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# SME TRANSFORMATION: MODELLING PROGRESSIONS

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## ABSTRACT

*Small firms (SMEs) are encouraged to embrace e-business. However, the mechanisms by which such business transformation occurs is not understood. IS transformation models suggest a single path, though, there is little evidence that SMEs follow it, and e-business transformation models are untested. Venkatraman's business transformation model provides a means of determining IS development that has been validated in large firms. While there is little research into its applicability to SMEs, research here in multiple SME cases reveals three business transformation paths, termed proscribed, disconnected and disjointed. The research demonstrates why some SMEs ossify at certain stages of transformation, and how disconnected progression may preclude SMEs from gaining the benefits of process redefinition and scope redesign. The implications for e-business, for the model and for SMEs are discussed.*

## 1. INTRODUCTION

Current business transformations focus on e-business. Business seeks to use the Internet to gain competitive advantage and grow. Small and medium sized enterprises (SMEs) are participating in moves to e-business, though it is unclear if they can benefit from information and communication technology (ICT) opportunities. Further, there is little validation of any e-business transformation models in practice.

This paper investigates whether, and in what form, SMEs achieve business transformation through IS. It demonstrates that SME e-business transformation is similar to that of other ICT adoption. Business processes and strategic intent affect achievement of transformation. The paper first reviews SMEs' potential for e-business transformation, but finds current models lack consideration of organisational issues. It therefore looks to Venkatraman's (1994) classic transformation model and assesses its suitability to SMEs. Next, the paper describes the case method and data analysis. 41 longitudinal SME cases are reviewed to consider ICT adoption over time. Organisational and management issues are assessed to consider SME approaches to transformation. Analysis reveals three paths or progressions through the transformation model, termed the '*proscribed*', the '*disconnected*', and the '*disjointed*' rather than one. Finally, the discussion reflects on the drivers of these three paths and employs an SME IS use model to shed light on them. Implications for management and research are presented.

## 2. SMEs AND E-BUSINESS: POTENTIAL FOR TRANSFORMATION

In essence, the Internet is a source of information and data. However, the data value depends on the provider, and its relevance, timeliness, accuracy, and retrievability. The Internet can potentially affect communication, the basis of competition, sales and collaboration (Nath et al 1998). SMEs believe the Internet will enable them to reach wider geographical markets and increase customers (Lunati 2000). Precise Internet benefits are as yet unclear, but speculation suggests the greatest benefits occur under full supply chain integration (Currie 2000). Implementation is thought to progress through several stages and evolves as businesses recognize the benefits. Costello and Tuchen (1997) suggest firms first *publish* information on the Web, then *interact* with customers and finally processes are *transacted* electronically. A further stage of *integration* focuses on full supply chain integration (Currie 2000). While Internet systems are necessary to develop these processes, value arises once businesses use the knowledge and experience to produce outputs accessible through the Internet (Willcocks et al 2000). Transformation potential is thought to emerge once businesses recognise the need to re-organise processes and focus on core competencies (Figure 1). Initially firms use basic Internet tools such as web pages, before moving to stage 2 - transacting business. Many businesses do not progress further, as they achieve no benefits. Moving to Stage 2 may cause SMEs difficulties due to resource constraints: ICT is only introduced when there is a business imperative (Levy et al 1999). At Stage 3 firms recognise that changes to processes, structures and skills are necessary to exploit the technology. Stage 4 is only reached once the business recognises it can transcend its existing products, using the Internet to develop new markets and products.

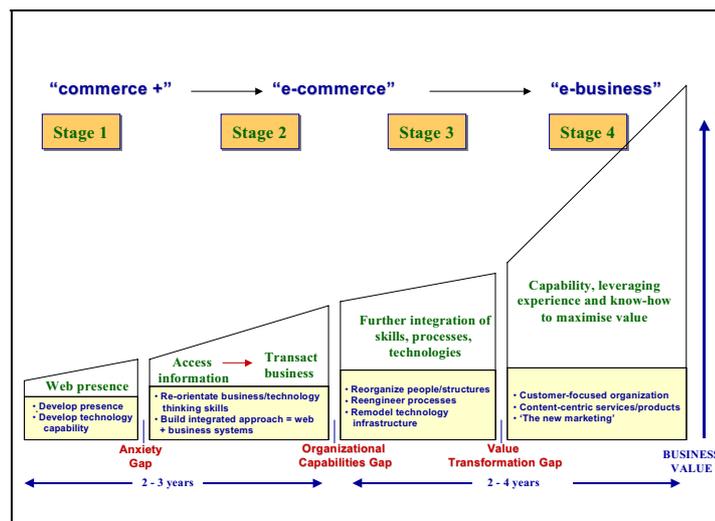


Figure 1: Moving to E-Business (Source Willcocks et al 2000)

An early study of SME Internet adoption finds SMEs followed a path similar to large firms (Poon and Swatman 1999). However, SMEs experience only three transformation stages, with process integration the endpoint. This position is only reached once SMEs identify benefits. However, the model does not allow for SMEs changing their business perspective. Innovative and entrepreneurial SMEs will change to take advantage of Internet opportunities (Levy et al 2001). Thus, Poon and Swatman's model is likely to be subsumed by Willcocks et al's.

However, neither of these models considers the organisational issues that influence business transformation in detail. These are the thrust of an earlier transformation model, Venkatraman (1994), widely regarded as seminal. Here transformation depends more on relationship management between partners in a trading network. The Internet offers opportunities to develop such networks. Hence, firms are encouraged to look outside their boundaries to gain transformation through ICT.

### 3. SMEs AND BUSINESS TRANSFORMATION THROUGH IT

SMEs regularly employ IS to help manage the business. Yet, most innovative uses of IS are found in large businesses, though there are innovative high-tech start-ups. Large firms use IS/IT to add value rather than simply to reduce costs. SMEs' exploitation of IS tends to mimic the early use in large firms - cost reduction (Levy et al 2001). However, SMEs may use IS to co-ordinate internal activities, to add value via collaboration, particularly with customers, and, occasionally, to innovate (Levy et al 2001).

Venkatraman's framework recognises IT plays a major role in enabling business to respond to flexible and dynamic markets. The framework focuses on organisational and management process change required to exploit IT. Its central thesis is that IT benefits are limited unless organisational structures undergo commensurate change to manage the business response. While not proposing a 'stages of growth' model, Venkatraman acknowledges that 'potential benefits' increase from Level 1 (localised exploitation) to Level 5 (business scope redefinition). The costs associated with change at each level increase and firms need to consider their value. However, as competitive pressures increase firms need to be pro-active.

*Localised exploitation* improves 'task efficiency' and IT has little impact on the business. Standard systems to support individual tasks are deployed. There is limited likelihood of competitive advantage as systems are easily imitated. *Internal integration* improves efficiency and effectiveness through firm-wide technical and organisational system integration. The focus is on 'technical interconnectivity' rather than 'business process interdependence'. Integration benefits are only realised if the firm uses the information to improve customer service or efficiency. Venkatraman calls these steps evolutionary as they involve incremental change in business activities.

The next three levels are 'revolutionary' as they require major process change to achieve competitive advantage. *Business Process Redesign* suggests firms question whether their structures enable them to compete in a changing market. However, benefits are limited if firms only look at their own requirements and exclude those within the industry value chain. *Business Network Redesign* recognises the need to exchange information across the value chain including managing relationship with collaborators. The solution is not merely technological, inter-firm relationships need to be developed to acknowledge network interdependencies. *Business Scope Redefinition* is the ultimate challenge, as firms exploit IT to change their business within an 'extended business network'. The focus is on the role of IT to develop greater co-opetitive relationships within existing and new markets.

Venkatraman suggests managers need to review the level appropriate to their firm and consider their competitors' positioning in determining their response to change. Interestingly, Venkatraman puts business process redesign at the heart of all effective change. He suggests two routes, first seeking efficiency, where process redesign is based on improving the quality of current strategies moving from evolutionary levels. Second is enhancing capabilities where changes in business scope require concomitant changes in business processes. Venkatraman identifies the strengths and weaknesses of each level (Table 1).

Venkatraman (1994) and Macdonald (2000) concur that revolutionary level success depends upon a firm's Level 2 experience. Venkatraman states 'it is tempting to move directly from type I to type III, but such a move may be risky given the absence of IT infrastructure linked to the strategic context'. Macdonald, reviewing experiences of success and failure of collaborative projects, writes that 'management understanding and experience in respect of cross-departmental, cross-divisional and cross-functional integration have been consistently amongst the top three issues'. He emphasises the need to implement Level 2 projects, as management needs to understand integration issues, before they embark on higher levels. Neither Venkatraman nor Macdonald suggest that IS projects will follow a discrete path from Level 1 to Level 5. Indeed, in some parts of a business, a Level 3 process redesign may be followed by Level 1 exploitation in another. However, substantial learning derives from undertaking projects, so that lower level projects are likely to be enablers of higher-level ones.

Level of Transformation	Major Strengths	Potential Weaknesses
Localised Exploitation	<ul style="list-style-type: none"> <li>○ IT easy to identify</li> <li>○ Organisational change minimal</li> </ul>	<ul style="list-style-type: none"> <li>○ Duplication</li> <li>○ Limited organisational learning</li> <li>○ Limited benefits from investment</li> </ul>
Internal Integration	<ul style="list-style-type: none"> <li>○ Focus on internal efficiency</li> <li>○ Improved customer service</li> </ul>	<ul style="list-style-type: none"> <li>○ Imposed on existing business processes</li> <li>○ May not consider competitors changes</li> </ul>
Business Process Redesign	<ul style="list-style-type: none"> <li>○ Offers high value to customers</li> <li>○ New processes offer future potential</li> </ul>	<ul style="list-style-type: none"> <li>○ Benefits limited if viewed as merely corrective</li> <li>○ Include processes that should be outsourced</li> </ul>
Business Network Redesign	<ul style="list-style-type: none"> <li>○ Focus on core competences</li> <li>○ Streamline scope for flexibility</li> <li>○ Exploit opportunities of network</li> </ul>	<ul style="list-style-type: none"> <li>○ Poor co-ordination of network partners may inhibit benefits</li> <li>○ Limited IT infrastructure could inhibit learning</li> </ul>
Business Scope Redefinition	<ul style="list-style-type: none"> <li>○ Information as a strategic resource</li> <li>○ Build co-opetitive relationships between partners</li> </ul>	<ul style="list-style-type: none"> <li>○ Focus on network relationships not core competence</li> <li>○ Hollow factory may limit growth opportunities</li> </ul>

**Table 1: Strengths and weaknesses of Transformation Levels (adapted from Venkatraman 1994)**

Venkatraman (1994) presents these perspectives as outcomes from cases in large firms. There is little research on their applicability across all businesses. This research seeks to investigate if business transformation is applicable to SMEs. As IT becomes more accessible, understanding of how SMEs seek to exploit it for business growth is required.

#### 4. METHOD

To understand in what way SMEs use IS to transform their businesses a case approach is most appropriate. This paper reviews 41 SME cases in the UK W. Midlands. All the SMEs are well established and have been trading for over 5 years, in some cases much longer. They have participated in Business Growth programmes directed at owners to assist in developing good management practice. This research employs a purposeful sample, from a self-selecting population. Each firm has been visited repeatedly over a period of up to 6 years (termed here interventions). This provides a means of identifying changes in IT adoption over time to determine any business transformation benefits. The analysis involves different industry sectors rather than focusing on one as earlier research (Levy and Powell 2000) suggests that sector impact is limited when considering information as a strategic resource.

Each case is conducted over one-week with semi-structured interviews lasting 1-2 hours with owners/CEOs, senior management team and employees. History, background, market material and interview outcomes are analysed. IS analysis tools are used to understand the relationship between information systems in use and those planned. For example, the IS strategic grid identifies the way systems are used. The purpose for which IS/IT is used, whether for production, management information or customer support, is mapped. Porter's 5 forces model identifies strategic possibilities from IS/IT. The 7S model investigates relationships with IS. Organisational maps are drawn to identify the IS contribution to efficiency and effectiveness. Soft Systems Methodology provides a framework for investigating information flow and business process issues. The interviews identify the history of IS development and the potential for IS adoption. Pertinent issues are reported back to provoke discussion and to refine findings. Subsequent investigations include repeat analyses using the same models; focus groups bringing owner-managers and senior staff together to discuss IS and business issues; and phone and personal contact. This longitudinal analysis provides a rich dataset of the firms' past, present and intended uses of IS. The lengthy contact period enables the SMEs' plans to come to fruition and outcomes studied.

#### 5. ANALYSIS

While the analysis that follows uses data from all 41 case SMEs, for reasons of brevity the transformations that they undergo is illustrated in each path by one exemplar. The discussion and conclusions reflect on all cases. The majority of case firms are small, by the EU definition. Employee

numbers is an appropriate size measure as differences in organisational structures occur with size (Storey 1994). The firms span manufacturing, wholesaling and retailing, business services and social services. The analysis explores transformation over a number of interventions and suggests paths the SMEs follow.

### **5.1 Localised Exploitation**

Localised exploitation is the starting point for all but five of the SMEs. This is not merely a reflection of a start-up position, but of the value of IS to the business. In most cases IS for managing and growth are seen as peripheral to the need for operational systems. However, at the second intervention 15 of the firms still used standalone systems - word processing and accounting. However, only one, Recycling and Training, indicated they had no intention of altering this.

Recycling and Training are a charity, founded 1985, that recycles waste paper and cans, and provides special needs training. The firm is stretched to provide the training and to support its commercial arm. There is little competition in training, but recycling is highly competitive. This causes financial difficulties, though grants support training. The owners find it time consuming to identify potential recycling customers, they do not manage existing customers well, relying on goodwill. However they need to focus on improving efficiency to reduce costs as well as identifying areas that are financially rewarding. The firm has two standalone PCs, one with word processing and a spreadsheet for accounts, while the other is used occasionally for training. At subsequent interventions the situation had not changed. Although it emerged that business processes needed to be changed to improve efficiency and to provide information on customers and trainees. Financial management remains a major issue. However, there is only limited need for IS investment. Nevertheless, the owners are reluctant to alter processes as they are comfortable with the status quo, although they recognise it is not efficient.

### **5.2 Moving to Internal Integration**

Revisiting opportunities for future development with owner/managers after a further time indicates that 16 SMEs do not wish major changes. Most owners are 'lifestylers' where the growth aspiration is to maximise value prior to retirement. Thus, owners focus on improving efficiency. Their ICT plans include investing in LANS to integrate systems to assist with managing growth, primarily supporting a growing customer base. However, there is little enthusiasm to invest further. These firms recognise the value of e-mail for external communication, although there is little development of Intranets or internal e-mail. Some SMEs have invested in web sites. These are primarily brochureware with contact to the SME by e-mail.

Family Solicitors is not planning to develop its systems further. There are 3 partners, 7 professional staff and 15 support staff in two branches. The firm provides a wide range of legal services, although much is based round land issues. Firm objectives are to grow through new customers and to increase margins by reducing costs. The structure means that partners have primary responsibility for all actions. The firm is traditional, although it started to change when a new partner joined. There is clear demarcation between professional and administrative staff leading to partners overseeing administrative activities such as billing and debt collection. There is a small accounts department using an outdated accounting package. Secretaries use some PCs for word processing, and client records are stored manually. The major problem is cash flow, as partners act as debt collectors. They are reluctant to do this task while discussing clients' cases, but are also unwilling to delegate it to Accounts. Client records are stored more than once - by the receptionist and by the responsible solicitor. Information is often only updated in one place having implications for billing, as Accounts are not informed when this can be done. Processes need to be streamlined with internal integration of computer systems a priority to ensure common information access.

At subsequent intervention, little had changed, although debt collection was more problematic. The organization had not taken action on any of the recommended changes from the previous intervention.

The organisation was surprised to receive the same recommendations for change although the analysis revealed the same problems as on the previous occasion. Recommendations included a need for partners to review their roles with regard to administration by appointing an office manager. This was done and the IT provision reviewed. The PCs were networked and an integrated customer database developed. The accounts department was made debt collector, reducing cash flow problems significantly. Thus, the company moved from a position of localized exploitation to internal integration.

### **5.3 Moving to Business Process Redesign**

While Family Solicitors undertook minor changes in processes, they were primarily improving efficiency. None of the case SMEs reviewed their business processes as a precursor to investment in ICT, due perhaps to their operational focus and market niche positioning meaning that the businesses already focused on core processes. However, there is a need to review these as SMEs grow (Levy et al 2002). Yet, it is not clear that the owners believe that their structure inhibits growth.

### **5.4 Moving to Business Network Redesign**

Seven case firms have developed ICT with customers and suppliers. Four are manufacturers using EDI for orders and account processing. Additionally, computer aided designs are transmitted electronically. However, the internal systems of these SMEs have not progressed beyond localised exploitation, leading to a need to re-enter data into internal systems to manage operations. It is only once the firm realises there is benefit to internal systems improvement that they revisit internal integration. There is again little or no review of business processes. Two SMEs provide 'social' services. Both are looking at improving services through electronic communication with external agencies such as pharmacies and medical practitioners. Again both have standalone systems to support operational processes. The owners believe their current processes to be efficient and effective. The Internet is recognised as a useful means of developing and managing the network relationship. The final organisation is a regional arts centre that is building customer relationships through the Internet and contributing to an Internet-based regional arts network.

Spring Manufacturer makes mission critical springs for the automotive industry. The industry is highly competitive and under threat from overseas manufacturers. In addition, alternative technologies replacing springs also threaten future viability. While the firm vision is optimistic, there are concerns that a lack of IT skills and knowledge will inhibit future developments. In 1994 they invested in a Materials Requirements Planning (MRP) system. They also have a standalone accounting system. The CEO uses spreadsheets to provide performance measurement information to customers. This data is rekeyed from production systems as there is no automated link. The MRP system is not integrated with production planning and processing. Customers send orders through EDI. Customer designs are also received electronically. First recommendations include changing processes to integrate order-processing information with the MRP, integration of the job costing system currently in development with the MRP and developing an interface for management information.

By the next intervention a LAN was in place for management and administration. However, it has taken time to embed the system within the business processes. E-mail is now commonly used within the company, by managers, for internal and external communication with customers and suppliers. Notwithstanding this, operational activities are carried out as they were in at the first intervention. Changes in the automotive industry, which include manufacturers working with sub-assembly suppliers, are looming. This means that Spring Manufacturer needs to build relationships with sub-assembly suppliers as part of a network. The CEO sees the future as greater involvement with customers in spring design, achieved through the development of Internet-based networks of customers and suppliers. Currently, there is limited Internet use – only a marketing web site.

## 5.6 Moving to Business Scope Redefinition

Only three SMEs changed their business scope. Two recognised e-business opportunities and refocused their strategy. The third implemented a knowledge management system to offer a new information-based service. All moved directly from Internal Integration to Business Scope Redefinition. They recognise the role of information as a strategic resource and look to build partnerships. A knowledgeable owner who understands the potential of ICT, particularly the Internet, primarily identifies the opportunities from new systems. Venkatraman suggests a potential weakness of this stage is that firms focus on external relationships to the detriment of core competences. The SMEs here are clear about the need to develop core competences, thus they not only develop network relations but go on to review business processes.

Model Toy Importers (MTI) was founded in 1986 to distribute toys. It moved into the more lucrative market of selling collectable model cars. MTI supplies the specialist hobby market, 95% retailers and the rest private collectors. While they compete on quality and delivery speed, customers may wait some years for a particular model. One owner's background is corporate IT so MTI has a small LAN and there are two standalone PCs bought as required with little strategic planning. However, the owners recognize the need for quality customer information and have a database and accounting system. All other systems are manual, including stock control. This causes problems, as MTI need to manage cash flow more effectively. First recommendations included improving the customer database, automated stock management and a financial control system. E-mail would improve communication with customers.

Localised Exploitation	To Internal Integration	To BNR	To BSR
Recycling and Training	Family Solicitors	Regional Arts Centre	Model Toy Importers
Perforated Tube Co	Land Rover Repair	Spring Manufacturer	Corporate Gifts
Lens Manufacturer	Bird Designs	Car Paint Co	Mobile Phone Surveyors
Burring Engineers	Coventry Events Management	Wooden Pallets	
Methane Gas Extractors	Wolverhampton surgery	Light Assembly Co	
Seven Stars Printers	GP Surgery (2)	Tree House Health Care	
Coventry Analysis Co	GP Surgery (3)	Garden Health Care	
Chemical Resin Maker	Envinronmental Consultants		
Henley Coaches	Marine Cable Co		
Electrical Accreditation Agency	Coventry Accountants		
Stratford Nursery	Coventry Designs		
Coventry Training	Heating Engineers		
Warwick Management Training	Biotechnology Co		
Regional Travel Agent	Warwick Insurers		
Enamel Box Co	Lubricant Wholesaler		
	Stratford Design Co		

By the second intervention, MTI underwent a radical strategy review. The Internet revolution suggested to the owners that they could sell collectables on-line. They therefore set up a trading web-site and collectable portal that was available to other collectable firms. The business focus has changed to one of attracting other collectable companies to be part of the portal, in other words selling space and getting commission. The retail arm continues but the dot.com is seen as the future. In the collectable business stock may not age, for example, the first item sold through the web site was an Ayrton Senna coaster. The SME still relies on its existing systems but plans include integrating the web site with operational systems.

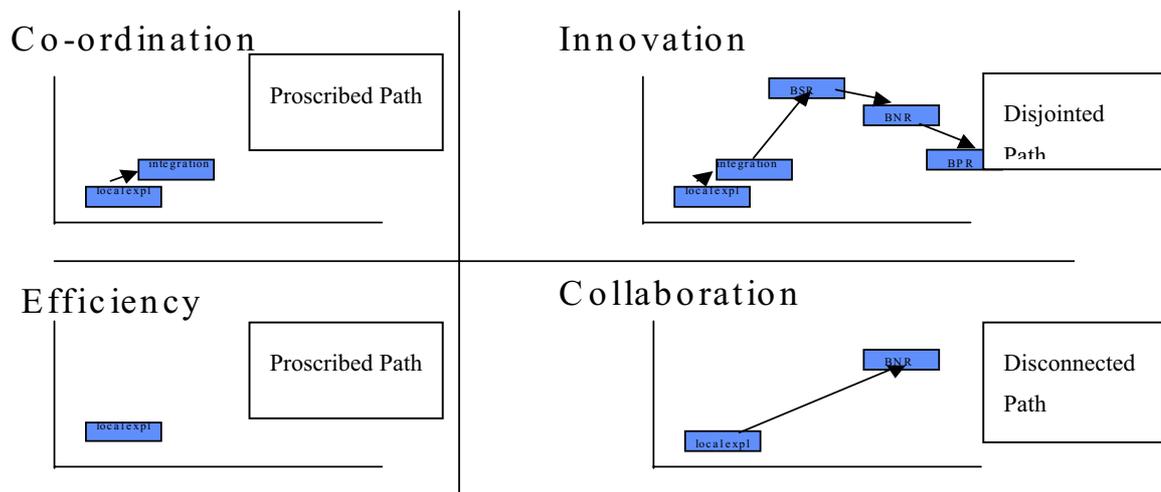
## 6. DISCUSSION AND CONCLUSIONS

The analysis has identified four distinct transformation paths for SMEs, not one as suggested by past research. The first path indicates that there are some SMEs for whom localised exploitation is the limit of their ICT investment. Owners are mainly concerned with lifestyle, not developing the business. None of the SMEs wants to change their management approach, although the cases demonstrate the need for business process improvement.

The second path is taken by the majority of case SMEs, localised exploitation is followed by internal integration as owners recognise they need to improve efficiency and reduce costs. However, there is little evidence of organisational change. These firms tend to be interested in, and achieve, steady growth by adding further, similar customers. Strategic opportunities from information are not recognised.

These two paths are ‘proscribed’ Venkatraman progressions. SMEs either ossify at localised exploitation or internal integration. The SMEs are all well established and have considerable experience. In all the cases there is evidence of the need to reconsider business processes prior, or as well as, developing IS. There is a general reluctance by owners to take this route perhaps due to resource constraints, fear of the uncertainty of changing processes, or a lack of vision.

The other two paths demonstrate that SMEs follow different routes to business transformation than suggested by Venkatraman. The third path has SMEs moving to a form of business network redesign, primarily due to customer demands, but occasionally to provide better service. However, this is not integrated with internal IS due to conflicting customer demands, leading to data re-keying into local systems. However, process re-engineering is not considered. SMEs gain no benefit as they treat the networked systems as localised. This mentality is inconsistent with full exploitation of IS potential. This demonstrates a ‘disconnected’ Venkatraman progression.



**Figure 2 Growth Paths and Venkatraman Progressions**

Entrepreneurs drive innovative SMEs. They follow Venkatraman’s suggested path of moving from localised exploitation to internal integration. They then make a step change and move to business scope redefinition. This is partly response to customer push, but also a recognition and desire to exploit the potential of IS and the strategic role of information. Innovation changes business scope, it crucially involves the roles and skills of individuals. However, innovation requires the redefinition of business networks and this, in turn, leads to business process redesign. Special EFX is refocusing its business to become an e-retailer. To do this it is developing its network of suppliers to ensure quality production. It is also growing a new customer network through this change of business direction. At the same time it continues to grow its corporate business.

The move to business network redesign involves strategy changes, while the move to business process redesign is a structural change extending beyond that experienced in moving to internal integration. This is a ‘disjointed’ Venkatraman progression. All levels of the model are employed but not in the order envisaged. To some extent this path supports Poon and Swatman’s model of SME e-business adoption.

Thus, SMEs in the first two paths are unlikely to fully engage in e-business. They may achieve stage 1 of Willcocks et al’s model, although they are unlikely to see business benefits from development of a

web site or use of e-mail. The ‘disconnected’ progression suggests that customer push moves SMEs directly to Stage 2 of Poon and Swatman’s model. However, unlike the ‘disjointed’ progression, SMEs are unlikely to be able to progress further.

These progressions or paths are better understood using Levy et al’s (2001) Focus-Dominance model (Figure 2). This suggests SMEs’ IT investment follows a four-pronged segmentation approach. The first approach is *efficiency* where IS is for control. There is no integration with business strategy. IS are usually standalone to improve efficiency of individual internal activities and IS investment is viewed as a cost. These SMEs are exploiters of IS on a local scale.

The focus of the second approach, *co-ordination* is to improve customer care through technological integration. LANS and customer databases are evident. IS improves business process effectiveness, but the focus remains internal. There is limited integration of IS with business strategy or changes in business processes. These SMEs develop internally-integrated systems using a common IT platform. The third approach, *collaboration*, is the first to focus on relationships along the industry value chain. SMEs communicate and exchange information with customers using systems such as e-mail and EDI. Few SMEs gain as major customers often instigate investment in such systems. Here SMEs are forced to become elements of external technology-enabled networks without integration with internal systems. *Innovation* is the final adoption approach. IS are an integral and tightly woven part of business strategy. Information is used to influence future learning and growth. Systems support a performance-focused management style and information and knowledge is exchanged with business partners. Table 3 identifies the strengths and weaknesses of these segmentation approaches, allowing comparison with those of Venkatraman (Table 1).

Segmentation	Strengths	Weaknesses
Efficiency	<ul style="list-style-type: none"> <li>○ Control</li> <li>○ cost reduction</li> <li>○ simple systems</li> </ul>	<ul style="list-style-type: none"> <li>○ operational focus</li> <li>○ internal focus</li> <li>○ no business strategy link</li> </ul>
Co-ordination	<ul style="list-style-type: none"> <li>○ improved internal communication</li> <li>○ improved customer care</li> <li>○ Increased operational effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>○ Internal focus</li> <li>○ Limited business strategy integration</li> <li>○ Improve staff training</li> </ul>
Collaboration	<ul style="list-style-type: none"> <li>○ integration with business strategy</li> <li>○ improved customer relations</li> <li>○ external focus</li> <li>○ ultimately reduces customer power</li> </ul>	<ul style="list-style-type: none"> <li>○ customers determine IS requirements</li> <li>○ cost</li> <li>○ systems flexibility</li> </ul>
Innovation	<ul style="list-style-type: none"> <li>○ changes/changed by business strategy</li> <li>○ external focus</li> <li>○ changes business processes</li> <li>○ changes employee profile</li> </ul>	<ul style="list-style-type: none"> <li>○ cost</li> <li>○ flexibility needed</li> <li>○ knowledgeable CEO needed</li> </ul>

**Table 3: Strengths and Weaknesses of SMEs Approaches to IS (adapted from Levy et al 2001)**

The Venkatraman model is not prescriptive. Thus the ‘proscribed’ route through the levels as evidenced by the efficiency and co-ordination approaches is expected. The Innovation approach involves a set of transformations that, while unexpected in sequence, are not completely unexpected in the Venkatraman model. This crucially rests on the experiences of internal integration as a precursor of higher-level changes. SMEs’ size may enable this ‘disjointed’ progression whereas cross-functional difficulties inhibit such paths in larger firms. Knowledgeable owners who recognise information as a strategic resource are critical here. The main difference in SMEs’ actions is seen in the collaboration approach where systems use jumps directly from localised exploitation to business network redesign. Benefits may accrue from collaboration but none from internal IS integration. Both customer pressure and limited IT inhibit change. SMEs are unlikely to be able to move from network redesign to process re-engineering. Schumpeter’s (1962) notion of creative destruction may be apt here.

Further research to identify enablers and inhibitors of e-business adoption for SMEs is necessary to ensure that SMEs can play a part in the network economy. For those managing SMEs, and those, such as governments, charged with bringing SMEs into e-business, the research indicates that there is a need to review objectives closely with SMEs if Internet adoption is to become a reality. Such a review

should include strategic objectives, owner's knowledge and customer demand rather than focus just on the technology.

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