IST strategy in organisations and highlights that IST strategy should be viewed as an integral part of the business strategy. This is even more so when we consider the emergence of e-business, which incorporates the need for integration of organisational processes and IT.

This dual dependence highlights a number of key concerns for IST strategy development – both technological and organisational that could create uncertainty for organisations. Investments in IT at the strategic level are generally of a large sum – ones that can affect the future of the organisation (Easterby-Smith, 1996). The importance of ensuring correct investments are made are highlighted when we consider the problems of information systems (IS) development over the years (Remenyi, 1997). Failed IS could ultimately restrict flexibility and growth, resulting in major costs for organisations. We must also consider the maturity of IT, as technology that is not mature could create an element of uncertainty due to lack of competence. As technology becomes mature, the understanding and certainty improves. E-business technology is however fairly immature compared to some of the established technologies available – potentially creating uncertainty of its capabilities. As noted by Doherty (1999), IT applications are selected to meet business needs; certainty in capabilities is therefore essential. Integrating these new technologies with legacy systems could cause problems for organisations. The new technologies needed for e-business may create new capabilities, but they may also need to be integrated into existing legacy systems.

Organisations face greater turbulence in the environment caused by various factors (Aveni, 1999). This turbulence can ultimately affect strategy development (Clemons and Hann, 1999). E-business could disrupt business by challenging the concepts and assumptions that lead to value creation in organisations (Sawy, 1999). As Whittington (1996) emphasises, strategy development is a social process that is extremely complex. Strategy development is not simply analytical and rational, but incorporates messier issues such as politics and conflict that can lead to various strategic options being developed (Galliers and Baets, 1998). Due to the above aspects – both technical and organisational – it is difficult to view strategy development from purely a deterministic stance. It is essential that flexibility be built into process. Realised strategies are not always the result of deliberate processes but can occur in an emergent fashion as the organisation develops (Minzberg, 1987).

Intellectual Framework

The I-space framework is a conceptual framework that can be used to analyse information flows (Boisot, 1998). The usefulness of this framework is summarised by Boisot himself:

> "… the fluidity of boundary that demarcate an organisation from its technology and products calls into question the viability of strategic frameworks whose analytical power depends on stable boundaries…" (Boisot, 1993, p 154)

This framework provides the opportunity to develop a dynamic tool, one that reflects the complexities experienced by organisations that are developing IST strategies in a turbulent and uncertain environment. The framework comprises three dimensions, as follows:

■ *Codification* – as individuals develop information, the codification process creates a number of categories that will help to facilitate the classification of the insight. Coding occurs when the insight is assigned to the categories that have been created. As this occurs data from the initial idea starts to take form, it leads to a reduction in uncertainty.

■ *Abstraction* – abstraction is a measure of specificity of the categories. A movement up the scale from low (concrete) to high (abstract) reduces the number of categories that need to be used. The category structure can be limited to only one application, or as it becomes more abstract it is generally applicable to all agents.

■ *Diffusion* – establishing the availability of information for those who want to use it can occur following codification and abstraction – the sharing of information. The agent who possesses the information decides who will receive it. This dimension is not concerned with acceptance of information but diffusion in a social process – movement between undiffused and diffused.

By combining the three dimensions into one framework – the I-space – we can analyse how the dimensions of codification, abstraction and diffusion, and the relationships between them condition the information flows. To achieve this we can utilise the social learning cycle (SLC) to highlight how new knowledge is created and evolves within the I-space (Boisot, 1995). The SLC comprises six phases that are linked together and operate within the I-space, which can run concurrently – see diagram 1.

Diagram 1- Social learning cycle in the I-space
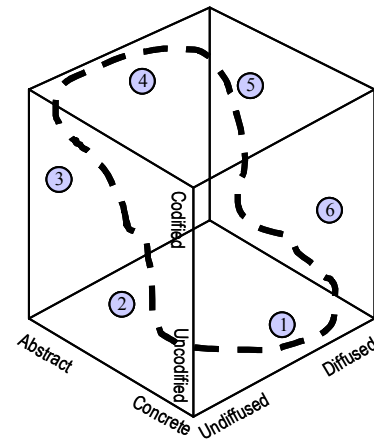
1. *Scanning* – This phase is concerned with identifying available data which becomes the possession of the individual. For strategic re-orientation the activation for change can originate from both the internal and external environment of the organisation (Nutt, 1998). Activation can be from both formal and informal elements – e.g. formal analysis or from political power within the organisation. Ciborra, (1994) notes that the new knowledge does not necessarily have to initiate in a top-down fashion - as in the mechanistic strategy model - but can develop from lower down the organisation.

2. *Problem Solving* – Uncertainty is eliminated by giving structure and coherence to the information. In terms of strategy development, strategic thinking plays a key role by developing the initial idea further. Thinking at this level does not necessarily have to be analytical but can be fairly creative (Heracleous, 1998). Business and IT knowledge is crucial in order to be able to understand the application of the initial insight.

3. *Abstraction* – The new insights now become codified into other situations by conceptualising them. Again business knowledge ensures that the insight will be of value for the organisation. Uncertainty is reduced as the idea is developed.

4. *Diffusion* – In this phase the newly created insights are communicated to the target population. The more codified and abstract the information – the easier to communicate. Strategist may use this phase to test out the idea with actors to ascertain viability.

5. *Absorption* – Here, the new knowledge is internalised through use and will eventually become tacit to the actors – learning by doing or learning by using. The learning aspect is crucial, as Kuwada (1998) notes, when strategic learning occurs the organisations basic assumptions may change as a new strategic orientation is taken.

6. *Impacting* – The final movement to the front of the I-space embeds the new knowledge in 'concrete practices and physical artefacts'. This phase can work in conjunction with the previous phase. It is here where the re-orientation is embedded into current practices – e.g. IST strategic planning processes.

Case Organisations

The advent of e-business initiatives provides an empirical opportunity to investigate IST strategy development in action. This paper, which is part of an ongoing research program, utilises empirical data obtained from three UK-based organisations that have recently developed e-business initiatives. Table 1 shows a high-level comparison of the case organisations. The organisations chosen for the research are those that have traditionally traded in the 'physical' world and are now transitioning into the 'virtual'

world. This meant a realistic view of IST and e-business strategy development was taken, without the risk of distortion from the dot.com start-ups, which, in the main, have had quite different strategic justifications.

Table 1. Case Organisations

	Company A	**Company B**	**Company C**
Industry	Retail – Food	Retail – Various	Reprographics
Geographical Location	UK	UK – Northwest	Multi-national
Turnover	£1,917.7 million	£787 million	European division = $5.3 billion
Employees	20000	10,500	94000
E-business Initiative	Product purchasing and delivery	Product purchasing and delivery	Product purchasing and delivery
Company Structure	Centralised	Divisional	Centralised

The research followed a case study approach, of which the suitability for is provided by Yin (1994). The actual data was collected from a number of sources including, websites, annual reports, company documents and primarily performing semi-structured interviews within the three organisations. What follows is an insight into the e-business and IST strategy development processes undertaken in the three case organisations.

Company A – This company is a high street food retailing business. The strategic re-orientation had its origins in previous customer delivery facilities developed within the organisation. The decision to move towards e-business was a natural progression from the previous product delivery initiatives such as home delivery. Because of the relatively incremental nature of this re-orientation there existed a degree of competence and knowledge both about developing the new initiative but also in how to adjust the IST strategy. The missing competence (new e-business technologies) was 'bought-in' through an outsourcing agreement with a service provider. This, combined with the existing business knowledge ensured a quick response to the trigger for reorientation. The level of competence obtained before and during the strategic reorientation meant Company A could develop with confidence. The strength of this competence is seen in a number of second movers adopting the same e-business model as Company A. Following the initial trigger for change, the ideas were developed within the organisation, at both a tactical and strategic level. Pilot programs where used to experiment and test ideas. Once direction was taken the program was integrated into the formal strategic planning processes used to communicate and control development.

Company B – This company is a very long established, national mixed retailing business organised by regional divisions. The CEO of the organisation - who following discussions with external colleagues triggered this strategic reorientation by deciding that an e-business model was required. To develop the new initiative a new company division was set-up, which allowed new ideas to be tested. The initial three months of development was spent investigating and evaluating both the process and IT requirements and capabilities. To support the experimentation of ideas the internal controls and business models were relaxed. To ensure organisation wide development, key decision makers from all divisions were involved in the initiative. This was to ensure that the strategy investment required for the reorientation was viable and had the 'buy-in' of all key actors. Once the initial idea was developed and tested the direction taken was controlled and monitored by being integrated into the strategic planning process. However, a degree of flexibility existed for the IST development process because uncertainty existed in the e-business technologies. Two years following inception half of the company's divisions are e-enabled.

Company C – This is an international company specialising in reprographics. For a number of years, Company C had been experiencing pressure from its suppliers and customers to integrate e-business facilities into their business model in order to reduce costs within the supply chain. Operational needs were therefore the main trigger of the IST reorientation. Within the organisation there had been extensive testing and experimenting with the e-business technologies prior to the formal decision to move e-business. Once the decision had been made, the competencies were assembled and a new organisational sector used to develop the initiative. Following the formal decision to develop the initiative, plans were drawn up to ensure control and continuity across the organisation. An incremental approach was taken to the strategic reorientation to ensure organisation wide development of the initiative. To date the majority of the company's supply chain and customer chain is internet based.

Discussion

This discussion is segregated into two main areas, being the trigger for strategic reorientation and the evolution of information following the trigger. Each area will be discussed in turn. The movement of information within the I-space for all cases is illustrated in diagrams 2 to 4.

Trigger for Change

Company B's reorientation was clearly driven by the CEO, whose activation for change was caused by external information from informal discussions with colleagues. No formal analysis was undertaken prior to the trigger, it was based on the CEO's intuition and his own internal alarm mechanism. This is illustrated by a low position on the codification scale. Company A on the other hand, illustrated confidence in their capabilities and their trigger was a natural progression from competencies previously developed within the organisation. As soon as the technology became available they were able to move into e-business. This competence is reflected in Company B, by the scanning phase which drew on highly codified information – with reduced uncertainty – unlike Company A whose trigger was unstructured and uncertain. Company C's trigger for change was driven by operational needs. The I-space illustrates poor scanning capabilities within the organisation. It took Company C approximately 24 months to formally respond to the need for reorientation. As a very large organisation it had become used to setting the agenda with its suppliers and customers and was genuinely disorientated when faced with customer pressures – in this case U.K. government departments. From the three cases it is apparent that the triggers for change do not necessarily follow a top-down control approach as determined in the mechanistic strategy model. In all three cases the trigger was not the result of formal analysis, as prescribed in many strategic models; and in two of the three cases, it did not follow a top-down approach as also advocated in the mechanistic strategy model. This goes against the orthodox literature that views strategy development as more analytical and formal. In these examples it is clear that reorientation for change can be triggered from various position inside or outside the organisation, and not necessarily from formal analysis, systems or procedures. However, in all cases the strategists need to make the strategic decision viable and justifiable because investment in IST reorientation can be at a high level for organisations. The next section discusses how the information evolved in the three organisations following their strategic trigger.

Information Evolution

Diagram 2 - Information Flows for
Company A – Food Retail
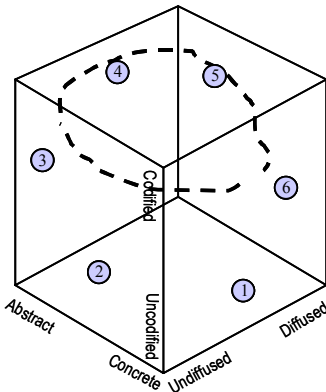
For Company A, the SLC tended to reside in the upper section of the I-space – see diagram 2. This shows that the organisation responded quickly to triggers due to their previous commitment to the incremental development of competencies in e-business and IST. Following the trigger, the initiative developed rapidly and was applied to various situations via a pilot program used to develop and test the idea. To reduce uncertainty of information with regards to IT capabilities, Company A obtained an external competence that had existing knowledge of the domain. Once developed, information was diffused around the organisation through the use of structured plans. The use of a pilot program in Company A illustrates a movement along the abstraction scale. Here, the initial idea – e-business, was developed to determine its viability in a number of situations for Company A. Thus it started in one area of retailing (concrete) and was modified and generalised into the other retail areas (abstract). In terms of IST strategy development this meant that the understanding of the technological implications and its impact on the business processes increasingly confident.

Company B's SLC is markedly different than that of company A – see diagram

Diagram 3 - Information Flows for
Company B – General Retail

3. The initial trigger for change occurs very low down the I-space, in the uncodified area. The company faced uncertainty in its technology and organisational process capabilities. The three months spent researching the e-business initiative was attempting to understand the environment and the technologies – that is to move up the codification scale. Even as the information evolved, there was still uncertainity towards IT and the environment. Again, experimentation was used extensively to determine viability of the reorientation but also to discover capabilities offered by the technology. As the data categories became more generalised the e-business initiative was increasingly adopted. However, the focus of the diffusion was on key decision makers only and therefore the absorption rate was compromised. The reason for such an approach had its roots in the uncertainty experienced by the organisation. Confidence had to be built into the reorientation prior to any major commitment being made – hence the relaxation of internal controls and models to allow flexibility.

For Company C, the trigger for change was with fairly codified information. However, poor scanning resulted in a serious time delay before the 'official' decision to change was made. This illustrated in
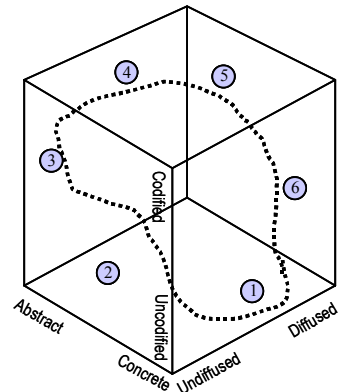
diagram 4. The combination of fairly codified information from the trigger and recently developed technological capabilities meant the movement through the I-space was fairly high on the codification scale but required movement up the abstraction scales so that the insights could be applied to business applications within their situation. The diffusion of this insight was not initially aimed at being organisationally wide. As with Company A and B, Company C utilised their formal planning systems to embed the new initiative within the organisation. However, Company C's poor scanning capabilities also affected the ability to diffuse information around the organisation. Sharing of information in the IST strategic reorientation was slow and filtered through the formal organisational channels – generally top-down in this organisation. Diffusion of the reorientation therefore took a long period of time to reach all organisational members.

To summarise the discussion we can return to the original three questions. The first was how the original strategic reorientation to e-business was triggered. The three cases illustrate that no one factor or mechanism was responsible. All were responses to external stimuli but only one was top-down and even this was without the formal planning systems. It is the case, however, that the concept of e-business for each of these organisations was inexplicitly linked to the capability of the technology. The view that business strategy leads IST strategy is too simplistic – each informs the other in an iterative process. Our second question concerned how the information supporting the e-business initiative evolved during the strategy formulation process. Here a complex picture emerges. The level of codification of potentially relevant data within the three organisations varied significantly from high uncertainty to low uncertainty. Despite these variations it did not stop any of the companies initiating action, although poor scanning of the environment – both business and IT – did affect the rapidity of response to the changing environment. Time spent experimenting and testing the ideas were present in all organisations, this enabled them to develop the idea and move up the codification and abstraction dimensions. Once structure had been gained, and uncertainty reduced, the organisations were in a position to diffuse the knowledge developed. The level of diffusion differed between organisations depending upon the audience to be targeted. In only one of the organisations was this target defined as the general workforce. In the others, despite the wish to adopt the e-business initiative on a widespread basis, the dissemination was top-down. Hence the new insights were embedded into the organisations at different rates. It is important to note, however, that during the reorientation to the new e-business model the experiences gained did shape the current view of what a desired outcome for the new initiative should be, for example including of additional functionality. Inevitably this changing appreciation of the new business model imposed demands on the IST provision, which were not always easily met. The tension between business need and technical facilitation therefore appeared key early in the strategic development. This illustrates an iterative mechanism within the IST strategy development process *whether or not such a mechanism was intended.*

The final question concerned the implications from this pilot research into IST strategy development. The work shows that the strategy process occurring within all case organisations was a complex one, incorporating actors, relationships, formal techniques and information. This suggests that simple prescriptions are not likely to be robust. There are, however, potentially useful insights. The first is the observation above, that despite the varying degree of information readiness this did not itself affect the willingness of the organisation to commit to the strategic initiative which led to the adoption of full-scale e-business. Scanning was helpful and the desire to reduce information uncertainty was common to all three cases but these were not hurdles – they were activities engaged in largely after the original commitment had been made. A related insight for IST strategy development derives directly from this latter observation. At no stage was the IST planning completed and subsequently revised; rather invention and revision went hand in hand from the outset.

Conclusion

The knowledge needed to make IST strategy reorientation successful is a blend of both business and IT elements – how this knowledge develops is crucial to the success of IST strategy development. The use of the I-space framework as an analytical tool provides researchers with the ability to investigate strategy development from a dynamic perspective – one that does not just focus on the analytical aspects of strategy but emphasises the more complex social aspects of information evolution. Our analysis of the information characteristics within the three case organisations confirms that IST strategy reorientation is a dynamic and complex activity.

Further research needs to be carried out in this area. The framework used has enabled an alternative perspective of the situation to be drawn out. However, further questions still remain unanswered. These include: What effect does time and resources have

Diagram 4 - Information Flows for Company C – Reprographics
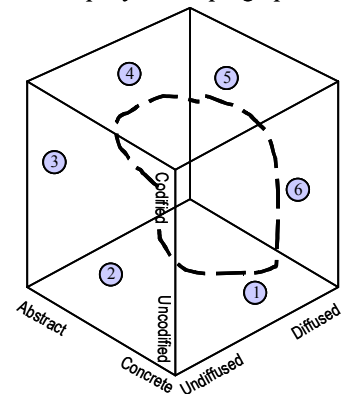
on the evolution of information? And, What is the interaction between the strategy formulation processes and techniques and the information flows in an organisation? The wider research, of which this is part, is seeking to address these in the context of an action research program.

Acknowledgements

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