

A thesis submitted to Lancaster University for the degree of doctor of philosophy

**AN INVESTIGATION INTO THE ENGAGEMENT OF
SMEs IN E-BUSINESS, WITH REFERENCE TO
AGGREGATION AND INTERMEDIARIES**

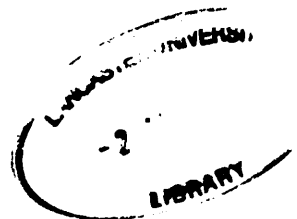
by

Nigel J Lockett

BSc (Applied Biological Sciences)

MSc (Information Management)

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Dedication

To Richard, who died as this research started yet lives on longer than it ever will.

“Love is not changed by death, and nothing is lost - and all in the end is harvest.”

Julian of Norwich, 14th century English mystic.

Abstract

Against a background of the low engagement of small to medium-sized enterprises (SMEs) in e-business this thesis investigates the emergence of, and potential for, critical e-aggregation applications defined as 'an e-business application, promoted by a trusted third party, which engages a significant number of SMEs by addressing an important shared business concern within an aggregation'. By using a triangulation of methodologies, namely qualitative case study, participant observation, context monitoring and quantitative survey the research shows that such applications can facilitate the e-business engagement of SMEs. Context monitoring is a proposed method of continuous appreciation, which was necessary because of the constantly changing environmental conditions during the period of the study. There were six key findings, namely (i) higher levels of e-business engagement by SMEs in aggregations, (ii) the emergence of critical e-aggregation applications, (iii) the emergence of collaborative 'one to many' business models, (iv) the importance of trusted third parties, (v) the deliberate accumulation of strategic information, and (vi) evidence of increased structure and integration. Significantly this work takes deliberately dual, user and provider, perspectives. The supporting literature review drew from both praxis and three areas of theory, namely IT adoption by SMEs, inter-organisational networks (IONs) and e-business models, in order to construct an interpretative framework for the dimensions of aggregations. In terms of future research the importance of a better conceptual understanding of complexity on the adoption of IT by SMEs and the impact of critical e-aggregation applications on business markets were highlighted.

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Glossary of abbreviations

ABO	Area business organisation
AC	Agricultural college
AMP	Advertising artwork management application service provider
ASP	Application service provider
B2B	Business to business
B2C	Business to consumer
CDA	Company directors association
CFIB	Canadian Federation of Independent Business
CM	Confectionery manufacturer
CMC	Construction media company
CMP	Community management application service provider
CRM	Customer relationship management
CSP	Content service provider
DMP	Dairy management application service provider
DTI	Department of Trade and Industry
EAP	Enterprise application service provider
EC	European Commission
EDI	Electronic data interchange
ERP	Enterprise resource planning
FMA	Framework, methodology and area of concern
FMP	Field management application service provider
ICT	Information and communication technology
IDC	International Data Corporation
IMP	Information management application service provider

ION	Inter-organisational network
IOS	Inter-organisational information system
IS	Information system
IT	Information technology
KTA	Knowledge workers trade association
LTA	Laboratory suppliers trade association
MTA	Motor manufacturers trade association
MBC	Media broadcasting company
NTA	Newspaper trade association
NSP	Network service provider
OCB	Organic certification body
Oftel	Office of Telecommunications
OGO	Oil and gas industry organisation
PMP	Project management application service provider
RTQ	Request for tenders
SBA	US Small Business Administration
SCM	Supply chain management
SLA	Service level agreement
SLC	Supermarket lead client
SMB	Small to medium-sized businesses
SME	Small to medium-sized enterprises
SMP	Sporting community management application service provider
SMS	Simple messaging service
SRM	Supplier relationship management
SP	Service provider

SSP	Storage service provider
TCO	Total cost of ownership
TTP	Trusted third party
UMP	Utility e-marketplace service provider
VAR	Value added reseller
VSP	Vertical application service provider
WASP	Wireless application service provider
WWW	World Wide Web

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1 INTRODUCTION

This thesis seeks to contribute to the understanding of the engagement in e-business technologies and services by small to medium-sized enterprises (SMEs) and in particular the role that aggregation and intermediaries might play within this context. The adoption of information and communication technologies (ICT) and the subsequent engagement in e-business by enterprises are seen, by both government and service providers alike, as important indicators of potential economic success and wealth generation in the 'information society'. Governments in many leading economies have established policies to encourage the adoption of ICT, especially in e-business, and have set benchmarked targets to monitor their progress. Recent studies suggest that this adoption is proving more difficult than anticipated.

“the government target of having 1 million businesses trading online by 2002 will be missed.” “the study has found a slowdown in the uptake of ICTs, and for micro and small businesses there has been a clear reverse.” “for larger firms, this slowdown reflects the high proportion of businesses already using ICTs. For micro and small businesses the slowdown is less easy to explain.” (DTI 2002: 6).

“of concern to all of the benchmark group is the stalling, or in some cases declining, willingness of businesses to trade online - this trend has been particularly prominent among small businesses.” (Booz Allen Hamilton 2002: 116).

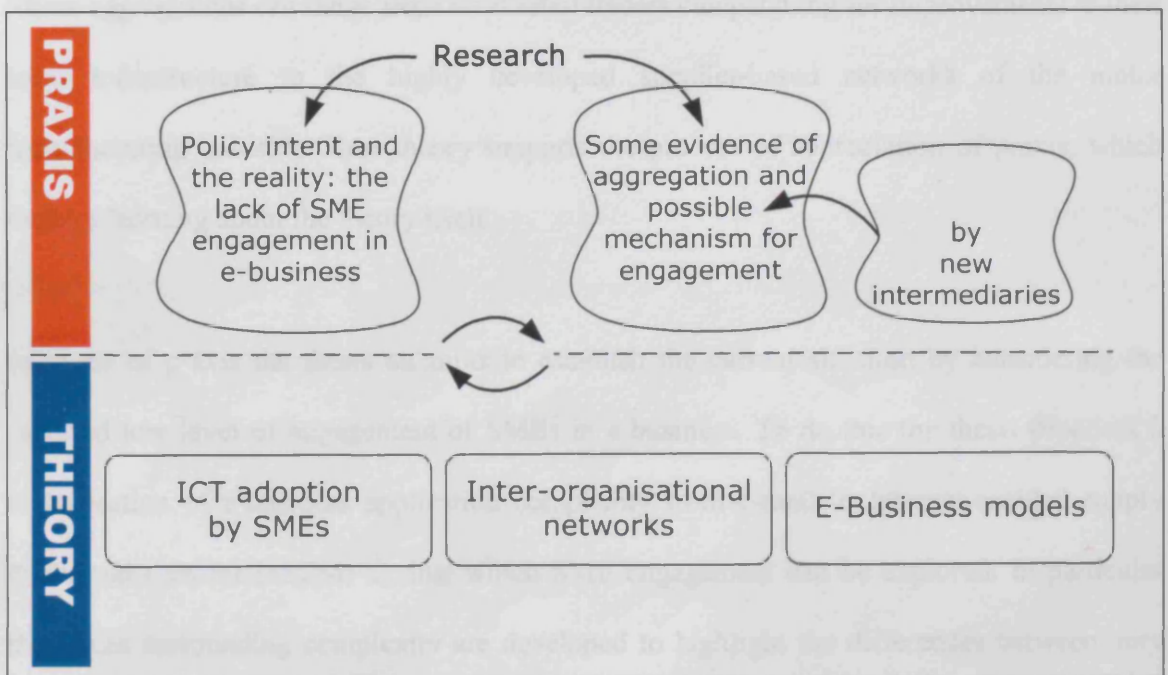
The central concern, for both policy and praxis¹, is that SMEs, which generate the vast majority of new jobs, some 80 percent in Europe during the 1990s (CORDIS 2002), are being by-passed by this 'digital revolution'. Where then is the evidence of the anticipated

¹ praxis is defined as the practice and practical side of a profession or field of study, as opposed to theory. Collins English Dictionary. 21st Century Edition.

widespread uptake of ICT so optimistically promoted by service providers and reportedly embraced by large companies?

The engagement of SMEs in e-business is far from simple. Why is it that most do not but a limited number do? And of those that do why does aggregation seem to play such a critical role? This thesis sets out to explore and explain a phenomenon which runs counter to much of the academic and commercial research published to date. E-Business related services, provided by new intermediaries, can lead to new ways of doing business. Why is it that some groupings or aggregations, served by these new intermediaries, are actively engaging in higher complexity e-business applications and services? Importantly, what contributions can this research make to theory and what value can be extracted for both policy and praxis? These questions are considered within the context of the praxis of e-business engagement by SMEs, with reference the relevant theory from ICT adoption, inter-organisational networks (IONs) and e-business models, Figure 1.1.

Figure 1.1. Context for research: theory and praxis



The underlying assumptions of the prevalent 'linear adoption model' for the adoption of e-business technologies by SMEs are that enterprises progress through distinct stages of increasing sophistication (such as email → website → e-commerce) and that as application complexity increases so to does the business value for adopter. There is an implied judgement that more complex is better and conversely that SMEs not adopting advanced e-business technologies are the lesser for it. This thesis explicitly seeks to challenge this dominant view, evident in academia, policymakers and service providers. In so doing it contributes to addressing the above research gap by using a triangulation of research methods which provides the opportunity for rich data collection, analysis and discussion.

The three-stranded theory context provides the critical framework in which praxis can be meaningfully considered. The reality of praxis challenges our understanding of both the adoption, by SMEs, of e-business within a changing environment and the emergence of aggregations as a meaningful concept. In this context the aggregation concept is defined as any grouping of enterprises where there is evidence of inter-organisational relationships. These aggregations can range from local retail traders campaigning for improvements to their local infrastructure to the highly developed supplier-based networks of the motor manufacturing industry. Thus theory supports the process of appreciation of praxis, which enables learning about the theory itself.

In terms of praxis the thesis attempts to establish the current situation by considering the reported low level of engagement of SMEs in e-business. To do this the thesis proposes a classification of e-business application complexity from e-mail to Internet-enabled supply chain management (eSCM) against which SME engagement can be explored. In particular the issues surrounding complexity are developed to highlight the differences between very

low complexity (e-mail) and the engagement in higher complexity (e-marketplaces) e-business applications. The thesis considers e-business provision, particularly new e-business models and the emergence of new intermediaries such as application service providers (ASPs) typically offering hosted applications accessed via web browser technologies.

Importantly this thesis reviews several strands of theory. Firstly the ICT adoption literature is reviewed both from the research strongly influenced by a user perspective and from the explicitly provider perspective emanating from Roger's seminal work on diffusion of innovations (Rogers 1962; 1983; 1990). Secondly the extensive literature regarding inter-organisational networks (IONs) is reviewed in order to explain the interactions enabled by new inter-organisational information systems (IOS) and how this might enrich our understanding of the engagement of SMEs in e-business. Thirdly the emergent e-business model literature is reviewed with particular attention being focused on the role of new intermediaries. The literature review, of both praxis and theory, resulted in an interpretative framework in which the data collection and analysis was undertaken.

The phenomenological nature of the area of concern researched and related issues are tackled by a triangulation of research methodologies namely qualitative case study, participant observation, context monitoring and quantitative survey. Context monitoring is a proposed method of continuous appreciation, which was necessary because of the constantly changing environmental conditions during the period of the study. The approach to the research is supported by the FMA research model, detailed in section 1.4, which incorporates the framework of ideas that inform both the selection of methodologies and the investigation of the area of concern.

1.1 Background to research

This thesis sets out the details of an investigation into the engagement of SMEs in e-business that evolved, in part, from earlier research undertaken by the author during 1999 into Internet Business Communities, a concept developed by Hewlett-Packard research laboratories (HPL), Bristol, UK, Appendix I. This initial research exposed selected UK groupings of businesses such as motorsport, organic and local food producing clusters to the concept of business networks mediated by a ubiquitous electronic platform, the Internet, and highlighted the potential emergence of such electronically mediated networks. It also helped to establish an important relationship with HPL, which resulted in financial support enabling extensive field investigations to be undertaken as part of this research. An action research project was initially considered during late 1999 involving HPL, the Computing Department at Lancaster University, business leaders from a healthcare practitioner grouping and the author. It would have involved the construction of a secure electronic platform, hosting e-business applications, through which the practitioner community would have interacted. As a result of changes in the economic climate it was agreed that this highly specific research project was no longer financially feasible but that the research issues of SME engagement and the role of aggregation remained valid. This led to the broader investigation that constitutes this thesis, which commenced in January 2000. Although the work done on the literature framework and familiarisation with issues of SME engagement in e-business could be carried forward, the revised investigation necessitated the use of a new empirical research design suitable for a more broadly based generic study. The introduction of a leading service provider as an additional sponsor to the research in late 2001 enabled further fieldwork and quantitative investigations. Importantly this also provided in-depth and privileged access to one of the largest providers of enterprise software and in particular to the mid-market team responsible for SME customers. The combination of two leading technology companies being associated

with the research helped to ground the work in both industrial and academic contexts. It was decided early in the investigation to establish the eCluster research project and website (www.ecluster.org) in order to promote these associations and to assist in obtaining access to other enterprises as the investigation unfolded.

1.2 Purpose of research

The purpose of this research is to deepen our understanding of the engagement of SMEs in e-business, where e-business is defined as the use of electronic communication networks to transact, process and collaborate in business markets and where SMEs are defined as organisations with up to 250 employees. SMEs play an important part in any economy with 3.7 million in the UK being 99.8 percent of enterprises, providing 55 percent of employment and generating 51 percent of turnover (SBS 2002). In particular the research seeks to consider their e-business engagement with reference to aggregations and intermediaries leading to specific research questions.

1.3 Statement of research questions

Within this research context five indicative research questions were developed in order to make contributions to both theory and praxis, namely:

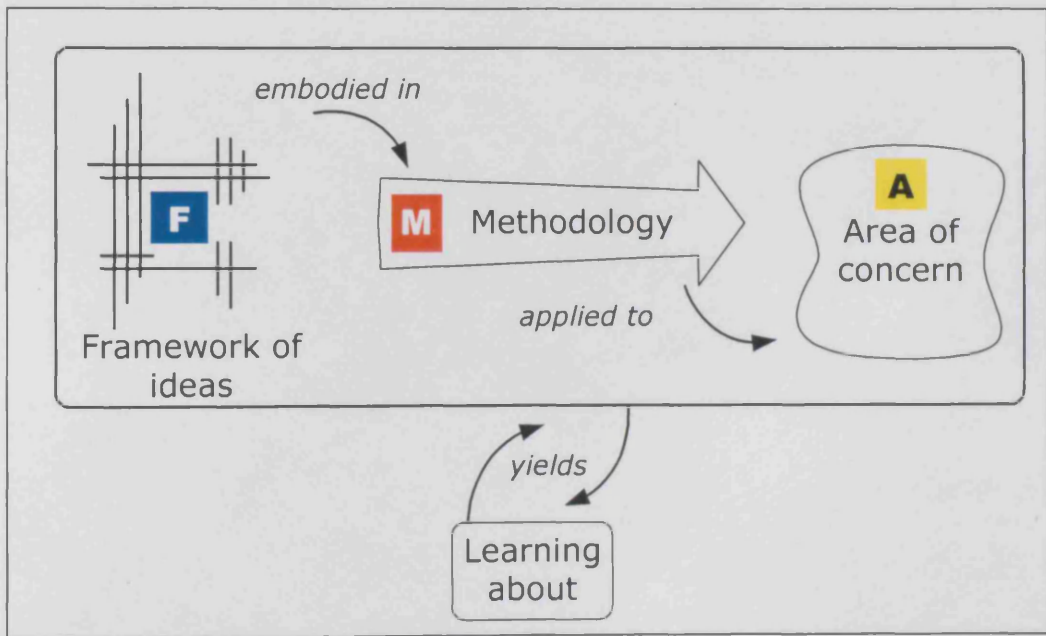
- (i) What is the current position for SMEs with reference to the adoption of e-business technologies?
- (ii) What evidence is there of aggregations of SMEs and what is their role both currently and potentially as a result of e-business developments?
- (iii) What are the potential roles and mechanisms for intermediaries in facilitating SME e-business engagement?
- (iv) What are the possible business models from a provider perspective?

- (v) Does ICT adoption, inter-organisational network and e-business model theory provide an appropriate interpretive framework for understanding electronically facilitated networks?

1.4 Approach to the research

The overall research schema follows Checkland's generic model of research, the FMA framework, Figure 1.2, where A is the area of concern, M is the methodology and F is the interpretive framework of ideas (Checkland 1985).

Figure 1.2. Generic research model (Checkland 1985)



Firstly, the area of concern (A) is the need to better understand the engagement of SMEs in e-business. Of particular interest are (i) the potential of aggregation-specific e-business applications, (ii) the potential roles for intermediaries in facilitating this engagement and (iii) the possible business models for service provision. Secondly the methodology is an empirically based approach, largely qualitative but using quantitative data where appropriate to supplement interview data and triangulate sources. The quantitative data is obtained from

questionnaire surveys of adopters (users) and non-adopters (non-users). In this context ‘users’ are defined as enterprises using e-aggregation applications within the aggregation cases and ‘non-users’ are defined as enterprises within the wider aggregation not using e-aggregation applications. And finally the theoretical framework of ideas guides both the detailed empirical work and the subsequent interpretation. The main elements of this framework of ideas are the adoption of ICT by SMEs, the concept of networks as a distinct organisational form and aggregation-based e-business models.

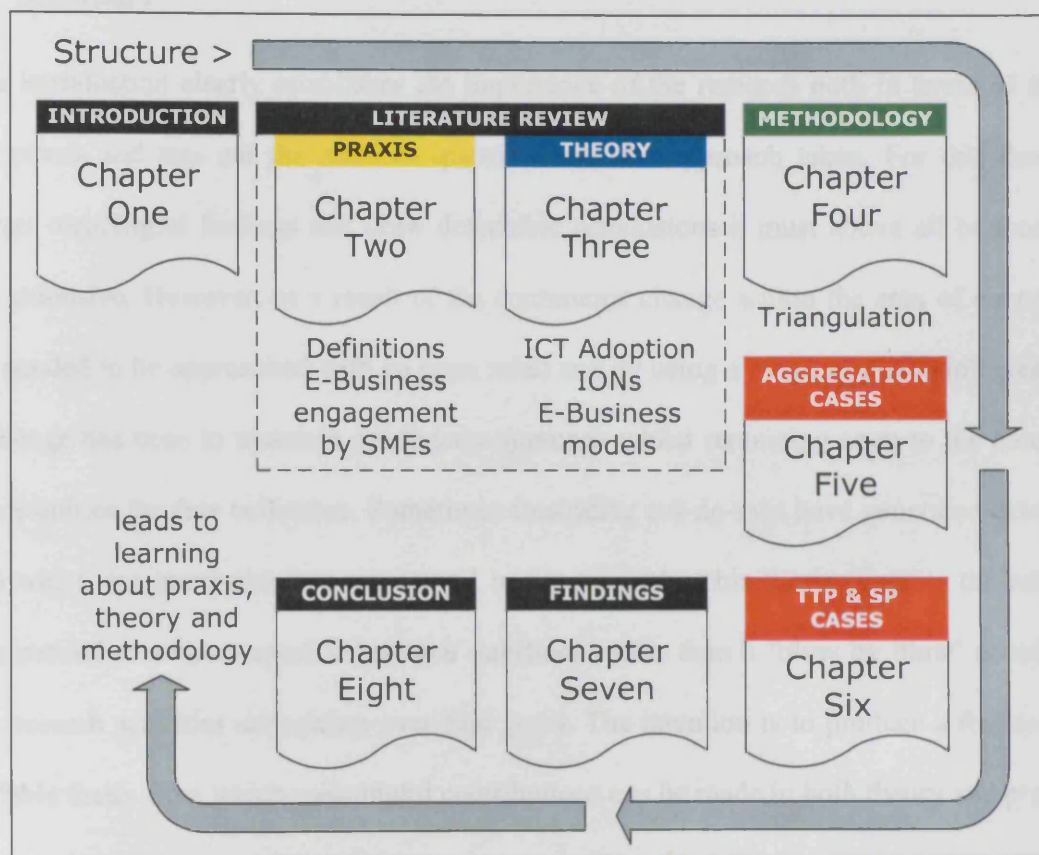
The investigation took place in four major stages over a four-year period. Initially, over the first 12 months the area of concern was reviewed, both in terms of theory and practice, and led to the development of various conceptualisations and frameworks. These provided both the theoretical context and the methodology, of selected of methods, for the subsequent empirical work. Secondly, the empirical work was undertaken over an extended period of some 24 months and was iterative in nature. Initially this involved qualitative research and concluded with the quantitative survey research ending in May 2002. Thirdly, the data analysis was initiated during the latter part of this period and was largely completed by the beginning of 2003. The final writing up stage started in earnest at the end of 2002 and was concluded in October 2003. Full-time employment, as a lecturer, started in July 2002 and resulted in an extended writing up period.

1.5 Structure of thesis

The thesis is divided into seven further chapters with the literature review comprising both the praxis and theory, in chapters two and three respectively. A detailed schema of the thesis in illustrated in Figure 1.3. This informative diagram highlights the overall structure of the

thesis, in particular the splitting of the literature review into two parts, namely a review of praxis and theory.

Figure 1.3. Structure of thesis



In chapter two, a detailed review of the area of concern and relevant literature is given in order to establish the domain in which the subsequent research is undertaken: this includes definitions of SMEs, e-business and application complexity together with a review of levels of e-business engagement by SMEs. In chapter three, a review of relevant theory including ICT adoption by SMEs, IONs and the emerging e-business model literature is summarised. In chapter four, the triangulation of methodologies is set out. Chapter five details the five aggregation case narratives and comparisons of both qualitative and quantitative data. In chapter six trusted third party and service provider cases are set out together with context monitoring. Sixthly, in chapter seven, the key findings are presented for each research

question. And finally chapter eight draws the main and substantive conclusions, for praxis, theory and methodology, from the investigation and suggests areas for future research.

1.6 Summary

This introduction clearly establishes the importance of the research both in terms of theory and praxis and sets out the research questions and the approach taken. For this thesis to extract meaningful findings and draw defensible conclusions it must above all be thorough and extensive. However, as a result of the continuous change within the area of concern, it has needed to be approached with an open mind and by using a range of methodologies. The challenge has been to maintain a scholarly approach whilst remaining open to the emergent opportunities for data collection. Sometimes frustrating cul-de-sacs have generated extensive data which are interesting but not central to the research. This thesis presents the relevant data needed to address specific research questions rather than a ‘blow by blow’ account of the research activities undertaken over four years. The intention is to produce a focused and readable thesis from which meaningful contributions can be made to both theory and praxis.

2 AREA OF CONCERN AND RELATED LITERATURE REVIEW (1)

This chapter constitutes the first part of the literature review by considering the praxis of e-business service provision. It defines the main elements of the area of concern under investigation, including e-commerce, e-business and SMEs and introduces the concept of service provision, including application service providers (ASPs) and the notion of aggregation. In order to appreciate the full spectrum of e-business engagement a classification of application complexity is proposed. This is followed by a review of secondary data undertaken of national, European and UK studies, in order to determine general levels of e-business engagement by SMEs and the drivers and barriers to ICT adoption. Importantly this provides the key data for justifying the investigation and framing the subsequent survey instruments. This chapter establishes the context for the subsequent review of theory in chapter 3.

2.1 E-Business and e-commerce definitions

E-Business and e-commerce have been variously defined to mean the same or different concepts. Kalakota and Whinston (1996) define electronic commerce from four perspectives, namely:

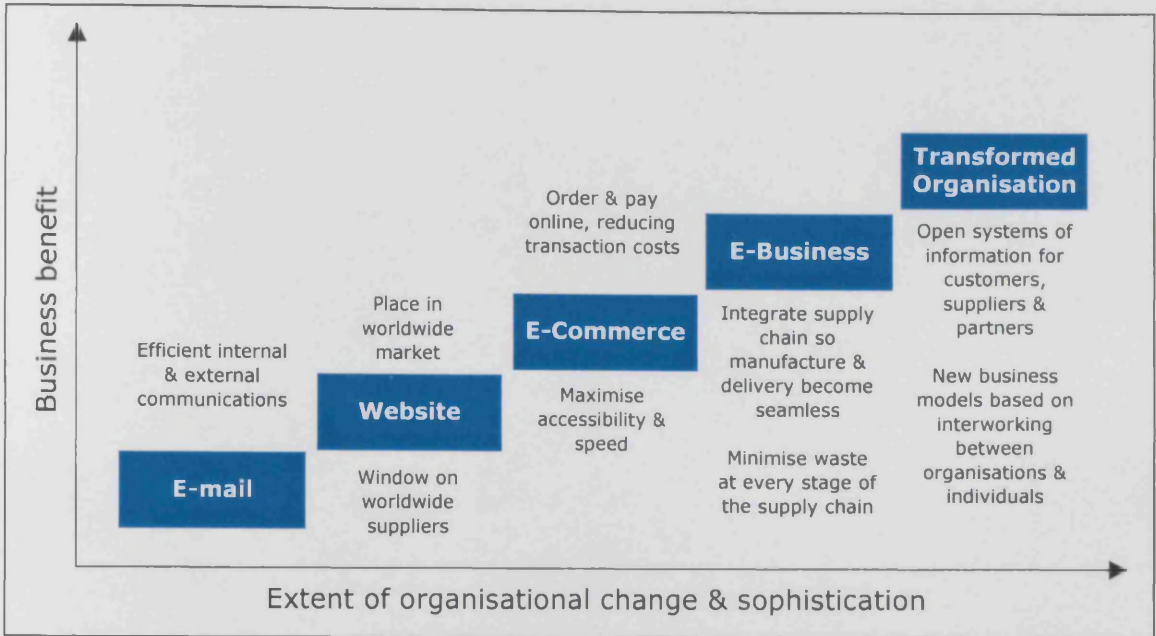
- *Communication* - as the delivery of information, products/service or payments over telephone lines, computer networks or any other electronic means.
- *Business process* - as the application of technology towards the automation of business processes and workflows.
- *Service* - as a tool that addresses the desire of firms, consumers and management to cut service costs while the improving quality and increasing the speed of service delivery.
- *Online* - as the capability of buying and selling products and information on the Internet and other online services.

Turban *et al.* (2000) in their leading textbook state “we use the term electronic commerce in its broadest scope, which is basically equivalent to e-business.” In the important UK Cabinet Office’s ‘e-commerce@its.best.uk’ report, which became the early reference point for much of government policy, it is stated that “what the government describes as e-commerce is recognised in industry as e-business” (Cabinet Office 1999). The report makes a distinction between process and transactional e-commerce, namely:

- *Process* - B2B activity for intermediate goods and a wide variety of information.
- *Transaction* - both B2B and B2C activity for final products and services.

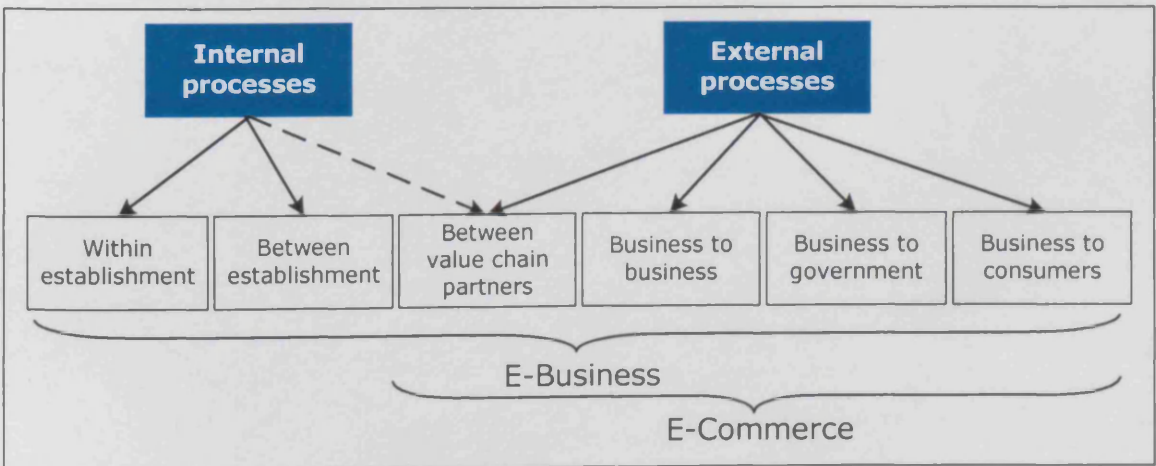
The UK Department of Trade and Industry (DTI) defines e-commerce as "any form of business transaction carried out electronically over public telephone systems" and currently uses a progressive model of e-adoption, Figure 2.1. In this e-commerce is defined as ordering and paying online, thus reducing transaction costs, and e-business as integrating supply chains so that manufacture and delivery become seamless.

Figure 2.1. Model of e-adoption ladder (DTI 2002)



The recently introduced European Commission (EC 2003), E-Business Watch initiative tracked e-business activity in Europe states "e-commerce will be taken to cover external transactions, and it therefore may be seen as a subgroup of e-business activities", Figure 2.2.

Figure 2.2. Elements of e-business activities (EC 2003)



The E-Business Watch benchmarking programme went further and proposed a detailed scoreboard of e-business technologies and applications, Table 2.1.

Table 2.1. Scoreboard of e-business technologies and applications (EC 2003)

Area	No	Indicator
ICT Infrastructure	1	Internet access
	2	Broadband Internet access
	3	Intranet
	4	Extranet
	5	Employee's access to e-mail
E-Commerce	6	Website
	7	Online selling
	8	Online procurement
	9	B2B e-marketplace
E-Business processes	10	Online collaboration
	11	eCRM
	12	IT supported ERP
	13	Online working hours tracking
	14	E-Learning

Over time the general trend has been towards using e-business as the broad term for all ICT supported activities and e-commerce to be more directly concerned with transactions. This thesis adopts that convention and for the purposes of this thesis e-commerce is taken to be transaction focused and defined as:

“selling or buying of goods or services using electronic communication networks.”

Similarly e-business is viewed as transaction, process and collaboration focused and defined as:

“the use of electronic communication networks to transact, process and collaborate in business markets.”

Hence in these definitions e-business incorporates e-commerce.

2.2 Complexity

In order to appreciate the full spectrum of e-business engagement we need to classify e-business applications, as there are significant differences between e-mail and e-marketplace applications both in terms of complexity and added value. Overall the superficial reporting of high levels of connectivity by SMEs in many countries does little to encourage critical analysis of the apparent lack of engagement in higher complexity e-business applications. The International Data Corporation used application complexity to segment the application service provider (ASP) market (Gillian *et al.* 1999) and forms an initial basis for a proposed classification, Table 2.2. Importantly this proposed classification of application complexity stresses the roles of collaboration and interaction as key features of e-business applications and recognises the resultant increase in complexity. In the context of this research application complexity incorporates both technical and organisational factors, for example both the security technologies underpinning virtual private networks used in higher complexity hosted applications and the perceived commercial risk from storing sensitive client information in third party data centres. Thus application complexity provides a meaningful framework in which to consider, compare and analyse e-business engagement.

Table 2.2. Classification of e-business application complexity (Lockett & Brown 2001)

Proposed classification		Examples	Complexity
Communication	COM	E-Mail, web access	Very Low
Marketing	MAR	Website	Low
Productivity	PRO	Microsoft Office, intranet	Low
E-Commerce	E-C	Buying & selling online	Medium
Collaborative	COL	Extranet	Medium
Enterprise	ENT	Financials, sales force automation, vertical applications	High
Marketplace	M-P	E-Marketplaces	High
Collaborative enterprise	C-E	Supply chain management, customer relationship management	Very High
Collaborative platform	C-P	Emerging platforms	Very High

2.3 E-Business service provision

The recent and rapid emergence of e-business applications has been primarily as a result of the availability of a low cost, ubiquitous electronic communication network, the Internet. Telecommunication, technology and service companies have emerged or evolved to provide a range of e-business services. Typically these are known as application service providers (ASP) and variously defined as:

“third-party entities that manage and distribute software-based services and solutions to customers across a wide area network from a central data facility.” (Webopedia 2003).

“provides a contractual service offering to deploy, host, manage and rent access to an application from a centrally managed facility, responsible for either directly or indirectly providing all the specific activities and expertise aimed at managing a software application or set of applications.” (Gillian *et al.* 1999).

“a company that offers individuals or enterprises access over the Internet to applications and related services that would otherwise have to be located in their own personal or enterprise computers. ASP services are expected to become an important alternative, not only for smaller companies with low budgets for information technology, but also for larger companies as a form of outsourcing.” (Whatis, 2003).

“a secure, flexible and integrated approach to delivering differentiated business value by combining the systems and processes that run core business operations with the simplicity and reach made possible by Internet technologies - IBM.” (Amor 2000).

The technology used by ASPs to deliver services relies on ‘thin-client’ application server products, such as Microsoft's terminal server and Citrix's WinFrame applications addressing client devices, such as PC and Windows terminals. The use of web browser technologies on the client devices both reduces the sophistication of the client device (thus

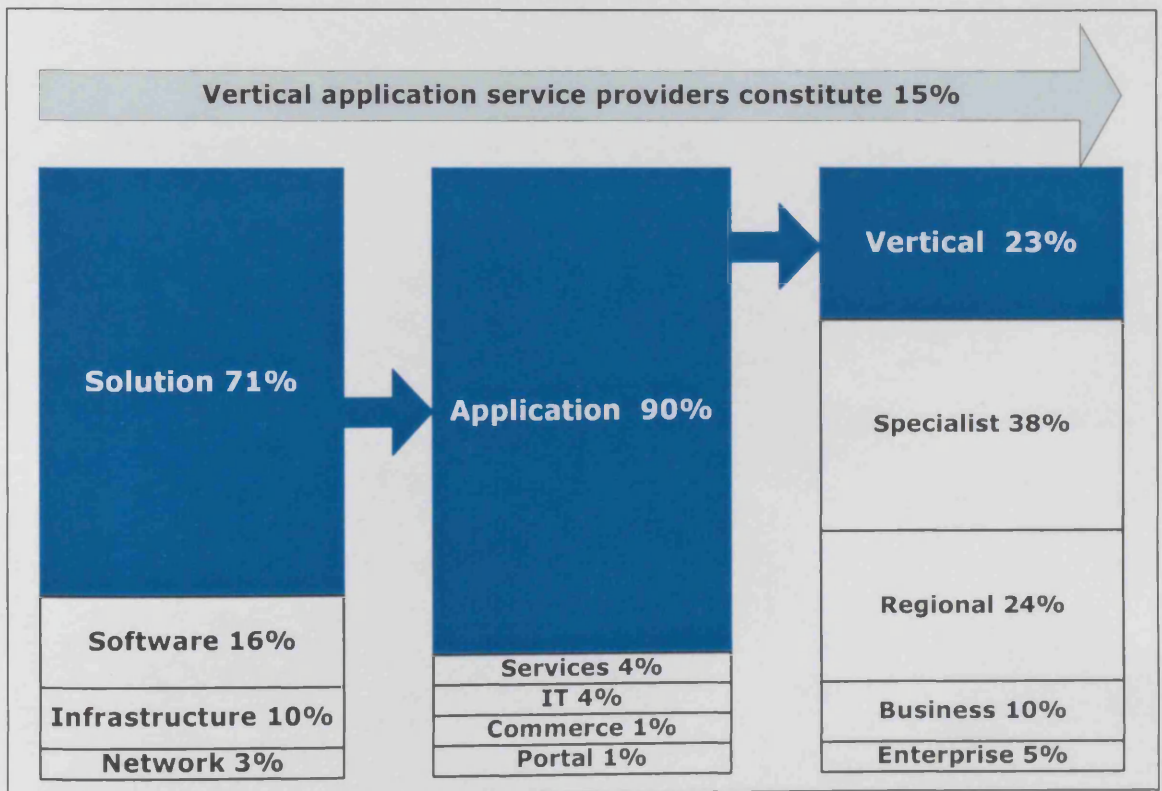
reducing purchase and support costs resulting in a lower total cost of ownership) and increases the interoperability of devices (as more devices incorporate web browsers). Whilst ASPs are external to organisations, larger enterprises can use these technologies to provide 'in-house' services, which effectively moves applications off PCs on to application servers resulting in central control over application cost, usage and support. For this research ASPs are considered as external to the user organisations.

The applications that enable e-business are very different from traditional software in one main regard, namely that the user interface, application software and data processing and storage can be located on different and multiple software, and hardware platforms and can be provided and supported by different entities. They are in essence hosted applications accessed by the user via a simple interface, such as a web browser, over electronic communication networks, such as the Internet. This is a fundamental change in the relationship between user, hardware and software and presents opportunities for new business models for service provision. Typically these new hosted applications are offered on a rental or fee basis rather than the traditional purchase model. The fee typically includes the use of the software and the provision of the processing and storage platforms but not the provision of the electronic communication network. Importantly, these electronic communication networks are increasingly being considered as ubiquitous and are rapidly evolving from the public Internet through virtual private networks to grid computing platforms. They provide the communication platform on which ASPs can deliver hosted services.

However there are many varieties of service providers, including application service providers (ASP), storage service providers (SSP), network service providers (NSP),

content service providers (CSP) and wireless application service providers (WASP). ASPNews (2003) provided a directory of 1,720 companies involved in service provision and highlighted 235 vertical market ASPs, defined as providing support to a specific industry, which constituted 15 percent of the total number of companies involved in service provision, Figure 2.3. Desai and Currie's (2003) longitudinal research of 424 ASPs concludes similarly that 12 percent are vertical application service providers (VSP) with the remaining being classified as horizontal application service providers.

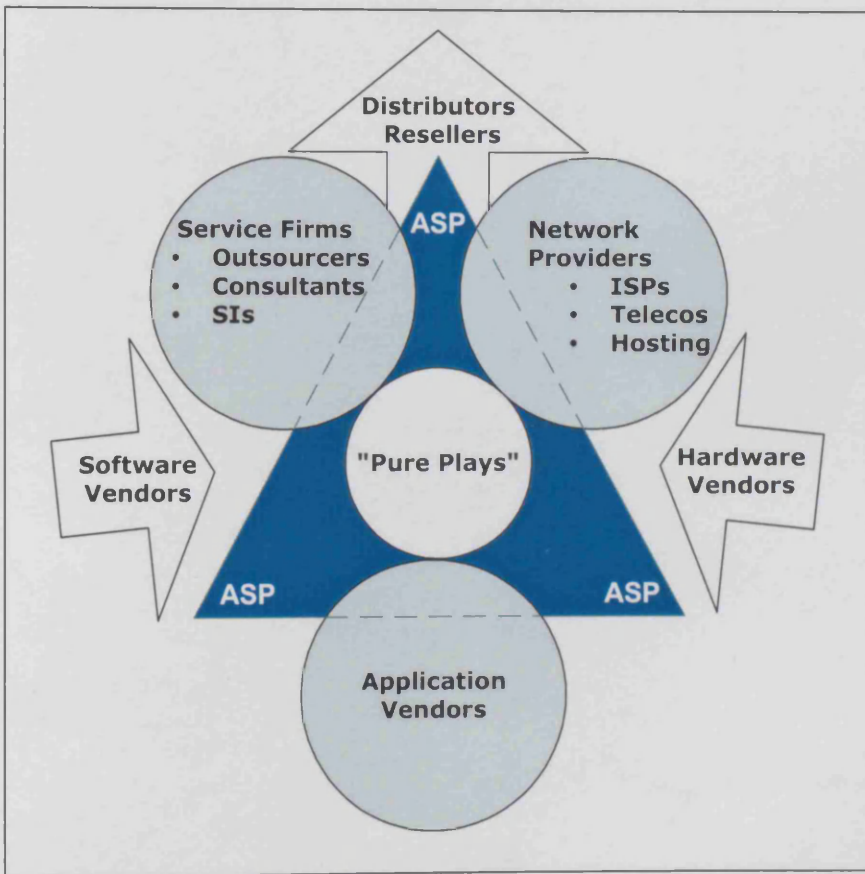
Figure 2.3. Categories of service providers (based on ASPNews 2003)



This thesis focuses on these minority VSPs and their role in engaging SMEs in higher complexity e-business applications, rather than the more dominant providers characterised by horizontal ASPs capable of offering services across multiple industries. Within these vertical and horizontal categories there are both new 'pure play' service providers (Corio, Netledger, Salesforce.com, Surebridge and USInternetworking) and existing service

companies including network providers (BT), application vendors (SAP), service firms (EDS), hardware vendors (HP) and software vendors (Microsoft), Figure 2.4. The vertical category is largely made up of 'pure play' ASPs such as BIW technologies, BuildOnline, ProjectOnline, Webtastic, Organic Ecology and AdFast, which have emerged to exploit business needs within aggregations of enterprises.

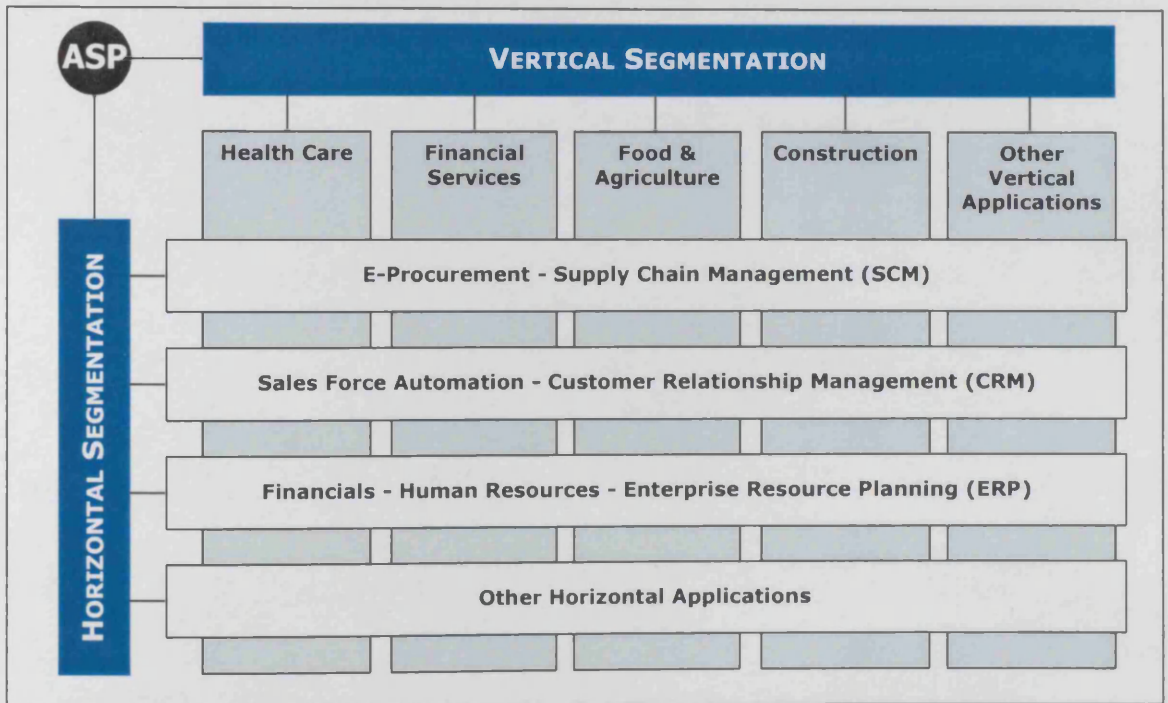
Figure 2.4. Application service providers (adapted from Gillian *et al.* 1999)



A notable difference, particularly for SMEs, in the relationship between the user and the IT provider is the importance of the formal contract which underpins service provision. This service level agreement (SLA) sets out the availability, security, network storage and management (Dewire 2001). The applications offered by ASPs can vary from horizontal applications, such as financials (e.g. sales, purchase and nominal ledgers) and human resources management (e.g. personnel and payroll), to vertical applications, such as

industry-specific e-marketplaces or healthcare billing systems, Figure 2.5. Clearly with horizontal service providers representing over 85 percent of the companies involved in application service provision they have attracted much of the early research and commercial interest (ASPNews 2003). This segmentation has provided a useful initial classification for the wide range of e-business applications available to businesses. As more applications begin to incorporate web services technologies, such as XML, businesses will become increasingly exposed to the ASP business model as a potentially viable alternative to the traditional purchase options.

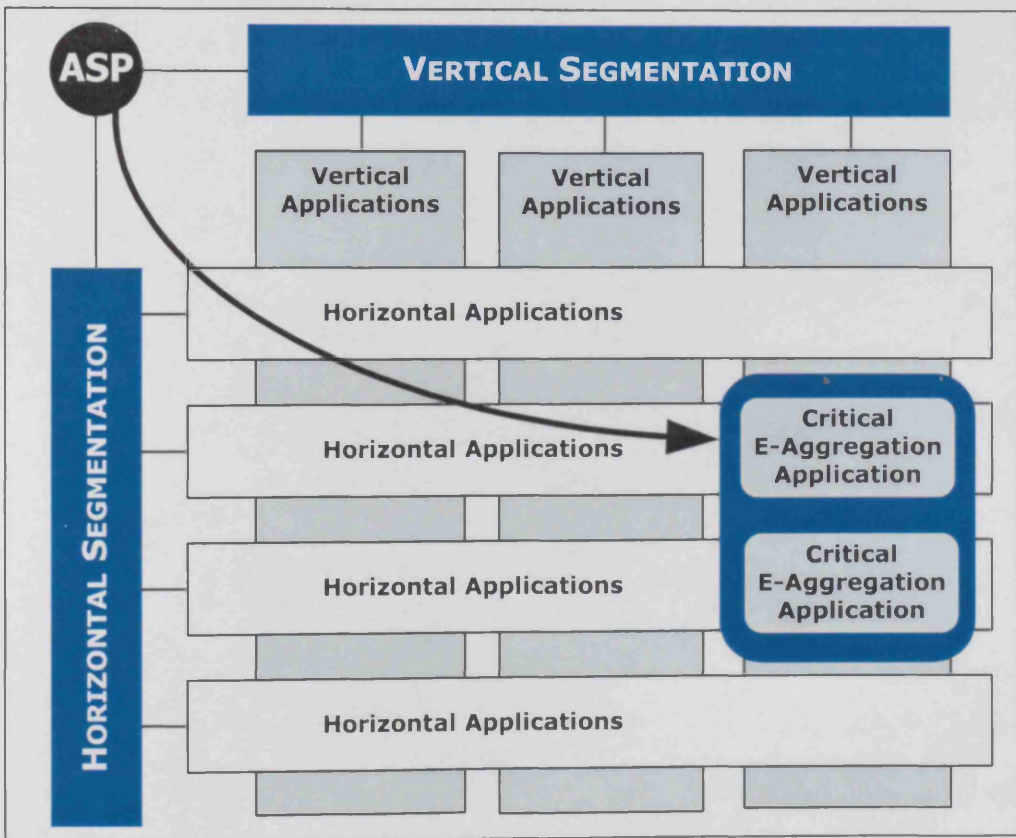
Figure 2.5. ASP segmentation (adapted from Gillian *et al.* 1999)



In the main the above segmentation, although general, is one which has emerged from the adoption of the hosted application model of service provision by large companies, namely horizontal and vertical applications and is noted more widely (Heart and Pliskin 2001; Desai and Currie 2003). Whilst the service delivery model has been 'one to many' the marketing and implementation models, in contrast, can be characterised as 'one to one' and

'customisation' respectively. Within this context, *and of special interest to this research*, has been the growth of vertical ASPs providing e-business applications designed to meet the needs of specific groupings or aggregations of enterprises, Figure 2.6. The thesis defines these critical e-aggregation applications as 'an e-business application, promoted by a trusted third party, which engages a significant number of SMEs by addressing an important shared business concern within an aggregation.' and constitutes a major finding of this investigation.

Figure 2.6. Critical e-aggregation applications (adapted from Brown and Lockett 2001)



2.4 Small to medium-sized enterprises

Small to medium-sized enterprises (SMEs) are highly heterogeneous and typically represent over 98 percent, by number, of businesses in an economy. They contribute

significant proportions of employment and turnover in the UK, European and North American economies. For example:

- In the US there are over 25 million small businesses (less than 100 employees) representing 99.7 percent of enterprises, who provide 53 percent of employment and generate 47 percent of turnover (SBA 2003).
- In Canada there are 4.8 million small businesses (less than 100 employees) representing 99.9 percent of enterprises, who provide 47 percent of employment (CFIB 2002).
- In Europe there are over 18 million SMEs (less than 250 employees) representing 99 percent of enterprises, who provide 67 percent of employment and generate 59 percent of turnover (CORBIS 2002).
- In the UK there are 3.7 million SMEs representing 99.8 percent of enterprises, who provide 55 percent of employment and generate 51 percent of turnover (SBS 2002).

Because of the disparate nature of SMEs meaningful analysis can prove illusive but is none the less considered an important element for assisting policymakers in providing appropriate legislative frameworks and support services. Governments recognise the important role they play in the economy, particularly in job creation. For example during the 1990s 80 percent of the new jobs created in Europe and 85 percent in Canada were provided by SMEs (CORDIS 2003, CFIB 2002). In order to assist in comparison of SMEs in different economies the various definitions are considered in the next section.

2.4.1 Definitions

Defining SMEs, however, can be problematic because of the many different international conventions. For example there is no single definition in the UK but the Government Small Business Service categorises businesses according to number of employees, namely:

‘small businesses have 0-49 employees, medium-sized businesses have 50-249 employees, and large businesses 250+ employees.’

More specifically section 248 of the Companies Act of 1985 states that a company is "small" if it satisfies at least two of the following criteria:

- a turnover of not more than £2.8 million
- a balance sheet total of not more than £1.4 million
- not more than 50 employees

and a medium-sized company must satisfy at least two of the following criteria:

- a turnover of not more than £11.2 million
- a balance sheet total of not more than £5.6 million
- not more than 250 employees

For statistical purposes, the UK DTI uses the following:

- micro firm: 0 - 9 employees
- small firm: 0 - 49 employees (includes micro)
- medium firm: 50 - 249 employees
- large firm: over 250 employees
- firms with between 250 and 500 employees are often reported separately.

Confusion was increased further when other UK government agencies used different definitions including the Office of Telecommunication (OfTel) when reporting Internet connectivity. OfTel changed its definition of SME in 2001 from less than 500 employees to less than 250 employees (OfTel 2001). In February 1996, the European Commission produced a communication setting out a single definition of SMEs, Table 2.3.

Table 2.3. European Commission recommended definitions of SMEs

Criterion	Micro	Small	Medium
Max. number of employees	9	49	249
Max. annual turnover	n/a	€7M	€40M
Max. annual balance sheet total	n/a	€5M	€27M
Max. % owned by one enterprise*	n/a	25%	25%

* or several enterprise(s) not satisfying the same criteria.

The US Small Business Administration defines a small business based on a 'size standard' for different industries (SBA 2002). The most common 'size standards' are:

- 500 employees for most manufacturing and mining industries
- 100 employees for all wholesale trade industries
- \$6 million annual turnover for most retail and service industries
- \$28.5 million annual turnover for most general & heavy construction industries

This list accounts for about 75 percent of US industries with the remaining 25 percent having 'size standards' that are different from these levels. Given these multiple criteria it is not surprising that for comparative purposes the definition is simplified and businesses with less than 500 employees are considered small to medium-sized businesses (SMBs), with small businesses defined as having less than 100 employees and medium businesses as having between 100 and 500 employees. Finally international research firms, such as International Data Corporation, simply define SMBs as any business with less than 500 employees (IDC 2003).

In order to assist in making meaningful comparisons across various international studies the definition of SMBs, used in this study, is any business with below 500 employees. This allows for the inclusion of US and internationally focused studies. A proposed classification was introduced to the research in order to reduce confusion and assist in comparison, Table 2.4.

Table 2.4. Comparison of SMB classifications

Number of employees	Proposed classification	DTI	Oftel pre 11/02	Oftel post 11/02	EC	SBA	IDC	CFIB
0	Micro-Sole	Micro			Micro	SMBs (with small less 100)	SMBs (with small less 100)	SMBs (with small less 100)
1 to 9	Micro-Employer							
10 to 49	Small	Small <i>includes Micro</i>	Small	Small				
50 to 249	Medium	Medium	Medium	Medium				
250 to 499	Large-Mini		Medium					

2.4.2 Economic importance

The economic importance of SMEs is widely recognised. With such an important role in the creation of national wealth it isn't surprising that governments pay attention to those factors, such as the emerging e-business technologies, which could affect this sector's performance. With the lack of homogeneity within SMEs governments often maintain definitions and statistics across different industry sectors. In particular the UK Government publishes statistics across the proposed classification and 12 industry sectors, which provides useful comparative data on composition and economic indicators, Tables 2.5, 2.6, 2.7 & 2.8.

Table 2.5. UK business statistics for 2001 (SBS 2002)

Number of employees	Proposed classification	Businesses (000s)	Employment (000s)	Turnover (£M)
0	Micro-Sole	2,596	2,888	152,383
1 to 9	Micro-Employer	948	3,665	295,387
10 to 49	Small	168	3,255	315,565
50 to 249	Medium	28	2,720	319,231
250 to 499	Large-Mini	3	1,128	157,237
500+	Large	4	8,964	870,211
	Total	3,747	22,620	2,110,014
	SMEs	3,740	12,528	1,082,566

Table 2.6. UK business statistics for 2001 as percentage (SBS2002)

Number of employees	Proposed classification	Businesses	Employment	Turnover
0	Micro-Sole	69.3%	12.8%	7.2%
1 to 9	Micro-Employer	25.3%	16.2%	14.0%
10 to 49	Small	4.5%	14.4%	15.0%
50 to 249	Medium	0.7%	12.0%	15.1%
250 to 499	Large-Mini	0.1%	5.0%	7.5%
500+	Large	0.1%	39.6%	41.2%
	Total	100.0%	100.0%	100.0%
	SMEs	99.8%	55.4%	51.4%

Table 2.7. UK business statistics for 2001 by sector (SBS 2002)

Industry sector	Businesses	Employment (000s)	Turnover (£M)
A,B Agriculture, forestry and fishing	181,115	426	24,157
C,E Mining, quarrying, energy, water	5,705	16	9,467
D Manufacturing	290,425	2,084	166,485
F Construction	691,495	1,408	102,265
G Wholesale, retail and repairs	540,655	2,329	382,724
H Hotels and restaurants	123,120	839	28,861
I Transport, storage, communication	235,110	647	64,229
J Financial intermediation	63,950	162	
K Real estate, business activities	866,470	2,451	210,172
M Education	117,355	244	8,528
N Health and social work	232,470	946	27,582
O Other social/personal services	391,695	877	48,184
SMEs	3,746,340	22,622	2,112,013

Table 2.8. UK business statistics for 2001 by sector as percentage (SBS 2002)

Industry sector	Businesses	Employment	Turnover
A,B Agriculture, forestry and fishing	100.0%	94.2%	92.0%
C,E Mining, quarrying, energy, water	98.4%	7.3%	9.9%
D Manufacturing	99.2%	50.8%	36.4%
F Construction	100.0%	84.5%	74.7%
G Wholesale, retail and repairs	99.8%	50.1%	52.8%
H Hotels and restaurants	99.8%	53.8%	58.5%
I Transport, storage, communication	99.8%	39.1%	38.1%
J Financial intermediation	99.5%	15.0%	
K Real estate, business activities	99.9%	70.2%	71.9%
M Education	99.9%	84.4%	86.0%
N Health and social work	99.8%	42.0%	36.8%
O Other social/personal services	99.9%	73.1%	63.5%
SMEs	99.8%	55.4%	51.4%

The proportion of SMEs in the UK has remained consistently over 99 percent for the last 5 years with the employment provided being 56.6%, 55.4% and 55.4% for 1997, 1999 and 2001 respectively and turnover generated being 53.7%, 51.0% and 51.3% for 1997, 1999 and 2001 respectively (SBS 2002).

2.5 E-Business engagement by SMEs

Before the Internet, electronically facilitated commercial activity was based on proprietary networks, such as EDI, and was mainly the province of larger companies for reasons of cost. However, the advent of the Internet offered relatively low cost access to network infrastructure, and hence new channels to market, which appeared to be particularly promising for smaller enterprises. This was emphasized early on by Kalakota and Whinston 1996 and has been acknowledged by both international agencies (such as OECD 1998) and national governments. For example in the UK the Government set three clear targets for the engagement of SMEs in e-business for the year 2002 (DTI 2001a):

- The first was to ensure the connectivity of 1.5 million SMEs. Connectivity measures the number of businesses within the benchmarked countries (US, Canada, Japan, Germany, Australia, France, Italy and Sweden) that either have a website, make frequent use of external e-mail or use electronic data interchange (EDI). In the UK the target had already been exceeded by mid 2001, totalling 1.9 million (DTI 2002).
- In contrast the second target of 1 million SMEs trading online was not met with just 490,000 trading online by the end of 2002. A business is defined as trading online if it is engaging in both ordering and paying online with either customers or suppliers. A recent international benchmarking study highlighted the ‘stalling or in some cases declining, willingness of businesses to trade online’ (Booz Allen Hamilton 2002: 116) and noted that this was particularly evident in small businesses and in the UK.
- The third target of reaching parity with the best world practice was expressed in terms of SMEs’ progress up a five-stage ‘adoption ladder’ with each stage representing a linear increase in complexity. The stages are: (i) email (ii) website (iii) e-commerce (i.e. trading online) (iv) e-business (i.e. integrated supply chain) and (v) transformed organisation (i.e. new business models based on interworking between organisations).

For this third target, because the adoption rate is believed to be so low, the Government had not tried to measure engagement in higher complexity applications beyond e-commerce (stage 3). The other leading economies against which the UK was benchmarked exhibit similar traits, namely that with the ever increasing complexity of e-business applications SMEs are proving slow to engage, beyond elementary email and web hosting services. This conclusion is further supported by earlier independent research (Poon and Swatman 1999). In the absence of any national statistics the North West of England provides a recent and detailed confirmation of the low uptake of the more

complex forms of e-business amongst SMEs. In Lancashire West only 1.3 percent of firms are networked with suppliers as part of a formal e-supply chain (Davies 2001).

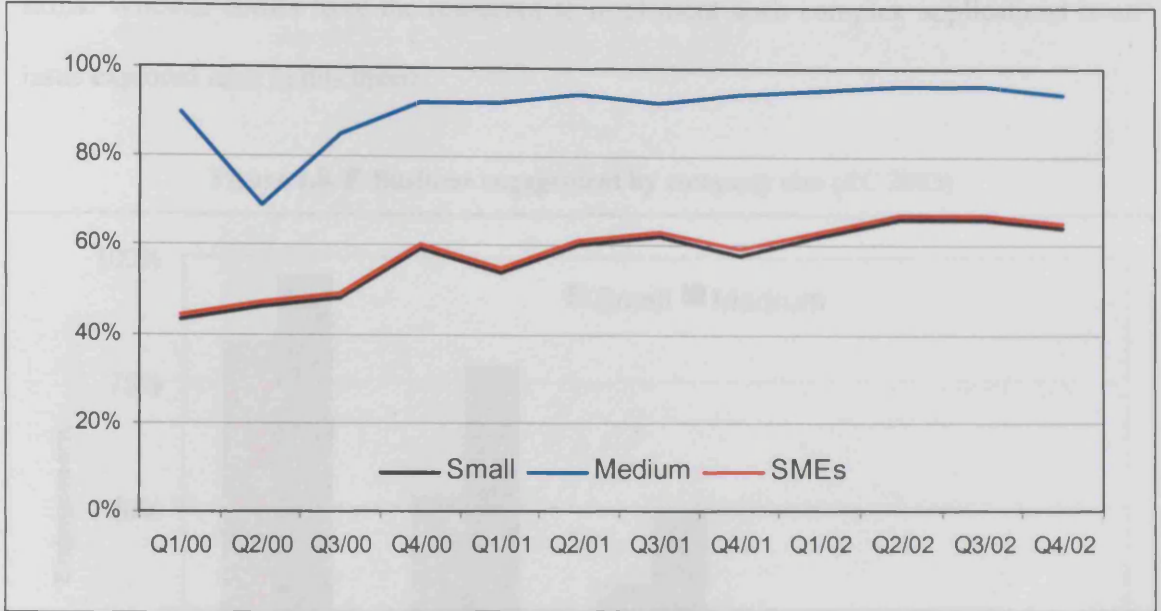
2.5.1 National studies

Good quality longitudinal survey research was available principally from the European Commission and the DTI international benchmarking studies and is considered in the next section. There were few US-generated research surveys available, although the Small Business Administration produced reports in 1999 and 2000, however these relied heavily on commercial secondary data, (SBA 1999 and 2000). These reports are rather deterministic, superficial and have not been continued to track e-business engagement or comment critically on developments. In Canada it was the Canadian Federation of Independent Business (CFIB) which produced research reports (CFIB 1999, 2000 & 2002).

The most reliable indicator of Internet connectivity of SMEs in the UK has been the quarterly Ofcom reports published since 1999. These showed consistent levels of connectivity at around 66 percent for all SMEs. This was further broken down into 95 percent for medium-sized businesses and 65 percent for small businesses, Figure 2.7. However there were important changes to the connectivity technologies used. The most recent report indicated an increase of broadband connectivity to 16 percent for SMEs and that “a third of businesses with Internet access, claim they are likely to upgrade to broadband at current prices” (Ofcom 2003: 3). This change in connectivity technology may facilitate increased use of e-business applications, although there appeared to be few studies which examine how and why broadband technology will do this. For the first time Ofcom reported levels of connectivity for SMEs for different industry sectors, namely

wholesale/retail at 59 percent, manufacturing/distribution at 79 percent and services at 81 percent.

Figure 2.7. Internet connectivity of SMEs in the UK (OfTel 2001; 2002; 2003)

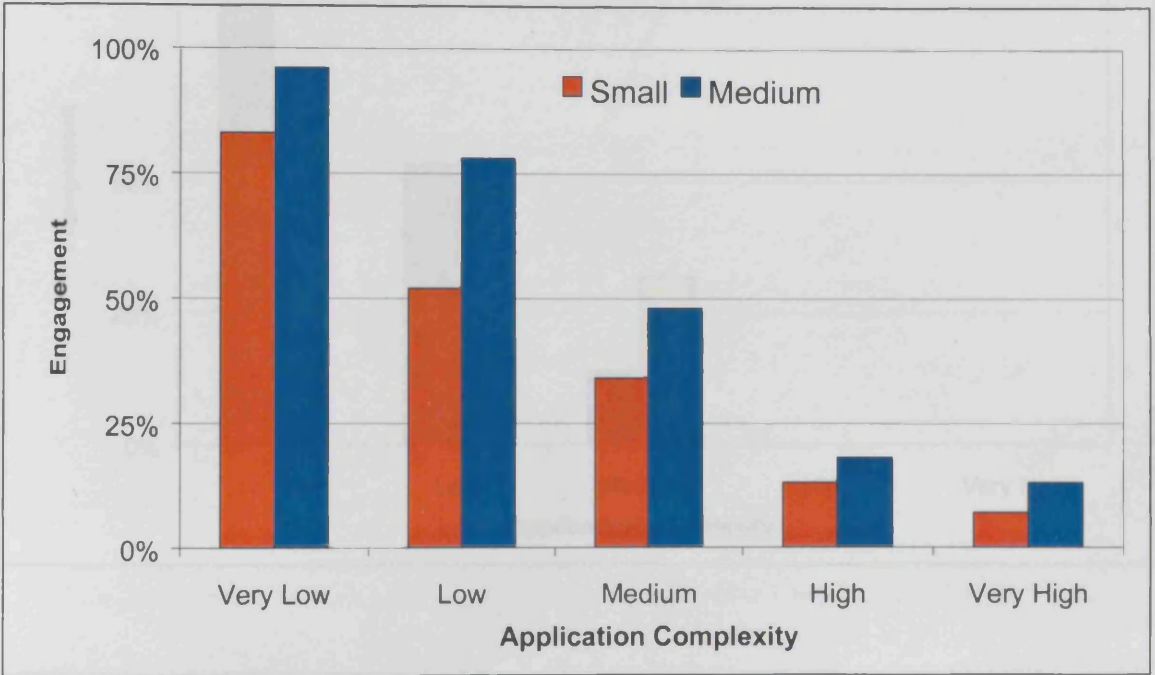


2.5.2 European studies

The introduction of the EC (2003) E-Business Watch first synthesis report used data collected in June and July 2002 and represented an important move towards tracking e-business engagement across 15 industry sectors and over a range of e-business technologies throughout all member states. The report concluded that access to ICT was no longer a barrier to e-business uptake with connectivity at 84 percent for small businesses. It stated “the use of e-mail and the www has become nearly ubiquitous in the business world” (EC 2003: 7). However this indicates an oversimplification evidenced by the tendency to equate e-business with e-mail and web access. The report recognised the differences in the quality of access available not least with regard to bandwidth. The use of e-commerce for online purchasing (medium complexity) had increased to 34 percent for

small businesses with higher levels in some sectors, Figure 2.8. Interestingly the report predicts that e-business integration, such as CRM and SCM applications, would be the new challenge for businesses and would be cost-intensive and require high levels of managerial skills. Whether SMEs have the resources to implement such complex applications is an issue explored later in this thesis.

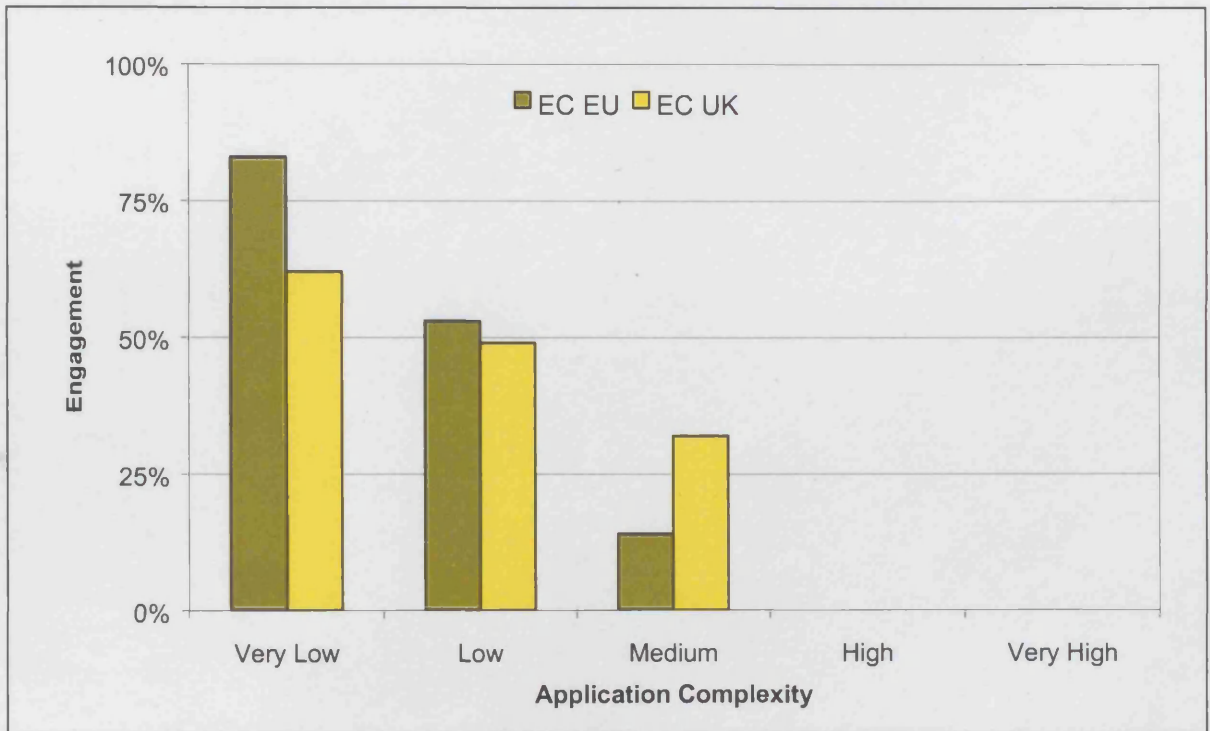
Figure 2.8. E-Business engagement by company size (EC 2003)



The importance of government e-business policies for supporting SMEs was recognised by the European Commission, stating a concern that “the digital divide by company size arising from significant ‘gaps’ between SMEs and larger enterprises in (the adoption of) more advanced forms of e-commerce and particularly in terms of e-business integration” (EC 2002: 3). The report warned against using the level of e-commerce adoption for predicting the uptake of e-business applications which supported processes such as integration between enterprises in supply chains, Figure 2.9. The concern was that this digital divide could be cumulative and tend to widen in spite of ‘horizontal’ policies designed to assist SMEs. This is a significant observation, confirmed by this thesis,

however the emergence of critical e-aggregation applications was identified, in this thesis, as one way of achieving high levels of SME engagement in higher complexity e-business applications and of potential importance to policymakers.

Figure 2.9. E-Business adoption by SMEs (EC 2002)

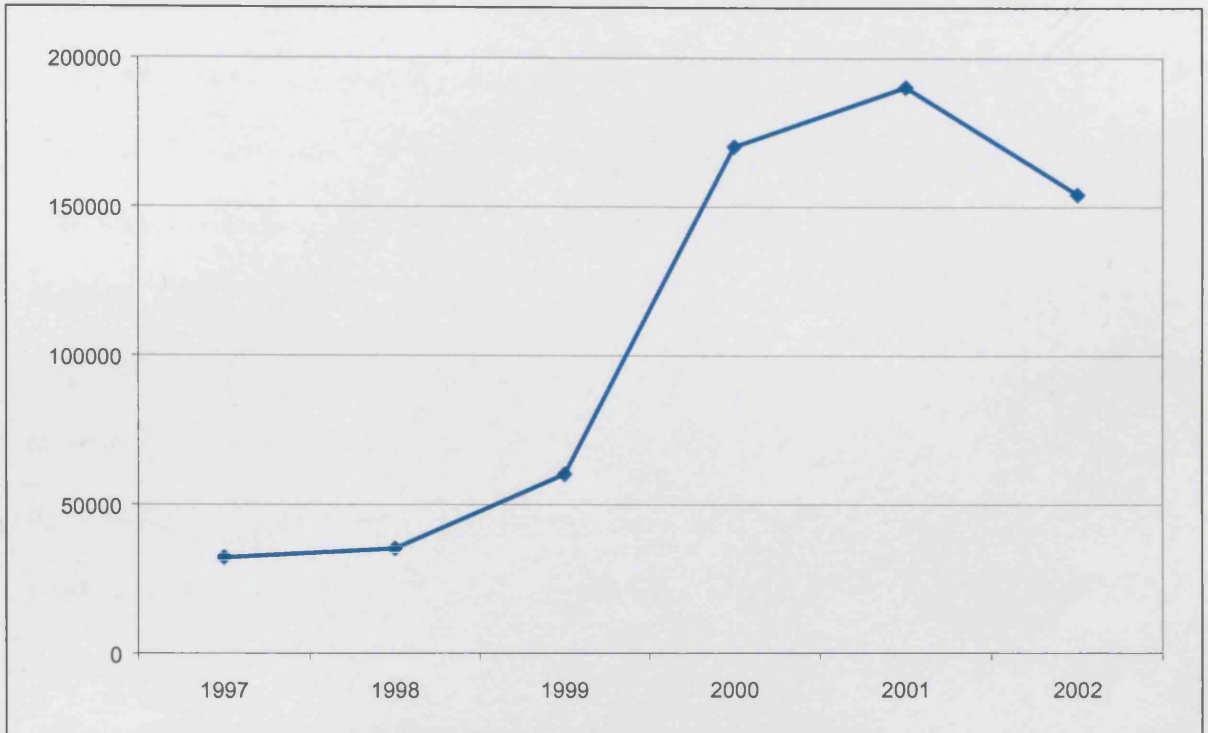


2.5.3 UK studies

The DTI produced six annual reports benchmarking UK enterprises against several other countries. These reports have been useful in considering the use of e-business by enterprises. However since the 2000 report there has been limited separate reporting of SMEs' responses, and the reports used the rather deterministic e-adoption ladder as the basis of comparison for different technologies. Importantly the latest study for 2002 used data collected between April and June, which overlapped with the author's survey research that addressed similar issues (DTI 2002). Notable findings include a reduction in the level of connectivity by SMEs between 2001 and 2002, Figure 2.10. However several other

similar countries had experienced similar declines, with lack of use being the main reason given.

Figure 2.10. UK SMEs with Internet connections (DTI 1999; 2000; 2001; 2002)



This most recent DTI report (2002) attempted to measure the extent to which all businesses were engaging in ICT which could transform their business processes and relationships by scoring different e-business technologies. The report ranked the UK fourth (44), behind Germany (52), Sweden (48) and US (47) with the lowest mean score being 29. This represents an attempt to recognise the complexity of e-business engagement *but did not report SMEs separately*.

Another recent UK-based benchmarking study took a more critical view of e-business engagement (Booz Allen Hamilton 2002). The report proposed an ‘e-economy framework’ including market, political and infrastructural factors across government, citizen and business categories to determine readiness, uptake/use and impact. The UK position was

compared against Australia, Canada, France, Germany, Italy, Japan, Sweden and US. The report ranked the UK fourth in term of the business category (behind Germany, Sweden and US) and commented favourably on the UK's progress generally. However concerns were raised, particularly about SMEs, regarding the willingness of businesses to trade online and noted that this decline was prominent in the UK. Interestingly the report identified five policy trends including the facilitation of online B2B interaction giving examples in Australia and Italy. In both cases government agencies took leading roles in enabling SMEs to engage in higher complexity e-business applications recognising the aggregations already present within the business market. For example an Australian government initiative provided grants to develop common standards across industries and, importantly for this thesis, to bring whole industries together through collaborative online projects. Over 80 awards were made for such projects, including: a textile supply chain project to allow production levelling and supply chain optimisation for SMEs; a collaborative B2B solution for SMEs in the mining industry to allow the exchange of transactional data, documents and messages; and a small appliance industry e-commerce project comprising retailers, wholesalers and suppliers who traditionally operated in isolation (NOIE 2003). In these examples the government acted as a catalyst by funding projects to existing aggregations dominated by SMEs and offered strong supporting evidence of emergence of e-aggregation applications, identified in this thesis.

In addition to internationally focused studies there have been several initiatives to conduct research into specific industry sectors, including over 60 DTI 'sectoral impact studies' (DTI 2003), which ranged from the aerospace to ceramic and from construction to footwear sectors. Whilst these studies included large companies they indicated different levels of e-business uptake between sectors. The EC E-Business Watch study highlighted

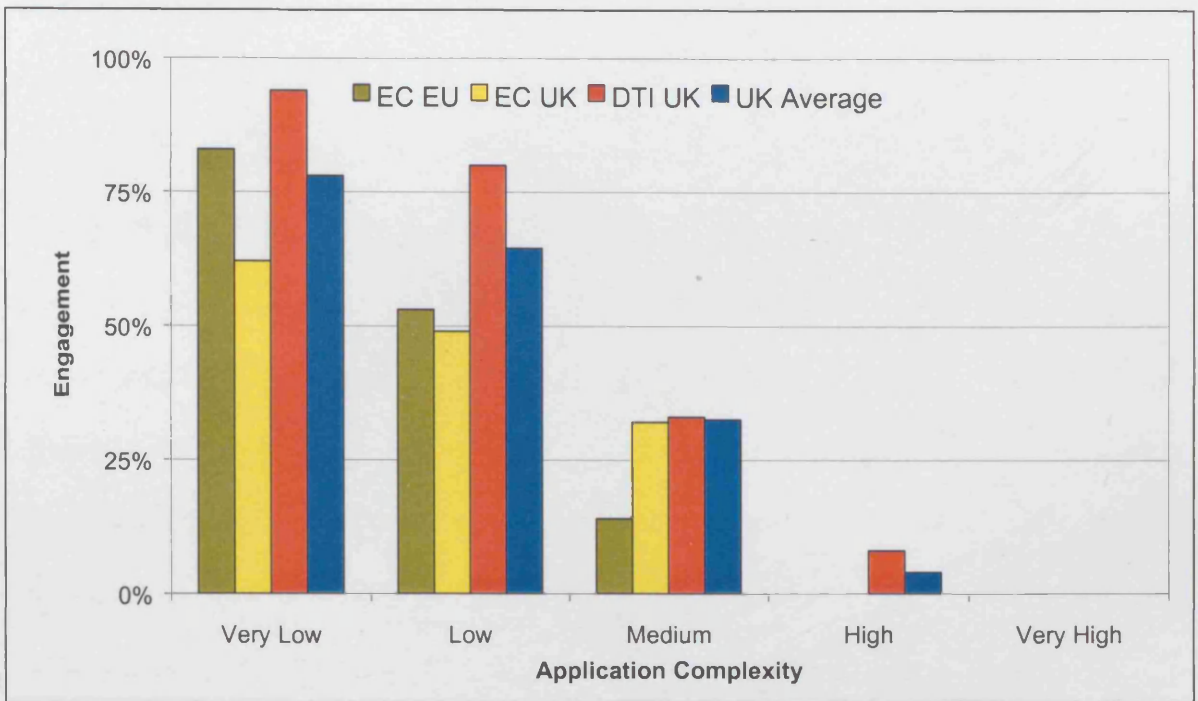
variable adoption of higher complexity application, such as CRM and SCM, between different sectors. 'ICT services' and 'banking and leasing' showed higher adoption rates at 42 percent and 39 percent respectively compared to 'chemical industries' and 'food, beverages and tobacco' at 23 percent and 14 percent respectively (EC2003). Over 20 of the DTI studies to date have been reviewed in order to identify key findings from the individual studies (Hawkins and Prencipe 2000; Clegg 2001). Both reports recognised the increasing levels of connectivity by all businesses but noted the lack of evidence of uptake of higher complexity e-business applications. Concerns were expressed regarding the ability to compare data across the studies and the need for longitudinal research.

The concerns expressed by both Hawkins and Prencipe, and Clegg serve to highlight the difficulties in comparisons both across industry sectors and within SMEs generally. There are two worrying assumptions within much of the, mostly government sponsored, research, namely that SMEs can be meaningfully discussed as a homogeneous whole and that e-business adoption per say is a good thing and results in gain for the adopters. Clearly the former is dangerous and the latter far to simplistic. The thesis attempts to address both these concerns by firstly recognising that enterprises, regardless of size, may group around a business activity and secondly that the presence of a perceived business need or gain is an important factor. Furthermore it is important to acknowledge from the outset that for some enterprises, of any size, it is simply not desirable or feasible to engage in e-business technologies and that this non-adoption decision may not result in any material social or economic disadvantage. The thesis however specifically seeks to investigate the phenomenon of aggregations of SMEs engaging in higher complexity e-business applications.

This relative failure of SMEs to engage in higher complexity e-business applications was unexpected by both academics and policymakers alike. It was anticipated that the e-practices of large organisation would migrate and influence the behaviour of SMEs. In selected instances, such as the aerospace, construction and motor industries, there is some emerging evidence that this is occurring but it is clearly not widespread. Booz Allen Hamilton noted that in Australia the Information Technology On-Line (ITOL) grants had achieved success by funding “business services that are focused on specific industry clusters of SMEs” (2002: 124). They cited an example of the design and construction portal focused on the whole industry, which was supported by the Master Builders Association. Many of the projects included key intermediaries, such as industrial and government bodies, as consortium members. From a theory perspective the issues are significant and suggest that our understanding of small firm behaviour and in particular their adoption of ICT, either alone or within sector aggregations, is too limited. To date well cited research on ICT adoption by SMEs (e.g. Cragg and King 1993; Iacovou *et al.*, 1995) is characterised by a user perspective and by a focus on the technical or organisational factors underpinning adoption, rather than the influence of application complexity on the adoption decision. In all cases such research takes as the unit of analysis the individual enterprise, and then combines the results to draw conclusions.

The above clearly suggests that a discussion of application complexity is important in the context of engaging SMEs. A proposed taxonomy of application complexity, which goes beyond the UK Government’s rather linear classification suggested above, is shown in Table 2.2, together with examples of applications. Using this proposed classification the most recently available survey data (EC2002; DTI 2003) was analysed to show the level of e-business engagement by SMEs in terms of application complexity, Figure 2.11.

Figure 2.11. SMEs e-business engagement (updated from Lockett & Brown 2001)



In summary, the analysis in Figure 2.11, suggests that most SMEs appear comfortable with e-mail and web access (lower complexity), are tentative with the use of the Internet for online buying and selling (medium complexity), but have little or no engagement in the high or very high complexity applications, such as e-marketplaces, supply chains or inter-organisational collaborative networks. This is despite the early promise of ASPs facilitating such access to complex applications. Typically the small number of enterprises engaged in the more complex e-business applications appear to do so for two main reasons. Firstly they form part of an existing supply chain, many of which will have had previous EDI links, such as transport-based SMEs supporting supermarket logistics. Secondly, there are those companies that are required to do so by larger companies as the latter take steps to migrate to web-based supply networks – the automobile and defence industries being current examples. Hence the trend in Figure 2.11 is not merely surprising in terms of the early expectations of engagement, but raises the important question of what this relative

lack of engagement will mean not only for SMEs but also the larger organisations that have significant numbers of SMEs in their supplier networks.

In sharp contrast to SMEs was the experience of larger organisations in their adoption of e-business applications. Frequently the e-business agenda has been provider-led with large software companies (e.g. Oracle, Peoplesoft, SAP) supplying and developing with these organisations systems such as Supply Chain Management (SCM) and Customer Relationship Management (CRM) which support core business processes including planning, production, distribution and sales. The provision of these so called 'critical applications', most recently through web-based technologies, have been central to the rapid adoption of e-business by large enterprises. Critical applications are so called because they purport to offer a route to 'best practice' that firms find difficult to ignore (SAP 2002; Oracle 2003). This isn't to suggest that provider-led innovation isn't problematic – it can be especially when the importance of the role of the user is underestimated (Swan and Clark 1992; Robertson *et al.*, 1996). In reality the combination of a high level of implementation support from the provider, together with user commitment, IS experience and clarity of their own organisational processes and priorities can mitigate the implementation risk. But such a partnership is resource-rich on both parties. For the provider this can be recovered in their pricing structures; for the user their size facilitates access to the necessary resources. Neither of these options are normally available to SMEs. The intense interest, by both governments and service providers, in the drivers and barriers to e-commerce and e-business adoption by SMEs has resulted in much quantitative research both at national and international levels. This research is examined in the next section.

2.5.4 Drivers for e-business engagement

The reasons why businesses generally adopt e-business technologies are important in order to identify the value and benefits businesses have either achieved or believe they will achieve. Such considerations are central to this research since understanding why SMEs in particular adopt or do not adopt e-business technologies could be informed by such research. Recent DTI studies (DTI 2001; 2002) have highlighted a number of drivers or enablers to ICT adoption which were relevant to the construction of a questionnaire as part of this thesis, Tables 2.9 & 2.10. Additionally from the DTI sector studies the following drivers were also highlighted: revenue growth, cost reduction, business partnership development, providing quality service, meeting customer/supplier demands and creating/gaining competitive advantage (Hawkins and Prencipe 2000; Clegg 2001).

Table 2.9. Perceived benefits of ICT (based on DTI 2001a)

Benefit	Category	Mean UK	Mean All
Increase business turnover significantly	Sales & marketing	3.05	3.39
Increase customer base in existing markets	Sales & marketing	3.13	3.20
Communicate better with customers	Sales & marketing	3.87	3.01
	Sales & marketing	3.35	3.20
Undertake operations more efficiently	Operational	3.55	2.86
Communicate with workforce	Operational	3.42	3.36
Enable better financial management	Operational	3.18	2.94
	Operational	3.38	3.05
Operate more effectively with suppliers	Innovation	3.61	2.74
Improve delivery of goods & services	Innovation	3.25	3.15
Better integrate all business processes	Innovation	3.50	2.92
	Innovation	3.45	2.94

Table 2.10. Main drivers for adoption of technology (based on DTI 2002)

Driver	Ranking	Response
Reduce costs/increased efficiency/profit	1	33%
Improve communication/relationship with customers	2	16%
Keep up with progress	3	16%
Improve communication with staff	4	10%
Keep up with competitors/competitive pressure	5	9%
Increase speed of access to information	6	9%
Improve communication with suppliers	7	8%
Standardise/simplify processes	8	8%
Increase customer base/market share in existing markets	9	3%
Increase IT knowledge	10	3%
Increase customer base/market share in new markets	11	3%
Improve quality/accuracy of products/services	12	3%

2.5.5 Barriers to e-business engagement

Many studies (including CFIB2002; DTI 2001, 2002; and EC2002) have been conducted in order to identify the barriers to ICT adoption by all enterprises (Tables 2.11, 2.12, 2.13, 2.14 & 2.15) and SMEs in particular (Tables 2.11 & 2.12). These were relevant to the construction of a questionnaire as part of this research and resulted in the inclusion of nine questions in four categories.

Table 2.11. Perceived barriers to uptake and use of ICT (based on DTI 2001a)

Barrier	Comparison type	Mean UK	Mean All
Risk of fraud	Security	3.41	3.20
Concerns about confidentiality	Security	3.44	3.48
	Security	3.43	3.34
Online technology set-up costs	Cost & benefits	3.11	3.06
Online technology running costs	Cost & benefits	2.94	2.90
	Cost & benefits	2.80	2.98
Not enough customers with online access	Infrastructure & services	3.24	3.14
Employees don't have the IT skills	Infrastructure & services	2.87	2.95
	Infrastructure & services	3.06	3.05
Don't have the time to understand	Information & education	2.65	2.74
	Information & education	2.65	2.74

Table 2.12. Main barriers to adoption of technology (based on DTI 2002)

Barriers	Ranking	Responses
Set-up costs	1	32%
Running costs	2	19%
Lack of time/resources	3	12%
Lack of skilled staff	4	10%
Reluctance of staff	5	7%
Lack of knowledge	6	6%
Difficulty integrating IT systems	7	5%
Not relevant to business	8	4%
Lack of technology	9	3%
Lack of board interest	10	3%
Difficulty in changing processes	11	3%

Table 2.13. Barriers to greater use of ICT (CFIB 2002)

Barrier	Ranking	Responses
Use low among customers	1	51%
Concerned about security	2	36%
Limited knowledge	3	17%
Set-up costs	4	8%
Running costs	5	7%
No tangible benefits	6	7%
Employees don't have IT skills	7	7%
Concerned about confidentiality	8	2%
Concerned about the risk of fraud	9	1%

Table 2.14. Barriers to greater use of ICT (Michaelis et al, 2001)

Barrier	Ranking	Responses
No obstacles	1	33%
Don't have time to understand the technology	2	18%
Isn't relevant to business	3	17%
Set-up costs	4	8%
Running costs	5	7%
No tangible benefits	6	7%
Employees don't have IT skills	7	7%
Concerned about confidentiality	8	2%
Concerned about the risk of fraud	9	1%

Table 2.15. Reasons for not using Internet (based on EC 2002)

Reason	Ranking	Micro	Small	Medium
Does not apply to enterprise/product	1	43%	40%	40%
No skilled personnel	2	17%	20%	16%
It would not pay off	3	18%	14%	16%
Customers' access to Internet is insufficient	4	6%	9%	5%
Do not trust technology/security	5	3%	2%	3%
No confidence in regulatory environment	6	1%	1%	2%
National difference in consumer protection	7	0%	4%	0%
Cost of distribution product too high	8	2%	2%	0%
Don't know/no answer	-	9%	9%	18%

Additionally the DTI 'sectoral impact studies' (DTI 2003) highlighted the following barriers to adoption: organisational inertia, lack of knowledge, lack of skilled staff, costs of investment, market structure, policy and legal factors, technical problems and system compatibility (Hawkins and Prencipe 2000; Clegg 2001).

The research reported in sections 2.5.4 and 2.5.5 was used directly in the construction of questionnaires that formed part of the empirical design and are discussed in section 4.5.

2.6 Aggregation

Central to this thesis is the concept of aggregations of enterprises, be they online or offline groupings, operating in business markets. In this context aggregations include small, medium and large-sized enterprises. Of particular interest is how these aggregations used or might use e-business applications and how these applications were or might be provided. Business groupings or aggregations is not a new concept with many businesses being fully aware of the importance of relationships within their industry, supply chain or trade association. There was increasing evidence of organisations recognising the potential role aggregations might have to play in facilitating e-business engagement. The need to

encourage SMEs engagement in e-business was recognised by the previously cited studies with some recommending generic SME-specific portals as a means of achieving this objective. Existing UK government SME-specific portals include general advice such as the Small Business Service, formed in April 2000 and the UK Online for Business. The latter states that it “exists to help UK small businesses exploit the business benefits of ICT - a major driver of competitiveness” (UKOforB 2002). Proposed SME-specific portals can be regional (WED 2000) or industry (Defra 2000) focused. The latter recommended the development of a rural portal providing farming-specific e-business applications provided by ASPs. In addition to government there are many authors in the emerging area of e-business models literature that recognise the importance of online aggregation through new intermediaries: these will be discussed in the next chapter.

Translating the above theoretical interest in the potential of aggregations and of new intermediaries to help engage SMEs in e-business was at an early stage during the conduct of this research but there were some commercial examples. The commercial intermediaries, detailed in Table 2.16, attempted to aggregate SMEs and in selected cases to engage them in higher complexity e-business applications. All these intermediaries offered services across industries and were in essence horizontal ASPs.

Table 2.16. Commercial intermediaries and SME-specific portals

Region	Example	Access to higher complexity applications
US	AllBusiness (NBCi 2002)	Yes – online accounting
	bCentral (Microsoft 2002)	Yes – web collaboration
	NetBusiness (Netscape 2002)	No
	Yahoo Small Business (Yahoo 2002)	No
Canada	BellZinc (Bell 2002)	No
UK	BT Openworld (BT 2002)	Yes – online data backup
	ClearlyBusiness (Freeserve 2002)	Yes – online data backup
Europe	BusinessEurope (BusinessEurope 2002)	Yes – e-marketplace

It was also possible for SMEs to access higher complexity vertical applications like B2B e-marketplaces through two other routes. The first was through vertical industry intermediaries (VertMarkets 2002; BizProLink 2002), and the second was through industry-specific e-marketplaces (Achilles 2002; Covisint 2002). The Covisint exchange is an intermediary that emerged from within the motor industry as a means of improving supply efficiencies. BuildOnline was an example of a similar UK development in the construction industry (BuildOnline 2002). Both these industries are characterised by large numbers of SMEs in their supply chain systems. However, despite the emergence of these horizontal and vertical intermediaries, it remained the case that engagement by SMEs was low.

2.7 Summary

This important chapter has defined the individual components of the area of concern under investigation, namely e-business including application complexity, SMEs and their economic importance and the notion of aggregation. The chapter also considered existing secondary research in order to answer the first research question posed in the introduction, namely what is the current position for SMEs with reference to the adoption of e-business technologies? This clearly raises several issues not least the low level of e-business engagement by SMEs and the impact of application complexity on adoption. A complementary insight is the contrast with larger organisations in which the role of 'critical applications' developed by providers has proved significant. It is against this background that the thesis explores the potential of applications designed specifically to encourage SMEs to engage in higher complexity e-business applications.

The economic importance of SMEs is recognised by Governments throughout Europe and North America. They provide significant employment (over 55 percent in the UK) and generate significant turnover (over 51 percent in the UK) and importantly have generated over 80 percent of the new jobs in the last decade. Unfortunately there is no one simple definition for SMEs; however for this thesis any firm with less than 250 employees in the Europe is considered an SME, and any firm with less than 500 employees in North America is considered an SMB. Pragmatically the thesis compares SMEs and SMBs in order to facilitate comparisons across different studies.

For the purposes of this research e-business was defined as the use of electronic communication networks to transact, process and collaborate in business markets - thus e-business incorporates e-commerce. Importantly a scale of application complexity was developed in order to assist the analysis of e-business engagement, which ranged from very low (e-mail) to very high (collaborative platforms), Table 2.2. The importance of application service provision was developed through understanding the enabling technology and types of service providers. It must be stressed that whilst attention is paid to ASPs and users these relationships are only made possible by the development of the Internet as a ubiquitous communication platform. A detailed exploration of the Internet is outside the scope of this thesis but recent increased uptake of broadband technologies will only increase the attractiveness, both financially and functionally, of the ASP proposition.

This chapter has reviewed the wide range of studies which have been undertaken in order to benchmark the engagement of enterprises in e-business and the difficulty in making meaningful comparisons between these studies. This has been attempted in Figure 2.11, which combines two well-regarded studies of engagement by SMEs in the UK and Europe.

This has proved important for comparison of the data collected as part of this thesis. The identification and selection of the drivers for and barriers to ICT adoption has also influenced the structure of the survey. Several important findings can be drawn from this review of secondary data, namely:

- The infrastructure required for connectivity was available to SMEs, although broadband provision was limited.
- The number of SMEs with connectivity was static or falling.
- As e-business application complexity increased the levels of engagement by SMEs declined rapidly with very little evidence of higher complexity applications being used.
- A deterministic and progressive model of adoption was the underlying assumption for most of the studies.
- There was some evidence in more recent studies of governments beginning to consider SMEs as heterogeneous, evidenced by the inclusion of industry sector comparisons. However this appeared to be very limited in nature.

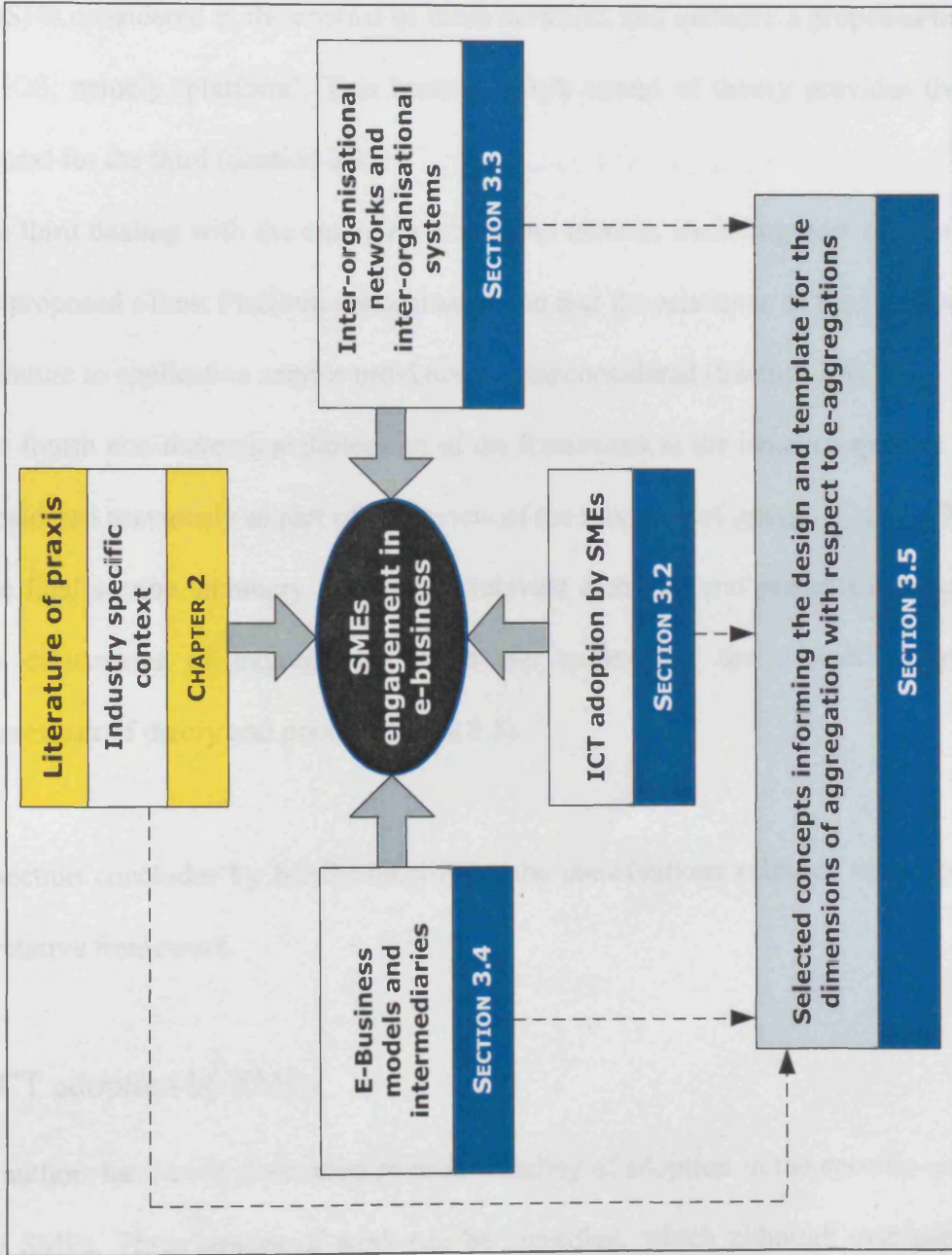
3 LITERATURE REVIEW OF RELEVANT THEORY (2)

3.1 Introduction

Together with the previous chapter this review of relevant theory forms the second part of the literature review. The intention of this chapter is twofold. Firstly, in a conventional way, to identify and discuss the framework of theories and concepts. This is done in section 3.1 to 3.3. Secondly, based on this discussion to select those elements which are especially relevant to the concept of e-aggregation, since this is the prime focus of the research. The research design and template for the dimensions of aggregation which results from this is made use of in the next chapter relating to the empirical design and informs both the questionnaire and the cases.

The literature review constitutes the framework of theories and concepts within the FMA research model (Figure 1.2) that inform both the research design and subsequent interpretation of the data. This framework of ideas was informed principally by other researchers' publications, but also by the concepts developed during the progress of this research and exposed to critical comment through conference and journal papers. The broad research setting for this investigation is the relative lack of engagement of SMEs in e-business, with the focused research area being the extent to which e-aggregation applications can facilitate such engagement. In terms of both informing the research design, and the subsequent interpretation of the research, data four main strands are relevant and are shown in Figure 3.1.

Figure 3.1. Literature review and interpretative framework



- The first is the adoption of ICT, and its antecedents, by SMEs, including the strategic, technical and organisational strands of research (Section 3.2).
- The second is the concept of networks as an organisational form (the proposed taxonomy of aggregations and the role of inter-organisational information systems (IOS) is considered in the context of these networks and includes a proposed new type of IOS, namely 'platform'. This broad network strand of theory provides the wider context for the third (Section 3.3).
- The third dealing with the emerging e-business models, including new intermediaries, the proposed eTrust Platform conceptualisation and the relevance of the IT outsourcing literature to application service provision can be considered (Section 3.4).
- The fourth non-theoretical dimension of the framework is the industry-specific context considered previously as part of the review of the literature of praxis. (Chapter 2).
- The final section summary extracts the relevant elements and presents a template for the dimensions of aggregation within the context of the overall interpretative framework of theory and praxis (section 3.5).

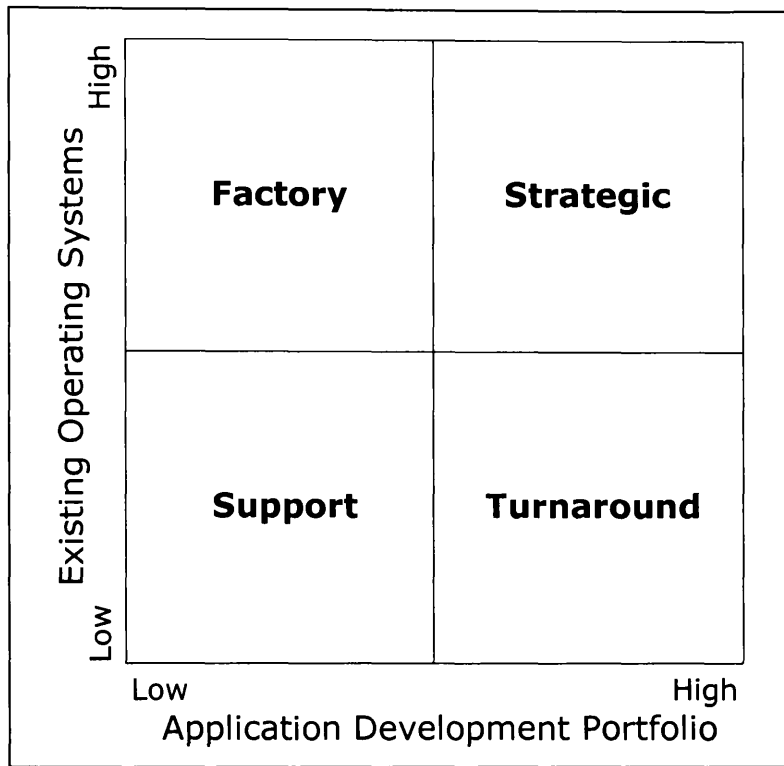
Each section concludes by briefly identifying the contributions relevant to the proposed interpretative framework

3.2 ICT adoption by SMEs

Many authors have tried to develop an understanding of adoption in the specific context of IT and SMEs. Three strands of work can be identified, which although overlapping can usefully be separated, namely strategic, technological and organisational. The first is that which emphasises the strategic logic in the decision to adopt information systems (IS) (Blili and Raymond 1993; Kowtha and Choon 2001; Sadowski *et al.* 2002). In this context

SMEs can be both victims and beneficiaries depending on their degree of proactivity. Bili and Raymond (1993) showed that IS planning by SMEs became more critical as technology became more central to their products and processes and concluded that IS planning needed to be integrated with business strategy. However Hagmann and McCahon (1993) concluded that few SMEs plan their adoption of IS and that the limited planning that was evident was focused on operational improvements and was not concerned with competitiveness. The notion of strategic information systems planning in SMEs is further developed in Levy and Powell (2000) and Levy *et al.* (2001). This strand of research has resulted in frameworks, such as Levy's 'focus domination model', to help position and integrate IS investments – one of which could be e-business applications. A model of the strategic use of IS by SMEs was proposed by Levy and Powell (2000) consisting of three interdependent factors, namely strategic content, business context and business process. Within the latter the analysis of business activities and their strategic use of IS was considered by using, in part, the McFarlan's 'strategic impact grid', consisting of factory, support, strategic and turnaround, Figure 3.2.

Figure 3.2. McFarlan strategic impact grid (McFarlan 1984)



Where:

- **Factory** - applications are essential for success. There is a heavy dependence on IS for smooth operations. Future IS may not be likely to give a competitive edge.
- **Support** - applications are valuable for success. These may speed up administration or occasionally improve processing but may not be critical.
- **Strategic** - applications are critical to sustaining future performance. Few IS have a strategic role in existing and future developments.
- **Turnaround** - applications may be important in achieving the future. Existing IS not too important but future developments are likely to have a major impact.

Levy and Powell (2000: 259) found that IS were predominantly located in support (63%) and to a lesser extent in factory (28%) and strategic (11%) with no evidence of turnaround.

They concluded that the use of strategic IS by SMEs “is firmly directed at improving the operation with limited appreciation of the value of strategic information”.

A second technological strand, and arguably the most prolific, has seen adoption as an outcome of a complex process of evaluation, frequently informal, by SMEs of multiple factors both external and internal. These factors are frequently cast as enablers or barriers to adoption (Lefebvre *et al.* 1991; Cragg and King 1993; Thong and Yap 1995; Walczch *et al.* 2000; Mehrtens *et al.* 2001; Stansfield and Grant 2003). Iacovou *et al.* (1995) focused on the single technology of EDI and identified perceived benefits, organisational readiness (resources) and external pressures (competitive and non-competitive) as the critical factors in adoption. Since EDI is a complex application (but not necessarily Internet-based) these findings may be particularly relevant in the adoption of similar higher complexity e-business applications.

The third strand is that which takes an explicit organisational stance, and frequently that of the owner-manager and the social parameters within which the firm operates. As such the approach counters the strategic or technological emphasis of the first two strands (Blackburn and McClure 1998; Dierchx and Stroeken 1999; Fuller and Southern 1999; Poon and Swatman 1999; Southern and Tilley 2000; Barry and Milner 2002; Hussin *et al.* 2002; Quayle 2002). An important observation of Southern and Tilley is that “when small firms use IT complex relations unfold. It is by no means a simple linear development whereby observers can expect an incremental build up of knowledge and expertise on ICT to be established within the firm” (1999: 152). In the context of the adoption of increasingly complex e-business applications this view appears highly pertinent.

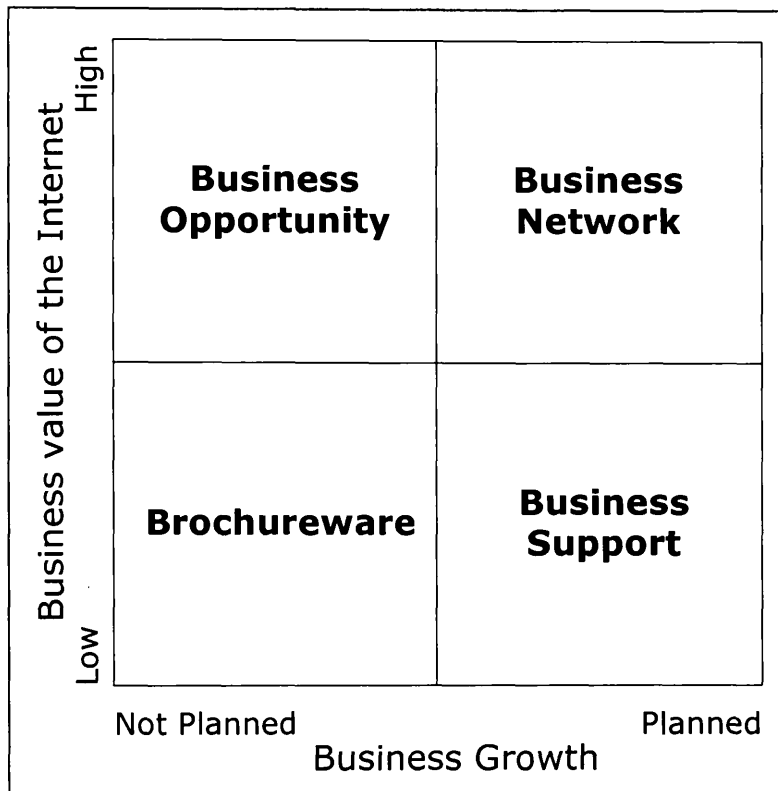
Throughout the above strands of literature three characteristics prevail, namely (i) the unit of analysis is the single firm (ii) the perspective adopted is that of the user, and (iii) the dimension of application complexity as a key variable is often absent. In their original context these characteristics are reasonable, but they are also limiting. For example the notion that once a firm has decided to adopt an IT application that obtaining the application is non-problematic. In the case of complex applications, such as integrated e-business, this assumption may be unwise. From a provider perspective the issue of user readiness (technical and financial) together with the ongoing support and maintenance issues may signal an uneconomic contract and mitigate against initial supply.

Much research on the adoption of ICT by SMEs has tended to assume progressive adoption (DTI 1999; Wilcocks *et al.* 2000; Clegg 2001; Kendall *et al.* 2001; Rao *et al.* 2003). Although the DTI (2002: 1) acknowledges that “it is important not to assume that business needs to pass through all the steps of the ladder in sequence” it continued to emphasise the ‘e-adoption ladder’ originating in previous studies (DTI 1999; 2000; 2001a), Figure 2.1. Interestingly non-linear ICT adoption models for SMEs have emerged, including Dixon *et al.* (2002) who concluded that “the typical linear model of ICT adoption may be inappropriate”. This change was further supported by the ‘transporter model’ proposed by Levy and Powell (2003: 125) which states SMEs are unlikely to follow a linear stages model but “rather, they will focus on what is best to meet the owners’ strategy for business growth”, Figure 3.3. The model identifies four SME groupings, namely brochureware, business opportunity, business network and business support, where:

- Brochureware - Internet value was low and firms did not plan business growth.
- Business opportunity - Internet to offered high value but are not planning growth.
- Business network - Internet is seen as key to business network development.

- Business support - Internet used for support and are planning growth, but currently see investment in the Internet for this growth.

Figure 3.3. Segmented ICT adoption patterns in SMEs (Levy and Powell 2003)



Levy and Powell (2003: 125) conclude that their research “demonstrates that different types of business will view Internet adoption in very different lights” and “will focus on what is best to meet the owners’ strategy for business growth.”

3.2.1 Diffusion of innovations

Studies on the adoption of e-commerce by SMEs are relatively recent but research antecedents are well established. Rogers’ work (1962; 1983; 1995) on the diffusion of innovations, whilst initially neither IT nor SME-focused, has evolved to incorporate diffusion networks and critical mass in order to appreciate the adoption of interactive innovations, such as the Internet (1995: 313). The early work of Rogers took a provider (or

supplier) perspective and identified the characteristics of innovation which would impact on its rate of diffusion including such factors as compatibility, complexity, observability, relative advantage and trialability. In particular Rogers highlights the important roles of change agents (intermediaries) in influencing innovation decisions, including developing a need, establishing communication, diagnosing problems, creating an intent to change and then action. Theoretically the role of the intermediary as a means of facilitating the diffusion of complex ICT has been observed by a number of authors, most notably Swan and Newall (1995), Swan *et al.* (1998) and Newall *et al.* (2000). In these particular instances it was the professional associations that assisted in this way. Recent studies investigating the adoption of ICT by SMEs utilised Rogers' model of innovation (Kendall *et al.* 2001; Methren *et al.* 2001). Kendall *et al.* highlighted three significant factors for the adoption of e-commerce, namely relative advantage, compatibility and trialability. Relative advantage is the perceived benefits such as lower costs and increased business opportunities, compatibility is how well the innovation will fit into existing processes and trialability is the use of innovation without incurring high start-up costs. Methren *et al.* also considered Internet adoption by SMEs in the context of diffusion of innovation concluding perceived benefits, organisational readiness and external pressures were the key factors. These two recent studies show some correlation between firstly relative advantage and perceived benefits, and secondly compatibility and organisational readiness, providing strong support for these being two important factors from Rogers' model of diffusion when related to e-business engagement by SMEs.

Within the context of an interpretative framework the diffusion of innovation literature supports the inclusion of two elements, namely change agent and critical mass, where:

- Change agent - is the actor who influences others to encourage adoption of innovation by establishing relevance of innovation and facilitating communication. Roles include: developing the need for change, establishing communication, diagnosing problems, creating an intent to change, translating intent into action and stabilising adoption (Rogers 1995; Swan and Newall 1995; Swan *et al.* 1998; Newall *et al.* 2000).
- Critical mass - is the adoption of interactive innovations. Critical mass occurs when enough users have adopted the innovation for further adoption to be self-sustaining. Strategies for achieving critical mass include: targeting top actors, shaping actors' perceptions, introducing to 'intact' groups and providing incentives to early adoption (Rogers 1995).

3.3 Inter-organisational networks

In the realm of firm behaviour the emergence of network theory has been an important development alongside our understanding of markets and hierarchies (Thorelli 1986; Powell 1990). Although 'networks' have always existed (e.g. the ongoing relationships within a vertical supply chain) the recognition of networks as a distinct organisational form, amenable to analysis and theoretical development is more recent (Miles and Snow 1986; Jarillo 1988; Axelsson and Easton 1992; Snow *et al.* 1992; Sydow 1992; Grandori and Soda 1995; Provan and Milwood 1995; Ebers 1997). This theoretical development has advanced on many different fronts: strategy, competition and collaboration (Doz 1996; Doz and Hamel 1998); network structure and embeddedness (Granovetter 1985; Shaw and Conway 2000); trust and governance (Johannisson 1986; Ring and Van de Ven 1994); classification and evaluation (Cravens *et al.* 1996, Sydow and Windeler 1998). Although these theoretical insights into networks have developed outside of a specific e-business

context (i.e. offline) they provide many of the antecedents for the later emerging concepts of e-business networks (i.e. online).

Sydow and Windelers' views on inter-organisational networks (IONs), or in their specific case interfirm networks, are particularly insightful (1998: 266-277). They have identified three characteristics which define and distinguish this organisational form: (i) a special kind of network relationship which exhibits a degree of social embeddedness resembling intraorganisational relations (ii) a certain degree of reflexivity arising from the property of the network to become the object of signifying, organising and legitimating action by the firms, and (iii) a logic of exchange which combines co-operative and competitive elements, autonomy and dependence, trust and control. Of these the second characteristic is the least obvious but is potentially very significant. Within an interfirm network 'managers are (then) more likely to consciously consider processes in restructuring endeavours which cut across organisational boundaries' (1998: 267).

Particularly useful here is the perspective of networks to help understand firm behaviour, where networks are one of three institutional ways of organising in business markets including markets and firms. Key areas include the delineation of the network, trust and the benefits and tensions of network collaboration and competition. This latter issue has been commented upon by Hamel and Prahalad (1994) and Jarillo (1988). Research has focused on network structure and embeddedness (Shaw and Conway, 2000) and the governance of networks (Johannisson 1998) with more recent work considering SMEs and networks and their contribution to promoting enterprise (Blundel and Smith 2001) and the role of ICT in SMEs networks. Blundel and Smith propose four types of business network, namely industrial district/cluster, supply chain, entrepreneurial and innovation and highlight the

importance of network governance. In particular the interpretive framework has been informed by micro-levels ties (Ebers 1997) including: resource flows through activity links (Dubois and Hakansson 1997); mutual expectation with trust (Ring 1997, Child and Faulkner 1998); information flows supported by catalysts be they actors (Lipparini and Sobrero 1997) or inter-organisational systems (Holland and Lockett 1997). The dimensions of strategy are included within the framework to specifically capture motivations (Child and Faulkner 1998), strategic perspectives (Jarillo 1993) and contingencies (Ebers 1997), which might facilitate the formation of aggregations.

Table 3.1. Ideal-typical characterisation of resource allocation (Ebers 1997)

Characteristics	Market	Firm	ION
Distribution of property rights over resources (residual claims and decision-making rights)	unilateral decision-management and decision-control with residual risk bearing by transaction partners	separation of decision-management, decision-control and residual risk bearing among transaction partners	unilateral decision-control and residual risk bearing combined with periodical joint decision-making by transaction partners
Resource flows among actors	infrequent, discrete acts of exchange of resources	resource pooling of co-specialised resources	repeated partner-specific exchange of resources
Mutual expectations among actors with regard to relationship	narrow, confined to term of contract short-term economic exchange relation finite duration	wider, including contractually unspecified reciprocal obligations and mutual expectations longer-term social relationship unspecified duration	wider, including contractually unspecified reciprocal obligations and mutual expectations longer-term social relationship finite duration (based on goal accomplishment or unspecified duration)
Information flows among actors	confined to terms of exchange (price, quantity, quality, delivery)	higher degree of information sharing with regard to wider spectrum of information	higher degree of information sharing with regard to wider spectrum of information
Main co-ordination mechanisms	bargaining and competition	authority and identification	negotiation and concurrence

Ebers (1997) proposed a framework for comparative assessment of ideal-typical characterisation of market, firm and ION as forms of governing economic exchange relations, Table 3.1. This provides a useful framework for understanding the differences

between the ways of organising and could assist in appreciating the key factors affecting the formation of online aggregations.

The concept of a business aggregations is well understood and can encompass many forms of relationship, from local retail traders campaigning for improvements to their local infrastructure to the highly developed supplier-based networks of the motor manufacturing industry (Marshall 1920; 1968). Such aggregations are now characterised by IONs, which develop either to reduce costs (Contractor and Lorange 1998; Zajac and Oslen 1993) or to increase revenue (Contractor and Lorange 1998) directly or indirectly or to mitigate risk in response to economic factors (Ebers 1997). These emerging, stable, non-equity based collaborative arrangements have become increasingly important and have generally been termed strategic networks. Jarillo's contribution to our understanding of strategic networks has been seminal and his definition has been widely adopted (Jarillo 1988; 1993):

“Strategic networks are long-term purposeful arrangements among distinct but related for-profit organisations that allow those firms in them to gain or sustain competitive advantage vis-à-vis their competitors outside the network” (Jarillo 1988:32).

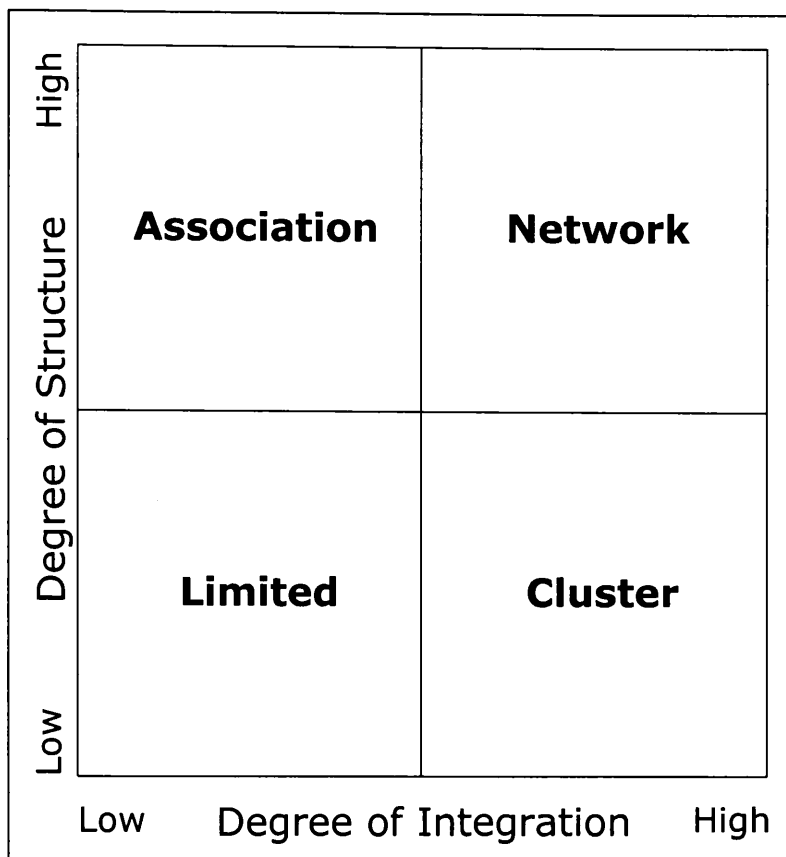
At the core of Jarillo's rationale for these networks is increased competitiveness through specialisation, focus and size. This research takes strategic networks to be a type of ION. Other authors have in turn emphasised the change in market structures, the move to long-term focus and different firm behaviours as important factors in the formation of IONs (Johanson & Mattsson 1987; Powell 1987; Barreyre 1988; Oliver 1990; Ebers 1997). In an analysis by Oliver (1990), she proposed six predictive contingencies for ION formation: (i) regulatory necessity; (ii) power asymmetry; (iii) reciprocity; (iv) efficiency;

(v) stability; (vi) adding legitimacy. In terms of the development of the inter-organisational relationships once formed Doz (1996) has provided a strategic level analysis based on in-depth case studies. This work showed the importance of interactive learning cycles to the success of relationships. In successful alliances continuous learning took place about the environment, goals, joint processes and shared tasks which allowed readjustments to the co-operative arrangements. The converse was true in those organisations where learning did not occur. Ford *et al.* (1998) also focus on managing these inter-organisational relationships, interactions and interdependence highlighting the complexity of IONs.

3.3.1 *Classifying networks*

Even within the above definition there are many possible manifestations of the network form and many ways of classifying them. Grandori and Soda (1995) differentiate networks by the extent to which the links between organisations are formalised and networks are termed bureaucratic, social or proprietary. Aldrich and Glinow (1992) classify networks into personal and social networks and provide a basis for understanding the role of network as a broker within a set of relationships. A further classification from Cravens *et al.* (1996) links the type of network relationship (from short-term, transactional to long-term, collaborative) to the degree of unpredictability, and hence risk, in the environment. In the context of SMEs the proposed taxonomy of aggregations, particularly Grandori and Soda, links the degree of structure (informal to formal) to the degree of integration (independent to integrated), Figure 3.4.

Figure 3.4. Taxonomy of aggregations for SMEs (Brown and Lockett 2003)



Within the broad concept of aggregation this taxonomy locates ‘networks’ as one form of strong or complex aggregation which can be contrasted with other weaker or simpler aggregation forms – a distinction which can be useful when considering the nature of an SME’s engagement in an aggregation and the role of any intermediaries. Whilst online aggregation, at SME or industry level, was seen as a way of engaging the SMEs, consideration needs to be given to existing offline aggregations or groupings. SMEs operate in business markets comprising relationships within their supply chain or industry sector, which can range from simple to complex in nature. The degree of structure (informal to formal) and degree of integration (independent to integrated) provides a taxonomy suitable for both online and offline aggregations and comprises four types:

- *Limited* - any relationships are loose and participants are independent, characterised by little or no aggregation. Intermediaries range from Chambers of Commerce, or local business groups, to more sophisticated organisations such as the Cambridge Network (Cambridge Network 2002).
- *Association* - including trade associations, guilds, professional and registering bodies, where reputation is enhanced by membership and structure is high, but businesses remain largely independent.
- *Cluster* - forming part of an identifiable business market, business cluster or economic cluster (Porter 1998) where SMEs are increasingly dependent on complex linkages within a sector, but structure is low. A recent study in the UK highlighted 154 business clusters classifying them by stage of development, cluster depth, employment dynamics and significance (DTI 2001b).
- *Network* - represents a more highly developed form of co-operation which exhibits both relatively high structure and integration. In the literature these networks are often implicitly described from a large business perspective.

This important taxonomy helped to inform the investigative process and proved useful in interpreting the findings and identifying trends. The dimensions of structure and integration in the context of aggregations are best explained by the use of simple examples. Firstly structure, by comparing the rules or regulations imposed on SMEs in an aggregation from low in the case of landscape contractors to high in the case of general practitioners. Clearly it is self evident that to establish a GP surgery is highly complex and regulated both at the individual practitioner and organisational levels whereas to establish a landscape gardening business is largely unregulated, other than the normal legal and tax frameworks for businesses. Secondly integration, by comparing the intensity of

interactions between SMEs in an aggregation from low in the case of dental practices, which do not rely on other practices to provide services to patients to high in the case of component manufacturers in the motorsport industry who need to work closely with other enterprises within the supply chain in order to operate effectively. Furthermore it is not implied that a business will only reside in one category. For example it would be possible for a Cumbrian organic dairy farmer to simultaneously be part of an organic trade association, a local Cumbrian food cluster and also part of a confectionery manufacturer's supplier network. However any aggregation-specific e-business application would need to carefully consider which of these aggregations the application was attempting to address. Summarising the above proposed taxonomy of aggregations, in Figure 3.4, based on degree of structure and integration, and consisting of four categories, provided an important framework for this investigation.

Within the context of an interpretative framework the ION and strategic network literature supports the inclusion of four main elements, namely micro-level ties, economics, strategic and governance, where:

- Micro-level ties comprise resource flows, mutual expectation and information flows:

Resource flows - evidence of activity links which lead to interdependence among organisations which in particular conditions might best be managed through IONs. Support for access to shared resources as a means of mitigating uncertainties. Asset specificity indicates the degree of shared resources (Easton and Araujo 1997; Dubois and Hakansson 1997).

Mutual expectation - evidence of resilient trust that influences actors' perceptions of the opportunities and risks to collaboration and shape the IONs. Resilient trust supports network formation. Strong existing social or experiential links support the formation of

resilient trust. Fragile trust supported by contractual safeguards leads to more formal and distant relationships. Both resilient and fragile trust are developed by informal and formal processes (Ring 1997).

Information flows - evidence of catalysts that influence the actors' perceptions and guide their actions in IONs. Informational intermediaries (such as IOS) act as brokers to enable cost-effective exploitation of informational synergies or (individuals) in conflict and dispute resolution. This results in reduced communication costs and better communication. Introduction of IOS can accentuate and stabilise existing relationships (Lipparini and Soberto 1997; Holland and Lockett 1997).

- Economics comprise nature of transaction and cost of networking:

Nature of transaction - evidence of value activity. Product or service, which are repeated or ad hoc in nature.

Cost of networking - evidence of internal and external costs. Balancing of costs versus benefits (actual or perceived). Impact of IOS and functionality.

- Strategic comprises motivation, perspective and contingencies:

Motivation - evidence of scope and scale. Cost savings through economies of scale by joint marketing or production. Enhanced learning by knowledge and information exchange. Increased revenue by using shared complementary resources to enhance competitiveness. Greater flexibility through concentration of resources (Porter and Fuller 1986; Contractor and Lorange 1988; Oliver 1990).

Perspective - evidence of intended and emergent strategy. Awareness of actors of the strategic implications and opportunities. Use of sense-making, understanding, committing and enacting as decision and trust-making processes (McFarlan 1984; Mintzeberg *et al.* 1990; Ring 1997; Levy and Powell 2000).

Contingencies - evidence of institutional and relational relationships. Instigation of network from environmental conditions or from existing social linkages between actors. Institutional contingencies can be based on environmental conditions such as political, legal, cultural, industry and regional factors. Relational contingencies stress the existing social relationships amongst individuals based on mutual obligation, loyalty and trust (Lane and Bachmann 1996; Whitley and Kristensen 1995; Saxenian 1994; Ford *et al* 1998).

- Governance comprises distribution of property rights and co-ordination mechanism:

Distribution of property rights - evidence of governance of property rights. Contractual agreements govern the behaviour of actors by establishing specific formal distribution of rights over resources and outcomes and establishing incentives (Barzel 1989; Fama and Jensen 1983).

Co-ordination mechanism - evidence of governance of behaviour. Relates to the rules of conduct and informal allocation of resources and responsibilities among actors (Grandori and Soda 1995).

The inter-organisational information systems, which support these IONs are strategically important components in the formation, success and longevity of IONs (Ward and Peppard 2002) and are explored further in the following section.

3.3.2 *Inter-organisational information systems (IOS)*

Inter-organisational information systems (IOS) have evolved both in support of and as a consequence of IONs. These IOS can be divided into three main types (Kumar and Dissel, 1996):

1. Pooled information resources (shared databases & applications)

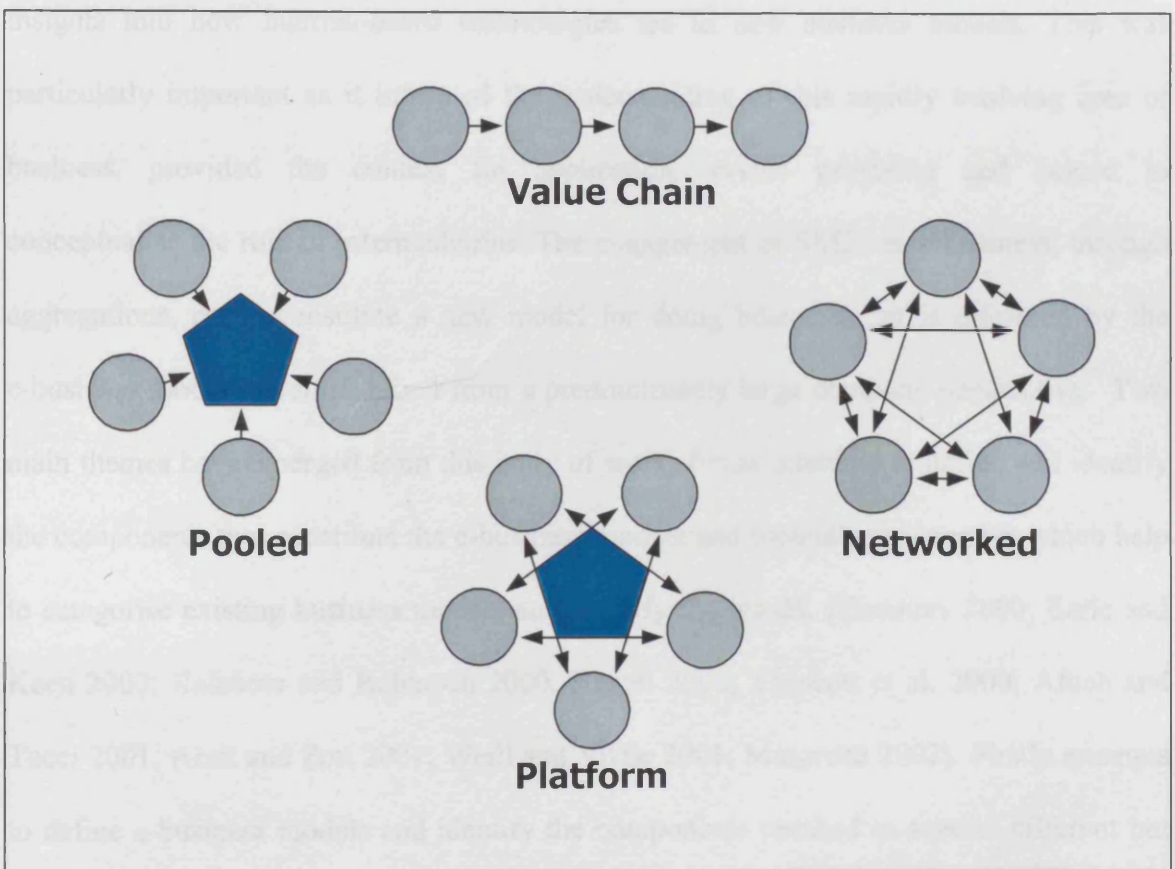
2. Value/supply chain (EDI, order-tracking & payment systems)
3. Networked (video-conferencing & extranets)

Of these the value/supply chain systems (type 2) have arguably had the most historical impact. These are not simply the systems which facilitate and co-ordinate the physical flows and invoicing between suppliers and customers, but also include the wide variety of information systems which support and enrich the relationships. For over 25 years electronic data interchange (EDI) has been the basis for much of the above and has featured extensively in the strategic IS literature as a means of achieving competitive advantage (Johnston and Lawrence 1988; Konsynski and McFarlan, 1990; Ward and Peppard 2002).

In the UK about 32 percent of all businesses used EDI in 1999, but usage by SMEs is much smaller, about 23 percent (DTI 1999: 95). The main reason is that smaller companies are less likely to be able to justify the investment in technology that, for the most part, is customer or supplier-specific. This observation is important as later we show that after 25 years there is a similar reluctance by SMEs to engage in higher complexity Internet-based applications. Three main factors appear to have influenced this relatively low adoption of EDI by small businesses, namely perceived benefits, organisational readiness and external pressure with the latter being the main reason (Iacovou *et al.* 1995). The other two types of IOS (types 1 and 3) are more recent and increasingly important. However, both pooled information resources (such as is common in the car insurance and repair industry) and network-based IOS again are much more common between larger companies. Taking extranets as an example of the latter, less than 5 percent of businesses used this technology in 1999 increasing to 20 percent by 2002. However only 7 percent of small and 12 percent

of medium-sized businesses used an extranet in 2002 (DTI 2002). A fourth type of IOS was proposed in direct response to the new forms of co-operation and collaboration between organisations and individuals as a result of significant changes in ICT functionality. Such systems can be described as 'platform' and are characterised by interactions via one or more intermediaries, such as e-aggregation application service providers. The four IOS types are shown in Figure 3.5.

Figure 3.5. Types of inter-organisational systems (adapted from Lockett and Brown 2000)



This platform type of IOS is especially significant precisely because it can lead to the formation of new forms of ION, rather than supporting existing configurations. These new forms are themselves manifestations of new business models for these electronic markets. The evolution of application service provision has been rapid and not without much over-optimism on the part of providers and government, particularly with regard to the SME

sector. The technical capability to host applications accessed by remote users using browser technology and electronic communications network has been possible for many years (see 2.3 for details) and is considered from a theory perspective as part of the review of the emergent e-business model literature in the next section.

3.4 E-Business models

The final strand of theory is the emergent e-business model literature, which includes insights into how Internet-based technologies led to new business models. This was particularly important as it informed the understanding of this rapidly evolving area of business, provided the context for application service provision and helped to conceptualise the role of intermediaries. The engagement of SMEs in e-business, through aggregations, could constitute a new model for doing business and is informed by the e-business model literature, albeit from a predominantly large company perspective. Two main themes have emerged from this body of work, firstly attempts to define and identify the components that constitute the e-business models and secondly taxonomies which help to categorise existing business models and identify the trends, (Timmers 2000; Earle and Keen 2000; Kalakota and Robinson 2000; Hamel 2000; Tapscott et al. 2000; Afuah and Tucci 2001; Amit and Zott 2001; Weill and Vitale 2001; Margretta 2002). Firstly attempts to define e-business models and identify the components resulted in several different but related contributions, namely:

Timmers (2000: 32) has been widely cited and defined e-business models as:

“An architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and description of the sources of revenues.”

Tapscott *et al.* (2000: 19) defines business webs as:

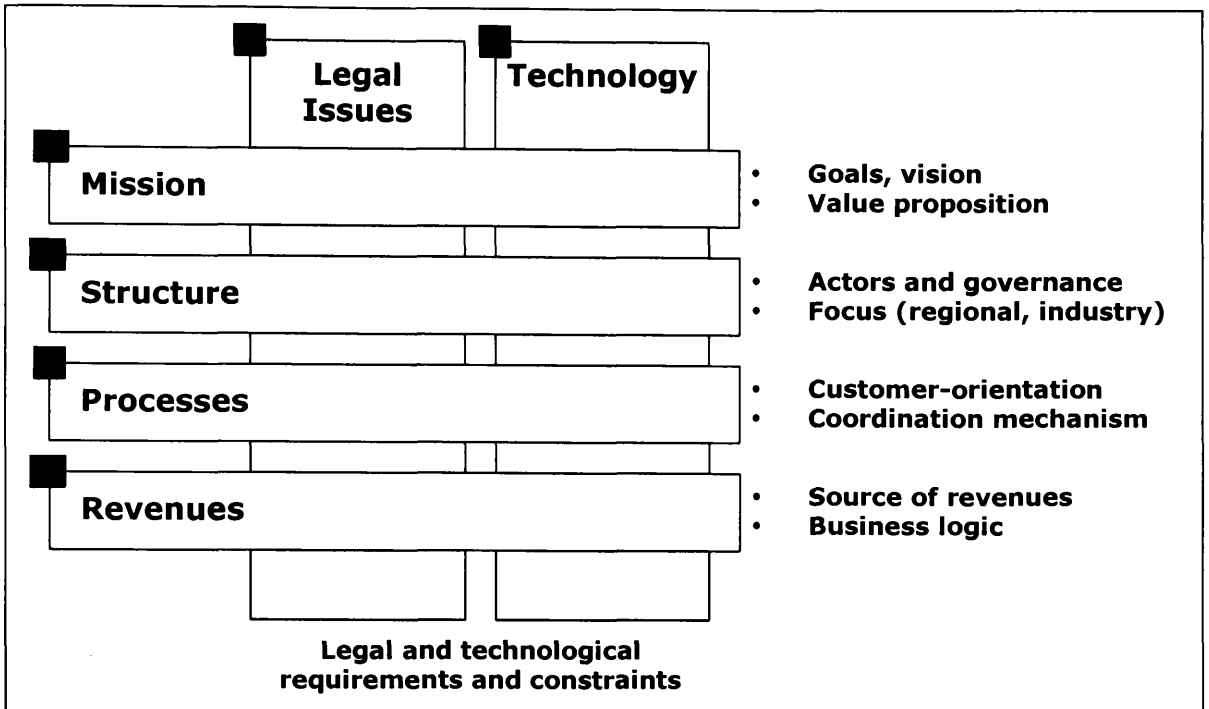
“A distinct system of suppliers, distributors, commerce services providers, and customers that use the Internet for their primary business communications and transactions. The business web consists of nine characteristics, namely Internet infrastructure, value proposition, multi-enterprise capability, five classes of participants, co-operation, customer centric, context, rules and standards, and knowledge intensity. ”

Other authors have highlighted the various elements that constitute a business model, including the components, linkages and associated dynamics, which take commercial advantage of the Internet (Afuah and Tucci 2001) and major components, bridge links and underpinning factors (Hamel 2000). Table 3.2 contrasts Timmers and Afuah and Tucci, from research originating from studying Internet-based businesses, and Hamel, from research originating from studying innovation.

Table 3.2. Comparison of business model elements

Timmers (2000)	Afuah and Tucci (2001)	Hamel (2000)
Architecture for: <ul style="list-style-type: none"> ▪ Product ▪ Service ▪ Information flows 	Business model: <ul style="list-style-type: none"> ▪ Components ▪ Dynamics 	Major components: <ul style="list-style-type: none"> ▪ Core strategy ▪ Strategic resources ▪ Customer interface ▪ Value network
Description of: <ul style="list-style-type: none"> ▪ Actors & their roles ▪ Potential benefits for actors ▪ Sources of revenues 	Business model: <ul style="list-style-type: none"> ▪ Value configurations ▪ Financing 	Linked by 'bridge' components: <ul style="list-style-type: none"> ▪ Configuration of activates ▪ Customer benefits ▪ Company boundaries
Marketing model: <ul style="list-style-type: none"> ▪ Business model ▪ Marketing strategy 	Internet: <ul style="list-style-type: none"> ▪ Technology ▪ Properties 	Underpinned by four factors: <ul style="list-style-type: none"> ▪ Efficiency ▪ Uniqueness ▪ Fit ▪ Profits boosters

Figure 3.6. Elements of e-business model (Alt and Zimmerman 2001)

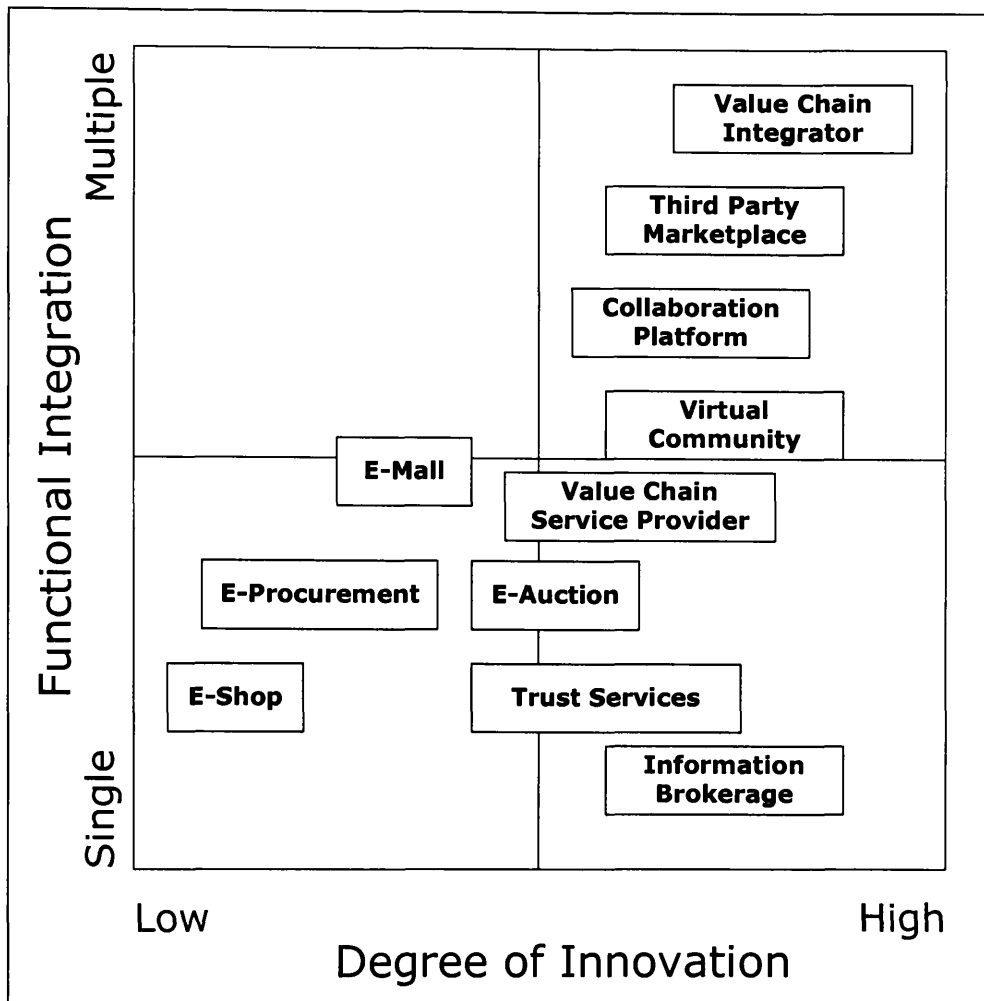


Alt and Zimmermann (2001) compared various business model definitions and proposed a useful generic definition of e-business models. This included four core components, namely mission, structure, processes and revenues together with the two 'cross cutting' elements of legal issues and technologies, Figure 3.6.

The key characteristics of the Internet that impact on e-business models, included:

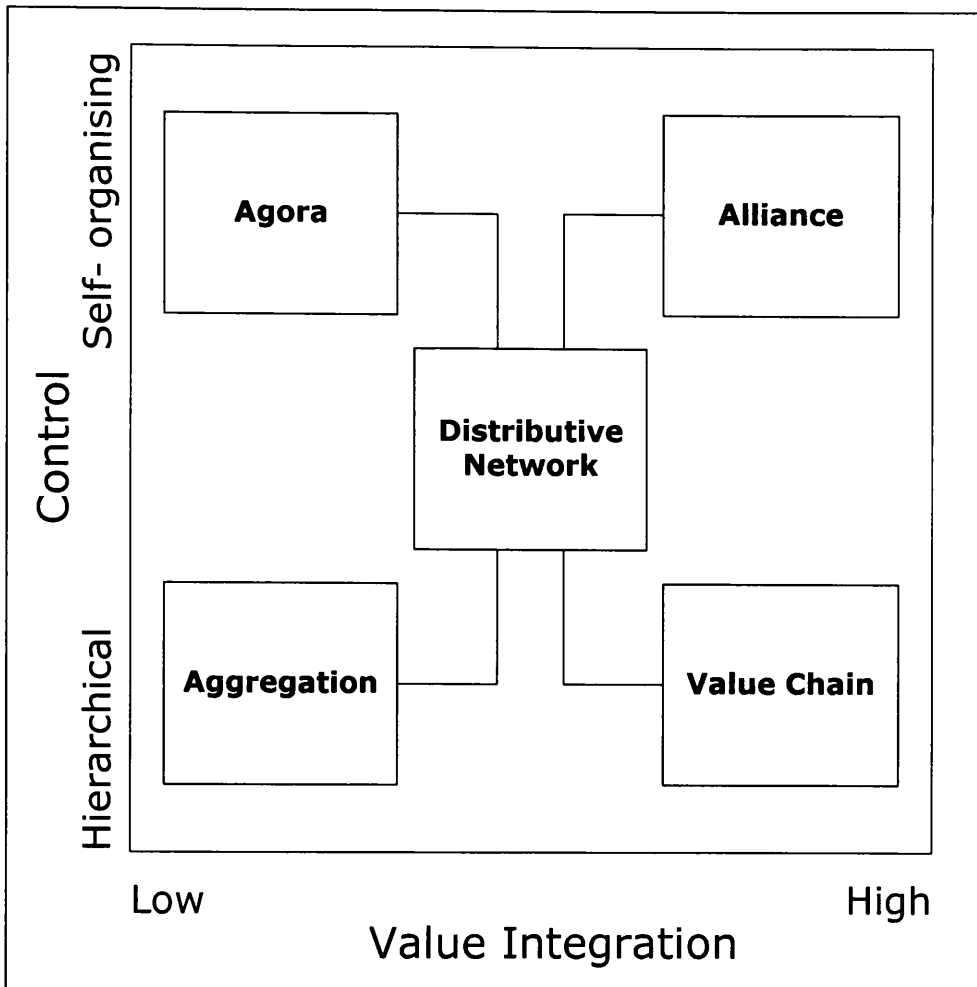
- Availability, ubiquity, global, local, digitisation, multimedia, interactivity, 'one to one', network effects and externalities, and integration (Timmers 2000: 10)
- Mediating technology, universality, network externalities, distribution channel, time moderator, information asymmetry, infinite virtual capacity, low cost standard, creative destruction, and transaction cost reduction. Leading to five impacts: co-ordination, commerce, community, content and communication (Afuah and Tucci 2001: 32)

Figure 3.7. Taxonomy of e-business models (Timmers 2000)



Timmers (1999) has proposed a broad taxonomy based on functional integration and degree of innovation resulting in 11 types from e-shop to value chain integrator, Figure 3.7, whilst Tapscott *et al.* (2000) differentiates by control and value and identifies five distinct types of ‘business webs’, Figure 3.8. Timmers concluded by identifying a trend towards “increased integration of information flows” (value chain integrator) and a trend towards “the development of specialised, highly innovative services” (information brokerage). Timmers usefully noted that e-business models are “not always mutually exclusive” (1999: 45) and can be combined. For example Amazon could be consider to consist of e-shop (books), e-mall (zShops), e-auction (e-marketplace), virtual community (reviewers) and service provider (ToyRus) e-business models.

Figure 3.8. Taxonomy of business webs (Tapscott *et al.* 2000)



Whilst Timmers and Tapscott produced useful overall taxonomies other authors have developed models specific to particular applications, including business to business (B2B) vertical supply chains (Kalakota and Robinson 2000) and value-adding intermediaries facilitating collaborative and community-based enterprises (Earle and Keen 2000). In the particular context of SMEs the scope for application service providers to serve ‘natural’ marketplaces of SMEs with SME-orientated applications has been noted (Mazzi 2001). Kalakota and Robinson (2000) identified 20 major trends that were driving e-business all of which would have an impact on all sizes of businesses, Table 3.3. Whilst large business may have the resources to take risks in order to identify and adapt to these trends, small businesses may find this challenging both from a resource and knowledge perspective.

Table 3.3. Major trends driving e-business (Kalakota and Robinson 2000)

Category	Trend
Customer	1. Faster service 2. Self-service 3. More product choice 4. Integrated solutions
E-Service	5. Integrated sales and service 6. Seamless support 7. Flexible fulfilment and convenience 8. Increased process visibility
Organisational	9. Outsourcing 10. Contract manufacturing 11. Virtual distribution
Employee	12. Hiring the best 13. Keeping talented employees
Enterprise technology	14. Integrated enterprise applications 15. Multi-channel integration 16. Middleware
General technology	17. Wireless web applications 18. Handheld computing appliances 19. Infrastructure convergence 20. Application service providers

When examining the uptake of e-business approaches amongst SMEs the concepts of collaboration, interdependence, power and trust also provide important contributions. The need to encourage SME engagement in e-business has been readily acknowledged by industry and government but just how this was to be achieved, particularly with the more complex e-business application areas, remained unspecified. However the concept of aggregation addressed through new intermediaries is increasingly being recognised by many authors, including aggregations (Mazzi 2001), B2B e-marketmaker (Kalakota and Robinson 2000), and value-adding intermediaries (Earle and Keen 2000). The Internet has spawned many new business models. Of special relevance to this research, however, has been the potential of Internet technologies to facilitate the development of new and economically viable inter-organisational systems (IOS), which have led in turn to new aggregation or network-based business models. The concept of aggregation and the addressing of online aggregations through new intermediaries, typically by ASPs, is increasingly being recognised as an important development. However only recently have researchers published more critical, reflective and impartial evidence of ASP business

models and adoption by SMEs (Dewire 2001; Patnayakuni and Seth 2001; Kern *et al.* 2002; Desai and Currie 2003; Susarla *et al.* 2003; Yoa 2003). This lack of academic literature is noted by Heart and Pliskin (2001) and Desai and Currie (2003).

Ward and Peppard (2002) place application service provision within the context of outsourcing strategies and in particular its role in selective outsourcing. They note that “ASPs primarily target SMEs that cannot afford their own IS functions” (2002: 574) but conclude that customers remain to be convinced. The value proposition for ASPs is still emerging but benefits can be significant and the adoption decision requires consideration of multiple factors, Tables 3.4 and 3.5.

Table 3.4. Potential user benefits of application service provision (Ward and Peppard 2002)

Benefit	Description
Reducing TOC	Total cost of ownership can reduce by between 30% and 60% over purchasing and managing hardware and software.
More predictable costs	Rental business model transfers financial risk of software and hardware to ASP.
Flexibility	Contracts typically one year with minimal exit fees. Generally able to change services used.
Quicker deployment	Significant reduction in the overall implementation time of IOS into productive operation.
Reduction in complexity	ASP manage the IT infrastructure themselves. Organisations buy a service rather than software application.

Table 3.5. Factors for consideration when selecting ASP (Ward and Peppard 2002)

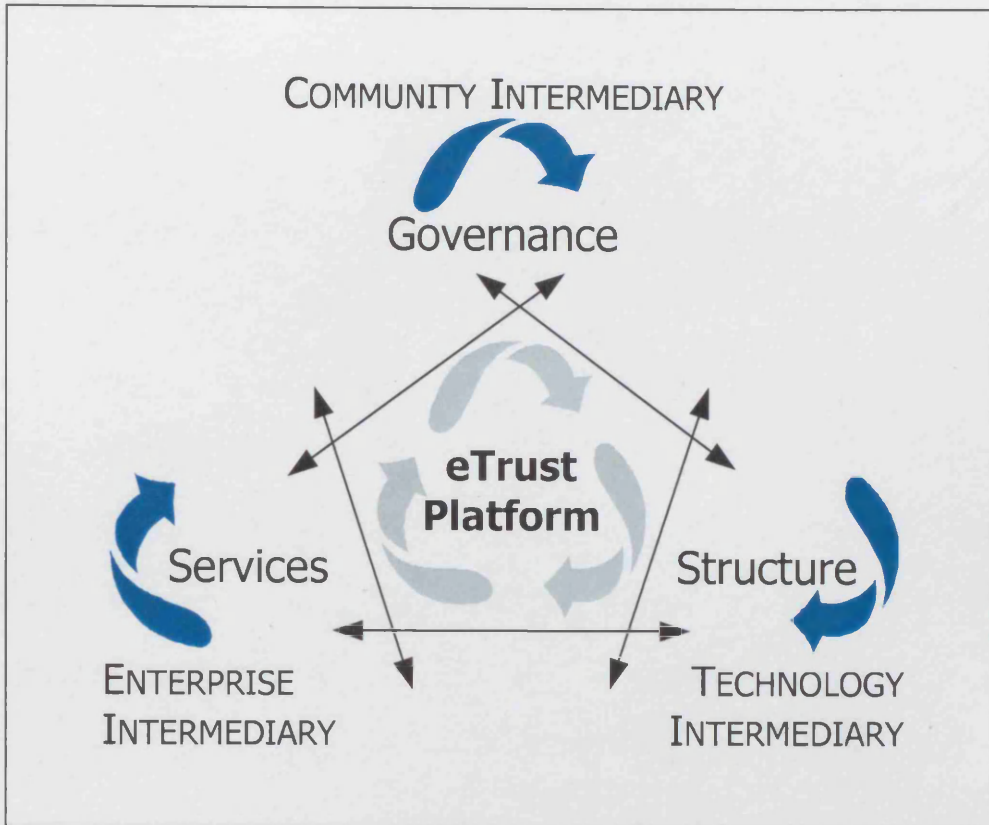
Factors	
Failsafe back-up servers to ensure 24x7x365	Set-up templates to speed implementation
Automatic load balancing to ensure accessibility	Simple set-up for new users
Highly configurable application level security	User statistics by application
Offline data back-up scheduling	Automatic up/download from application
Service level agreement to ensure performance	E-Mail delivery of alerts and reports
Secure access to application servers	Online FAQs, manuals and training courses
Support for EDI	Online support via e-mail and real-time chat

Kern *et al.* (2002) explored the strategic outsourcing nature of ASPs arguing that there were many similarities with more traditional IT outsourcing through the use of a

contingency model, which incorporated resource dependency, resource-based transaction cost and agency theory. Currie and Seltsikas (2001) also noted the similarity between IT outsourcing and applications service provision but also that SMEs had little experience of outsourcing. Interestingly their study stated that of the 424 ASPs reviewed over 45 percent failed, over the four years of the investigation, and that only 42 percent had survived in their original form with the remainder being the subject of mergers and acquisitions. Patnayakuni and Seth (2001) similarly described ASPs as a new model of IT outsourcing and proposed an adoption model which incorporated social exchange theory, particularly concerning power and trust. More elaborate and ambitious models have recently been proposed by Yao (2003) with an 'integrative adoption' model, which included economic, strategic and social factors and by Jayatilaka *et al.* (2003) with an 'interpretative perspective' model, which attempts to select appropriate elements from transaction cost, resource-based, resource dependence and knowledge-based theory. The comparison of the traditional IT outsourcing and ASP models highlighted the differences in the target clients, namely large organisations with their own IT departments and initially SMEs with low IT expertise respectively. Interestingly the recent trend for larger organisations to adopt the ASP model was identified. Clearly there are differences between IT outsourcing and the ASP model both in terms of user, provider, delivery and functionality but the extensive research on IT outsourcing has much to contribute to this emerging field, not least in the strategic nature of this decision regardless of the company size (Willcocks and Lacity 1998; Willcocks *et al.* 2000; Kern *et al.* 2002). The impact of companies' decisions to adopt the ASP business model was beginning to emerge from published research and indicated the complex nature of measuring customer satisfaction and the strong relevance of the IT outsourcing literature (Susarla *et al.* 2003).

This section proposes an important new conceptualisation of intermediaries and their role in facilitating e-business engagement by SMEs based on the platform type of IOS, namely the eTrust Platform, Figure 3.9. This conceptualisation was derived from earlier research into the Internet Business Community concept and other attempts to conceptualise the role of intermediaries in the digital economy. The eTrust Platform can be summarised as the provision of the necessary structure, services and governance that will enable online aggregations of SMEs to function. Each of these in turn is provided by three kinds of intermediary, namely technology, enterprise and community. The role of the technology intermediary is to provide the ICT platform on which services can be provided and could include hardware, security and communications. The role of the enterprise intermediary is to provide the services including applications software, hosting and consultancy. The technology and enterprise intermediaries can be considered as generic. In reality these functions could be provided by one or more organisations. The community intermediary, being specific to a particular aggregation, has a critical role in gaining the commitment of potential participants to enter the e-aggregation and can be considered as a trusted third party. It is the community intermediary, providing a broad governance function, which is a distinguishing characteristic of the eTrust Platform conceptualisation.

Figure 3.9. eTrust Platform (developed from Brown and Lockett 2001)



Although unlikely it would be theoretically possible for a community intermediary to also provide structure and services. More elaborate platform conceptualisations or models have been proposed including; the Media Reference Model with four layers and four phases (Lechner and Schmid 2000), the VEGA Reference Model with four layers of business, process, service and infrastructure (Suter 1999) and a 'framework of e-services' divided into three layers of basic services and five layers of business services (Kluber *et al.* 1999). The eTrust Platform provides a simple conceptualisation that highlights the collaboration required by intermediaries in order to achieve the appropriate levels of trust necessary for member participation and commitment. In reality there may be intermediaries involved in the provision of such platforms but the conceptualisation provides a new explanatory framework. Theoretically the role of the intermediary as a means of facilitating the diffusion of complex information technologies has been observed by a number of authors,

most notably Swan and Newall (1995); Swan *et al.*, (1998) and Newall *et al.*, (2000). In these particular instances it was the professional associations that assisted in this way. In terms of the above conceptualisation these associations were fulfilling elements of both the enterprise and community intermediary roles. However, the setting for these authors' works was not SME-specific and was not concerned with the viability of provision.

Within the context of an interpretative framework the e-business model literature supports the inclusion of two elements, namely intermediaries and service provider models, where:

- Intermediaries - actors who specifically participate with service providers to promote adoption (Earle and Keen 2000; Kalakota and Robinson 2000; Mazzi 2001; Tapscott *et al.*, 2000; Timmers 2000).
- Service provider business model - consisting of four core components, namely mission, structure, processes and revenues together with the two 'cross cutting' elements of legal issues and technologies (Tapscott *et al.*, 2000; Timmers 2000; Alt and Zimmermann 2001).

3.5 Proposed template for the dimensions of aggregation

The purpose of this review has been to both understand previous work and perspectives in a way which helps position the research and importantly to provide a basis for interpretation. It has located the research in the context of both the theory and praxis that was believed to be relevant to the engagement of SMEs in e-business, and was addressed in Chapters 2 and 3 respectively. Within the above the concept of aggregation is central to the argument in this thesis and in Table 3.6 the key characteristics and dimensions of aggregation, which are evidenced in the literature of theory and praxis, are identified and provide a template for use later in the data collection and interpretation.

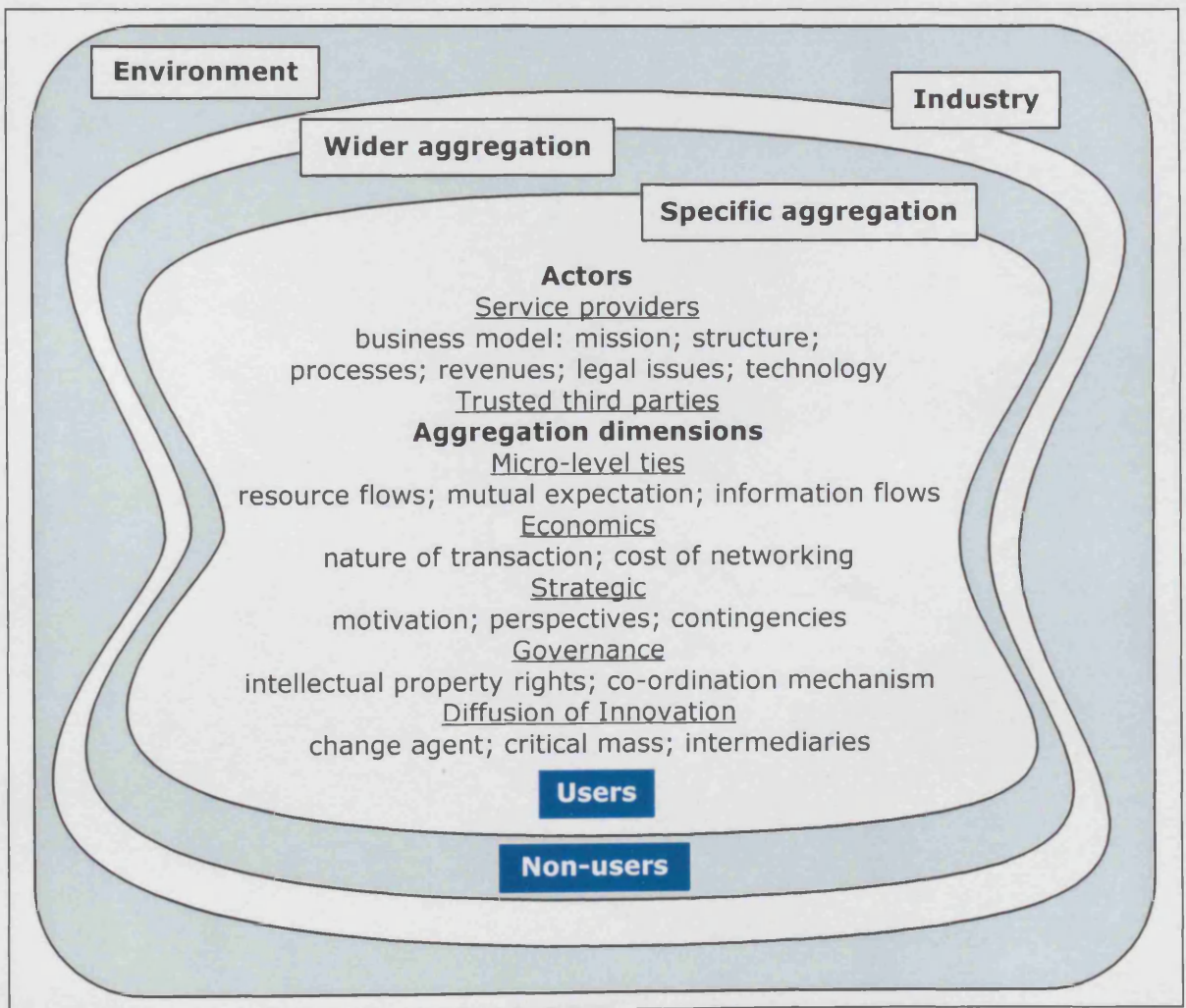
Table 3.6. Template for the dimensions of aggregation

Dimension (section)	Key characteristics
Micro-level ties	
Resource flows (3.3)	Evidence of activity links - support for access to shared resources as a means of mitigating uncertainties.
Mutual expectation (3.3)	Evidence of resilient trust - strong existing social or experiential support the formation of resilient trust.
Information flows (3.3)	Evidence of catalysts - IOS acting as brokers to enable cost-effective exploitation of informational synergies.
Economics	
Nature of transactions (3.3)	Evidence of value activity - repeat or ad hoc.
Cost of networking (3.3)	Evidence of internal and external costs - balancing of costs versus benefits. Impact of IOS and functionality.
Strategic	
Motivation (3.3)	Evidence of scope and scale - cost savings through economies of scale by joint marketing or production.
Perspective (3.2)	Evidence of intended and emergent strategy - awareness of actors of the strategic implications and opportunities.
Contingencies (3.3)	Evidence of institutional and relational relationships - instigation of network from environmental conditions or from existing social linkages between actors.
Governance	
Distribution of property rights (3.3)	Evidence of governance of property rights - contractual agreements govern the behaviour of actors.
Co-ordination mechanism (3.3)	Evidence of governance of behaviour - relates to the rules of conduct and informal allocation of resources and responsibilities among actors.
Diffusion of innovation	
Change agent (3.2)	Actors who influence others to encourage adoption of innovation by establishing relevance of innovation and facilitating communication.
Critical mass (3.2)	Adoption of interactive innovations. Critical mass occurs when enough users have adopted the innovation for further adoption to be self-sustaining.
Intermediaries (3.4)	Actors who specifically participate with service providers to promote adoption.

The above template consists of five dimensions of aggregations, namely micro-level ties, economics, strategic, governance, diffusion of innovations and provider business models, which were drawn from each of the strands of theory detailed in Section 3.1 to 3.4. The template is located within a wider context, which includes four systemic constructs, namely: (i) the ‘environment’ is taken to be the factors which lie outside the influence of any of the actors, such as the evolution of the Internet and its rapid adoption by individuals, (ii) the ‘industry’ is taken to be the notional industry sector, such as agriculture or

construction, in which the actors may be involved but of which they have little direct control, and (iii) the 'wider aggregation' consists of enterprises which have similar characteristics to those in the 'specific aggregation' but are not related to them. The fourth systemic construction is the specific aggregation itself, Figure 3.10. The relationship of the template for the dimensions of aggregation to the methodology is illustrated in Figure 5.7. The template informed both qualitative and quantitative elements of data collection in the research design. Furthermore it supported the rigorous iterative process of identifying key findings and developing conclusions. This research design is detailed in the next chapter.

Figure 3.10. Context for the template for the dimensions of aggregation

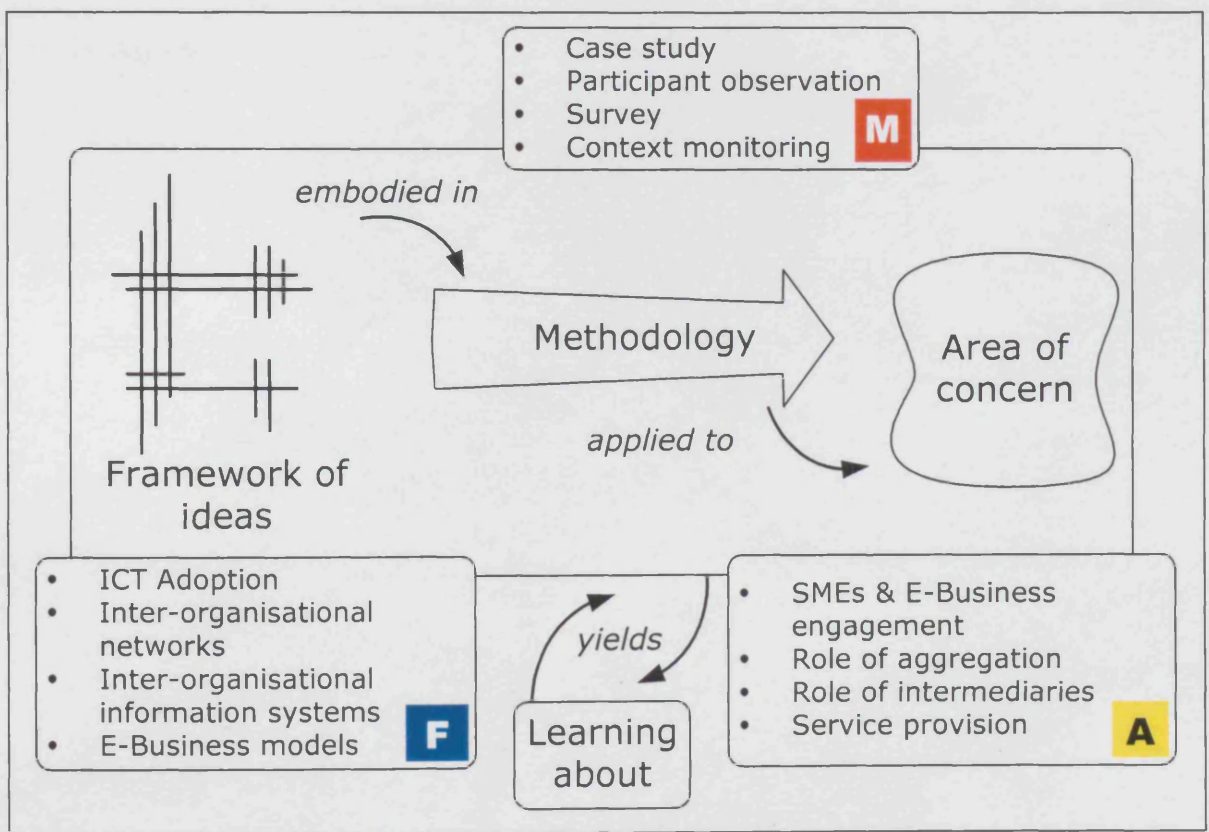


4 RESEARCH METHODOLOGY

4.1 Introduction

This methodology chapter sets out the rationale for the selection of a range of methods for investigating the area of concern with reference to both the framework of literature and the body of knowledge supporting the use of qualitative and quantitative research instruments. The FMA research model, Figure 4.1, provides the overarching framework for this empirical investigation.

Figure 4.1. Thesis research model (adapted from Checkland 1985)



Initially the nature of the research enquiry is examined, in particular the dimensions of philosophical perspective and degree of intervention, together with a consideration of the use of qualitative and quantitative research instruments. The selection of methods is then

underpinned by considering the use of triangulation at both methods and data collection levels before leading to a more detailed description of each approach, including case study, participant observation, context monitoring and survey research. It is important to acknowledge from the outset that case study was the dominant approach which informed the data collection, analysis and presentation of this thesis. The use of the case study method in this investigation helped to provide an internal consistency to the investigation and importantly a structure for interpreting the subsequent narratives.

The selected methods sought to answer the following five research questions:

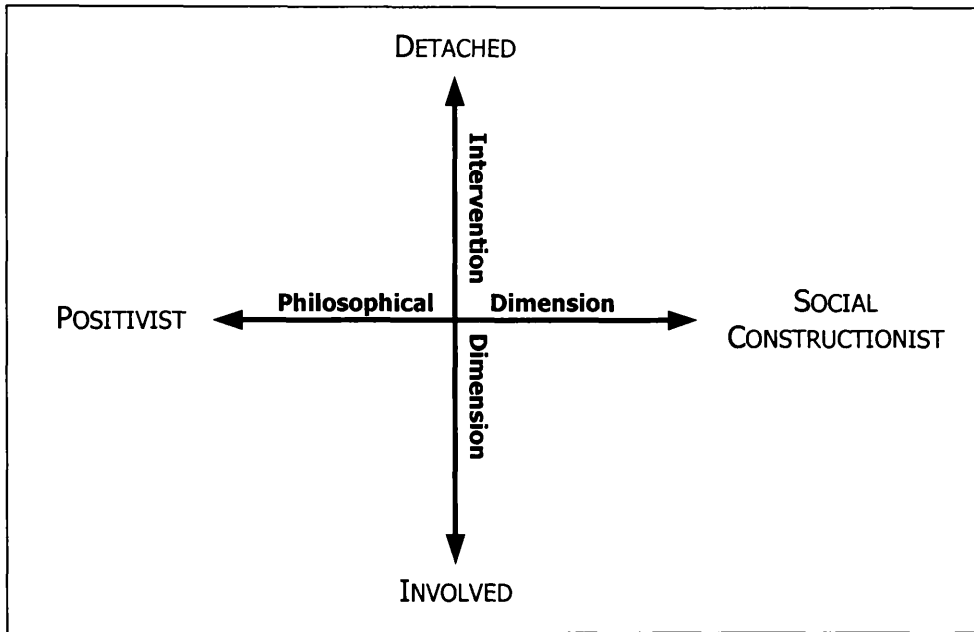
1. What is the current position for SMEs with reference to the adoption of e-business technologies?
2. What evidence is there of aggregations of SMEs and what is their role both currently and potentially as a result of e-business developments?
3. What are the potential roles and mechanisms for intermediaries in facilitating SME e-business engagement?
4. What are the possible business models from a provider perspective?
5. Does ICT adoption, inter-organisational network and e-business model theory provide an appropriate interpretive framework for understanding electronically facilitated networks?

4.2 Nature of research

The essentially phenomenological nature of the area of concern necessitated the careful selection of methods as part of the research design in order to reduce the risk of limited or superficial data collection and to provide a framework for interpretation. To assist in this process the matrix of research philosophies proposed by Easter-Smith *et al.* (2002) was

used, Figure 4.2. This matrix identifies two important dimensions for considering methodologies namely philosophical (positivist to social constructionist) and intervention mode (detached to involved), and is used to illustrate and compare the research methods used in this investigation.

Figure 4.2. Matrix of research philosophies (Easterby-Smith *et al.* 2002)



4.2.1 Characteristics of positivism and social constructionist dimension

The nature of the philosophical dimension is best understood by considering the extreme cases, that is from the focus on facts in the positivist approach to values in the interpretative social constructionist approach, which attempts to deduce meaning from rich contextual information. The declared position on this dimension strongly influences the methodologies used to conduct an investigation. Positivist methodologies tend to look for regularities in the data and propose general findings which apply to wider populations (hypotheses testing), whereas social constructionist methodologies tend towards open views of research where the findings will emerge from the research data (ethnography). Easterby-Smith *et al.* (2002) attempts to summarise the differences between positivism and social constructionist approaches, Table 4.1.

Table 4.1. Perspective on validity, reliability and generalisability (Easterby-Smith *et al.* 2002)

	Positivism	Social constructionist
Validity	Do the measures correspond closely to reality?	Does the study clearly gain access to the experience of those in the research setting?
Reliability	Will the measures yield the same results on other occasions?	Is there transparency in how sense was made from the raw data?
Generalisability	To what extent does the study confirm or contradict existing findings in the same field?	Do the concepts and constructs derived from this study have any relevance to other settings?

4.2.2 *Characteristics of detached or involved dimension*

The relationship between the researcher and the subject of the research - the intervention mode - adds the second dimension to the matrix, which again is best illustrated by the extreme cases. The first is where the researcher has no involvement or is completely detached and there is no attempt to influence the behaviour of the actors in the area of concern, indeed it would be counter to the research design to do so (e.g. survey research). The second is where the researcher explicitly recognises that involvement will influence the outcome and furthermore that it is part of the learning process and facilitates data collection (e.g. action research).

4.2.3 *Pros and cons of quantitative and qualitative methods*

Having considered both the philosophical and intervention dimensions this leads to the distinction between quantitative and qualitative methods and finally to the decision to use mixed methods or a triangulation.

At a simple level it is possible to state that quantitative methods, such as survey research, are essentially positivist in approach in that there is an objective truth under investigation. From this follow three separate stages of research: firstly data collection, secondly data analysis and finally findings which are deduced from the analysis. In the example of the

survey research method hypotheses can be developed and be statistically validated or refuted. The advantage of such methods is the ability to express with some statistical confidence the attributes and differences of the different sample groups under investigation. These statements can be verified or challenged by others either by repeating the analysis of the dataset or by using different statistical methods. Positive statements can be extracted to 'prove a point', such as "66 percent of participants using aggregation-specific applications considered themselves to be part of a business network compared with only 35 percent of non-users". This illustrates both the advantages and disadvantages of such quantitative methods, namely that they support 'what' questions (providing the meaning of the entity in question is clear) and enable simple direct questions to be asked and responded to but often fail to contribute to answering the 'why' questions and are vulnerable to oversimplification. In this example what is meant by 'business network' could be open to interpretation, and explaining why 'aggregation-specific applications' produce such a difference (66% vs. 35%) in terms of the membership of a business network is a complex question, beyond a quantitative approach.

Qualitative methods can be summarised as broadly being ways to extract insights from a domain under investigation in order to construct explanations. Whilst these could be seen as upholding a social constructionist philosophy they can in fact be highly structured and codified particularly in the analysis phase. One advantage of qualitative methods is that they support the understanding of 'why' an event or situation happened and can include a variety of different methods including interviews, participant observation and action research. Some researchers propose that all events are constructed by the observer who subsequently 'tells the story' and are inherently unique and unrepeatable. This research however seeks to use qualitative methods to help explain a phenomenon in a way which

whilst not repeatable is at least rigorous and defensible. The deliberate decision to use multiple methods or triangulation is discussed in the final section but each of these methods is considered individually in the following sections.

4.3 Case study method

The choice of case study as a research method is central to the design and interpretation of this thesis. There are a number of methodologies which come under case study methods most noticeably Yin (1994) and Stake (1995), which can be distinguished by their level of intervention. Stake takes a more involved approach, closer to action research, where the potential for the researcher to assist is greater and is less concerned by issues of validity (Easter-Smith 2002). On the other hand Yin attempts to achieve a high degree of validity consistent with more positivist approaches and can include both quantitative and qualitative data. The latter type of case study (Yin) was selected in the research design because of the focus on validity, rigour and support for logical comparison. Yin sets out the main features of case study empirical inquiry as firstly that it is used to investigate a contemporary phenomenon within its real life context, and secondly “when the boundaries between the phenomenon and the context are not clearly evident” (1994: 13). This investigation of SME e-business engagement by aggregations of SMEs meets both of these key characteristics. In addition Yin proposes three additional (technical) characteristics, namely that (i) there are many variables from (ii) multiple data sources from which the data collection and analysis benefit from a (iii) declared theoretical framework. Case study research designs can be considered at five levels, namely (i) questions, (ii) propositions, (iii) unit of analysis, (iv) linking data to propositions and (v) criteria for interpreting the findings.

4.4 Selection of cases

The selection of cases was critical to this thesis and required a broad approach to identify potentially rich data opportunities. In essence cases needed to provide insights into the context for, and use of, e-business applications by groupings or aggregations of SMEs. In this thesis a 'case' is defined as a number of units of analysis (where the units of analysis are the individual firms) which together comprise a meaningful construct for answering the research questions. Therefore three case types are considered as follows:

1. An aggregation case consists of those firms, including SMEs, which are served by an aggregation-specific application (e-aggregation application), trusted third parties and service providers. There are five such aggregation cases. These cases are intended to provide a rich understanding of the use of e-aggregation applications by using both qualitative and quantitative methods. In addition a sample of non-users were surveyed.
2. A trusted third party case consists of organisations trusted by SMEs within aggregations. These include both aggregations where there are aggregation-specific applications and where there are not. There are 13 such trusted third party cases. These cases are intended to assist in the appreciation of the role of trusted third parties in the context of e-business and SMEs.
3. A service provider case consists of enterprises providing both vertical and horizontal applications and services to SMEs. These included providers of e-aggregation applications but importantly other service providers attempting to address the SME sector. There are 12 such service provider cases. These cases are intended to assist in appreciating the role of service providers in the engagement of SMEs in e-business.

This research was informed by the taxonomy of aggregations and the conceptualisation of the eTrust Platform (Figures 3.4 & 3.9) and resulted in the identification of e-aggregation

applications (e.g. project management application). These provided a focus for the selection of cases by identifying roles within the context of e-business engagement by aggregations of SMEs. In particular, organisations that were involved as intermediaries operating within both offline and online aggregations were approached. Three groups of cases were explored through this activity, namely (i) aggregation cases, (ii) trusted third party cases and (iii) service provider cases, with the majority of the aggregation cases including survey research of both users and non-users of e-aggregation applications.

The sample frame was derived from the eTrust Platform conceptualisation and the taxonomy of aggregations. The eTrust Platform model identifies two important intermediary types. The first is the community intermediary which represents or governs the aggregation. The second is the enterprise intermediary which delivers the services or applications. Together these two intermediaries represent the provider perspective and constitute the data sources. (The third intermediary is the technology intermediary which lies outside the scope of this investigation and which for users is largely invisible). The taxonomy of aggregations identifies the four aggregation types – association, limited, cluster, and networks. Combining these models provided a sample frame in which intermediaries, either enterprise or community, could be associated with different aggregation types. In the case of the enterprise intermediaries a further subdivision into horizontal and vertical service providers was possible. A key issue in the research was the fact that the established base of e-facilitated SME aggregations was very small and hence populating the sample frame was governed by what was available, rather than some empirical ideal. A total of 42 potential organisations were identified from literature and Internet searches and these were approached in order to identify senior managers and negotiate access. Some 24 organisations agreed to participate and are categorised by

intermediary and aggregation types, Tables 4.2 & 4.3; in addition two expert sources were selected to provide an additional independent perspective, Table 4.4. This resulted in a total of 26 data sources.

Table 4.2. Community intermediaries

Business description	Size	Aggregation type served
1. Newspaper trade association (NTA)	SME	Association
2. Laboratory supplies trade association (LTA)	SME	Association
3. Motor manufacturing trade association (MTA)	SME	Association
4. Company directors association (CDA)	SME	Association
5. Knowledge worker trade association (KTA)	SME	Association
6. Agricultural college (AC)	Large	Cluster
7. Construction media company (CMC)	SME	Cluster
8. Organic certifying body (OCB)	SME	Cluster
9. Oil & gas industry organisation (OGO)	SME	Cluster
10. Media & broadcasting company (MBC)	Large	Network
11. Confectionery Manufacturer (CM)	Large	Network
12. Area business organisation (ABO)	SME	Limited

Table 4.3. Enterprise intermediaries

Business description	Size	Provider type	Aggregation type served
13. Advertising artwork management ASP (AMP)	SME	Vertical	Association
14. Community management ASP (CMP)	SME	Vertical	Association
15. Sporting community management ASP (SMP)	SME	Vertical	Association
16. Dairy herd management ASP (DMP)	SME	Vertical	Cluster
17. Organic field management ASP (FMP)	SME	Vertical	Cluster
18. Information management ASP (IMP)	SME	Vertical	Network
19. Project management ASP (PMP)	SME	Vertical	Network
20. Utility e-marketplace provider (UMP)	Large	Vertical	Network
21. E-Business applications ASP (ASP A)	SME	Horizontal	n/a
22. E-Business applications ASP (ASP B)	SME	Horizontal	n/a
23. Enterprise application provider (EAP A)	Large	Horizontal	n/a
24. Enterprise application provider (EAP B)	Large	Horizontal	n/a

Table 4.4. Independent sources

Business description	Size	Sector
25. Business representation expert	Individual	Associations
26. Trade association body	SME	Associations

4.4.1 Data collection

Identification of suitable data sources was undertaken in 2000 and 2001, with the field investigations carried out between 2000 and 2002. Interview data collection took the form of semi-structured interviews with mostly senior managers in the 26 organisations shown in Tables 4.2, 4.3 & 4.4. The semi-structured interviews covered: the context for e-business engagement and SMEs, including special factors and personal experience; the evidence and nature of aggregation, including governance, intermediary roles and actual or future actors; provider business models, including strategy, structure, processes, revenues, legal issues and technology - see interview template Appendix II. This interview template was used as a guide to the discovery process and rather than a precise interview script. Thus questions were shaped by the individual situation and perceived knowledge of the interviewees. Most interviews were conducted on the participant's premises and lasted between 60 and 90 minutes. In some cases several interviews were conducted over a period of 18 months. Interview notes were taken and combined with other supporting data to form case notes. The interviews showed considerable internal consistency, suggesting that the sample numbers were representative. Where possible additional data, marketing material, technical briefs and websites, were collected in order to supplement interview data and achieve a triangulation of data sources. Data analysis was undertaken in parallel to the data collection.

In five industries both community and enterprise intermediaries were interviewed, namely construction, dairy, knowledge worker, media and organic aggregations. These interviews became the basis for the aggregation cases with, in four of the aggregations, survey research being conducted on users of the aggregation-specific application and non-users in the wider aggregation, Table 4.5.

Table 4.5. Data sources for aggregation cases

Aggregation	Community intermediaries	Enterprise intermediaries	Survey research
Construction	Yes (7)	Yes (19)	Yes
Dairy	Yes (6,11)	Yes (16)	Yes
Knowledge worker	Yes (5)	Yes (14)	Yes
Media	Yes (1,10)	Yes (13)	No
Organic	Yes (8)	Yes (17)	Yes

(Numbers in brackets indicate the data source from Tables 4.2, 4.3 and 4.4)

4.4.2 Analysis and method

Qualitative data analysis was undertaken in parallel to the data collection. The units of analysis were individual enterprises in three case types, namely (i) five aggregations, (ii) service providers, (iii) trusted third parties. The overall method of data collection and analysis was rooted in the concept of embedded case design as suggested by Yin (1994). This necessitated a methodical, systematic approach to the multiple site investigations. Specifically explanation building (Yin 1994: 110), a type of pattern matching, was used across and within the sample groupings in order to produce defensible research findings. In this explanation building technique the goal is to build a structure narrative about each case. Yin comments that “explanation building has occurred in narrative form” and that because “such narratives cannot be precise, the better case studies are the ones in which the explanations have reflected some theoretically significant propositions”. It should be noted that explanation building is essentially iterative in nature, that is a comparison of data within and across cases in which ideas emerge and are refined. Yin warns of the danger inherent in this iterative process and highlights the need for constant reference to the original purpose of the research in order to avoid drifting away from it. The analysis for this research has attempted to follow this guidance by using the interpretative framework detailed in chapter 3.

4.5 Participant observation

During the course of the empirical investigation an opportunity arose to present the research to a leading enterprise software provider and this was judged to be highly relevant to the research and was pursued. It resulted in both sponsorship and importantly access to senior members of the management team. This access provided an opportunity to participate in the company during its deliberations on how best to approach the increasingly important SME sector. The purpose of this participant observation was to enhance the service provider cases and compliment the other data collected by semi-structured interviews, document analysis and context monitoring. This longitudinal data collection significantly improved the richness of the horizontal application service provider perspective and enabled more in-depth comparisons with providers of e-aggregation applications. More specifically access was granted to the mid-market team, the research manager, marketing director and an e-marketplace manager. As part of the conditions for this sponsorship and access the company commissioned a report on behalf of the mid-market (companies between 50 to 1,000 employees) team responsible for sales and marketing to SMEs in the UK. This involved working with the members of the team, over a period of 6 months, to design, conduct and analyse the research. The role of the author as a researcher was explicit, however participation in the team was also required. The use of participant observation to conduct research is well established (Donald, 1952) and many classifications have been proposed including Junkers (1960) a) complete participant, b) participation as observer, c) observer as participant and d) complete observer to Easterby-Smith (2002) a) researcher as employee, b) research as explicit role, c) interrupted involvement and d) observation alone. The latter classification provided the most appropriate framework for conducting the research, in particular the interrupted involvement. This type of participant observation is defined as:

“involves the observer being present sporadically over a period of time, moving in and out of the organisation to deal with other work or to conduct interviews with, or observation, of different people across a number of different organisations.”

(Easterby-Smith 2002: 113).

In addition it was stated that this type of participant observation is not one of continuous longitudinal involvement and is unlikely to contain much actual participation in work. This element of the research helped to provide additional data for the aggregation cases and an important component of the service provider cases.

4.6 Survey research

The survey research forms an important part of the empirical research design and was necessary in order to appreciate the views of adopters (users) and non-adopters (non-users), thus providing a deeper understanding in the aggregation cases. In this context ‘users’ are defined as enterprises using e-aggregation applications within the aggregation cases and ‘non-users’ are defined as enterprises within the wider aggregation not using e-aggregation applications. In all cases users and non-user samples are independent of each other. In order to gain access to users of e-aggregation applications in the five aggregation cases the service providers were approached resulting in permission being obtained in four cases. Having established this co-operation, quantitative survey research was undertaken using the questionnaire detailed in Appendix III. This questionnaire was constructed after carefully considering the secondary data reviewed in chapter 2. Once the user survey had been conducted the responses and profile of respondents was considered. Non-user samples from within the wider industry were alphabetically selected from the wider aggregation and a survey was conducted using a modified questionnaire (Appendix IV). In

order to support comparison it was important that the user and non-user samples were from similar industries yet were independent of each other. Surveys were conducted between January and May 2002 for the selected user and non-user sample groups as detailed in Table 4.2. For the user survey, populating the sample frame was governed by what was available, rather than some empirical ideal. However an estimated 20 percent response rate was anticipated from the 500 sample frame used for conducting the non-user survey. Comparison between the two sample groups, namely users of e-aggregation applications within the user sample and non-users within the wider aggregation, was undertaken at a combined level. This was a deliberate part of the empirical research design necessitated by the low number of e-aggregation application users available. The user, non-user and comparison data is presented in full in Appendix V. The sum of the four surveys for each sample group were combined in order to enable statistically significant differences to be highlighted. In both independent samples the number of responses was greater than 30 (being 43 for users and 104 for non-users). In this situation the parametric independent samples t-test could be applied and demonstrated statically important differences between the two samples.

The following hypotheses were developed:

The null hypothesis H_0 is: the values for the user and non-user groups are equal.

The alternative hypothesis H_1 is: the values for user and non-user groups are not equal.

The levels of accuracy of the user and non-user responses can be expressed by using the formula in Figure 4.3. With the number of valid responses at 43 for users and 104 for non-users, accuracy levels achieved were at least 92 percent and 95 percent, respectively.

Table 4.6. Selection and data collection for survey research.

Aggregation	Users	Non-users
Construction	Initially a sample of 20 users across different clients was provided by the project management ASP, however this consisted mainly of large contractors and no trusted third parties. At a meeting with an account manager details of 15 SME users of an online project management application, for a large supermarket client's new store building programme, were selected. A jointly agreed letter of introduction was sent to each contractor. These contractors were then contacted by telephone and questionnaires subsequently posted, e-mailed or the URL given for an online version, depending on their stated preference. Two subsequent telephone calls were made or e-mails sent reminding contractors of their agreement to participate. No contractor wished to complete the questionnaire by telephone interview. 10 valid responses were received.	125 building contractors were alphabetically selected from the www.yell.co.uk online directory for North West England. A letter of introduction was sent to each contractor, together with a questionnaire and a stamped addressed reply envelope resulting in 18 valid responses being received.
Dairy	After negotiating with the community intermediary, an agricultural college, access was given to the manager of an online dairy management ASP. At a meeting with the ASP account manager details of 15 SME users were provided. A jointly agreed letter of introduction was sent to each dairy farmer together with a questionnaire and a stamped address reply envelope. One e-mail reminder was sent. No dairy farmer wished to complete the questionnaire by telephone interview. 8 valid responses were received.	125 dairy farmers were alphabetically selected from the www.yell.co.uk online directory for North West England. A letter of introduction was sent to each farmer, together with a questionnaire and a stamped addressed reply envelope resulting in 27 valid responses being received.
Knowledge worker	Access to members of a professional contractors association was negotiated with the chief executive and marketing manager. Initially a request, by the marketing manager, to complete either an online questionnaire or to download a Word version was posted on the general online community forum, which resulted in only one completed questionnaire. A further request, by the marketing manager was included in a member's e-newsletter to 14,000 members and resulted in no responses. Finally a single, jointly agreed, request was e-mailed to members by the marketing manager and resulted in 19 valid responses being received.	125 accountants; solicitors; independent financial advisors; quantity surveyors and structural engineers were alphabetically selected from the www.yell.co.uk online directory for North West England. A letter of introduction was sent to each knowledge worker, together with a questionnaire and a stamped addressed reply envelope resulting in resulting in 21 valid responses being received.
Organic	The manager of the organic field management ASP was interviewed and subsequently provided details of 6 SME users in the UK. These producers were e-mailed a jointly agreed statement and a Word format questionnaire requesting a telephone interview. Each user was telephoned and if consent was given a telephone interview was arranged and conducted. 5 valid responses were received.	125 organic producers were selected alphabetically from the Soil Association online directory for England, Scotland and Wales. A letter of introduction was sent to each producer, together with a questionnaire and a stamped addressed reply envelope resulting in 38 valid responses being received.
Total	43 valid responses	104 valid responses

Figure 4.3. Accuracy formula (Easterby-Smith *et al.* 2002)

$$n = \frac{25000}{E^2}$$

n is the sample size
E is the maximum error

4.7 Context monitoring

The final element to the triangulation is in the form of context monitoring by the intermittent appreciation of public documents, websites and media statements of nearly 20 selected companies, Table 4.7. This appreciative inquiry represents possible methodological originality and is necessary due to limited access to providers and the dynamic and contemporaneous nature of the area of concern. It represents a method of structured data collection in highly dynamic situations. The companies chosen for monitoring were selected because they were operating within the area of e-business engagement SMEs and as intermediaries (see eTrust Platform, Figure 3.9). Each company was monitored to determine any changes in their position relative to SME aggregation, aggregation-specific e-business applications or SME e-business engagement. This element also supports the case study research by the inclusion of additional intermediaries where access was problematical. The theory supporting this approach draws on Vickers appreciative system, which recognises the interacting flux of events and ideas (Vickers 1965). This seminal work on the use of systems thinking draws on the subtle notion of ‘appreciation’ rather than the more positivist goal-seeking model of human activity. Checkland and Casar (1986) extended Vickers’ work to include a diagrammatic representation of the appreciative system, Figure 4.5. This highlights the continuously varying nature of appreciation by recognising that the reality and value judgements made

when considering the flux of events and ideas over time are influenced by previous appreciations. This supports the case for continuous and intermittent consideration of the events and ideas affecting the area of concern during the investigation but importantly recognises that this appreciation by the researcher is influenced by previous observations and changes in the wider context. For practical purposes this context monitoring is enacted by the appreciation of a limited number of carefully selected organisations, Table 4.7. This selection supports the aggregation and service providers case studies.

Table 4.7. Organisations selected for context monitoring

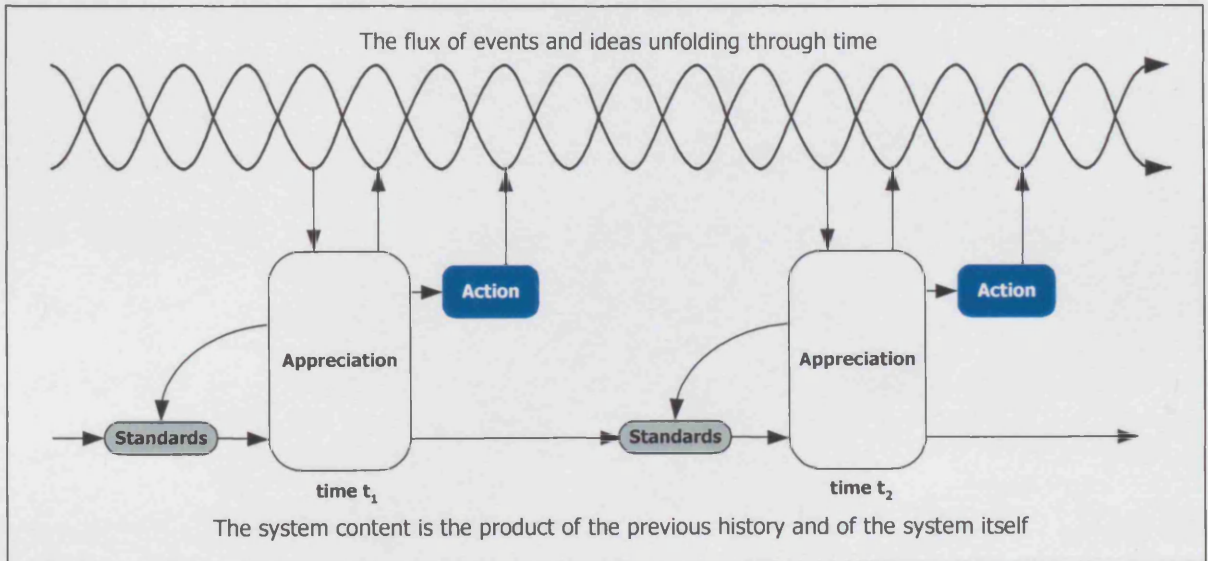
	Name	Intermediary type	Type	Notes
1	Build Online	Community	Construction intermediary	UK-based
2	BuildNet	Community	Construction intermediary	US-based
3	NetDoctor	Community	Healthcare intermediary	European-based
4	webMD	Community	Healthcare intermediary	US-based
5	BizProLink	Enterprise	Marketplace aggregator	US-based
6	VerticalNet	Enterprise	Marketplace aggregator	US-based
7	PurchasePro	Enterprise	Marketplace aggregator	US-based
8	Ariba	Enterprise	Marketplace applications	Global
9	CommerceOne	Enterprise	Marketplace applications	Global
10	Oracle	Enterprise	Enterprise applications	Global
11	PeopleSoft	Enterprise	Enterprise applications	Global
12	Sage	Enterprise	Enterprise applications	UK-based, SME-focused
13	Intuit	Enterprise	Enterprise applications	US-based, SME-focused
14	i2	Enterprise	Supply Chain applications	Global
15	Wesupply	Enterprise	Supply Chain applications	UK-based
16	Agillion	Enterprise	ASP	US-based, SME-focused
17	Corio	Enterprise	ASP	US-based
18	BT	Technology	Telecom and ASP	Global
19	Energis	Technology	Telecom and ASP	UK-based

Sage and Intuit, suppliers of SME-focused enterprise software, provide examples of how context monitoring proved useful in appreciating change over the course of the investigation. Both companies compete in the UK and US markets. Interestingly both launched hosted accounting (horizontal) applications in the US in 2001. However Intuit

announced (resident) industry-specific applications in 2002 and were actively promoting the success of its online accounting application, stating 10,000 users by mid-2003. Neither company offered online accounting applications in the UK or had made any statement regarding doing so. This was in contrast to evidence from the aggregation cases which clearly identified higher complexity applications being used by SMEs in the UK.

It should be noted that this methodological innovation (which the author found helpful) forms only a supporting role in the thesis and its contribution is considered as part of the conclusion.

Figure 4.5. Appreciative inquiry system (Checkland & Casar 1986).

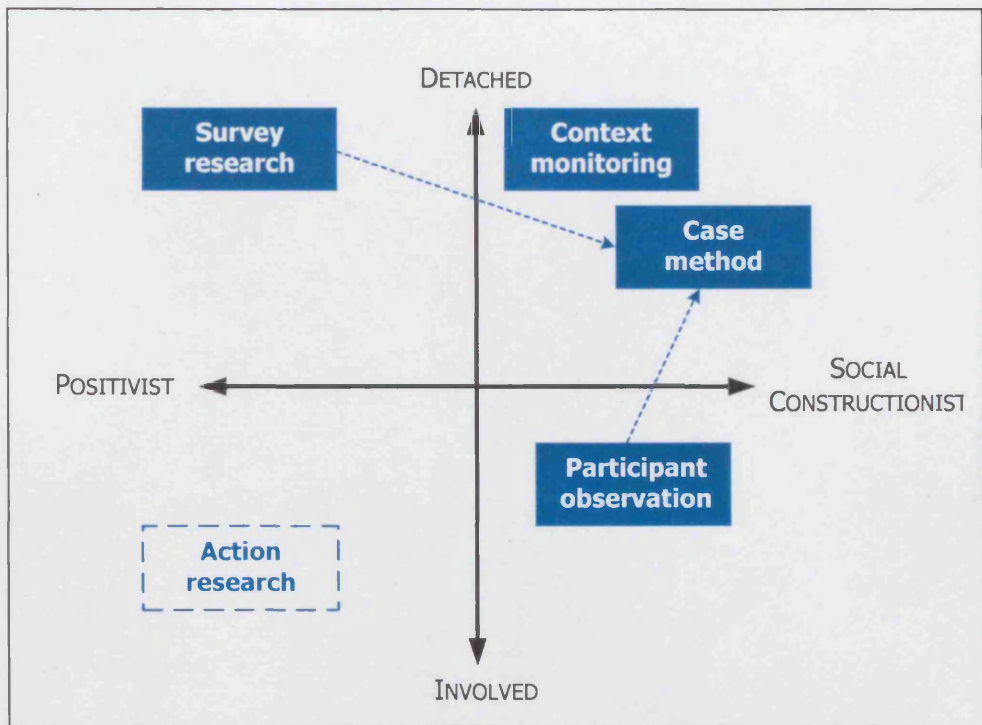


4.8 Triangulation

Triangulation is the use of multiple but independent elements for conducting research and can be categorised as (i) theoretical triangulation, (ii) data triangulation, (iii) triangulation of investigators or (iv) methodological triangulation (Easterby-Smith 2002: 146). Whilst this thesis draws on multiple theory and data sources it is the triangulation of methods which is considered in this section. The mixing of both qualitative and quantitative

methods (triangulation) is not an end in itself but is an imaginative way of maximising the amount of data collected (Todd 1979). It is not intended to be a 'catch all' but is a necessary measure to increase the validity of the findings and reduce risks, (Mason 1996, Silverman 2000). Denzin (1978: 119) states "a final methodological rule is that multiple methods (triangulation) should be used in every investigation". Patton (1987: 61) concludes that 'triangulation is ideal' and can be based on data, investigator, theory or methodology. Mason (1996: 149) is more circumspect regarding the use of triangulation warning that its use does not "provide an easy route to the demonstration of validity of method" but it can support the case that social phenomena are more than one-dimensional. Silverman (2000: 99) also warns that multiple methods (triangulation) are "often adopted in the mistaken hope that they will reveal the whole picture". The deliberate use of triangulation in this research is validated by these authors but is particularly prudent due to the contemporary and emergent nature of e-business engagement by aggregations of SMEs. Five methodologies were initially considered as appropriate for the triangulation, namely qualitative case study, participant observation, action research, context monitoring and quantitative survey research. Context monitoring is a proposed method of continuous appreciation necessitated by constantly changing environmental conditions during the period of the study. The approach to the research is informed by the overall schema in the introduction, which incorporates the framework of ideas that informs both the selection of methodologies and the investigation of the area of concern. At an early stage in the research design it was decided that action research was not feasible (see section 1.1). The four remaining methodologies were integrated into the research design and can be compared in the matrix of research design, Figure 4.6.

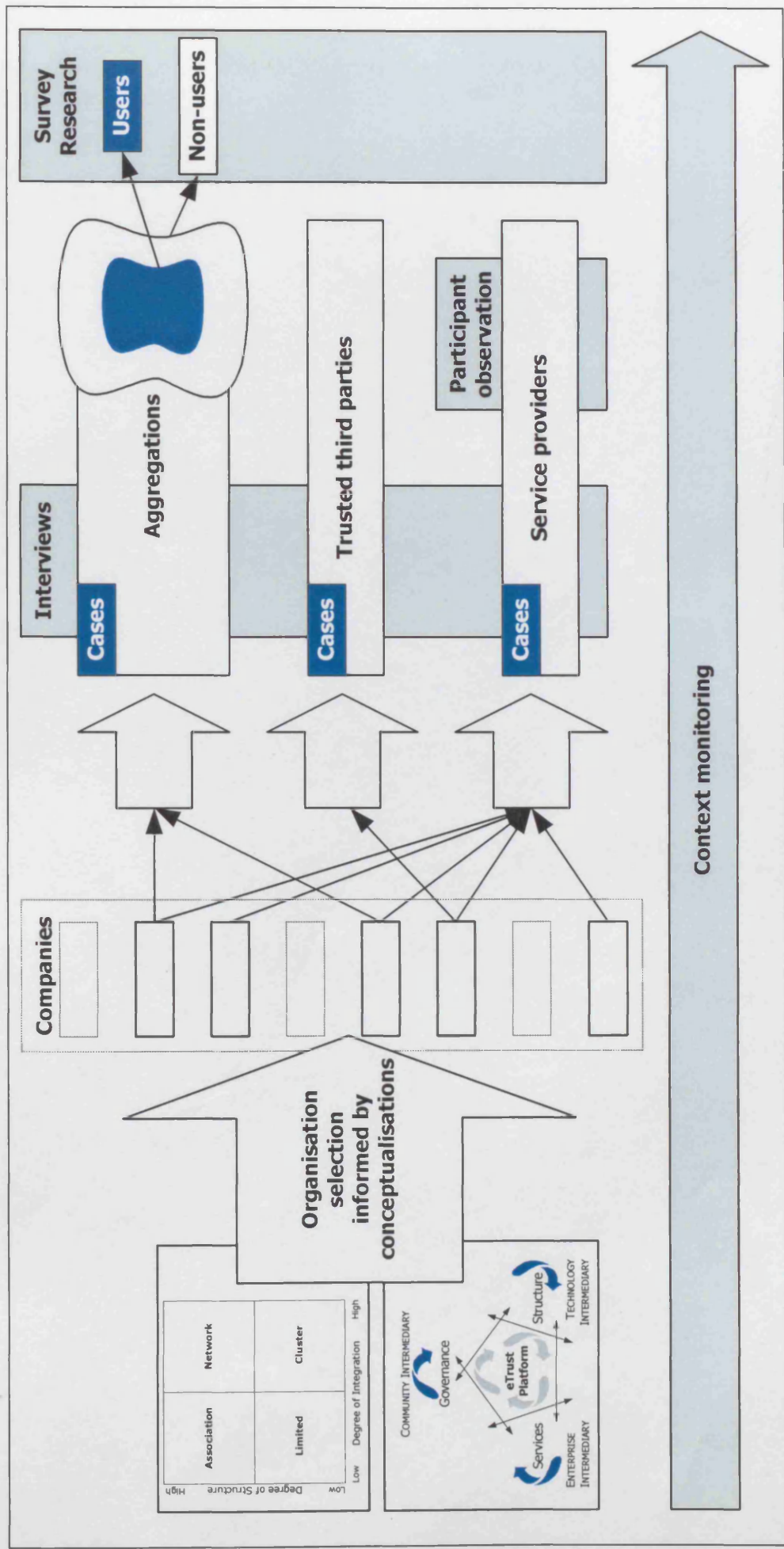
Figure 4.6. Matrix of research design (adapted from Easterby-Smith *et al.* 2002)



Whilst this triangulation of methods, included qualitative and quantitative, detached and involved, and positivist and social constructionist methods they were integrated by the overarching use of case study to provide a rigorous and defensible research design.

This triangulation of research design is consistent with the phenomenological nature of the area of concern and interpretative framework derived from the FMA research model. It includes the careful selection of data sources, case studies built around qualitative and quantitative methods, including semi-structured interviews, participant observation and survey research, and is supported by context monitoring, Figure 4.7.

Figure 4.7. Triangulation of methods



4.9 Summary

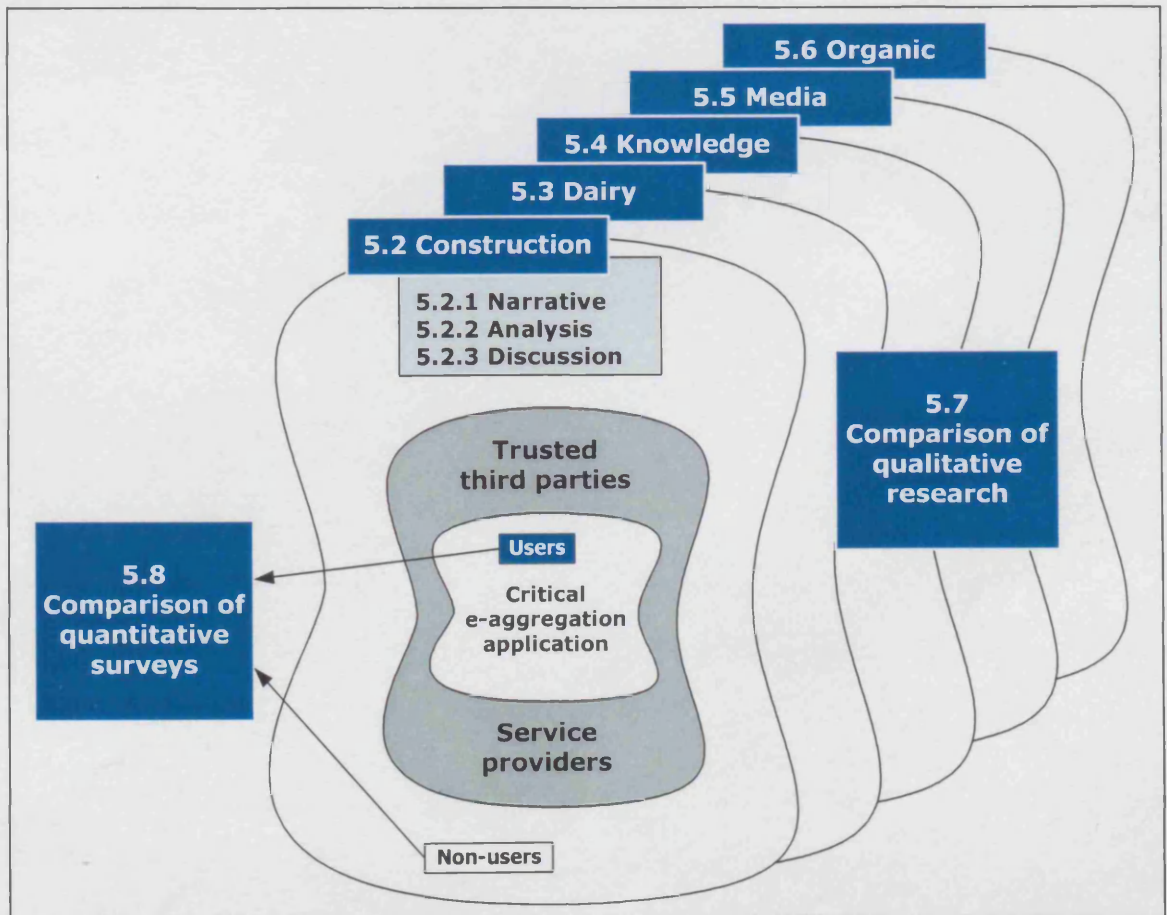
This chapter sets out the rationale for the selection of the methodologies for investigating the phenomenon of aggregations of SMEs engaging in higher complexity e-business applications. The FMA research model, Figure 4.1, provides the framework for a triangulation of four methods, namely case study, participant observation, context monitoring and survey research. These are placed within the dimensions of philosophical perspective and the degree of intervention. Interestingly context monitoring is proposed as a new method particularly relevant to investigating dynamic and contemporary areas of concern. Case study is used as the overarching approach to inform the qualitative and quantitative research instruments used in data collection, analysis and presentation. This deliberate use of triangulation seeks to generate research which incorporates both the user and provider perspectives. The next chapter details these case narratives.

5 AGGREGATION CASES

5.1 Introduction

There are five aggregation cases, namely construction, dairy, knowledge workers, media and organic with each being presented separately in sections 5.2 to 5.6 respectively. In each of the aggregation sections the case narrative is given before the interpretative framework outlined in Table 3.6 is used at the basis for analysis. The remaining two sections, 5.7 and 5.8, compare the qualitative and quantitative research across all the aggregations. Figure 5.1 details the overall structure of this important chapter, including the section numbers for each element.

Figure 5.1. Elements of aggregation cases



5.2 Construction aggregation: Case 1

This case centres on an online supermarket construction project aggregation which includes SME contractors. The case narrative comprises three elements, namely a lead client and media company (trusted third parties), a project management application service provider (ASP) and a survey of users and non-users. Initially the media company was approached before gaining access to the ASP who assisted in surveying the user community. The selection of non-users was independent of these participants.

5.2.1 Narrative

The aggregation was located in the UK construction industry, which could be characterised as an aggregation centred on building projects consisting of multiple organisations, including the lead client, contractors, subcontractors, architects, manufacturers and surveyors. Finch highlights the “transient nature of construction projects and the teams that engage in them to create an environment of continual upheaval” (Finch 2000). The construction industry, of which contractors are an important part, is SME-rich in that statistically 100 percent of the enterprises have less than 250 employees (SBS 2002).

The construction aggregation was formed from existing contractors involved in building supermarkets for the lead client. Not all contractors used the online project management application, provided by the project management application provider (PMP) for the management of new supermarket and rebuild projects. The PMP speculatively developed the online project management application having perceived a market opportunity existed. Once the application had been developed prospective lead clients were approached, which resulted in the particular supermarket lead client (SLC) being recruited. There was a deliberate and declared strategy to approach the lead client or the main contractor rather

than individual users. Having recruited the lead client the PMP, with the explicit support of the client, attempted to recruit contractors involved in building projects. At the time of the investigation more than 80 percent of contractors were using the application on current projects for the SLC. The PMP was established in 1994 as an ASP offering a range of Internet-based applications to the construction industry. There were many new intermediaries addressing the construction industry offering a range of services, including: online project management, e-procurement and e-tendering. The PMP offered a project and asset management application addressing the building phase of a construction project. With over 500 projects being hosted at the time of the study and with over 100,000 user log-ins a month, the PMP was Europe's leading provider. The research director stated, "we are currently market leaders in the online project and asset management field." The PMP secured £3 million investment funding during 2001 and projects under management exceeded £1.6 billion. The account manager stated that the PMP would soon be the first profitable ASP providing managed applications to the construction industry. This hosted application was designed to foster collaborative working throughout the lifecycle of construction projects. The application stored detailed specifications of the products used, provided project management functionality and a secure, simple-to-use service accessed via the Internet. The PMP worked closely with the lead client to get SME contractors to engage by offering encouragement, training and support. The account manager who carried out the user training stated, "after one or two initial concerns were discussed they (contractors) were happy to use the application." He felt that contractors could identify the advantages to the client, and the opportunities for the improvement in project management and potential for increased sales to other clients using the PMP's project management application.

A construction media company (CMC) was established in 1999 and was a widely recognised Internet media company, providing a wide range of information services to the construction industry. The CMC employed 35 full-time people and was expected to break even by the end of 2002. It formed part the largest information supplier to the UK construction industry, including journals for architects and construction companies. The CMC provided ten inter-linked websites, which attracted over 50,000 different users per month, representing around half of all UK construction professionals using the web for business. It provided a range of core information free of charge to its user communities. Income was generated around this free information including: recruitment services, advertising, conferences and paid-for content. The general manager stated that “for this to be viable the user communities needed to recognise us (CMC) as a trusted source of information that addressed their business needs”. The CMC perceived one of its roles was to raise awareness of e-business developments and in certain cases recommend services. It had recently researched online project planning services and organised conferences. The CMC recommended the PMP as a leading UK provider of hosted project management applications to the construction industry.

The supermarket lead client (SLC) was a large national supermarket chain that had an extensive new-build and rebuild program comprising over 60 new stores within 3 years. It was formed in the 1960s, had over 200 stores and employed over 100,000 staff. SLC stores were supplied by over 2,800 suppliers via over 15 depots across the UK. No direct access was gained to the SLC however the PMP account manager to the SLC was subsequently interviewed in order to gain some insight into the position of the lead client. The SLC first used the PMP on a £10 million new store construction project in 2000 which resulted in the store being completed in just over 13 weeks and opening a day ahead of schedule. This

helped to secure the use of the online project management application for future new stores and rebuilds. The SLC contracted with the PMP to provide the application for its entire building programme. The service level agreement was between the SLC and the PMP. As part of this agreement the PMP provided training and support to all users by visiting all contractors in order to encourage and support them in the use of the application. The SLC paid the application licence fee resulting in no direct charge being made to the contractor, however all participating contractors needed Internet connectivity and web browser technology. The SLC had decided not to make it compulsory for contractors to use the application but to encourage them instead. Some contractors clearly felt that the SLC insisted or demanded that they use the systems, Table 5.1, and remarked that it was stated that the SLC's future selection of contractors would be influenced by the willingness of contractors to use the PMP application and thus provided an important incentive for using the application.

5.2.2 Analysis

The analysis below (and the subsequent analyses for all cases 5.3 to 5.6) is based on the template for the dimensions of aggregation derived from the literature reviews in Chapters 2 and 3.

1. Micro-level ties

Resource flows through activity links: A shared information asset (project and product specification) was created as part of the interactions between the SLC, the PMP and the contractors, whilst existing resources appeared unaffected. The SLC and the PMP recognised this asset as a valuable resource in the existing aggregations. The PMP recognised the value of accumulated information across multiple aggregations.

Mutual expectation with resilient trust: Prior to using the application trusted relationships existed between the SLC and the contractors built up over previous building projects. The introduction, by the PMP, of the project management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust, evidenced by a lack of service level agreement between the contractors and the PMP.

Information flows supported by catalysts: The crucial role played by the provision, by the PMP, of the project management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the SLC both by funding and promoting the use of the application to an existing aggregation.

2. Economic

Nature of transaction with value activity: The project management application increased the structure of the information component of the transactions between the SLC and the contractors. In doing so it increased the perceived value and reduced the costs of repeated transactions for both for the SLC and the contractors.

Cost of networking: The contractors had to bear any internal cost associated with Internet connectivity, which in one case meant purchasing a computer. The project management application reduced the cost of interaction with the SLC and provided a low cost opportunity to trade with other clients.

3. Strategic

Motivation: All participants were motivated to engage in the project management application. The SLC believed that they would achieve increased control, cost savings and transparency whilst contractors recognised the opportunity for increased business with

existing and new clients at little increase in costs. The PMP generated revenue from the SLC and other clients.

Perspectives: The SLC and the PMP both identified important long-term benefits from using the application, in particular the accumulation of information. Their decisions can be considered as strategic in nature. The contractors were less concerned with the wider opportunities emergent from using the application but could identify benefits to the relationships with the SLC and the potential for new business with the PMP's other clients.

Contingencies: At an institutional level the SLC played an important and central role in the formation of the aggregation. As the organisation funding the building project they could encourage their contractors to use the project management application. At a relational level it can be seen that existing relationships between the SLC and contractors inferred trust in the choice of the online application provided by the PMP.

4. Governance

Intellectual property rights: The value of the new shared information asset was acknowledged by the PMP and formed part of their business strategy. The PMP intended to develop additional applications which exploited this information asset. The client's interests appeared to be focused on their project management needs rather than more generic uses of this information. A service level agreement existed between the SLC and the PMP.

Co-ordinations mechanism: There was a service level agreement between the PMP and the SLC. The contractors used the application without a service level agreement with either the PMP or the SLC, thus deferring direct control to the SLC for this governance mechanism.

5. Diffusion of innovations

Change agent: The PMP account manager appeared to play an important role in the recruitment of contractors. He worked with managers at the SLC to identify contractors and subsequently undertook recruitment and training. Whilst he was fully aware of the SLC's desire for contractors to engage in the application he acted to 'tone down' this pressure and helped contractors to identify the benefits for themselves.

Critical mass: The use of previously identified methods for increasing adoption of interactive innovation were identified. The PMP promoted the application to the SLC and other clients thus targeting the leading organisations, supported contractors by training and promoted the benefits thus shaping users' perceptions, deployed the application project by project thus addressing aggregations and the free use provided an incentive to early adopters.

Intermediaries: The role of the SLC was crucial to achieving the engagement of contractors who were willing to trade with the SLC and provide products and services to the construction projects. The CMC promoted the PMP to potential users in the construction industry. The role of the PMP was fundamental to the formation of the aggregation with their speculative provision of the online project management application being a prerequisite.

5.2.3 Discussion

This case highlights the importance of the relationship, in this case non-exclusive, between the project management application service provider (PMP) and a trusted third party, a supermarket lead client (SLC), in the adoption of the online project management

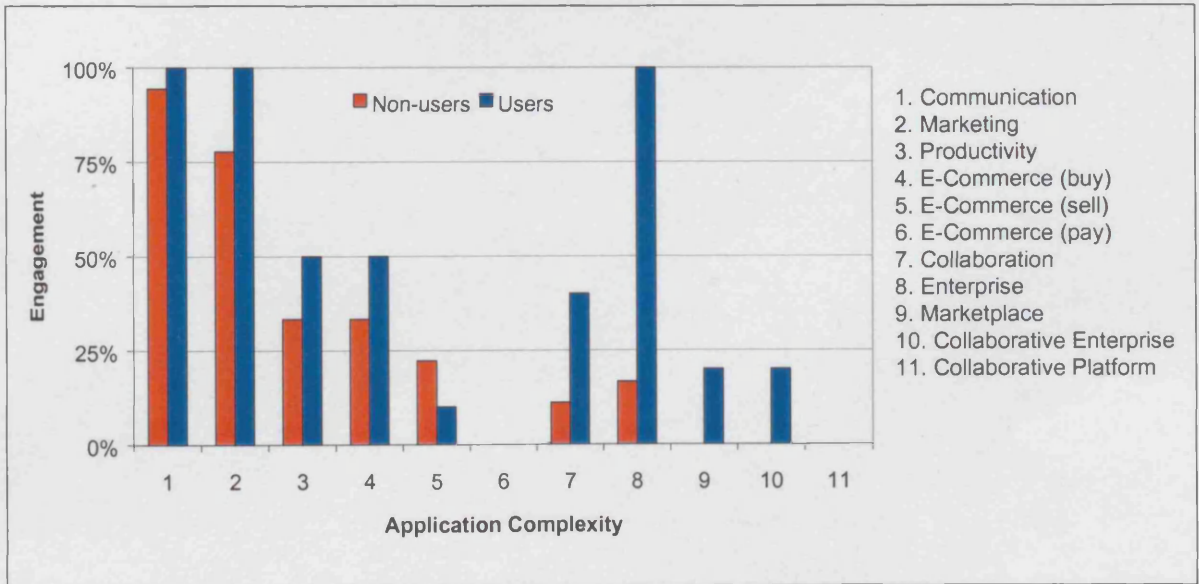
application by an aggregation of contractors. Additionally it indicates a possible role for multiple trusted third parties, such as the CMC, in sponsoring e-business applications. Clearly the PMP's online application supported the business needs of the SLC and of the contractors in managing construction projects, which nearly all users (89%) confirmed was of importance to their businesses. The PMP initiated the application development however subsequently both the SLC and the users became involved. The contractors relied on the SLC to negotiate and manage the service level agreement with the service provider and there was no direct cost to the contractors for using the application. The lead client paid the service provider for contractors to use the application.

From the survey of contractors using the project management application, users had very high levels (90%) of daily ICT usage compared to non-users (67%). Non-users had very low levels of awareness of hosted aggregation-specific applications (14%). The PMP's online application provided new functionality to all users who all trusted the PMP and felt it was committed to providing the application, Table 5.1. Significantly users were much more likely to trust both customer and suppliers than non-users thus reinforcing the resilient relationships within the specific aggregation. Users could be characterised as feeling part of a business network (56% vs. 39%), having a very positive attitude to (100% vs. 72%) and good knowledge and experience of (70% vs. 67%) e-business compared to non-users. Users largely agreed that e-business improved efficiency and enabled new ways of business, Table 3 in Appendix V. Users were more engaged in e-business regardless of application complexity, Figure 5.2.

This specific aggregation exhibited many characteristics associated with IONs in particular at a micro-level the resource flows through activity links of the shared information asset,

evidence of mutual expectation with resilient trust leading to a lack of service level agreement with contractors and information flows supported by the catalyst role of trusted third parties and inter-organisational information systems. Governance mechanisms were not formalised for intellectual property right of the information repository and no service level agreement existed with the contractors. The economic effects of the applications were to increase the structure of the information component and the perceived gain was greater than internal and external costs. At a strategic level participants were motivated by longer term objectives, multiple perspectives converged on the engagement in the application and there was institutional and relational level support for engagement. This case identified the creation of an information repository, which could be exploited by the ASP as an emergent property of the aggregation. There were characteristics associated with the diffusion of innovation through networks evident by a change agent, critical mass building and intermediaries.

Figure 5.2. E-Business engagement by contractors.



The use of the e-aggregation application by the contractors significantly increased the degrees of structure and integration within the aggregation. The application provided a

standardised format in which information was exchanged between contractors and clients. The ability of contractors to work to this increased structure materially affected future business opportunities. The application also supported increased integration by managing the building project and specification of the various components. The account manager gave an example of how a small manufacturer had to make a commitment to provide ‘end gondolas’ product specifications, used to display products at the end of supermarket aisles. Failure to do so would result in an accumulated error and aisles being out of line. Once the design had been submitted any alterations to specification or lead time had to be agreed with the client. The overall effect was to strengthen the ‘network’ aggregation type.

Table 5.1. Sample views of contractors

Benefits of e-business applications
"Speed up communication." "Part of our commitment to customer." "Client driven." "Client suggested." "Client insisted." "Chosen by client." "Client directive." "Suggested by customer." "Did not choose." "Client insists we use it." "Client demands." "Client requirement." "Client pays." "Wish to retain our partnership with client."
Benefits of project management application
"Do know enough to comment." "Improved productivity & client communication." "Always working with up-to-date information, provide better client service." "Savings in the production of paper documents, faster & more efficient communication, good audit trail, time savings in sharing of electronic data, better design co-ordination in sharing of electronic data." "Reduced admin costs." "Streamline existing business processes." "Improve procedural efficiency, speeds up communication transfer." "Sustain growth & increased capability without the traditional barriers to communication." "Improve chances of retaining work." "Closer contact with clients, reduced costs." "Get rid of office facilities for paper production & storage, print room, print machines, plotters, filing room, files, archives, staff costs, creation of fully engineered & co-ordinated virtual building design on the web with electronic take off of material & material quantities." "Reduced admin costs." "Flexible working for employees & more efficient for business." "Would enable us to offer our customers consistent best value."
Comments regarding PMP
"None." "Good." "Very good." "High." "Average."

5.3 Dairy aggregation: Case 2

This case centres on an online dairy farming aggregation including SME dairy farmers. The case narrative comprises three elements, namely an agricultural college (trusted third party), a dairy management application service provider (ASP), and a survey of users and non-users. Initially the agricultural college was approached before gaining access to the ASP who assisted in surveying the user community. The selection of non-users was independent of these participants.

5.3.1 Narrative

The agricultural sector, of which dairy farmers are a part, is SME-rich in that statistically 100 percent of the enterprises have less than 250 employees (SBS 2002). The dairy industry has been affected by many structural changes in the past two decades. These include changes to the European Union's common agricultural policy and the fragmentation of the supply chain previously dominated by one single national governmental body, the Milk Marketing Board, into large separate buying groups, including large supermarket chains and food manufacturers. These structural changes have tended to reduce the margin of milk producers. In addition foot and mouth disease affected many regions in the year prior to the quantitative study.

The dairy farming aggregation was formed from dairy farmers using an online dairy management application provided by an ASP, which was a trading division of an agricultural college. The agricultural college was known to and trusted by all users prior to using the online application. The ASP was known to some users prior to using the online application and was closely associated with the agricultural college.

The dairy management application service provider (DMP) developed the application with a trading division of an agricultural college (AC). It offered an Internet-based fully integrated dairy costings, quota management and information system for the dairy industry with subscribers having access to AC research information and dairy costings. The application provided the following features: topical, technical and research notes; discussion forum, access to AC dairy specialists; milk manager; benchmarking; quota milk manager; milk manager notes; cattle tracing scheme. The DMP application was a fully interactive milk costing system, operated by screen-based input sheets to record physical and financial information about the dairy herd. The system recorded milk produced, milk sold, changes in cow numbers, feed used and other dairy expenses. The DMP offered various options within the application but the typical annual cost was around £200. On-farm dairy consultancy was also available from the AC at an additional cost. It was the first dairy management system to be made available over the Internet with all physical and financial information being entered via a web browser and with reports printed locally. The DMP stated that “all data entered was securely stored and remained confidential”. A precursor application was originally developed as a PC-based product with data entered centrally from postal data sheets completed manually by dairy farmers. The manager stated that “significantly more functionality is available with the online application. It can be provided economically by an ASP model”. The manager recognised the importance of a central database which could provide additional information regarding the dairy industry. Even though the DMP was a division of the AC it operated on a separate basis and worked with other service providers to deliver the online application.

The AC was an innovative, knowledge-based organisation, which supported the development of rural industries and communities through specialist resources including

education, training and expert services from farm advisors. The AC's work was wide-ranging but there was a particular emphasis on agriculture and related sciences, rural business development, food chain quality, and environmental management. It attempted to provide a mechanism for the transfer of knowledge and ideas, which emerged both from its own research activities and from other expert sources. It was well-regarded and trusted within the farming communities to which it provided support and services. The AC dairy services offered impartial advice on all aspects of dairy husbandry and management to dairy farmers. The AC's independent expertise was backed by active research programmes and on-going trial work at AC-run units. Through locally based dairy advisers the AC dairy services covered all aspects of milk production from calf-rearing through to the point of sale when the milk left the farm. The AC promoted the use of the online application provided by the DMP by using seminars and workshops at which both AC and DMP personnel were presented.

The confectionery manufacturer (CM) was part of a large international food company, which had a wide range of products serving many sectors, including confectionery. The CM's first e-procurement priority was indirect purchasing through both purchasing cards and e-procurement. The CM managers described their e-business strategy as a 'toe in the water' approach. The CM had not yet decided whether to use its own e-marketplace or third party providers for purchasing from SME suppliers, partly due to uncertainty in service provision. The CM was a founding member of a consumer packaged goods industry consortium-lead e-marketplace. This e-marketplace had five elements, namely tender process, catalogue tools, supply chain, business intelligence and fulfilment. There were clear benefits to larger suppliers, such as the CM, in using this e-marketplace but the managers acknowledged that it was difficult for SMEs to see the benefits. In the view of

the CM managers the responsibility for cataloguing products needed, for cost and practical reasons, to be with SME suppliers. The CM were considering recommending a third party e-marketplace through which they would buy indirect supplies in order to reduce the risks and costs for smaller suppliers. The difficulties facing SME suppliers were the costs of updating different catalogues for different suppliers and the risk of choosing the wrong third party e-marketplace. For cost reasons the CM stated it was not possible to use the SME's own websites to integrate into the CM's internal e-procurement system and that education would be critical to reassuring SME suppliers that their products would not be devalued by using e-marketplaces. The CM considered using a vendor independent service provider to manage and integrate the cataloguing activity. The CM considered SMEs to be an important part of their business and recognised it could have an important role in encouraging SME suppliers to use e-marketplaces but had not decided on a mechanism to achieve this. In addition the CM also had over 10,000 suppliers of direct goods including 1,000 dairy farmers of whom 99 percent supplied the CM exclusively. Demand for milk was higher than supply. There was an ongoing project considering the provision of an online dairy management application to reduce the administration and internal costs for dairy farmers. This project could have provided positive benefits to dairy farmers and made them more loyal to the CM. One possible business model being considered was for the CM to fund the development costs and application usage fees, resulting in little or no cost to dairy farmers. It was too early in the project to say whether its use would be mandatory but the CM had a history of working in partnership with smaller suppliers and were trusted by their milk suppliers.

5.3.2 Analysis

1. Micro-level ties

Resource flows through activity links: A shared information asset (herd nutrition) was created as part of the interactions between the AC, the DMP and the dairy farmers, whilst existing resources appeared unaffected. The AC and the DMP recognised this asset as a valuable resource in the existing aggregation.

Mutual expectation with resilient trust: Prior to using the application trusted relationships existed between the AC and dairy farmers built up over previous interactions. The introduction, by the DMP, of the dairy management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust established over a long period.

Information flows supported by catalysts: The crucial role played by the provision, by the DMP, of the dairy management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the AC in initiating and promoting the use of an application to an existing aggregation.

2. Economic

Nature of transaction with value activity: The dairy management application increased the structure of the information component of the transactions between the AC and dairy farmers. In doing so it increased the perceived value and reduced the costs of repeated transactions for both for the AC and the dairy farmers.

Cost of networking: The dairy farmers had to bear any internal cost associated with Internet connectivity and a modest annual rental charge to the DMP. The application was supported by farm advisors.

3. Strategic

Motivation: All participants were motivated to engage in the dairy management application. The dairy farmers believed that they would achieve increased cost controls and access to leading research on herd management. The AC and the DMP were committed to supporting the dairy farmers and disseminating research information in a financially viable way.

Perspectives: The AC identified important long-term benefits from developing and offering the application and their decision can be considered as strategic in nature. The dairy farmers were less concerned with the wider opportunities emergent from using the application but could identify cost benefits to their businesses.

Contingencies: At an institutional level the AC played the central role in the formation of the aggregation having existing trusted relationships. At a relational level it can be seen that existing relationships between the participants inferred trust in the decision of farmers to use the online application provided by the DMP.

4. Governance

Intellectual property rights: The value of the new shared information asset was acknowledged by both the AC and the DMP and formed part of their business strategies. The dairy farmers' interests appeared to be focused on their herd management needs rather than more generic uses of this information. Service level agreements existed between the AC and the DMP and between most dairy farmers and the DMP.

Co-ordinations mechanism: There was a service level agreement between the DMP and most dairy farmers. Dairy farmers relied on the AC to manage the relationship with the DMP regarding functionality, costs and development.

5. Diffusion of innovations

Change agent: The AC, through its farm advisors, played an important role in the recruitment of dairy farmers to use the dairy management application.

Critical mass: The use of previously identified methods for increasing adoption of interactive innovation were identified. Both the AC and the DMP supported dairy farmers by training and promoting the benefits thus shaping the users' perceptions, initially deployed the application to existing offline users thus addressing an aggregation and were considering developing relationships with other trusted third parties in different geographical regions thus addressing other aggregations.

Intermediaries: The role of the AC in promoting engagement by farmers was crucial as they were seen as independent and able to recommend the application through their farm advisors. The role of the DMP was fundamental to the formation of the specific aggregation with their provision of the online dairy management application being a prerequisite.

5.3.3 Discussion

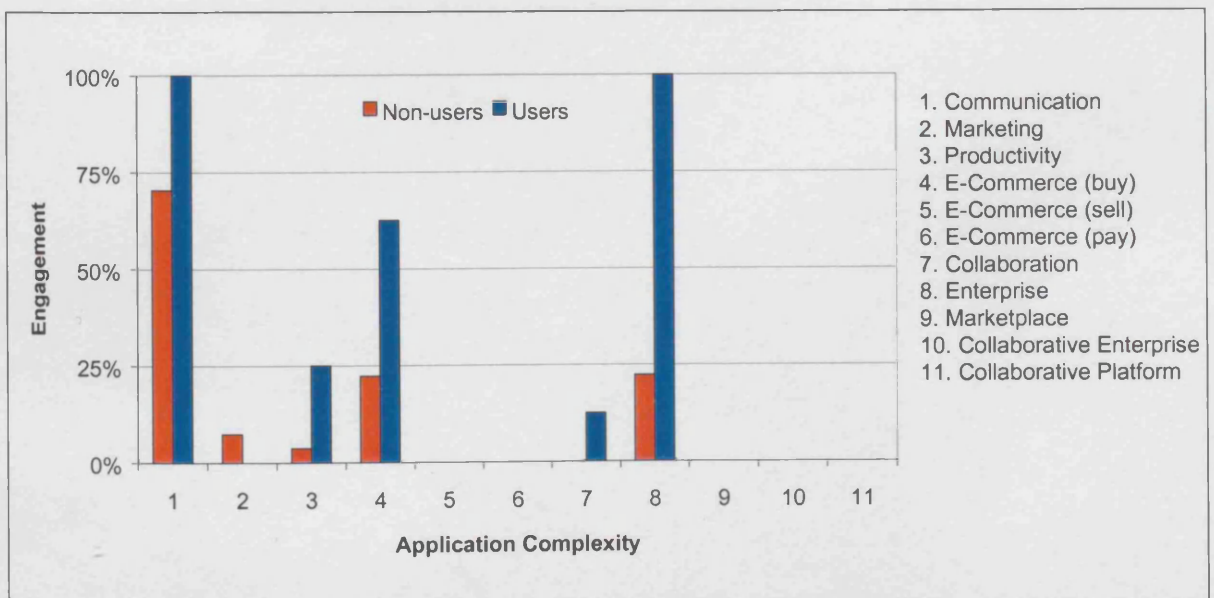
This case highlights the importance of the relationship, in this case exclusive, between the dairy management application service provider (DMP) and the trusted third party, a research and educational organisation, in developing an aggregation-specific application

for the dairy industry. Both the AC and the DMP initiated the application development. Because of the closeness in the relationship between the AC and the DMP it was difficult for the users to distinguish between the two entities. The dairy management application supported the business needs of dairy farmers by providing herd management and access to relevant research information, which nearly all users confirmed was of importance to their businesses (88%). Interestingly the confectionery manufacturer (CM), a large milk purchaser, was considering supporting its milk suppliers by providing a hosted dairy management application. The service level agreement was largely between the user and the service provider. Farmers paid a modest fee, directly to the service provider, for using the application.

From the survey of farmers using the dairy management application, many of the users had previously used a non Internet-based application (75%) provided by the trusted third party and had migrated to the significantly enhanced hosted application. Users had high levels of daily ICT usage (66%) compared to non-users (18%), who had low levels of awareness of hosted aggregation-specific applications (32%). All users trusted the DMP and felt it was committed to providing the application, Table 5.2. Users could be characterised as feeling part of a business network (83% vs. 27%), having a positive attitude (73% vs. 52%) to and reasonable knowledge and experience (38% vs. 23%) of e-business than non-users. Users largely agreed that e-business improved efficiency (87% vs. 44%) and enabled new ways of business (100% vs. 64%). Users were more engaged in e-business regardless of application complexity than non-users, Figure 5.3. Users were less concerned with barriers of cost and benefits (23% vs. 61%), Table 3 in Appendix V.

This specific aggregation exhibited many characteristics associated with IONs in particular at a micro-level the resource flows through activity links of the shared information asset, evidence of mutual expectation with resilient trust and information flows supported by the catalyst role of trusted third parties and inter-organisational information systems. Governance mechanisms were not formalised for intellectual property rights of the information repository but a service level agreement was in place between the DMP and the users. The economic effects of the application were an increase in the structure of the information component and there was a perceived gain greater than internal and external costs. At a strategic level participants were motivated by longer term objectives, multiple perspectives converged on engagement in the application and there was institutional and relational level support for engagement. This case also identified the creation of an information repository, which could be exploited by the AC and the DMP as an emergent property of the aggregation. There were characteristics associated with the diffusion of innovations through networks evidenced by a change agent, critical mass building and intermediaries.

Figure 5.3. E-Business engagement by dairy farmers.



The use of the e-aggregation application by the dairy farmers significantly increased the degrees of structure and supported integration within the aggregation. The application provided a standardised format in which information was exchanged between dairy farmers and the AC. The increased structure enabled the integration of information between different farms and the AC's managed unit. The overall effect was to move the aggregation from the 'cluster' towards the 'network' aggregation type.

Table 5.2. Sample views of dairy farmers

Benefits of e-business applications
"Can save time and buy & sell further afield." "Price comparison, information transfer e.g. BCMS." "None." "Simplicity." "Better reporting, ability of different people in different locations to access information." "Saves time." Price, speed and new markets." "Speed, instant access to info at anytime of day." "Less paper." "Reaching customers." "Cost saving, better informed." "Better management, less paper work." "Reduced cost as no middleman, saves time, speed, cost."
Benefits of dairy management application
"Compares with other farmers." "Gives us monthly figures which help run the dairy profitably or minimising loss." "Control costs." "Up-to-date costings." "Already in business with AC." "AC." "Next generation." "Ease." "Because it was done manually by AC, we use AC and manager in particular." "Easy to use and extract information." "Progression from using manual system." "Originally novelty value, instant answers."
Comments regarding DMP
"Good." "Very good." "High."
Comments regarding AC
"Advisory." "Were already used for dairy advice and doing costings, it was a logical extension to use online application." "Plenty helpful information & contacts." "Some support." "We still use agricultural college for advise." "Support if needed & helpful advice."

5.4 Knowledge worker aggregation: Case 3

This case centres on an online aggregation including knowledge workers, predominantly in the IT sector. The case narrative comprises three elements, namely a professional association (trusted third party), a community management application service provider (ASP) and a survey of users and non-users. Initially the professional association was approached before gaining access to the ASP who assisted in surveying the user community. The selection of non-users was independent of these participants.

5.4.1 Narrative

Over the last decade the UK Government has identified the importance of the ‘knowledge economy’ as a means of achieving economic growth. Various initiatives have been developed to support the role of the knowledge worker whether operating as an individual or in an organisation. There was a marked trend for individual knowledge workers to move towards freelance or contractor working patterns. This enabled skills to be transferred, through individuals, between organisations and promoted highly flexible employment markets. Whilst the Department of Trade and Industry developed policies and initiatives to promote the development of the knowledge-driven economy, the Treasury sought to provide a fair framework to tax individual knowledge worker’s income. The introduction of ‘intermediaries legislation’ IR35, in April 2000, sought to eliminate ‘disguised employment’ where employers could reduce their tax liabilities. It allowed for fees paid to a company or partnership to be treated as an individual’s personal salary. It was believed that this single tax measure severely damaged the initiatives promoting knowledge working and as a result various organisations attempted either to have IR35 repealed or modified to recognise the changing nature of employment in the knowledge economy.

The aggregation formed as a direct result of changes to UK tax legislation which affected the consultancy industry. A new trade association, consisting of knowledge workers, emerged in order to support members wishing to change tax legislation. Very early on in its development the knowledge workers trade association (KTA) recognised the need to support high levels of interaction both between the KTA and its members and between the members themselves. This need was met by an ASP developing and hosting a community management application.

The community management application service provider (CMP) was a software development company based on the south coast of England, which provided online community management applications primarily to trade associations typically consisting of knowledge workers, such as engineers and tax advisers. The community management application hosted for the knowledge workers trade association (KTA) provided a range of services to members, including e-newsletters, discussion forums, content management, downloads and administration. There was a service level agreement between the CMP and the KTA, which paid directly for the provision of the community management application. The CMP had a close working relationship with the KTA whose members assisted in the development of the application by actively providing suggestions for improvements. The managing director acknowledged that in many ways the functionality of the community management grew in parallel with the increased demands of the KTA. Importantly the application supported interaction between members and allowed key members to moderate or manage sub-groups. This resulted in the generation of highly focused content by some members which was accessible to all members. CMP marketing strategy was to deliberately promote their community management application to trade associations and

other key intermediaries involved with managing highly interactive groups such as knowledge workers.

The KTA was a professional trade organisation set-up to represent the interests of knowledge based workers. It was the fastest growing professional organisation in the UK with over 10,000 members signing up in its first year. The KTA was formed in May 1999 to provide independent contractors and consultants with a representative voice in opposition to new tax regulations. However it developed from this single-issue campaign to a full professional body, representing contractors' interests and lobbying on regulatory issues in a wide variety of sectors including oil and gas, engineering, telecommunication, pharmaceutical and IT professionals. This latter group made up the majority of the membership. The KTA defined a knowledge-based worker as a "professional person who completes a task using intellect and experience rather than machinery and tools".

The chief executive personally founded the association when he received hundreds of e-mails in response to a simple website protesting about the new tax legislation affecting knowledge-based workers. He quickly realised that he could not be the link between the government and knowledge workers. The association attempted to provide a platform on which members could interact and organise action. The general secretary stated that he was "overwhelmed by the response" to his original website but was able to co-ordinate the launch and receive enough finance from membership fees to provide some technology to support interaction. The CMP was commissioned to develop a hosted application which could support both high levels of member interaction and the administration of the association. The chief executive gave an example of how this platform was able to galvanise members in response to a call to attend a lobbying meeting in the House of

Commons. This involved, at short notice, disseminating advice and plans and resulted in a significant number of members gaining access to Members of Parliament during a debate on the new legislation. It was the interviewees' view that the ability of the association to act so quickly and decisively was as a result of the community management application and had an immediate effect on public awareness. The association quickly established itself as the leading organisation representing the interests of knowledge workers and offered additional services to members. The membership fee included a wide range of services including draft contracts, legal and tax advice, lobbying and access to the community management application. The KTA was run by an executive group elected by the members and was trusted by them to act in their best interest. The interactive nature of the group reinforced this trusted relationship by promoting member feedback.

5.4.2 Analysis

1. Micro-level ties

Resource flows through activity links: A shared information asset (knowledge base) was created as part of the interactions between the KTA, the CMP and the knowledge workers, whilst existing resources appeared unaffected. The KTA recognised this asset as a valuable resource in the existing aggregation for retaining existing and recruiting new users.

Mutual expectation with resilient trust: The emergence of the KTA went hand in hand with the provision, by the CMP, of the community management application. The application supported the establishment of the relationship between the KTA and the knowledge workers. Adoption can in part be attributed to resilient trust, evidenced by a lack of service level agreement between the knowledge workers and the CMP.

Information flows supported by catalysts: The crucial role played by the provision, by the CMP, of the community management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the KTA both by initiating, funding and promoting the use of the application.

2. Economic

Nature of transaction with value activity: The community management application increased the structure of the information component of the interactions between KTA and knowledge workers. The application increased the perceived value and reduced the costs of repeated interactions between knowledge workers and the KTA and between knowledge workers.

Cost of networking: Knowledge workers had to bear any cost associated with Internet connectivity. Knowledge workers paid an annual subscription to the KTA which included the use of the community management application.

3. Strategic

Motivation: All participants were motivated to engage in the community management application. The KTA believed that they would achieve cost savings and transparency whilst knowledge workers recognised the opportunity for increased interaction with each other and the KTA, which supported their business needs. The CMP generated revenue from the KTA and other clients.

Perspectives: The KTA identified important long-term benefits from using the application and their decision can be considered as strategic in nature. Whilst knowledge workers

recognised the important role the application played in supporting their business activities it was seen as part of the total benefits derived through membership of the KTA.

Contingencies: At an institutional level the KTA played the central role in the formation of the aggregation as the organisation that identified and met the need for interaction by procuring the community management application. At a relational level it can be seen that relationships between the KTA and knowledge workers inferred trust in their choice of the online application provided by the CMP.

4. Governance

Intellectual property rights: The value of the new shared knowledge base was acknowledged by the KTA and formed part of their business strategy for retaining existing and recruiting new members. Only a limited amount of information was accessible to non-members visiting the website. The members also valued this knowledge base for their own benefit. A service level agreement existed between the KTA and the CMP.

Co-ordinations mechanism: There was a service level agreement between the KTA and the CMP. The knowledge workers used the application without a service level agreement with the CMP thus deferring direct control of this governance mechanism to the KTA.

5. Diffusion of innovations

Change agent: The executive members of the KTA played an important role in the recruitment of members to the community management application. They ensured that the application was used to disseminate information from the association to members and facilitate the operation of the association. They recruited moderators and contributed to the discussion forum.

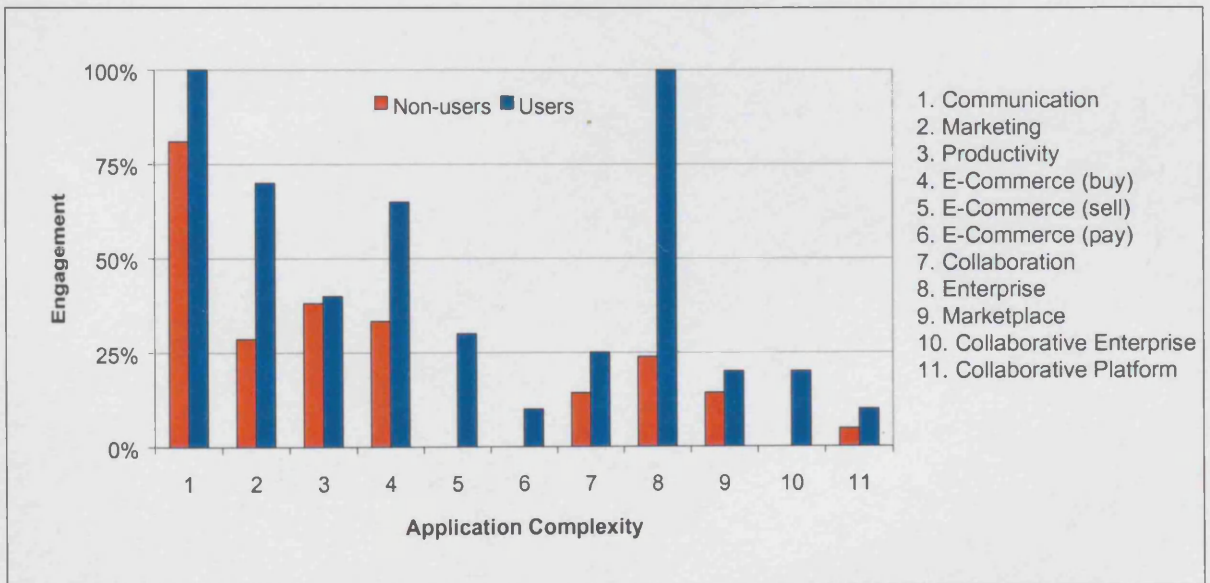
Critical mass: The use of previously identified methods for increasing adoption of interactive innovation was identified. The KTA promoted the application through executive members and key moderators thus targeting the leading individuals, used the application to disseminate information and conduct operations thus shaping the knowledge workers perceptions and the use of moderated forums addressed aggregations.

Intermediaries: The KTA played a crucial role in achieving the engagement of knowledge workers. It acted on behalf of members to negotiate with the CMP. The development of the online community management application by the CMP was a prerequisite to the formation of the aggregation and an important factor in the growth and success of the KTA.

This case highlights the importance of the relationship, in this case non-exclusive, between the application service provider (CMP), the trusted third party, and knowledge workers trade association (KTA), in the adoption of the online community management application by an aggregation of knowledge workers. The CMP's online application supported the business needs of the KTA and knowledge workers in carrying out their business activities, which the majority of users confirmed was of importance to their businesses (58%). The KTA initiated the application development with the CMP, however users subsequently became involved in this process. The continuous improvement of the application was a result of the interaction between the KTA, the CMP and members. The members relied on the KTA to negotiate and manage the service level agreement with the CMP and there was no direct cost to the knowledge workers for using the application. The KTA paid the CMP to provide the application.

From the survey of knowledge workers using the community management application, users had very high levels of daily ICT usage (100%) compared to non-users (75%), who had very low levels of awareness of hosted aggregation-specific applications (8%). The CMP's online application provided new functionality to all users who trusted the CMP and felt it was committed to providing the application, Table 5.3. Users could be characterised as feeling part of a business network (67% vs. 35%), having a very positive attitude (90% vs. 62%) to and good knowledge and experience (78% vs. 48%) of e-business than non-users. Users largely agreed that e-business improved efficiency (89% vs. 62%) and enabled new ways of business (72% vs. 57%), Table 3, Appendix V. Users were more engaged in e-business regardless of application complexity, Figure 5.4.

Figure 5.4. E-Business engagement by knowledge workers.



This specific aggregation exhibited many characteristics associated with IONs in particular at a micro-level the resource flows through activity links of the shared information asset, evidence of mutual expectation with resilient trust leading to a lack of service level agreement with knowledge workers and information flows supported by the catalyst role of trusted third parties and inter-organisational information systems. Governance mechanisms

were not formalised for intellectual property right of the information repository and no service level agreement existed with the members and the CMP. The economic effects of the applications were to increase the structure of the information component and the perceived gain was greater than internal and external costs. At a strategic level participants were motivated by longer term objectives, multiple perspectives converged on the engagement in the application and there was institutional and relational level support for engagement. This case also identified the creation of an information repository, which could be exploited by the trusted third party (KTA) as an emergent property of the aggregation. There were characteristics associated with the diffusion of networks evident by a change agent, critical mass building and intermediaries. The use of the e-aggregation application by the knowledge workers significantly increased the degrees of integration and supported structure within the aggregation. The e-aggregation application provided a standardised format in which information was exchanged between knowledge workers and the KTA. The e-aggregation application increased the integration of users by facilitating collective action and enabling new commercial relationships to develop. The overall effect was to move the aggregation from the 'association' towards the 'network' aggregation type.

Table 5.3. Sample views of knowledge workers

Benefits of e-business applications
"It's a line of business for us." "Ease of delivery of digital goods, downloads of software, music etc Ease of access to information." "Greater convenience for customer, reduced costs for supplier, which may be passed on to the customer." "Allows new business models, such as E-Bay." "Ability to easily communicate with many people at once." "Allows quicker communication between people in different locations and cuts down on administrative processes." "Speed of communication and accessibility, distribution of information, reducing manual administration and paperwork." "Reduced manual & semi-manual administration therefore business responds faster to its consumers, suppliers, partners and employees, As an IT development methodology it offers very quick deployment of new systems and enhancements, allowing developers to respond faster to changing needs of the business". "E-business provides a new channel of collaboration between individuals and businesses, which in turn leads to - faster response times to changing business situations - a more structured approach to work - a greater feeling of team spirit, even in quite disparate work groups." "It allows cottage industries to reach a wide market which they would not be able to reach otherwise." "Work remotely as a homogenous team even though individuals can be sited anywhere."
Profile of respondents
E-Commerce security; IT project management; Oracle consultant; system testing in telecommunications; third line support & technical development; system administration support; software testing; Oracle financials implementation; web application development; system tester; software engineering; web development; Visual Basic development; Sun Solaris consulting; IT consultancy; embedded real time software; infrastructure project management; electronic design.
Comments regarding CMP
"Good." "Satisfactory." "100%." "Very high." "High." "Adequate." "Fantastic, above and beyond the call of duty." "Excellent." "Very good." "No opinion."
Comments regarding KTA
"Understands contractors' needs as it is made up of contractors." "Because it is independent." "The wealth of information, advice, political and legal representation provided supports my business perspective." "These people are other KTA members and know where I'm coming from." "It's the only organisation specific to my needs."

5.5 Media aggregation: Case 4

This case centres on an aggregation consisting of advertising agencies (SMEs) in the media industry. The case narrative comprises two elements, namely an artwork management application service provider (ASP) and a newspaper trade association (trusted third party). Initially the trade association was approached before gaining access to the service provider. Unfortunately after initially agreeing to assist in gaining access to users the ASP withdrew their support. As a result no user or non-user surveys were conducted.

5.5.1 Narrative

The UK newspaper industry consists of two main sectors, namely national and regional titles. Historically regional newspapers have been independently owned, often locally. However over the last decade whilst the number of regional newspaper titles has increased their ownership has consolidated into fewer companies. Increasingly media companies have purchased regional and local newspapers to form portfolios of titles with over £6 billion being spent on acquisitions since 1995. The largest 20 companies owned 85 percent of the titles although over 45 percent of owners have only one title. The trade association that represents the industry consists of independently owned and group members and represents the interests of an important media sector. More adults read a regional than national newspaper, 84 percent versus 67 percent. One of the main challenges of the industry was in competing with national titles for advertising income.

Well-established relationships existed between advertising agencies and members of a newspaper trade association (NTA), representing regional newspapers. However the operational complexities for advertising agencies, in dealing with so many different

regional newspapers, when placing artwork for advertisements was identified by the trade association as a barrier to business development. The trade association initiated the development of an online advertising artwork management application, which was funded by £1 million of contributions from trade association members.

The advertising artwork management application service provider (AMP) was a software development company owned by the members of a NTA, which built a bespoke Internet-based transmission system for sending artwork for advertisements to regional newspapers. It reduced the need for physical transmission of artwork which could instead be downloaded in standard file formats from the central database. The application included other facilities which simplified media planning and scheduling. These combined to reduce costs significantly and helped to develop an expanded market for national advertisers in the regional and local press. Advertising agencies, predominantly SMEs, paid no charge to use the application. There was no service level agreement between agencies and the service provider. The business manager stated that the trade association was “a trusted name amongst advertising agencies” and felt that this gave the AMP a competitive advantage over other artwork management applications. The rapid increase in uptake by agencies was attributed to the close association between the AMP and the trade association together with no charges. The business manager stated that “over 60 percent of the market are using the application and growth in users has been exponential”. The application had processed over 250,000 file transfers between advertising agencies and regional newspapers in the two and half years since it was launched. The business manager recognised the value of the accumulation of information regarding advertising in regional newspapers.

The NTA was a leading association representing the interests of regional newspapers in the UK. The chief executive recognised the importance of developing the online advertising artwork management application in order to address the business needs of members. It was stated that the membership “is competing with national newspapers and magazines for advertising and is increasingly concerned to maintain and increase its market share”. This concern was translated into members contributing directly into a fund of over £1 million to develop a suitable application. Members were also concerned with the fee-based business models used by other commercial service providers which were identified as a potential threat to their margin. The chief executive felt that the NTA was trusted in the industry because of long-established relationships and its historical stance on key issues affecting the industry. The NTA had not attempted to quantify the benefits to its members as part of the business case for the development of the application. It was stated that the investment case was made on the basis that the application was needed to secure existing income and prevent new intermediaries reducing margins. The chief executive felt that this had been achieved and that members were broadly happy with the outcome. It was noted that the NTA had been approached by other publishing sectors with a view to using the application. This represented an unexpected outcome which could result in additional income or reduced capital investment. The NTA was considering other ways in which Internet-based technology could benefit members, including planning and payment applications.

5.5.2 Analysis

1. Micro-level ties

Resource flows through activity links: A shared information asset (advertising placement) was created as part of the interactions between NTA members, the AMP and advertising agencies, whilst existing resources appeared unaffected. NTA members and the AMP

recognised this asset as a valuable resource in the existing aggregation. The value of the hosted application for new aggregations had emerged.

Mutual expectation with resilient trust: Prior to using the application trusted relationships existed between NTA members and advertising agencies built up over previous transactions. The introduction, by the AMP, of the artwork management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust, evidenced by a lack of service level agreement between advertising agencies and the AMP.

Information flows supported by catalysts: The crucial role played by the provision, by the AMP, of the advertising artwork management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of NTA members by initiating, funding and promoting the use of the application to an existing aggregation.

2. Economic

Nature of transaction with value activity: The advertising artwork management application increased the structure of the information component of the transactions between NTA members and advertising agencies. In doing so it increased the perceived value and reduced the costs of repeated transactions for both for NTA members and advertising agencies.

Cost of networking: The advertising agencies had to bear any internal cost associated with Internet connectivity. Interviewees were unaware of any users who required connectivity in order to use the application.

3. Strategic

Motivation: All participants were motivated to engage in the advertising artwork management application. The NTA members believed that they would achieve cost savings and opportunities for increase business whilst advertising agencies appeared to be motivated by increased ease of use at no direct increase in costs. The AMP received revenue from the NTA.

Perspectives: The NTA identified important long-term benefits from using the application and their decision can be considered as strategic in nature. The advertising agencies appeared to be less concerned with the wider opportunities emergent from the using the application. The value of the application to other aggregations did not form part of the original business case.

Contingencies: At an institutional level the NTA played the central role in the formation of the aggregation. As the organisation funding the application development they could encourage advertising agencies to use the online application. At a relational level it can be seen that existing relationships between NTA members and advertising agencies inferred trust in the choice of the online application provided by the AMP.

4. Governance

Intellectual property rights: The value of the new shared information asset was acknowledged by the NTA and the AMP and formed part of their business strategy. The advertising agencies' interests appeared to be focused on their operational needs rather

than more generic uses of this information. A service level agreement existed between the NTA and the AMP.

Co-ordinations mechanism: There was a service level agreement between the NTA and the AMP. The advertising agencies used the application without a service level agreement with either NTA members or the AMP, thus transferring direct control of this governance mechanism.

5. Diffusion of innovation

Change agent: The NTA appeared to play an important role in the recruitment of advertising agencies. It worked independently and with members to recruit advertising agencies.

Critical mass: The use of previously identified methods for increasing adoption of interactive innovation were identified. The NTA promoted the application to the leading advertising agencies thus targeting the leading organisations, supported agencies by training and promoted the benefits thus shaping the users' perceptions, deployed the application through members thus addressing aggregations and the free use provided an incentive to early adopters.

Intermediaries: The role of the NTA was crucial to achieving the engagement of advertising agencies. The role of the AMP was fundamental to the formation of the specific aggregation with their provision of the online advertising artwork management application being a prerequisite.

5.5.3 Discussion

This case highlights the importance of the relationship, in this case exclusive, between the advertising artwork management application service provider (AMP) and the trusted third party, NTA, in the adoption of the online application by an aggregation of advertising agencies. The AMP's online application supported the business needs of the members of the NTA and agencies in managing advertising artwork. The NTA initiated the application development with funding directly from members. The agencies relied on the trade association to negotiate and manage the service level agreement with the application service provider, AMP, and there was no direct cost to the agencies for using the application. The members paid for agencies to use the application because of the perceived benefits of retained and increased business.

This specific aggregation exhibited many characteristics associated with IONs in particular at a micro-level the resource flows through activity links of the shared information asset, evidence of mutual expectation with resilient trust leading to a lack of service level agreement with agencies and information flows supported by the catalyst role of trusted third parties and inter-organisational information systems. Governance mechanisms were not formalised for intellectual property right of the information repository and no service level agreement existed with the agencies. The economic effect of the applications was to increase the structure of the information component and the perceived gain was greater than internal and external costs. At a strategic level participants were motivated by longer term objectives, multiple perspectives converged on the engagement in the application and there was institutional and relational level support for engagement. This case also identified the creation of an information repository and the value of the application, which could be exploited by the NTA as an emergent property of the aggregation. There were

characteristics associated with the diffusion of innovation through networks evident by a change agent, critical mass building and intermediaries.

The use of the e-aggregation application by the advertising agencies significantly increased the degrees of integration and supported structure within the aggregation. The e-aggregation application provided a standardised format in which information was exchanged between the advertising agencies and NTA members. Importantly the e-aggregation application increased the level of integration between advertising agencies and NTA members by making it easier to transfer artwork to regional newspapers. The overall effect was to move the aggregation from the 'association' to the 'network' aggregation type.

5.6 Organic aggregation: Case 5

This case centres on an organic industry aggregation consisting of SME organic growers and producers (producers). The case narrative comprises three elements, namely the field management application service provider (ASP), an organic certification body (trusted third party) and a survey of users and non-users. Initially both the certification body and the service provider were approached independently with the latter assisting in access to the user community. The selection of non-users was independent of these participants.

5.6.1 Narrative

The organic movement has its origin in the 1920s with the increasing use of fertilisers, pesticides, herbicides and mass rearing of animals. Lady Balfour galvanised the movement in the UK and initiated the formation of the Soil Association in 1946. The movement had grown fuelled in part by health and environmental scares resulting from intensive farming methods and pest control. These included the use of DDT highlighted by Carson's book *Silent Spring* published in 1963 and more recently by BSE and foot and mouth disease in the UK. Over 4 percent of UK and European farmland was under organic production. The worldwide annual market was estimated to be worth over £15 billion and had grown at over 15 percent per year in Europe but still represented only 1 percent of food sales. In the UK about 65 percent of the organic food was imported, including milk. At the time of the research there were nearly 3,500 certified producers in the UK with over 5,000 forecasted within 5 years. Each country maintained the authenticity of organic food through inspections by certification bodies, such as the Soil Association, which certified 70 percent of UK producers. There were recent concerns about the ability of this regulatory system as false certification and labelling infiltrated the supply chain. Most of the organic sales in the

UK were through the large supermarkets which caused concerns amongst producers regarding increased external control and the potential for reduced margins. The UK organic industry is SME-rich in that statistically 100 percent of the enterprises have less than 250 employees (SBS 2002).

The formation of the aggregation centres on the provision of an online, pan-European field management application by an ASP. The ASP speculatively developed the application but worked with a trusted third party, an organic certification body (OCB), to promote the application to producers. The certification body was known and trusted by the producers however the ASP was not known to users prior to engagement.

The field management application service provider (FMP) was a software development company based in Berkshire, which built bespoke applications for emergent markets, where it considered Internet-based technology could provide competitive advantage and where there was potential for creating a product that might meet the needs of a niche market. The FMP believed that catering for the needs of a niche market would generate opportunities to deliver 'broker solutions'. These solutions acted as a broker between interested parties, created an environment where mutually beneficial networking and transactions could be undertaken in an impartial 'shared space'. The FMP stated that "It (a broker solution) can be the catalyst for new brand/business opportunities to emerge from market participants" and that by "capturing, integrating and adding value to information flows, it can reduce costs, improve effectiveness and promote product and service innovation". Examples of broker solutions developed by the FMP included the field management application for the organic sector and an international cargo managing application developed with industry partners in order to serve the cargo risk management

sector. The organic sector application provided by the FMP was a web-based, pan-European field management system that offered complete crop traceability to organic growing groups and co-operatives. At its core was a comprehensive record keeping tool for individual farms to fill in their day-to-day crop management activities. It was designed to be simple, easy to use and featured a variety of report formats to ease the burden of farm record keeping. Records were stored securely on FMP servers, however access could be given to selected trusted third parties, such as certification bodies. For each harvest recorded in the system a 'trace code' was generated, which provided information about that particular crop, from soil preparation through to the harvest date and its organic authenticity. The application could be integrated with certifier's databases allowing each farm to have an authentic, up-to-date online certificate. This could then be distributed with the 'trace code' automatically. The organic certification body (OCB) supported this feature for certified growers. The field management application was designed to support relationships within the organic industry. The business manager stated that the FMP "chose the organic sector because it was a greenfield site with no direct competition". In addition there was a perceived value to users, a predicted market growth where infrastructure would become more important and there was already a sense of community. The business manager stated that "one of our UK importers, who supplies supermarkets, uses the system to manage his growers across Europe". The FMP believed this logic could be applied to any business involved in collaboration. The business manager appreciated that the hosted application platform was accumulating potentially valuable information about the organic industry. The FMP worked closely with the OCB and other certifying bodies to promote the application within the organic industry. OCB members were recruited by mailshots and other sales and marketing. The FMP recognised the importance of working with certification bodies, as they were trusted within the industry. The FMP business model was

to provide the application free of charge to smaller organic growers and at moderate fees for larger users, £50 per annum. The FMP believed the value of the application would increase with the number of users. The OCB reduced the first year inspection fee for growers who used the FMP application.

The organic certifying body (OCB) was a leading UK campaigning and certification organisation for organic food and farming. It was founded by a group of farmers, scientists and nutritionists who observed a direct connection between farming practice and plant, animal, human and environmental health. Since then the organisation had developed organic standards and worked with consumers, farmers, growers, processors, retailers and policymakers. Through its campaigning arm the OCB tried to create an informed body of public opinion in order to promote organic agriculture as a sustainable alternative to intensive farming methods. The OCB was a not-for-profit organisation. Its regulatory arm enforced organic standards in farming, processing and retailing. The OCB believed it was a trusted third party to the organisations, such as growers, producers and importers. The OCB initially identified the Internet as a means of communication with its personnel and the general public. During the course of this investigation the static website was revised and upgraded resulting in a more dynamic website with personalised content. The primary focus remained members and the general public but producers and growers were able to access members-only information and discussion forums. In addition the OCB supported the FMP application both through its promotion and a reduction in certification fees to growers. The OCB had limited resources, both personnel and financial, to develop online applications and welcomed relationships with intermediaries. It recognised that growers and producers could benefit from access to appropriate online applications such as e-marketplaces.

5.6.2 Analysis

1. Micro-level ties

Resource flows through activity links: A shared information asset (produce and authenticity) was created as part of the interactions between the OCB, the FMP and producers, whilst existing resources appeared unaffected. The OCB and the FMP recognised this asset as a valuable resource in the existing aggregation.

Mutual expectation with resilient trust: Prior to using the application trusted relationships existed between the OCB and producers built up over previous interactions. The introduction, by the FMP, of the field management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust, evidenced by a lack of service level agreement between producers and the FMP.

Information flows supported by catalysts: The crucial role played by the provision, by the FMP, of the field management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the OCB in promoting the use of the application to an existing aggregation.

2. Economic

Nature of transaction with value activity: The field management application increased the structure of the information component of the transactions between the OCB and producers. The application increased the perceived value and reduced the costs of repeated interactions between producers and the OCB and between producers.

Cost of networking: The users had to bear any internal cost associated with Internet connectivity larger producers paid a limited fee to the CMP. The OCB offered a reduced annual certification fee for producers.

3. Strategic

Motivation: All participants were motivated to engage in the field management application. The producers believed that they would achieve reduced administration and certification costs. The OCB recognised the opportunity to reduce the risk of fraud. The application supported the FMP's declared strategy for developing online aggregations.

Perspectives: The OCB and the PMP both identified important long-term benefits from using the application and their decisions can be considered as strategic in nature. The users were less concerned with the wider opportunities emergent from the using the application but could identify benefits to the relationships with the OCB and collaboration with other producers.

Contingencies: At an institutional level the OCB played an important role in the formation of the aggregation as the organisation promoted the applications to producers. At a relational level it can be seen that existing relationships between the participants inferred trust in the choice of the online application provided by the FMP.

4. Governance

Intellectual property rights: The value of the new shared information asset was acknowledged by the FMP and formed part of their business strategy. The OCB recognised the value of tracing organic produce throughout the food chain. The producers' interests appeared to be focused on their own needs rather than more generic uses of this information. A service level agreement existed between the OCB and the FMP.

Co-ordinations mechanism: There was a service level agreement between the OCB and the FMP. The producers used the application without a service level agreement with either the OCB or the CMP, thus transferring direct control of this governance mechanism.

5. Diffusion of innovations

Change agent: The FMP business manager appeared to play an important role in the recruitment of producers. He worked with the OCB to identify ways of recruiting producers and appreciating the needs of the OCB. The OCB promoted the field management application to producers and offered incentives.

Critical mass: The use of previously identified methods for increasing adoption of interactive innovation were identified. The FMP promoted the application to the OCB and other certifying bodies across Europe thus targeting the leading organisations, supported users by training and promoted the benefits thus shaping the users' perceptions, deployed the application by certifying body thus addressing aggregations and with the free use for smaller producers provided an incentive to early adopters. The OCB also supported the adoption by a reduced certification fee.

Intermediaries: The role of The OCB was crucial in encouraging the engagement of producers. The role of the FMP was fundamental to the formation of the aggregation with their speculative provision of the online field management application being a prerequisite. The FMP deliberately formed relationships with other certification bodies in Europe.

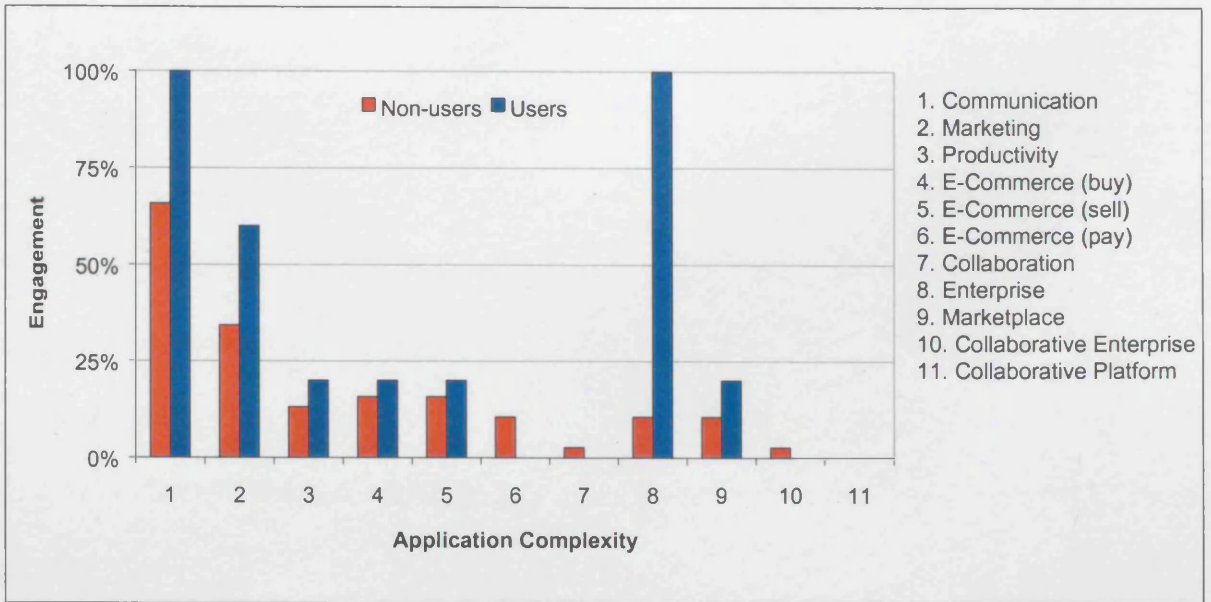
5.6.3 Discussion

This case highlights the importance of the relationship, in this case non-exclusive, between the field management application service provider (FMP) and the trusted third party, an

organic certification body (OCB), in the adoption of the online field management application by an aggregation of organic producers. Clearly The FMP's online application supported the business needs of the OCB and producers in managing organic farming, which nearly all users confirmed was of importance to their businesses (75%). The FMP initiated the application development, however subsequently both the OCB and users became involved in its development. Producers paid the FMP for the use of the application, although smaller producers paid no fee.

From the survey of producers using the field management application, users had high levels of ICT daily usage (38%) compared to non-users (21%), who had very low levels of awareness of hosted aggregation-specific applications (8%). The FMP's online application provided new functionality to all users who all trusted the ASP and felt it was committed to providing the service, Table 5.4. Users could be characterised as feeling part of a business network (60% vs. 26%), having a very positive attitude to (100% vs. 48%) and fair knowledge and experience of (40% vs. 24%) e-business than non-users. Users largely agreed that e-business improved efficiency (100% vs. 36%) and enabled new ways of business (80% vs. 54%), Table 3, Appendix V. Users were more engaged in e-business regardless of application complexity, Figure 5.5.

Figure 5.5. E-Business engagement by organic producers.



This specific aggregation exhibited many characteristics associated with IONs in particular at a micro-level the resource flows through activity links of the shared information asset, evidence of mutual expectation with resilient trust leading to a lack of service level agreement with producers and information flows supported by the catalyst role of trusted third parties and inter-organisational information systems. Governance mechanisms were not formalised for intellectual property rights of the information repository. The economic effect of the application was to increase the structure of the information component and the perceived gain was greater than internal and external costs. At a strategic level participants were motivated by longer term objectives, multiple perspectives converged on the engagement in the application and there was institutional and relational level support for engagement. This case also identified the creation of an information repository, which could be exploited by the service provider as an emergent property of the aggregation. There were characteristics associated with the diffusion of networks evident by a change agent, critical mass building and intermediaries.

The use of the e-aggregation application by the organic farmers significantly increased the degrees of structure and supported integration within the aggregation. The application provided a standardised format in which information was exchanged between organic farmers and the OCB. The degree of integration changed significantly by the incorporation of digital certificates and audited movement of produce. One importer stated that the application enabled the movement of fruit from co-operatives in Italy to be managed in a transparent and authenticated way, which satisfied a major supermarket customer. The overall effect was to move the aggregation from the ‘cluster’ to the ‘network’ aggregation type.

Table 5.4. Sample views of producers

Benefits of e-business applications
"The way forward." "The value increases the more widely used." "Speed of use is increasing, makes you expect instant responses, still need personal contact." "Efficiency & communication." "Better communication. Improving record keeping & access to information." "Speed & cheaper." "Efficiency & communication." "Greater efficiency." "Access to data & interaction with network." "Cost reduction."
Reason for using field management application
"The OCB." "Curiosity, no specific need." "Recommended by OCB." "OCB recommended it." "Efficiency, communication & traceability." "Allows for data integration, reduces the need for organised paper system." "Standardises, helps meet the needs of OCB, cheaper saves time & organisation."
Comments regarding FMP
"Very good." "Can't say." "High." "Committed."

5.7 Comparison of qualitative research (Table 5.5)

Dimension (Evidenced by)	Aggregation				Organic
	Construction	Dairy	Knowledge	Media	
Micro-level ties					
Resource flows (Activity links → support for access to shared or specific resources; asset specificity)	A shared information asset (project and product specification) was created as part of the interactions between the TTP, ASP and users, whilst existing resources appeared unaffected. The TTP and ASP recognised this asset as a valuable resource in the existing aggregations. The ASP recognised the value of accumulated information across multiple aggregations.	A shared information asset (herd nutrition) was created as part of the interactions between the TTP, ASP and users, whilst existing resources appeared unaffected. The TTP and ASP recognised this asset as a valuable resource in the existing aggregation.	A shared information asset (knowledge base) was created as part of the interactions between the TTP, ASP and users, whilst existing resources appeared unaffected. The TTP recognised this asset as a valuable resource in the existing aggregation for retaining existing and recruiting new users.	A shared information asset (advertising placement) was created as part of the interactions between the TTP, ASP and users, whilst existing resources appeared unaffected. The TTP and ASP recognised this asset as a valuable resource in the existing aggregation. The value of the hosted application for new aggregations had emerged.	A shared information asset (produce and authenticity) was created as part of the interactions between the TTP, ASP and users, whilst existing resources appeared unaffected. The TTP and ASP recognised this asset as a valuable resource in the existing aggregation.
Mutual expectation (Trust → resilient trust supports network formation)	Prior to using the application trusted relationships existed between the TTP and users built up over previous building projects. The introduction, by the ASP, of the project management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust, evidenced by a lack of service level agreement between users and the ASP.	Prior to using the application trusted relationships existed between the TTP and users built up over previous interactions. The introduction, by the ASP, of the dairy management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust established over a long period.	The emergence of the TTP went hand in hand with the provision, by the ASP, of the community management application. The application supported the establishment of the relationship between the TTP and users. Adoption can in part be attributed to resilient trust, evidenced by a lack of service level agreement between users and the ASP.	Prior to using the application trusted relationships existed between the TTP and users built up over previous transactions. The introduction, by the ASP, of the artwork management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust, evidenced by a lack of service level agreement between users and the ASP.	Prior to using the application trusted relationships existed between the TTP and users built up over previous interactions. The introduction, by the ASP, of the field management application enhanced these existing relationships and adoption could in part be attributed to this resilient trust, evidenced by a lack of service level agreement between users and the ASP.

<p>Information flows (Catalysts → informational intermediaries; IOS)</p>	<p>The crucial role played by the provision, by the ASP, of the project management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the TTP both by funding and promoting the use of the application to an existing aggregation.</p>	<p>The crucial role played by the provision, by the ASP, of the dairy management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the TTP in initiating and promoting the use of an application to an existing aggregation.</p>	<p>The crucial role played by the provision, by the ASP, of the community management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the TTP both by initiating, funding and promoting the use of the application.</p>	<p>The crucial role played by the provision, by the ASP, of the management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the TTP both by initiating, funding and promoting the use of the application to an existing aggregation.</p>	<p>The crucial role played by the provision, by the ASP, of the field management application in facilitating and shaping the formation of the online aggregation was evident in this case. It reinforced the information flows within the aggregation. There was strong evidence of the facilitation role of the TTP promoting the use of the application to an existing aggregation.</p>
Economics					
<p>Nature of transactions (Value activity → product/ service; repeated/ad hoc)</p>	<p>The project management application increased the structure of the information component of the transactions between the TTP and users. In doing so it increased the perceived value and reduced the costs of repeated transactions for both the TTP and users.</p>	<p>The dairy management application increased the structure of the information component of the transactions between the TTP and users. In doing so it increased the perceived value and reduced the costs of repeated transactions for both the TTP and users.</p>	<p>The community management application increased the structure of the information component of the interactions between the TTP and users. The application increased the perceived value and reduced the costs of repeated interactions between users and the TTP and between users.</p>	<p>The advertising artwork management application increased the structure of the information component of the transactions between the TTP and users. In doing so it increased the perceived value and reduced the costs of repeated transactions for both the TTP and users.</p>	<p>The field management application increased the structure of the information component of the transactions between the TTP and users. The application increased the perceived value and reduced the costs of repeated interactions between users and the TTP and between users.</p>
<p>Cost of networking (Impact of ICT → on internal & external costs)</p>	<p>The users had to bear any internal cost associated with Internet connectivity, which in one case meant purchasing a computer. The project management application reduced the cost of interaction with the TTP and provided a low cost opportunity to trade with other clients.</p>	<p>The users had to bear any internal cost associated with Internet connectivity and a modest annual rental charge to the ASP. The application was supported by farm advisors.</p>	<p>Users had to bear any cost associated with Internet connectivity. Users paid an annual subscription to the TTP which included the use of the community management application.</p>	<p>The users had to bear any internal cost associated with Internet connectivity. Interviewees were unaware of any users that required connectivity in order to use the application.</p>	<p>The users had to bear any internal cost associated with Internet connectivity. Larger users paid a limited fee to the ASP. The TTP offered a reduced annual certification fee for users.</p>

Strategic	
<p>Motivation (Scope & scale → greater flexibility; cost savings; enhanced learning; increased revenue)</p>	<p>All participants were motivated to engage in the project management application. The TTP believed that they would achieve increased control, cost savings and transparency whilst users recognised the opportunity for increased business with existing and new clients at little increase in costs. The ASP generated revenue from the TTP and other clients.</p>
<p>Strategic perspective (Intended & emergent → models of sense making; understanding; committing; enacting)</p>	<p>All participants were motivated to engage in the dairy management application. The users believed that they would achieve increased cost controls and access to leading research on herd management. The TTP and the ASP were committed to supporting the users and disseminating research information in a financially viable way.</p>
<p>Contingencies (Institutional & relational → instigation of network from existing bodies or form links between them)</p>	<p>All participants were motivated to engage in the advertising artwork management application. The TTP believed that they would achieve cost savings and transparency whilst users recognised the opportunity for increased interaction with each other and the TTP, which supported their business needs. The ASP generated revenue from the TTP and other clients.</p>
<p>Motivation (Scope & scale → greater flexibility; cost savings; enhanced learning; increased revenue)</p>	<p>All participants were motivated to engage in the community management application. The TTP believed that they would achieve cost savings and transparency whilst users recognised the opportunity for increased interaction with each other and the TTP, which supported their business needs. The ASP generated revenue from the TTP and other clients.</p>
<p>Strategic perspective (Intended & emergent → models of sense making; understanding; committing; enacting)</p>	<p>The TTP identified important long-term benefits from using the application and offering the application and their decision can be considered as strategic in nature. The users were less concerned with the wider opportunities emergent from using the application but could identify cost benefits to their businesses.</p>
<p>Contingencies (Institutional & relational → instigation of network from existing bodies or form links between them)</p>	<p>The TTP identified important long-term benefits from using the application and their decision can be considered as strategic in nature. The users were less concerned with the wider opportunities emergent from using the application but could identify benefits to the relationships with the TTP and the potential for new business.</p>
<p>Motivation (Scope & scale → greater flexibility; cost savings; enhanced learning; increased revenue)</p>	<p>All participants were motivated to engage in the field management application. The users believed that they would achieve reduced administration and certification costs. The TTP recognised the opportunity to reduce the risk of fraud. The application supported the ASP's declared strategy for developing online aggregations.</p>
<p>Strategic perspective (Intended & emergent → models of sense making; understanding; committing; enacting)</p>	<p>The TTP identified important long-term benefits from using the application and their decision can be considered as strategic in nature. The users were less concerned with the wider opportunities emergent from using the application but could identify benefits to the relationships with the TTP and collaboration with other users.</p>
<p>Contingencies (Institutional & relational → instigation of network from existing bodies or form links between them)</p>	<p>At an institutional level the TTP played an important role in the formation of the aggregation as the organisation funded the development of the application they could encourage users to use the online application. At a relational level it can be seen that existing relationships between the participants inferred trust in the choice of the online application provided by the ASP.</p>
<p>Motivation (Scope & scale → greater flexibility; cost savings; enhanced learning; increased revenue)</p>	<p>All participants were motivated to engage in the advertising artwork management application. The TTP believed that they would achieve cost savings and transparency whilst users recognised the opportunity for increased interaction with each other and the TTP, which supported their business needs. The ASP generated revenue from the TTP and other clients.</p>
<p>Strategic perspective (Intended & emergent → models of sense making; understanding; committing; enacting)</p>	<p>The TTP identified important long-term benefits from using the application and their decision can be considered as strategic in nature. The users were less concerned with the wider opportunities emergent from using the application but could identify benefits to the relationships with the TTP and collaboration with other users.</p>
<p>Contingencies (Institutional & relational → instigation of network from existing bodies or form links between them)</p>	<p>At an institutional level the TTP played an important role in the formation of the aggregation as the organisation funded the development of the application they could encourage users to use the online application. At a relational level it can be seen that existing relationships between the participants inferred trust in the choice of the online application provided by the ASP.</p>

Governance					
Distribution of property Rights (Governance → contractual agreements)	The value of the new shared information asset was acknowledged by the ASP and formed part of their business strategy. The ASP intended to develop additional applications which exploited this information asset. The client's interests appeared to be focused on their project management needs rather than more generic uses of this information. A service level agreement existed between the TTP and ASP.	The value of the new shared information asset was acknowledged by both the TTP and ASP and formed part of their business strategies. The users' interests appeared to be focused on their herd management needs rather than more generic uses of this information. Service level agreements existed between the TTP and ASP and between most users and the ASP.	The value of the new shared knowledge base was acknowledged by the TTP and formed part of their business strategy for retaining existing and recruiting new members. Only a limited amount of information was accessible to non-members visiting the website. The members also valued this knowledge base for their own benefit. A service level agreement existed between the TTP and ASP.	The value of the new shared information asset was acknowledged by the TTP and ASP and formed part of their business strategy. The users' interests appeared to be focused on their operational needs rather than more generic uses of this information. A service level agreement existed between the TTP and ASP.	The value of the new shared information asset was acknowledged by the ASP and formed part of their business strategy. The TTP recognised the value of tracing organic produce throughout the food chain. The users' interests appeared to be focused on their own needs rather than more generic uses of this information. A service level agreement existed between the TTP and ASP.
Co-ordination mechanism (Governance → allocation of resources and responsibilities)	There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with either the TTP or ASP, thus transferring direct control to the TTP for this governance mechanism.	There was a service level agreement between the ASP and most users. Users relied on the TTP to manage the relationship with the ASP regarding functionality, costs and development.	There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with the ASP thus transferring direct control to the TTP.	There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with either the TTP or ASP, thus transferring direct control of this governance mechanism.	There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with either the TTP or ASP, thus transferring direct control of this governance mechanism.
Diffusion of innovation					
Change agent	The PMP account manager appeared to play an important role in the recruitment of users. He worked with managers at the TTP to identify users and subsequently undertook recruitment and training. Whilst he was fully aware of the TTP's desire for users to engage in the application he acted to 'tone down' this pressure and helped users to identify the benefits.	The TTP, through its farm advisors, played an important role in the recruitment of users to the dairy management application.	The executive members of the TTP played an important role in the recruitment of members to the community management application. They ensured that the application was used to disseminate information from the association to members and facilitate the operation of the association. They recruited moderators and contributed to the discussion forum.	The TTP appeared to play an important role in the recruitment of users. It worked independently and with members to recruit users.	The ASP business manager appeared to play an important role in the recruitment of users. He worked with the TTP to identify ways of recruiting users and appreciating the needs of the TTP. The TTP promoted the field management application to users and offered incentives.

<p>Critical mass (Interactive innovations → target leading actors; shape perceptions; early aggregation; early adaptor incentives)</p>	<p>The use of previously identified methods for increasing adoption of interactive innovation was identified. The ASP promoted the application to the TTP and other clients thus targeting the leading actors, supported users by training and promoted the benefits thus shaping users' perceptions, deployed the application project by project thus addressing aggregations and the free use provided an incentive to early adopters.</p>	<p>The use of previously identified methods for increasing adoption of interactive innovation was identified. Both the TTP and ASP supported users by training and promoted the benefits thus shaping the users' perceptions, initially deployed the application to existing offline users thus addressing an aggregation and were considering developing relationships with other trusted third parties in different geographical regions thus addressing other aggregations.</p>	<p>The use of previously identified methods for increasing adoption of interactive innovation was identified. The TTP promoted the application through executive members and key moderators thus targeting leading actors, used the application to disseminate information and conduct operations thus shaping the users' perceptions and the use of moderated forums addressed aggregations.</p>	<p>The use of previously identified methods for increasing adoption of interactive innovation was identified. The TTP promoted the application to the leading users thus targeting the leading actors, supported agencies by training and promoted the benefits thus shaping the users' perceptions, deployed the application through members thus addressing aggregations and the free use provided an incentive to early adopters.</p>	<p>The use of previously identified methods for increasing adoption of interactive innovation was identified. The ASP promoted the application to the TTP and other certifying bodies across Europe thus targeting the leading actors, supported users by training and promoted the benefits thus shaping the users' perceptions, deployed the application by certifying body thus addressing aggregations and with the free use for smaller users provided an incentive to early adopters. The TTP also supported the adoption by a reduced certification fee.</p>
<p>Intermediaries (Existence → existing; informational)</p>	<p>The role of the TTP was crucial to achieving the engagement of users who were willing to trade with the TTP and provide products and services to the construction projects. The TTP promoted the ASP to potential users in the construction industry. The role of the ASP was fundamental to the formation of the aggregation with their speculative provision of the online project management application being a prerequisite.</p>	<p>The role of the TTP in promoting engagement by farmers was crucial as they were seen as independent and able to recommend the application through their farm advisors. The role of the ASP was fundamental to the formation of the specific aggregation with their provision of the online dairy management application being a prerequisite.</p>	<p>The TTP played a crucial role in achieving the engagement of users. It acted on behalf of members to negotiate with the ASP. The development of the online community management application by the ASP was a prerequisite to the formation of the aggregation and an important factor in the growth and success of the TTP.</p>	<p>The role of the TTP was crucial to achieving the engagement of users. The role of the ASP was fundamental to the formation of the specific aggregation with their provision of online advertising artwork management application being a prerequisite.</p>	<p>The role of the TTP was crucial in encouraging the engagement of users. The role of the ASP was fundamental to the formation of the aggregation with their speculative provision of the online field management application being a prerequisite. The ASP deliberately formed relationships with other certification bodies in Europe.</p>

Provider Business Model	
Mission	<p>The ASP's mission was to develop collaboration systems that enabled professionals to communicate and exchange information about built assets securely over the Internet. It sought to work in partnership with industry organisations, government and universities. These systems were targeted at clients, consultants, users and suppliers in the construction, property and utilities industries.</p>
Structure	<p>The ASP sought to combine their information systems expertise with architectural, engineering and construction experience to develop applications in three areas: project management, design and planning, and an industry portal. The ASP's project management application had the largest market share in Europe.</p>
	<p>The ASP's mission was to maximise the impact and benefits of communications for their clients by the use of advanced technology. They worked in partnership with their clients to meet their existing communications needs and develop new approaches. They sought to deliver added value through innovative ideas and provide tailored solutions. They specifically sought to meet the needs of trade associations and campaign groups.</p>
	<p>The ASP's mission was to develop, with the AC, the online application with the support of leading regional agencies, institutions and companies. It was an internet-based information system for the dairy industry which used the latest technology to enable subscribers to have fast and efficient access to the TTP information.</p>
	<p>The ASP's mission was to deliver solutions that embodied their approach to the way that information was collected, stored and used. This approach sought to better utilise the information-sharing potential of ICT that encouraged greater flexibility in the way knowledge is managed. The ASP sought to develop bespoke 'broker' solutions that met the needs of niche markets by providing software, hardware, consulting, training and support.</p>
	<p>The ASP provided an Internet-based digital artwork transmission system, launched in 2000, following £1 million of investment from TTP members. It was the fastest growing Internet artwork delivery system in the UK. It was launched to streamline artwork delivery and provide a single point of access to the regional newspaper industry.</p>
	<p>The ASP's solutions acted as brokers between interested parties in order to create an environment for mutually beneficial networking. It could be the catalyst for new business opportunities to emerge from market participants. By capturing, integrating and adding value to information flows, a broker solution could reduce costs, improve effectiveness, and promote product and service innovation.</p>

Processes	<p>The project management application offered by the ASP enabled all members of a project team to share, exchange and re-use information via the web. The ASP sought to deliver a complete and integrated information service for asset owners and operators, capturing all information associated with their projects or programmes.</p>	<p>The internet milk manager offered by the ASP was a fully interactive milk costing system. Operated through input sheets on screen to record physical and financial information about the dairy herd. The system recorded milk produced, milk sold, changes in cow numbers, feed used and other monthly expenses. This created monthly results for the herd which when combined with other information on forage and fertiliser usage produced a full gross margin report.</p>	<p>The online community management application offered by the ASP allowed content management, personalisation, interaction between members of the community and tight access control. It aimed to reduce the time, costs, and complexity involved in deploying large amounts of information to websites. The system used a database-backed website, managed through a web browser interface, that combines content management with a fine-grained access control system.</p>	<p>The ASP's application used industry standard software to create and transmit files via the internet. The users created the artwork as normal and filled out a job ticket for the destination newspaper. A pre-delivery check ensured that the artwork had been created to the required specification of the destination newspaper. Once uploaded on the website, the server sent an e-mail to the publishing centre to tell them the artwork is waiting and automatically e-mailed a receipt to the sender when it had been collected.</p>	<p>The ASP offered a web-based field management application that offered a complete crop traceability solution to organic users. At its core was a comprehensive record keeping tool for individual farms to fill in their day to day cropping activities. Records were stored securely on the ASP's servers. To further promote authenticity the application integrated with certifier's databases allowing each user to have an authentic, up-to-date certificate online, which was then distributed with a 'trace code' automatically.</p>
Revenues	<p>The lead client paid all charges for the provision of the application directly to the ASP. This included training and support costs. Users paid no charges.</p>	<p>Users paid fees directly to the ASP.</p>	<p>Trade associations and community-based organisations paid a fee to the ASP for use of the application. This fee varied depending on the functionality required and level of community activity.</p>	<p>The ASP was funded entirely by the TTP members. This contribution varied according to size. Users paid no charge.</p>	<p>Charges were paid by larger users directly to the ASP. The TTP contributed any reduction in annual certification fee to the ASP.</p>
Legal issues	<p>There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with either PMP or SLC.</p>	<p>There was a service level agreement between the ASP and most users.</p>	<p>There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with the CMP.</p>	<p>There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with either TTP members or the ASP.</p>	<p>There was a service level agreement between the TTP and ASP. The users used the application without a service level agreement with either the TTP or ASP.</p>
Technology	<p>The application was hosted by the ASP with users accessing the application via standard web browsers on either Windows or Macintosh computers. The application used a relational database management system and supported multiple file formats.</p>	<p>The application was hosted by the ASP with users accessing the application via standard web browsers. The application generated a database-backed website, managed through a web browser interface, that combined content management with a fine-grained access control system.</p>	<p>The application was hosted by a third party under contract with the ASP. Users accessed the specialist application which managed the transmission of compressed PDF formatted files.</p>	<p>The application was hosted by the ASP with users accessing the application via standard web browsers. The application used a relational database management system. Digital certification was incorporated into the application.</p>	<p>The application was hosted by the ASP with users accessing the application via standard web browsers. The application used a relational database management system. Digital certification was incorporated into the application.</p>

5.8 Comparison of quantitative survey

The questionnaire survey represents an important part of the empirical research design principally because it explores both the user and non-user perspectives. The survey research seeks to make two contributions. Firstly, increasing our understanding of the user perspective by focussing on SME's who are users of hosted applications provided by the emergent ASP sector. Secondly, by providing additional data in support of the aggregation cases. Comparison between the two sample groups, namely users of aggregation-specific e-business applications (e-aggregation applications) within the case aggregations (users) and non-users within the wider aggregation (non-users), was undertaken at a combined level, Figure 5.7.

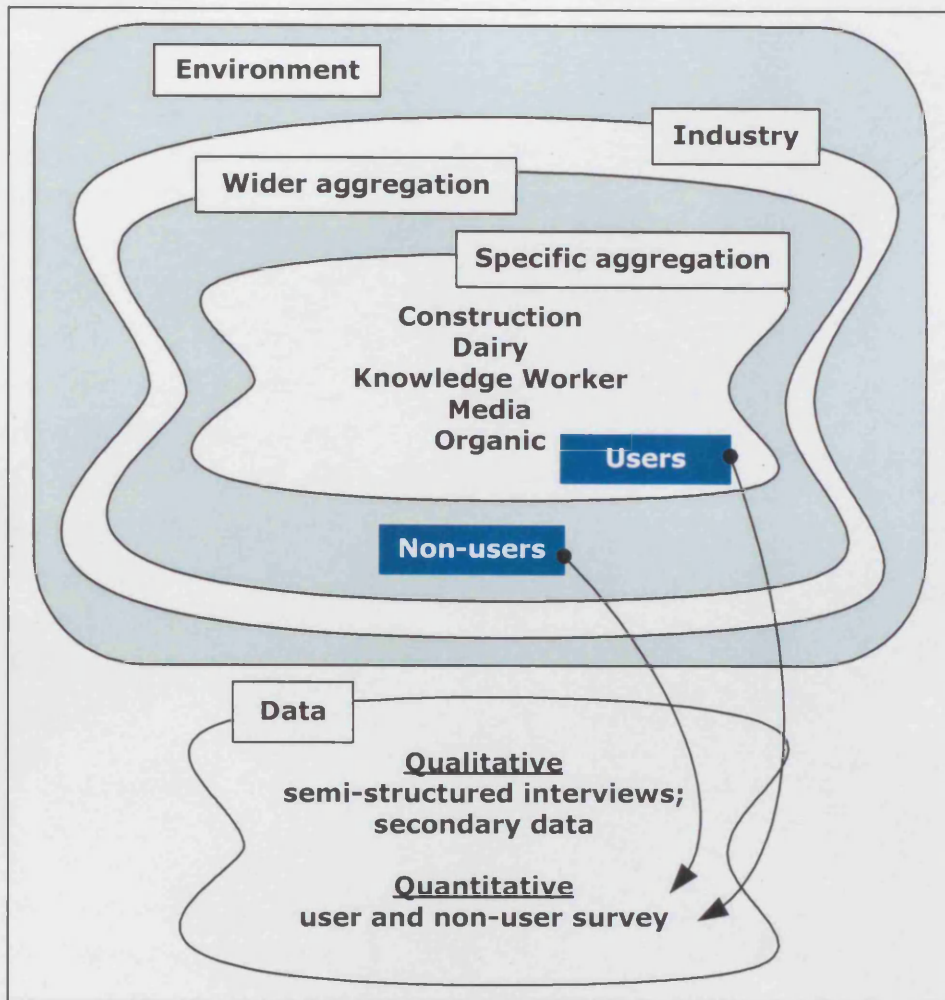
The two samples of users and non-users were independent of each other. In both samples the number of responses was greater than 30 (i.e. 43 for users and 104 for non-users). In this situation the parametric independent samples t-test could be applied and demonstrates statistically important differences between the two samples. The t-test was applied to a number of variables anticipated to highlight differences and are listed in full in Table 3 of Appendix V.

The following hypotheses were developed:

The null hypothesis H_0 is: the values for the user and non-user groups are equal.

The alternative hypothesis H_1 is: the values for user and non-user groups are not equal.

Figure 5.7. Context for quantitative survey



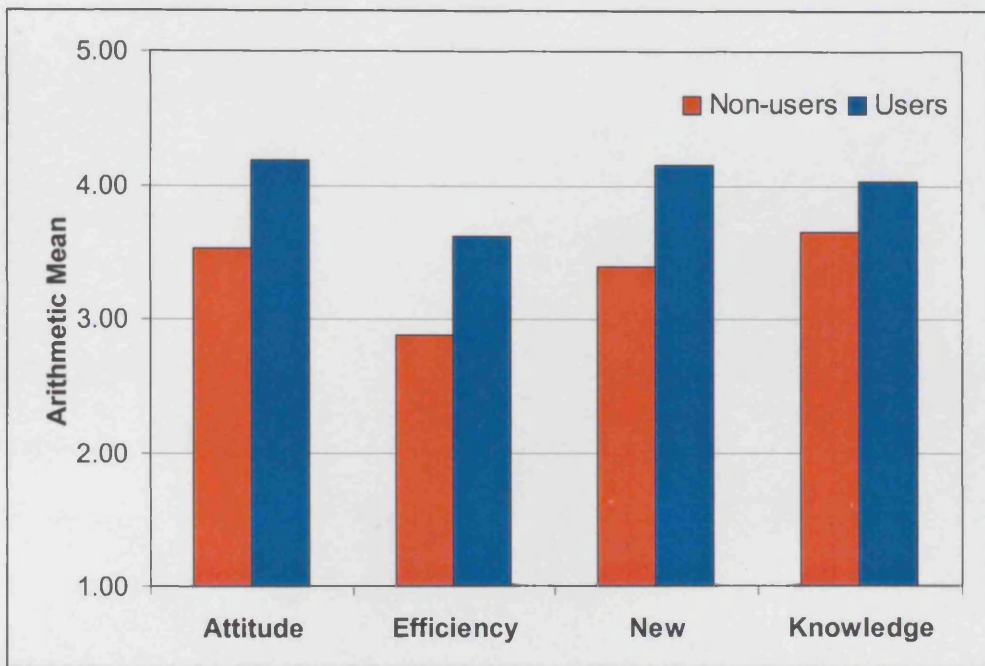
In order to accept or reject the null hypothesis the significance level, the degrees of freedom (df) and one-tail tests were calculated (Table 3, Appendix V). For there to be a significant difference the null hypothesis was rejected if the critical value is less than 0.05 or 5 percent and therefore the alternative hypothesis is accepted, Table 5.6. The individual results for the enablers and barriers are presented (*in italics*) before listing the four main groups for both, that is firstly enablers: (i) sales and marketing, (ii) operational, (iii) innovation, and (iv) external and secondly barriers: (i) security, (ii) cost and benefits, (iii) infrastructure and services, and (iv) information and education. This grouping of the enablers and barriers to e-business engagement by SMEs assisted in comparisons with secondary data.

Table 5.6. Statistically significant differences between users and non-users.

* indicates a significant difference (greater than 0.05 or 5%)	df	Critical Value % 5.0%, 2.5%, 1.0%	t-test
Attitude to e-business	• 100	1.660, 1.984, <u>2.364</u>	4.694
Knowledge & experience of e-business	• 85	1.663, 1.988, <u>2.371</u>	3.612
E-Business allows you to do same activities more efficiently?	• 100	1.660, 1.984, <u>2.364</u>	4.855
E-Business allows you to develop new ways of doing business?	• 95	1.661, <u>1.985</u> , 2.366	2.285
Enablers: What has helped or encouraged you to use e-business applications? (category)			
<i>Improving company image (sales & marketing)</i>	• 85	1.663, <u>1.988</u> , 2.371	2.311
<i>Opportunity for increased sales (sales & marketing)</i>	80	1.664, 1.990, 2.374	0.453
<i>Reducing operating costs (operational)</i>	85	1.663, 1.988, 2.371	0.888
<i>Improving customer services (operational)</i>	75	1.665, 1.994, 2.381	0.537
<i>Improving collaboration with partners (innovation)</i>	• 90	1.662, 1.987, <u>2.368</u>	4.046
<i>Provides new ways of doing business (innovation)</i>	• 90	1.662, 1.987, <u>2.368</u>	2.516
<i>Customer demands (external)</i>	80	1.664, 1.990, 2.374	0.394
<i>Supplier demands (external)</i>	45	1.679, 2.014, 2.412	0.248
Category of enabler			
i) Sales & Marketing	• 100	<u>1.660</u> , 1.984, 2.364	1.864
ii) Operational	100	1.660, 1.984, 2.364	0.466
iii) Innovation	• 100	1.660, 1.984, <u>2.364</u>	4.642
iv) External	100	1.660, 1.984, 2.364	0.564
Barriers: What is discouraging you from further use of e-business applications? (category)			
<i>Concerned about confidentiality (security)</i>	90	1.662, 1.987, 2.364	0.878
<i>Concerned about security (security)</i>	75	1.665, 1.992, 2.377	1.265
<i>Concerned about risk of fraud (security)</i>	• 75	<u>1.665</u> , 1.992, 2.377	1.882
<i>ICT costs too high (cost & benefits)</i>	85	1.663, 1.988, 2.371	0.969
<i>No benefits to company (cost & benefits)</i>	• 80	1.664, 1.990, <u>2.374</u>	2.956
<i>No suitable e-business applications available (infra/st & services)</i>	• 80	<u>1.664</u> , 1.990, 2.374	1.733
<i>Shortage of ICT skilled (internal) staff (infra/st & services)</i>	50	1.676, 2.009, 2.403	0.580
<i>Lack of knowledge of e-business (information & education)</i>	• 80	1.664, <u>1.990</u> , 2.374	2.372
<i>Lack of information, support or training (information & education)</i>	• 85	1.663, 1.988, <u>2.371</u>	2.385
Category of barrier			
i) Security	100	1.660, 1.984, 2.364	1.193
ii) Cost & Benefits	• 100	1.660, 1.984, <u>2.364</u>	5.130
iii) Infrastructure & Services	100	1.660, 1.984, 2.364	0.711
iv) Information & Education	• 100	1.660, 1.984, <u>2.364</u>	3.870

It can be concluded that users are significantly more positive and more knowledgeable and experienced than non-users regarding e-business. Users are significantly more likely to agree that e-business allows the same activities to be done more efficiently and allows new ways of doing business to develop. Users have an arithmetic mean greater than 3 (the neutral point) for all characteristics and greater than 4 regarding attitude, new ways of doing business, and 'knowledge and information' than non-users, Figure 5.7.

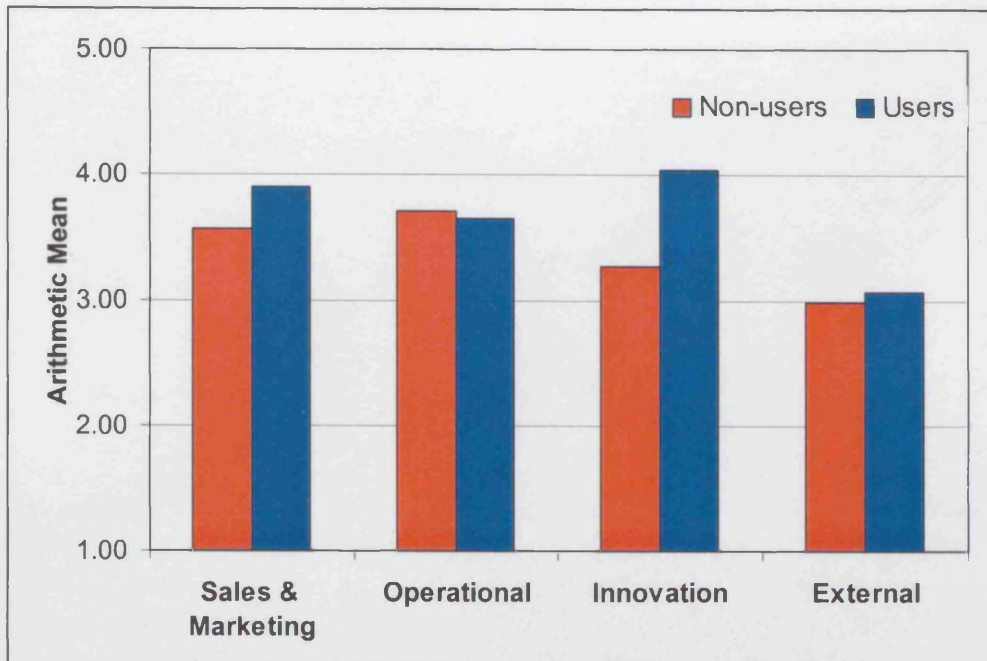
Figure 5.7. Arithmetic mean of characteristics



The difference in ALL characteristics is significant (1.0%, 1.0%, 1.0%, 2.5%)

Regarding enablers or drivers for e-business engagement, users are significantly more influenced by sales and marketing factors and innovation opportunities than non-users. There is no significant difference between users and non-users regarding operational and external drivers to e-business engagement. Interestingly users are neutral regarding external drivers but with an arithmetic mean greater than 4 identified innovation as a key driver, a very significant difference between the samples, Figure 5.8.

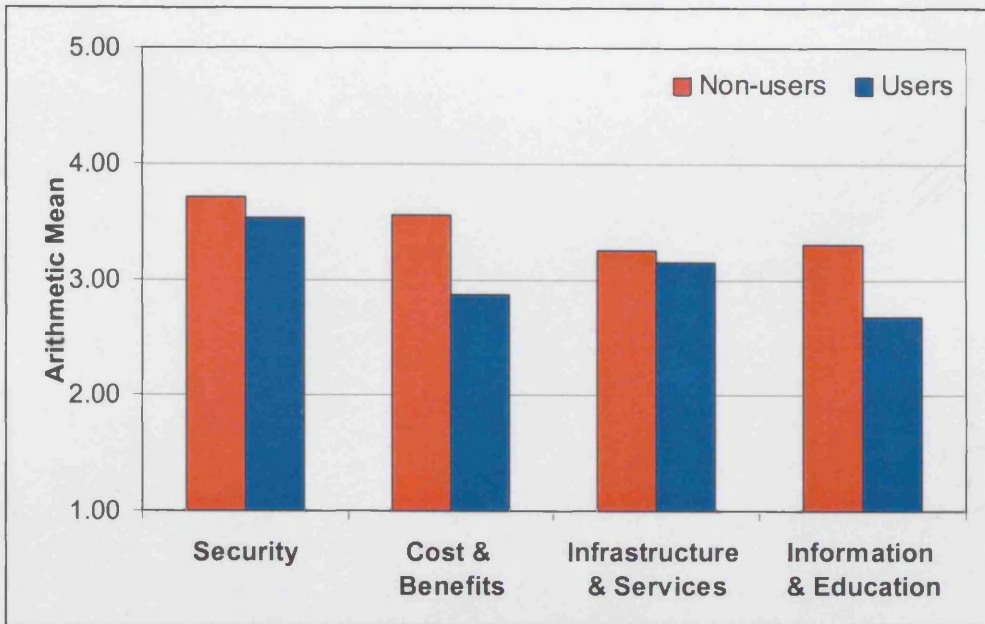
Figure 5.8. Arithmetic mean of enablers



The difference in S&M and Innovation is significant (5.0%, 1.0%)

Users are significantly less concerned regarding ‘cost and benefits’ barriers and ‘information and education’ barriers than non-users. There are no significant differences between users and non-users regarding security barriers and ‘infrastructure and services’ barriers to e-business engagement. With arithmetic means of less than 3 for ‘cost and benefits’ and ‘information and education’, these factors are not identified as barriers by users, Figure 5.9. Interestingly both users and non-user identified security as the main barrier to further e-business engagement. Users of aggregation-specific applications are significantly more positive and more knowledgeable and experienced than non-users regarding e-business. Users are significantly more likely to agree that e-business allows the same activities to be done more efficiently and allows new ways of doing business to develop. Users are significantly more influenced by sales and marketing factors and innovation opportunities as drivers to e-business engagement and are significantly less concerned regarding cost and benefits barriers and information and education barriers to e-business engagement than non-users.

Figure 5.9. Arithmetic mean of barriers



The difference in C&B and I&E is significant (1.0%, 1.0%)

There were significant differences in the levels of engagement in e-business between non-users and users levels of engagement in e-business both on a simple (very low to very high) scale of application complexity and a more detailed (1 to 11) scale, Figures 5.10 & 5.11. Self evidently all users had Internet connectivity and were engaged in high complexity e-aggregation applications compared to non-users being 75 percent and 17 percent respectively. Importantly however users had significantly higher levels of engagement in low (63%), medium (56%) and very high (14%) complexity applications compared to non-users being 34 percent, 24 percent and 1 percent respectively. In particular the difference at medium application complexity was over twofold (24% to 56%) compared with non-users. It could be concluded that users of e-aggregation applications have significantly higher levels of engagement in e-business applications, regardless of application complexity, than non-users in comparable aggregations. There may of course be a predisposition amongst users to have higher levels of engagement, however there is no

reason to suppose this as the e-aggregation applications sought to reduce costs or increase sales.

Figure 5.10. Comparison of levels of e-business engagement – summary

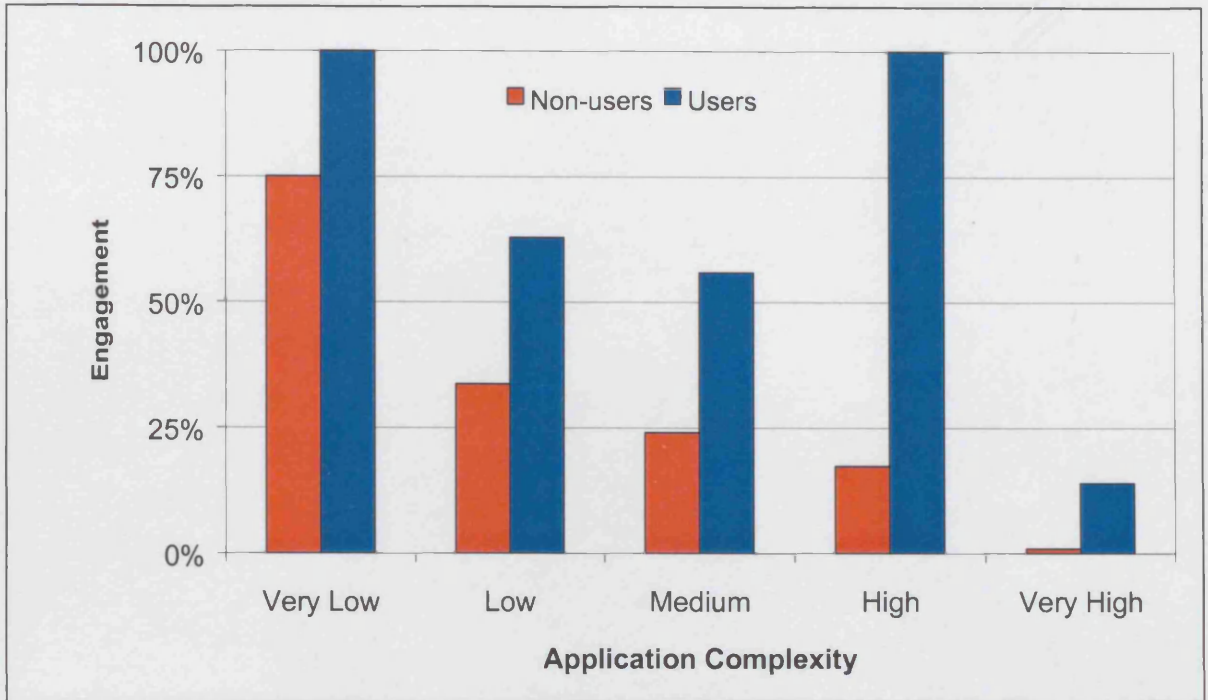
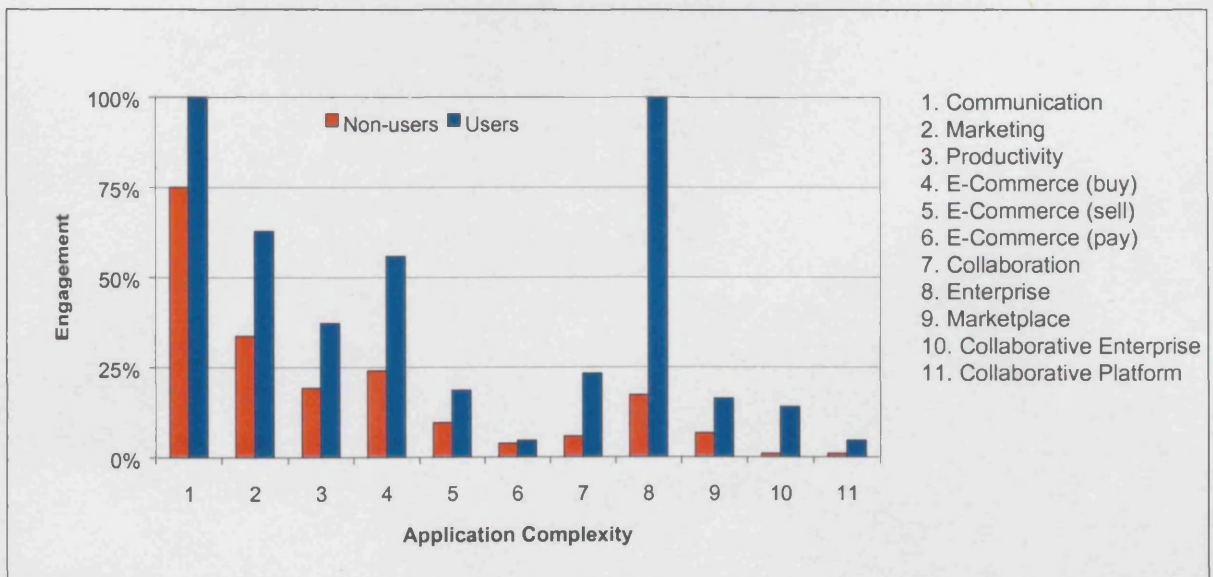
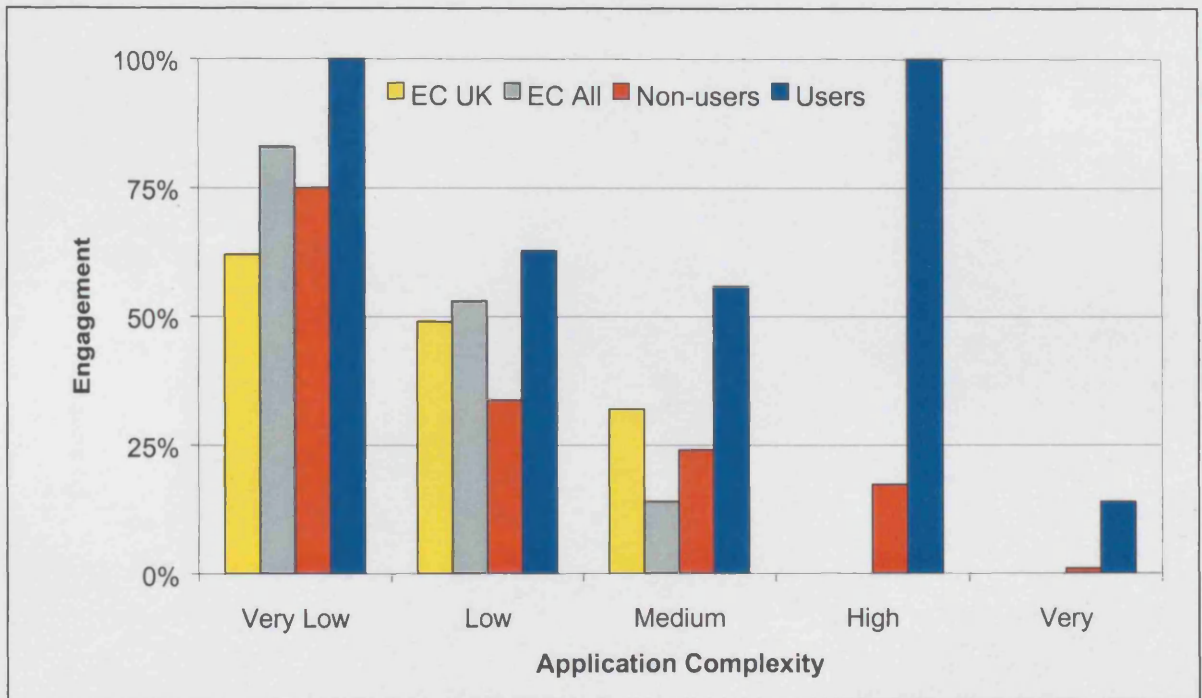


Figure 5.11. Comparison of levels of e-business engagement – detailed



Furthermore comparison with a European benchmarking study conducted at a similar time, which investigated SMEs, generally indicated some important differences, Figure 5.12. Significantly users had higher levels of engagement in e-business applications regardless of application complexity. In particular the difference at medium application complexity was nearly twofold (32% to 56%) compared with UK SMEs, and nearly fourfold compared to EU SMEs (14% to 56%). It could be concluded that users of aggregation-specific applications have significantly higher levels of engagement in e-business applications, regardless of application complexity, than SMEs in the UK and EU.

Figure 5.12. Wider comparison of levels of e-business engagement



There was no indication that non-users or users had any plans in the next 12 months that would change these findings, Figures 5.13 & 5.14.

Figure 5.13. Non-user engagement in e-business for current and next 12 months

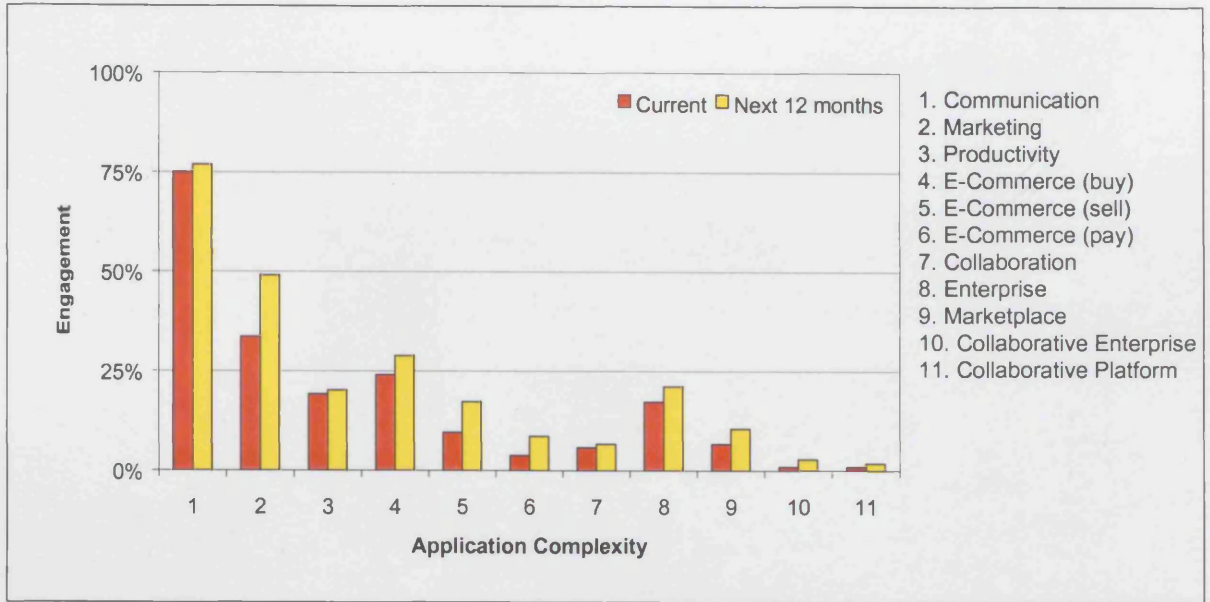
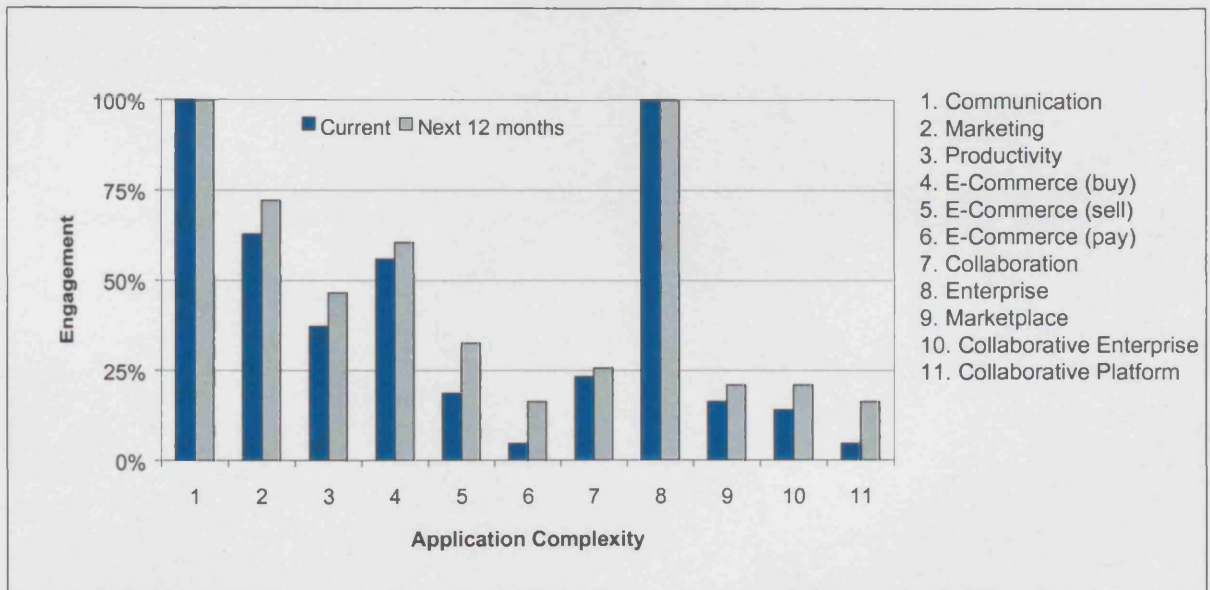
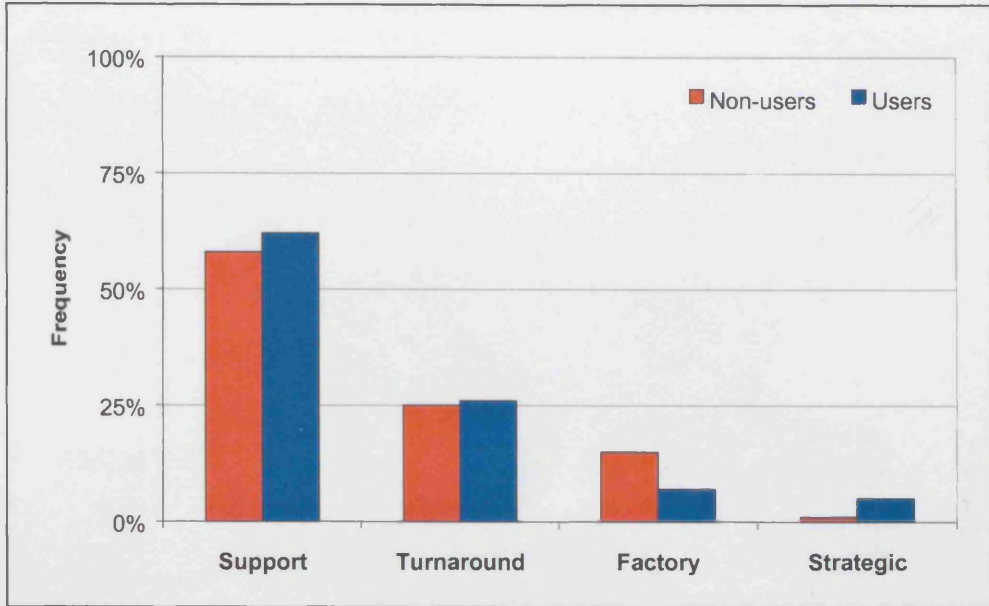


Figure 5.14. User engagement in e-business for current and next 12 months



There was no significant difference between users and non-users regarding the descriptive category of the current ICT use, Figure 5.15. Both non-users and users ranked *support* first (58% & 62% respectively) and *turnaround* second (26% & 25% respectively). This is similar to other studies conducted on the strategic use of information systems by SMEs.

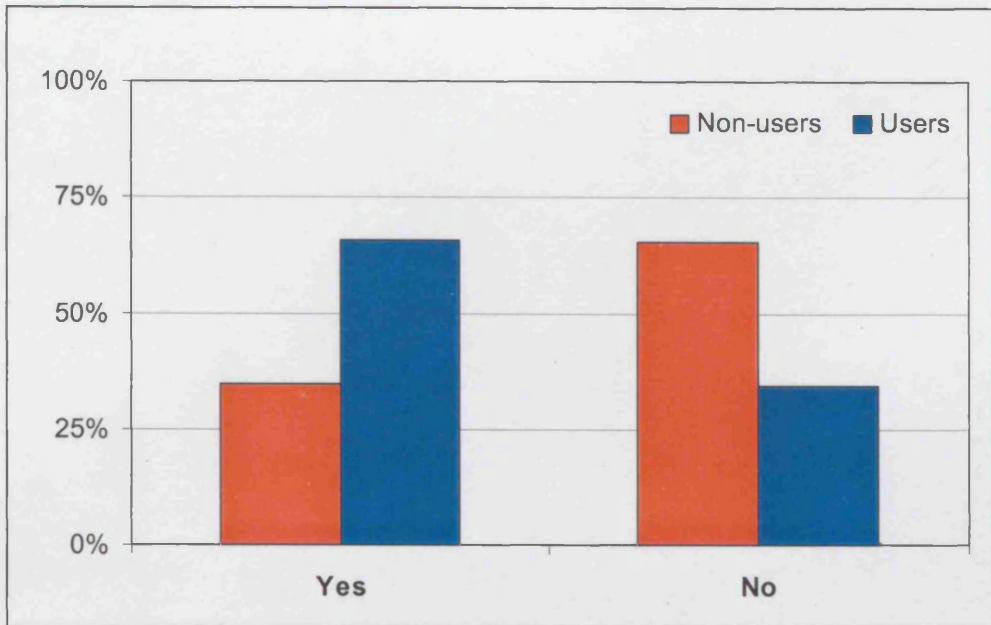
Figure 5.15. Comparison of category of current ICT use



General characteristics for the sample groups were that users had an average turnover of £8.1 million and 17 employees, and non-users had an average turnover of £4.1 million and 12 employees thus defining both groups as small businesses.

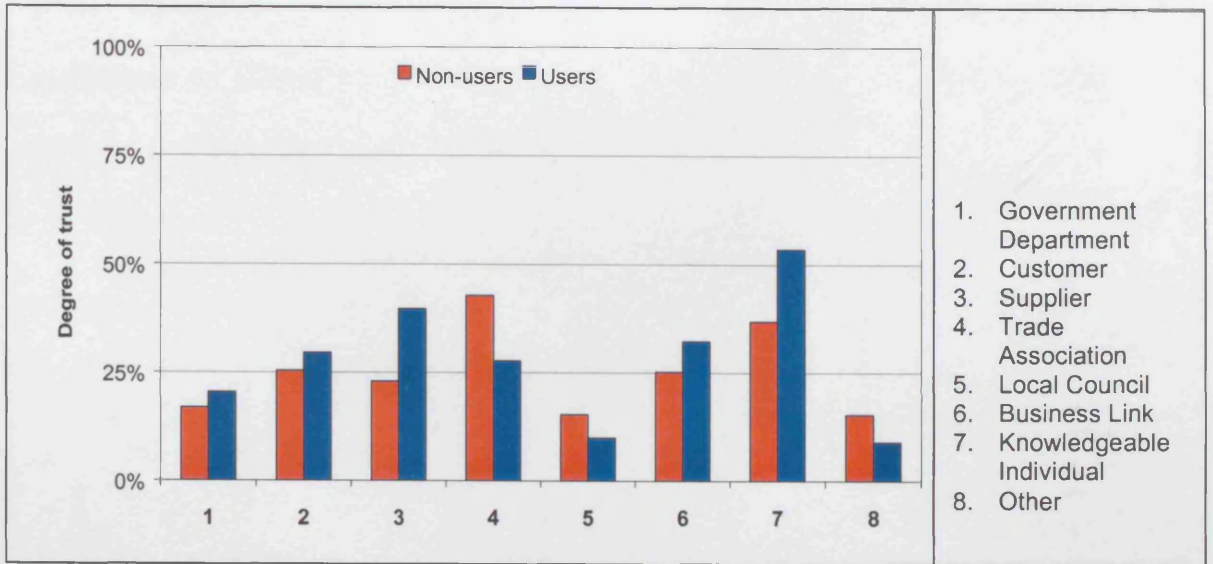
Interesting users are more likely to consider themselves part of a business network (66%) than non-users (35%), Figure 5.16.

Figure 5.16. Membership of business network



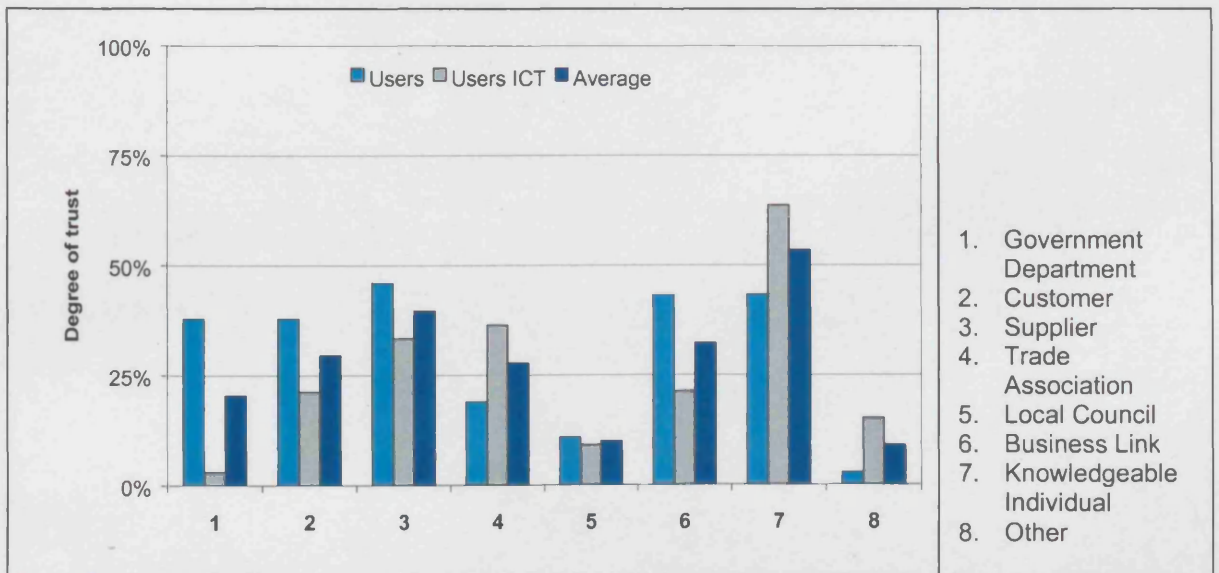
Both users and non-users were asked to identify individuals or organisations they trusted within their industry, both generally and when considering ICT. There were some differences between the sample groups regarding trusted third parties with, on average, users preferring knowledgeable individuals (53%), suppliers (40%), business link (32%) and customers (30%) and with non-users preferring trade associations (43%), knowledgeable individuals (37%), business link (25%) and customers (25%), Figure 5.17.

Figure 5.17. Comparison of averages for trusted third parties



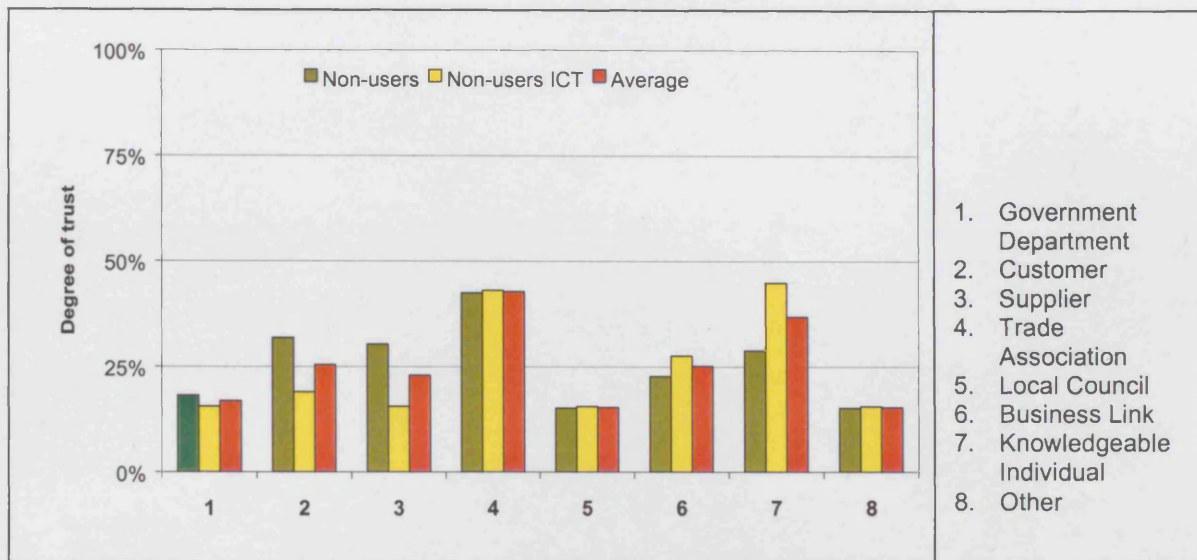
More specifically, when considering ICT, users had similar preferences for suppliers (46%), business link (43%), knowledgeable individuals (43%), government departments (38%) and customers (38%) as general trusted third parties but a marked preference for knowledgeable individuals (64%) and to a lesser degree for trade associations (36%) and suppliers (33%), Figure 5.18.

Figure 5.18. Users' trusted third parties



Non-users had a preference for trade associations (42%), customers (32%), suppliers (30%) and knowledgeable individuals (29%) as general trusted third parties. The preferences for trusted third parties when considering ICT were knowledgeable individuals (45%) and trade association (43%), Figure 5.19.

Figure 5.19. Non-users' trusted third parties



Interestingly when considering ICT, both groups ranked knowledgeable individuals first and trade associations second. No similar alignment was identified for general trusted third parties.

Regarding the e-aggregation application, the most important drivers to adoption were managing upgrades to applications, need to reduce costs and the reduced working life of applications, Table 5.7. Interestingly difficulty in recruiting ICT staff was not a driver.

Table 5.7. Drivers for using aggregation-specific application

Driver	Arithmetic Mean
Managing upgrades to applications	3.53
Need to reduce costs	3.45
Reduced working life of applications	3.37
Globalisation of services and markets	3.30
Increasing complexity of ICT	3.26
Increasing availability of e-business applications	3.16
Increasing difficulty in managing ICT	3.11
Difficulty in recruiting ICT staff	2.32

Users of e-aggregation applications felt that they speeded up deployment of the application, reduced costs and improved quality of service to customers and suppliers,

Table 5.8. Interestingly users felt the application did not reduce flexibility.

Table 5.8. Statements regarding aggregation-specific applications

Statements	Arithmetic Mean
Speeds up deployment of application	3.80
Reduces costs	3.75
Improves quality of service to customers & suppliers	3.75
Allows for internal comparisons	3.55
Gives access to leading applications	3.45
Reduces risk	3.26
Easier to identify value of applications	3.05
Enhances status of company or manager	2.75
Reduces flexibility	2.63

5.9 Summary survey findings

The survey of users of e-aggregation applications and non-users in the wider aggregation highlighted the many significant differences between users and non-users. Users were more positive and more knowledgeable and experienced regarding e-business generally and more likely to agree that e-business allowed the same activities to be done more efficiently and new ways of doing business. This may be because users were predisposed to this position or that it was a consequence of using the e-aggregation application or a combination of both. More specifically users were more influenced by 'sales and marketing' and 'innovation' drivers of using e-business applications and less concerned with 'cost and benefits' and 'information and knowledge' barriers than non-users. The main driver for increased e-business engagement was innovation and the main barrier was security, this latter characteristic was the same for non-users.

Understandably all users had Internet connectivity (very low complexity) and used an e-aggregation application (high complexity) as these were a prerequisite of the sample. However users were significantly more engaged in other e-business applications (i.e. non-aggregation specific applications). Again this may be because users were predisposed to this position or that it was a consequence of using the e-aggregation application or a combination of both. Importantly users were convinced that the e-aggregation e-business application speeded up deployment of the application, reduced costs and improved quality of service to customers and suppliers. These were clearly perceived business benefits from using these specialised hosted applications and tends to indicate that using the e-aggregation application either reinforced or created more positive views of e-business.

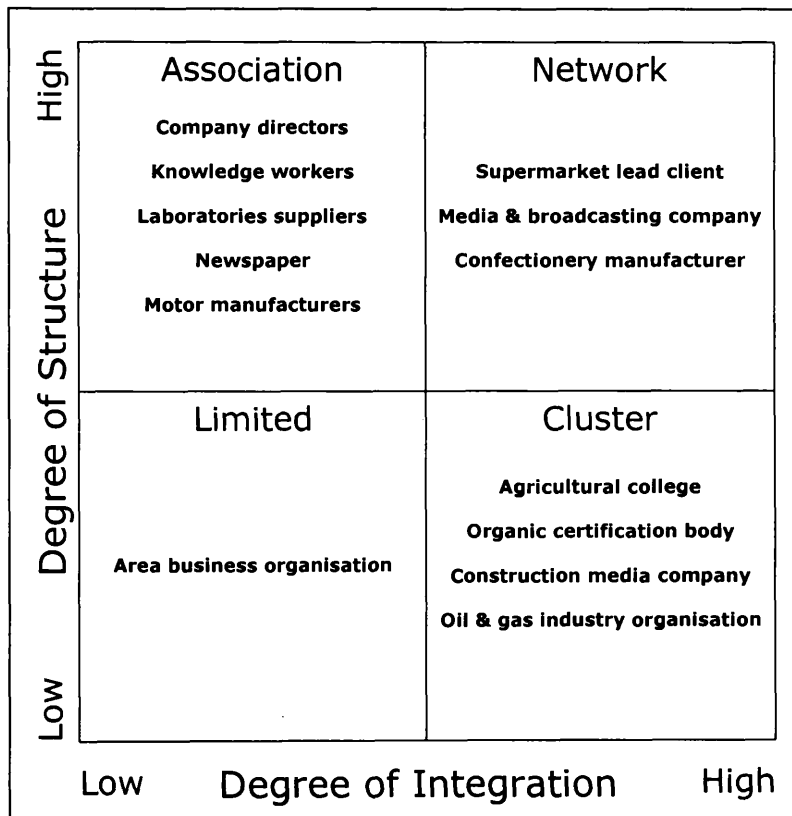
Interestingly users were significantly more likely to consider themselves part of a business network. Clearly aggregation has an important part to play in the engagement of SMEs in e-business either by reinforcing existing and creating new relationships or simply as a mechanism for delivering higher complexity e-business applications at lower cost. However the appreciation of these finding must be set in the context of the qualitative data in order to better understand why users of e-aggregation applications are acting in a significantly different way to non-users. More specifically what roles do trusted third parties and service providers play.

6 TRUSTED THIRD PARTY AND SERVICE PROVIDER CASES

6.1 Introduction

This chapter sets out the details of the interviews for each of the trusted third parties and service providers before summarising these in two comparison tables. The 13 trusted third parties interviewed are discussed in Section 6.2. For each of them there is a short descriptive narrative and the section concludes with an analysis of their similarities and differences. For ease of comparison the trusted third parties are grouped according to the taxonomy of aggregation introduced in Figure 3.4 and annotated and reproduced here, as Figure 6.1.

Figure 6.1 Annotated taxonomy of aggregations



The service providers are discussed in Section 6.3 and use the same pattern of narrative followed by comparative analysis. For ease of comparison the service providers are grouped into vertical and horizontal service providers, Table 6.1.

Table 6.1 Service providers

Vertical	Horizontal
Advertising artwork management ASP	Enterprise ASP A
Project management ASP	Enterprise ASP B
Dairy management ASP	Enterprise application provider A
Field management ASP	Enterprise application provider B
Sporting community management ASP	
Community management ASP	
Information management ASP	
Utility e-marketplace ASP	

6.1.1 Trusted third party cases

In this section there are 13 narratives which include both the trusted third parties within the case aggregations and those that are outside. For the former the description of their activities has already been covered in Chapter 5 and hence only a synopsis is given here together with the original page numbers.

6.1.2 Lead company in 'network' type

Supermarket lead client (SLC)

This case was based on an interview with the account manager (1) and secondary data sources, such as websites and documentation as detailed in pages 103-106. The SLC appeared to play a critical role in encouraging contractors to engage in the e-aggregation application by paying both licence fees and training. The SLC also managed the relationship with the service provider through a service level agreement.

Media and broadcasting company (MBC)

This case was based on an interview with the e-procurement manager (1) and secondary data sources, such as websites and documentation. The MBC were attempting to introduce a company-wide enterprise resource planning (ERP) and integrated e-procurement system, which was seen as a strategic decision by the senior management of the company. The manager stated that small businesses were involved in both direct and indirect supplies to the organisation and were an important part of their supply chain. Indirect purchases, £750 million per year, were the initial focus for the e-procurement initiative and the manager stated “this is by no means simple because internally people are used to dealing with suppliers in their own way” and that “changing ingrained practices requires organisational

changes”. The manager acknowledged that the focus had been on dealing with these internal issues and external factors were only just beginning to be addressed. It was recognised that suppliers, particularly SMEs, were reluctant to invest in integrating their internal systems with MBCs because of the risk of them being incompatible with other customers. The manager acknowledged this risk but was concerned that suppliers should maintain their own online catalogues. The manager stated that the MBC were considering recommending an external e-marketplace in order to encourage smaller suppliers to adopt online supply technologies. This would reduce the technology risks for SME suppliers and make it economic for them to maintain their online catalogues. The MBC did not want to use multiple supplier online catalogues as this was costly, time-consuming and did not support competitor analysis. Regarding direct purchases the MBC was at an early stage of development but recognised the complexity of implementing this next phase. External direct suppliers were dominated by small specialist media companies with a complete spectrum of ICT usage. The manager acknowledged that little thought had been given to how this important issue would be addressed but that their existing relationships would be an important factor in gaining the trust of SME suppliers. There appeared to be few external intermediaries attempting to aggregate these specialist media suppliers. The MBC were considering ways in which they could facilitate SME supplier engagement and recognised there may be a cost to them in supporting this process. The business manager stated that “there needs to be mutual benefits” and that “the key for SME supplier e-procurement systems is to be user friendly, easy to implement, have visible benefits and have little or no cost implications”. The gains for the MBC in trading with both their indirect and direct suppliers were perceived to be considerable, not least in supporting the strategic implementation of the company-wide ERP system. The manager acknowledged that the relationships between the MBC and its network of suppliers were highly structured

and integrated. It was felt that both the existing indirect and proposed direct e-procurement projects would increase both the degree of structure and integration within MBC's supply chain.

Confectionery manufacturer (CM)

This case was based on interviews with the UK e-procurement (1) and purchasing (1) managers and secondary data sources, such as websites and documentation as detailed in pages 113-116. The CM was a large purchaser of milk and had established relationships with dairy farmers. Interestingly the company was still developing a e-business strategy for its direct supplies but was seriously considering providing an online dairy management application to its milk producers.

6.1.3 Institution in 'cluster' type

Agricultural college (AC)

This case was based on an interview with the manager (1) and secondary data sources, such as websites and documentation as detailed in pages 113-116. The AC was a trusted research organisation which was highly regarded within the dairy farming communities it served. The college had jointly developed an online dairy management application and appeared to play an important role in encouraging dairy farmers to engage in the e-aggregation application by promoting its use through seminars and its farm advisors. The e-aggregation application was seen as a means of both disseminating and acquiring data of dairy herd management.

Organic certification body (OCB)

This case was based on interviews with IT manager (3), website manager (1), certification and marketing staff (2) and secondary data sources, such as websites and documentation as

detailed in pages 140-143. The OCB was a large and well regarded organisation within the organic movement whose e-business services were focused on engaging a wide audience in its activities rather than enabling new ways of working. However the OCB worked with a service provider by sponsoring or supporting their e-aggregation application in order to encourage its members to engage in higher complexity e-business applications.

Construction media company (CMC)

This case was based on interviews with the general manager (1) and technical contributor (1) and secondary data sources, such as websites and documentation as detailed in pages 103-106. The CMC provided impartial information to the construction industry including the provision and use of e-business applications. The company organised seminars and provided online reviews of e-business applications for the construction industry and more particularly the use of online project management services.

Oil & gas industry organisation (OGO)

This case was based on an interview with a board member (1) and secondary data sources, such as websites and documentation. The OGO represented the interests of a wide range of companies involved in the marine, offshore and renewable energy sectors in the North of England. The OGO acted as an information manager, catalyst, advisor and provider of consultancy services to the industry. It worked closely with government departments and government agencies to promote the sector. There were many initiatives targeted at this sector including the use of ICT to improve competitiveness and encourage innovation. The board member felt that the OGO played an important role in bringing together interested parties and in particular supporting and understanding the needs and pressures on SMEs in the industry. The board member stated that “whilst there are many large companies involved in the industry the importance of smaller businesses is often overlooked”. The OGO used its trusted relationships with members and external organisations to promote the

best interests of the industry. It acted as an information source and used web-based technologies to promote members and interaction between members. The board member recognised the need for intermediaries to encourage members to adopt appropriate e-business technologies and that the OGO had an important role to play in this.

6.1.4 Institution in 'association' type

Company directors association (CDA)

This was based on an interview with the e-business director (1) and secondary data sources, such as websites and documentation. The CDA was a well-established association representing the interests of 50,000 members, of which 70 percent were directors of SMEs. It had recently appointed the e-business director in order both to help make members aware of the potential of e-business technologies and to advise on their use for the development of the association. The director stated that the CDA was well-regarded by a wide number of organisations, including the government, and trusted by its members. The CDA had developed a highly sophisticated member-focused, interactive web-based application (e-aggregation application), which enhanced the communications with members evidenced by over 20,000 members, 40 percent, using the site per month. Additionally the website had generated over £400K of sales in the first 8 months of operation. The director recognised the important role the CDA had in education and promotion of appropriate e-business technologies to members. It was stated that current government e-business initiatives for SMEs were focused on size or industry but very little had been done to identify intermediaries or groupings of SMEs. Furthermore the provision of horizontal applications to SMEs was relatively unsophisticated with an inherent assumption that small businesses would engage in e-business through unknown new intermediaries. The director explained the strategy of an existing trusted cash handling company which had developed

an online payment system for SMEs and relied on its existing trusted image for achieving credibility and recruitment. He stated that “there is a logical link between the ASP and SMEs but trust is the key to adoption” and felt that service providers needed to form relationships with existing trusted parties. Furthermore that he considered the business models needed to increase added value or reduce costs and this might come from using e-business technologies to reconfigure existing functionality in new ways. The director acknowledged that the member-focused e-aggregation application supported the existing relationships between members and the structure of the association. Importantly the application increased the degree of integration and structure within the aggregation by increasing the interaction between both the members and the CDA and its members.

Knowledge workers trade association (KTA)

This case was based on interviews with the chief executive (2) and PR executive (1) and secondary data sources, such as websites and documentation as detailed in pages 123-126. The KTA was instrumental in the development of an online community management application and had identified it as an important factor in the associations success. The KTA negotiated the charges and service level agreement with the service provider. The association promoted the use of the e-aggregation application to members by conducting its internal business through the application and including it as part of the normal subscription fee.

Laboratories suppliers trade association (LTA)

This case was based on an interview with the general secretary (1) and secondary data sources, such as websites and documentation. The LTA represented the interests of laboratory equipment suppliers in the UK and was in the process of negotiating a merger with a larger trade association. The general secretary was aware of many of the opportunities that e-business, such as e-marketplaces and e-procurement, could offer

members but was also concerned with the increasing number of new, often US-based, intermediaries. Members could benefit from the opportunity to promote themselves both individually and as groups to international customers and use e-business technologies to manage complex projects involving many companies. However the general secretary stated that “our members are finding it increasingly difficult to know which e-marketplace to use and are wanting us to endorse products”. The LTA were organising a special event at their next general meeting to discuss this with members. Members were concerned about the cost of maintaining several catalogues on different e-marketplaces and e-procurement systems. Additionally the general secretary recognised that it was not cost-effective for the LTA to develop its own e-marketplace but that the LTA had an important part to play as a trusted party in the industry. There was a recognised need for LTA members to collaborate particularly in export markets and responding to requests for tenders (RTQ), which the general secretary recognised could be supported by appropriate e-business technologies.

Newspaper trade association (NTA)

This case was based on an interview with the chief executive (1) and secondary data sources, such as websites and documentation as detailed in pages 132-134. The NTA played a critical role in the development of the e-aggregation application and was trusted within the newspaper industry. The NTA members promoted the use of the e-aggregation application to advertising agencies by providing the service free of charge. Interestingly the NTA members had funded the applications development but had not quantified the financial benefits for themselves or their members but anticipated increased advertising reviews.

Motor manufacturers trade association (MTA)

This case was based on attendance at an e-business summit (1) and secondary data sources, such as websites and documentation. The MTA provided services and support to the UK

motor industry by making representations to government on key industry issues, promotion through events and exhibitions, and providing reliable information and practical advice to members. The summit was organised by the MTA for its members and included presentations by an e-marketplace provider and a web-based supply chain management ASP. The focus was on the benefits from e-business engagement by companies in the motor industry with examples of original equipment manufacturer (OEM) and tier one suppliers being highlighted. In response to the question of what is the level of SME supplier (tier two & three) engagement in e-business, the chief executive stated that “the situation is dire!” and that “below tier one engagement was worryingly low”. It was acknowledged that there appeared to be no strategy emerging in order to achieve increased engagement and that the summit was seen as one method of increasing awareness.

6.1.5 Organisation in ‘limited’ type

Area business Organisation (ABO)

This case was based on an interview with the business manager (1) and secondary data sources, such as websites and documentation. The ABO was founded in 1998 by a group of local organisations, including businesses and a university, who invested in the ABO and were board members. The ABO had over 1,000 members, comprising both individuals and organisations, who used the networking facilities provided, which included regular meetings and limited online services. The ABO promoted the interests of members both within the local area and on a national and international basis. The business manager stated that the ABO was set up primarily to facilitate local business people to network with each other and had quickly become recognised and trusted within the local business community.

6.1.6 Summary

13 interviews were conducted across the full range of TTP types, six of which are detailed in the aggregation cases. All were compared against the interpretive framework in order to assist in identifying matching patterns against the five aggregation dimensions, namely micro-level ties, economics, strategic, governance and diffusion of innovation, Table 6.1.

Each is considered in turn, firstly micro-level ties where all TTPs that were involved in e-aggregation applications had evidence of activity links supporting resource flows and those who were not had limited or no evidence of activity links. Mutual expectation evidenced by resilient trust was present in all TTPs. All TTPs that were involved with e-aggregation applications and network types had evidence of IOS acting as catalysts supporting information flows. Secondly regarding the economics dimension, all TTPs that were involved with e-aggregation applications and network types had repeated value transactions whilst all others were ad hoc. All TTPs that were involved with e-aggregation applications provided new functionality and the value was either actually or perceived to be greater than the cost of networking. Thirdly regarding the strategic dimension, all TTPs that were involved with e-aggregation applications showed high levels of scope and scale in relation to SME e-business engagement, whilst other TTPs, including network types, could be considered as medium.

Table 6.1. Comparison of trusted third party relationships to SME e-business engagement

Dimensions \ Aggregation type (bold if in aggregation case)	Network			Cluster				Association				Limited	
	SLC	MBC	CM	AC	OCB	CMC	OGO	CDA	KTA	LTA	NTA		MTA
E-Aggregation application	yes	no	no	yes	yes	no	no	yes	yes	no	yes	no	no
Micro-level ties													
Resources flows (activity links, asset specificity)	yes	limited	limited	yes	yes	limited	limited	yes	yes	limited	yes	no	no
Mutual expectation (resilient trust)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Information flow (catalysts)	IOS	IOS	IOS	IOS	IOS	limited	limited	IOS	IOS	limited	IOS	limited	limited
Economics													
Nature of transaction (value activity)	repeat	repeat	repeat	repeat	repeat	ad hoc	ad hoc	repeat	repeat	ad hoc	repeat	ad hoc	ad hoc
Cost of networking (impact of ICT, functionality)	new	exist	exist	new	new	limited	limited	new	new	limited	new	limited	limited
Strategic													
Motivation (scope, scale)	high	med	med	high	high	med	low	high	high	med	high	med	low
Perspective (intended, emergent)	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend
Contingencies (institutional, relational)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Governance													
Distribution of property rights (contractual agreements)	yes	yes	yes	yes	yes	limited	limited	yes	yes	limited	yes	limited	limited
Co-ordination mechanism (allocation of resources)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Diffusion of innovation													
Change agent	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Critical mass (interactive innovations)	yes	limited	limited	yes	yes	limited	limited	yes	yes	limited	yes	limited	limited
Intermediaries (existing, new)	ASP	limited	limited	ASP	ASP	limited	no	ASP	ASP	limited	ASP	limited	no

All TTPs had evidence of an intended strategy to support e-business engagement by SMEs and there were both institutional and relational contingencies. Fourthly regarding governance, whilst all TTPs had evidence of co-ordination mechanisms only TTPs that were involved with e-aggregation applications and network types had evidence of contractual agreements supporting the distribution of property rights. Finally regarding diffusion of innovations, all TTPs had characteristics of change agents but only TTPs that were involved with e-aggregation applications showed significant evidence of critical mass building and used intermediaries (ASPs) extensively.

6.2 Service provider cases

In this section there are 12 narratives which include both the service providers within the case aggregations and those that are outside. For the former the description of their activities has already been covered in Chapter 5 and hence only a synopsis is given here together with the original page numbers.

6.2.1 Vertical

Advertising artwork management ASP (AMP)

This case was based on interviews with the business manager (2) and secondary data sources, such as websites and documentation as detailed in pages 132-134. The AMP was formed by a trade association in order to provide an e-aggregation application to advertising agencies and worked closely with the trusted third party to promote this.

Project management ASP (PMP)

This case was based on interviews with the research director (1) and account manager (2) and secondary data sources, such as websites and documentation as detailed in pages 103-106. The PMP deliberately promoted the e-aggregation application to many different lead clients in the construction industry. The PMP subsequently worked with the lead client to encourage the engagement of contractors involved in the construction projects. Interestingly PMP recognised the value of the generic information accumulated as part of the interactions through the e-aggregation application.

Dairy management ASP (DMP)

This case was based on interviews with the manager (1) and secondary data sources, such as websites and documentation as detailed in pages 113-116. The DMP was a division of a

trusted third party within the dairy farming industry. The DMP worked with this trusted organisation and its farm advisors to promote the e-aggregation application to dairy farmers.

Field management ASP (FMP)

This case was based on interviews with the business manager (2) and secondary data sources, such as websites and documentation as detailed in page 140-143. The FMP deliberately formed relationships with trusted third parties within various European countries in order to promote the e-aggregation application to organic producers. The FMP recognised the value of the information accumulated from the interactions through the e-aggregation application.

Sporting community management ASP (SMP)

This case was based on interviews, with the technical director (3), marketing manager (2) and managing director (1), and secondary data sources, such as websites and documentation. The SMP was a new company set up in order to provide online services to sporting communities in the UK. The company was funded by private investors. The sporting community management application was designed to provide both generic services to sporting clubs and specific services to particular sports. The SMP decided to launch their service to the cricket community first, principally because directors had existing personal relationships with members of a leading cricket ruling body. The technical director stated that “we worked with members of non-professional league cricket clubs and the ruling body to find out what their needs were”. The application was designed to address these multiple needs by providing a directory of clubs, score recording, match arranging, league table information and forums. The SMP worked closely with the ruling body to promote the voluntary use of the e-aggregation application by cricket clubs. The managing director recognised the strategic importance of recruiting clubs to the platform in

order to acquire information about the community. The accumulation of information about the clubs and individual members was identified as a valuable asset for sales and marketing activity. The marketing manager was set the task of recruiting clubs to the platform and used a variety of means to do this, including mailshots, telephone campaigns and seminars. These activities were focused at the key decision makers in the clubs, such as treasurers and club secretaries. Revenues from advertising and product sales were central to the SMP's business model and dependent on recruiting clubs. They envisaged each club being able to have an online shop selling products and tickets and processing subscription payments online.

The managing and technical directors became increasingly concerned about the slow recruitment of clubs and they set up a focus group consisting of club officials and conducted a survey of clubs. As a result of these initiatives the SMP redesigned and relaunched their website and changed the technology platform. This also resulted in a delay in launching to other sporting communities. The SMP had intended to focus of teamed-based sports such as rugby and football. They acknowledged the importance of the relationship with the ruling body in the sport and were attempting to identify similar bodies in other sports. At about that time the SMP was approached by a larger, alternative investors market (AIM) quoted, company addressing the football sporting community. This company also had a close relationship with the ruling body for the sport. The technical director recognised that having the support of a trusted organisation within the sport was a prerequisite to recruiting clubs to the platform. After the last interview the ownership of the cricket platform transferred to the ruling body supported by the CMP as the service provider. The technical and managing directors acknowledged that the e-aggregation

application significantly increased the degree of integration and enhanced the structure of the sporting community.

Community management ASP (CMP)

This case was based on interviews with the managing director (1) and marketing manager (1) and secondary data sources, such as websites and documentation as detailed in pages 123-126. The CMP deliberately formed relationships with trade associations and professional bodies. It worked with these trusted third parties to build online communities of members.

Information Management ASP (IMP)

This case was based on an interview with the managing director (1) and secondary data sources, such as websites and documentation. The IMP provided engineering content management services in order to help businesses to improve the performance, reliability and safety of processing plant equipment. They provided specialist services at each stage of the processing plant's life cycle, from design, procurement, construction, commissioning through to operations & maintenance and finally de-commissioning. The managing director stated that whilst much of the product data they managed was client-specific they increasingly held generic information, which was being exploited by the provision of a web-based process industry-wide product database. Access to indexed and catalogued PDF files was provided on a subscription fee business model. "Many of the new web-based intermediaries (such as e-marketplaces) have not recognised the importance of product data" stated the managing director. Whilst the IMP recognised the value of providing client-specific data management services they explicitly recognised the strategic importance of building a product database and making this available in a hosted environment. The managing director felt that the ability to maintain a supplier-independent database which held both specification and product usage information placed the IMP in a

strong position to act as an information intermediary. The IMP provided applications which supported marketing, maintenance, technical queries, recalls, upgrades and diagnostic tools. The managing director acknowledged that the e-aggregation application significantly increased the degree of structure and supported the integration of the companies involved in the process industry.

Utility e-marketplace service provider (UMP)

This case was based on an interview with the business manager (1) and secondary data sources, such as websites and documentation. The e-marketplace sought to allow UK-based utility companies to achieve significant savings on their goods and services by combining detailed content, on a large number of European suppliers, with online electronic trading facilities through a portal incorporating a wide range of procurement functions. The e-marketplace had over 400 purchasing organisations and 14,000 suppliers registered transacting over \$55 billion of goods and services. The company stated that e-procurement was making sourcing products and services easier, quicker and reduced the average transaction costs from around £60 to £15. This was achieved by facilitating closer relationships in the supply chain. The UMP provided added value online services, including buying and selling, demand aggregation, request for tender, request for quote, dynamic pricing, financial services, comparison shopping, collaborative engineering and business communities.

The business manager acknowledged that the use of higher complexity applications by SMEs was negligible. The e-marketplace had focused on recruiting the top 20 percent of suppliers, which represent 80 percent of the transaction values. There was a strategy to recruit the rest, which were predominately SMEs, by introducing specialised services. It was recognised that recruiting smaller suppliers in the supply chain was important but was

also problematic. The declared strategy was to provide events and seminars to promote the application to SME suppliers in order to address the previously identified concerns of reduced margins and lack of business benefits. The business manager stated that “the initial focus is the 4 percent of purchase costs attributed to the transaction element” and that the “next focus will be on producing the tools to address the 40 percent of the total cost of acquisition, which are process rather than product based”. The e-marketplace business model was fee-based and justified on the basis of cost saving. The business manager identified different levels of sophistication in SMEs using the e-marketplace and felt that it was important to allow engagement in low complexity applications such as e-mail. SMEs could be assisted more easily if they had some relationship with the e-marketplace and could then be ‘coaxed’ into full integration in due course. It was recognised that different companies used the e-marketplace in different ways but that one of the central issues was standardisation of products and increased structure. The manager acknowledged that the e-aggregation application significantly increased the levels of structure and supported further integration amongst the e-marketplace participants.

6.2.2 Horizontal

Enterprise ASP (ASP A)

This case was based on interviews with the managing director (2) and secondary data sources, such as websites and documentation. ASP A was based in Dublin and sought to deliver ‘best of breed’ e-business solutions in partnership with leading technology and software vendors. It was one of Europe's leading enterprise ASPs and part of a technology provider group. The company’s key strength was identified as the ability to fast track implementation through strategic review, process design, implementation and knowledge transfer services. ASP A offered a range of services from system development and

implementation, to managing and supporting applications through a service level agreement (SLA). The company focused on three main sectors, namely manufacturing, high tech, and 'distribution and logistics'. It had worked with a leading enterprise software vendor to develop templated versions of an enterprise resource planning (ERP) system and provide this to clients on a hosted basis. The managing director stated that "the ASP model is viable for companies with between 25 and 75 users, although we have implemented systems for as few as 10 users" and that "we have steadily built our client base on UK and Ireland targeting a range of suitable verticals". All of these clients were using hosted applications to manage business-critical processes. The ASP model was not identified as a barrier to engagement once connectivity (bandwidth) and security issues had been addressed. The company was optimistic about the future of providing higher complexity e-business applications to SME clients in a hosted environment. Clients were charged for implementation services and a recurring annual fee per user. The managing director felt there was no need to use intermediaries to sell hosted services to SMEs but recognised that the company was at the early stage of development.

Enterprise ASP (ASP B)

This case was based on an interview with the marketing director (1) and secondary data sources, such as websites and documentation. ASP B, based in Berkshire, provided a range of outsourcing or managed services, including enterprise-wide messaging, data backup, simple messaging service (SMS) and security services. The company had originally focused on data backup services for mobile users in large companies and had worked with a range of software vendors to expand its service into offering hosted solutions. The marketing manager stated that "increasingly we are focusing on SMEs particularly for enterprise-wide messaging", which involved companies contracting out their e-mail provision to a hosted Microsoft Exchange platform. This reduced the need for internal IT

personnel and included additional services such as anti-virus and security. The services were charged at a rate per user and had maximum storage parameters. The applications offered could be characterised as messaging and data services and did not replace existing 'critical' applications within ASP B's clients. The company was considering forming strategic relationships with other service providers in order to offer a more extensive range but intended to maintain a horizontal focus. The company had relationships with value added resellers (VARs) but also dealt with clients directly and this appeared to be their preferred route to market.

Enterprise application provider (EAP A)

This case was based on interviews, with the research manager (3), business managers (3) and marketing director (1), and secondary data sources, such as attendance at e-business seminars, websites and documentation. EAP A was a UK division of a leading global provider of enterprise software and was focused on the provision of enterprise applications to medium-sized companies (mid-market) defined as employing between 50-1,000 employees and less than £150 million turnover. The company had primarily supplied the market both through a direct sales operation and a limited number of large management consultancy firms. However the mid-market division had started to develop a network of value-added resellers (VARs) to serve smaller customers. The mid-market sector had been identified as a strategic focus of EAP A and additional resources had been allocated for market development. The business manager stated that the mid-market will provide "at least 10 percent of our UK revenue within the next 12 months". The emerging strategy, in 2001, was to continue to provide 'in-house' or resident applications via VARs and develop a network of service providers to provide hosted solutions to the mid-market. There was a high level of concern about the financial viability of the ASP model within the division and no clear business model had emerged. One business manager felt that whilst the

technology was now available to provide hosted solutions it was unclear how smaller customers could be persuaded to move from resident to hosted solutions. In his opinion there were still a number of issues, such as service levels, bandwidth, cost and security, that needed to be addressed. However EAP A were providing incentives to VARs to develop hosted service offerings. This consisted mainly of reduced functionality or 'templated' versions of large enterprise applications hosted by the ASP on an implementation and rental fee basis. Access to the application was via the Internet through web browser technologies. A new business manager stated that his previous company had been an ASP providing financial information to SMEs and had developed strong relationships with a UK bank and a leading credit referencing agency. However the company had been unable to secure second round financing and had closed. The business manager acknowledged that no attempt had been made by the company to appreciate the needs of the SME sector before developing the application and that this was a contributing factor to the company's closure. In late 2001 EAP A commissioned a study of the European mid-market sector by a leading international research company. This study identified the prime market for the division as being SMEs who already had an appreciation of the benefits of ICT and relatively complex business operations (termed sophisticated SMEs). This aligned well with the existing marketing strategy which promoted the commercial benefits of ICT in supporting collaboration. The marketing director felt that UK businesses had been slow to recognise the cost saving and growth opportunity from using e-business technologies. The marketing focus was on advertisements and a programme of national seminars promoting the benefits of collaborative e-business. The latter were targeted at decision-makers in all sizes of businesses but attendees were dominated by representatives from larger companies. The format of the e-business seminars was key note speakers from industry and demonstrations

of e-business applications. The mid-market division had developed a focus on provision, both resident and hosted, for the delivery of its enterprise applications. The business manager stated that the “development of ‘one to many’ ASP solutions will only be successful if market requirements are used to specify the functionality of the solution”. This argument was extended to identify a role for trusted advisors in understanding the needs and drivers of businesses in aggregations and relating this to IT services.

In early 2002 the business manager for the mid-market division moved to a European unit. The new business manager had commercial experience in the VAR community and changed the focus of the division away from provision to application. This resulted in the targeting of ‘sophisticated’ and ‘advanced’ SMEs, with the benefits of the company’s enterprise applications and once a solution had been identified the most appropriate method of provision was discussed. This meant the division did not lead on resident or hosted provision. At this point the company also purchased an independent software company specialising in SME enterprise applications and over the course of 12 months re-branded the product, enhanced the existing product range and recruited additional VARs serving the SME sector. The resulting mid-market service offering comprised an entry level resident-only product and a pre-packaged scaled down version of existing applications available as a resident or hosted solution. In addition to VARs and ASP provision the division formed a strategic relationship with a hardware vendor to provide a ‘turnkey’ resident solution. The new business manager stated that even though the pre-packaged range “could be hosted, it was only economically viable for 20 users or more” and that “this is also the point at which the turnkey resident solution was targeted”. This meant that practically only companies with 20 users were viable for hosted solutions and that there was no cost incentive over resident systems. This called into question one of the

key drivers for the ASP business model, namely cost saving by renting. Given the leading position of EAP A this was an important statement. EAP A had not developed relationships with TTPs preferring to recruit a network of VARs some of which had industry-specific knowledge.

Enterprise application provider (EAP B)

This case was based on an interview with the business manager (1) and secondary data sources, such as websites and documentation. EAP B was a UK trading division of a leading global provider of information technology and services. It focused on the provision of hardware and enterprise software solutions to SMEs and the division did not provide hosted solutions. The strategy focused on offering a total solution, including enterprise software, hardware, implementation and support services to clients with over 20 users. This strategy had been developed over a number of years. The business manager stated that “hosted solutions are no cheaper than purchasing hardware and software” and felt that the ASP did not currently represent a threat to the division’s business model of providing highly complex and essentially horizontal applications. EAP B had recently developed an integrated offer for SMEs which included a fixed monthly payment plan, including the purchase and ongoing support for hardware and software. This was in direct response to the emerging threat of hosted (rented) service offerings. The manager felt that the infrastructure was not yet available for hosted solutions and that there were many barriers to overcome, not least security issues. The division operated directly with clients and did not use intermediaries.

6.2.3 Summary

12 interviews were conducted across a range of service providers, six of which were detailed in the aggregation cases. All were compared against the interpretive framework in

order to assist in identifying matching patterns against the five aggregation dimensions, namely micro-level ties, economics, strategic, governance and diffusion of innovations, Table 6.2. Each is considered in turn, firstly micro-level ties where all the vertical application service providers (VSP), who provided e-aggregation applications, had evidence of asset specificity of a shared information resource which was not evident in the four horizontal service providers. All VSPs established resilient trust via trusted third parties in support of network formation with horizontal service providers having fragile trust supported by contractual agreements. All service providers had evidence of IOS as catalysts for informational flows. Secondly regarding the economics dimension, all VSPs and ASPs had evidence of repeated value transactions with both enterprise application service providers (EAP) having more ad hoc transactions. All VSPs offered new or significantly enhanced functionality and the value was either actually or perceived to be greater than the cost of networking. All horizontal service providers largely offered replacement of existing functionality albeit enhanced. Thirdly regarding the strategic dimension the scale and scope of vertical service providers were significantly higher than for horizontal service providers with reference to SME e-business engagement. All service providers had evidence of strategic perspectives through intended strategies for engaging SMEs in e-business applications. All horizontal service providers had limited evidence of institutional or relational contingencies whilst vertical service providers relayed on TTPs. Fourthly regarding governance all service providers had evidence of co-ordination mechanisms. All, bar one, vertical service providers had contractual arrangements involving TTPs as a means of managing the distribution of property rights. Finally regarding diffusion of innovations all service providers had evidence of change agents. All vertical service providers showed evidence of critical mass building and used TTPs to promote SME engagement in e-aggregation applications.

Table 6.2. Comparison of service provider relationships with SME e-business engagement

Dimensions \ Provider type (bold in aggregation case)	Vertical						Horizontal					
	AMP	PMP	DMP	FMP	SMP	CMP	IMP	UMP	ASP A	ASP B	EAP A	EAP A
E-Aggregation application	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no	no
Micro-level ties												
Resources flows (activity links, asset specificity)	yes	yes	yes	yes	yes	yes	yes	yes	limited	limited	no	no
Mutual expectation (resilient trust)	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	limited	limited	limited	limited
Information flow (catalysts)	IOS	IOS	IOS	IOS	IOS	IOS	IOS	IOS	IOS	IOS	IOS	IOS
Economics												
Nature of transaction (value activity)	repeat	repeat	repeat	repeat	repeat	repeat	repeat	repeat	repeat	repeat	ad hoc	ad hoc
Cost of networking (impact of ICT, functionality)	new	new	new	new	new	new	new	new	replace	replace	replace	replace
Strategic												
Motivation (scope, scale)	high	high	high	high	high	high	high	high	medium	medium	medium	medium
Perspective (intended, emergent)	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend	intend
Contingencies (institutional, relational)	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	limited	limited	limited	limited
Governance												
Distribution of property rights (contractual agreements)	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	via TTP	yes	yes	yes	yes
Co-ordination mechanism (allocation of resources)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Diffusion of innovation												
Change agent	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Critical mass (interactive innovations)	yes	yes	yes	yes	yes	yes	yes	yes	limited	limited	limited	limited
Intermediaries (existing, new)	use TTP	use TTP	use TTP	use TTP	use TTP	use TTP	use TTP	use TTP	limited	no	limited	no

6.3 Context monitoring

The explicit purpose of context monitoring is to identify, by observing the flux of events and ideas unfolding through time, any changes in the selected companies' positions relative to SME e-business engagement and e-aggregation applications. The companies were selected because they provided services to SMEs as community, enterprise or technology intermediaries. The companies are grouped by type and each is briefly discussed in Appendix VI with any significant changes being identified below.

- Four community intermediaries were monitored over the course of the investigation, two in the construction industry and two for healthcare practitioners. All were new intermediaries formed between 1998 and 2000 in order to provide online services to aggregations. Each is considered briefly, firstly BuildOnline, a pan-European UK-based company, which in three years established itself as a leading provider of online services, particularly project management, to the construction industry and was profitable by 2003. The company secured third round funding of €36 million in 2002. BuildOnline worked with large utility and construction companies and had established relationships with trade associations and professional bodies. The company had a clear strategy of working with existing trusted third parties. Secondly BuildNet, a US-based company, which provided online building and procurement services for the residential construction industry. The company integrated its services into existing software products but did not appear to establish successful relationships with existing trusted third parties. After failing to secure further funding in August 2001 the company filed for Chapter 11 bankruptcy protection and its assets were purchased by a 'material management software' vendor. Thirdly NetDoctor, a European-based company, established a network of 500 healthcare professionals contributing to an online knowledge base for patients and established online collaborative services to healthcare

professionals. The company secured second round funding of €5 million in 2001 and reached breakeven by 2002. In addition to establishing a network of contributors, NetDoctor established partnerships with a number of large healthcare-related companies. The company had a clear strategy of working with existing trusted third parties. Finally webMD, a US-based company, provided online services to groups of healthcare practitioners, including EDI, practice management, clinical information and patient services. In four years the company had recruited 575,000 users to its patient services and 300,000 doctors to its other services. In the first quarter of 2003 webMD generated sales of \$234 million resulting in a trading loss of \$7 million. The company promoted its service directly to potential users through advertising, referrals and particularly conferences. There was no evidence of working successfully with existing trusted third parties.

- Three marketplace aggregators (service intermediaries) were monitored over the course of the investigation. All were new intermediaries formed between 1995 and 1999 in order to provide online e-commerce services to aggregations, consisting predominantly of SMEs. Each is considered briefly, firstly BizProLink, a US-based company, which initially provided online business tools to its own SME-targeted industry-specific online communities of which it had established 124 by 2001. There was no evidence of the company working successfully with existing trusted third parties. By 2003 BizProLink no longer hosted online communities but provided over 1,700 online business tools to large companies providing services to their trading partners or users. Secondly VerticalNet, a US-based company, which had established 56 industry-specific online trading communities by 2001. The company had established relationships with other service and technology providers but there was no evidence of working specifically with existing trusted third parties. By 2002 the company was

losing \$10 million per quarter and had developed a range of horizontal services for large enterprises to establish private e-marketplaces. In June 2002 the company sold its industry-specific trading communities to a publishing and media company but continued to provide horizontal services to large organisations, working with them to provide online services to trading partners and members. Initially VerticalNet did not appear to have a strategy of working with trusted third parties in its 56 industry-specific communities but latterly began to work explicitly with existing trusted third parties (lead organisations) to develop online services to aggregations. Finally PurchasePro, a US-based company, which provided e-commerce services to SME-dominated, online trading communities to large companies. By 2001 the company operated 160 such marketplaces with over 25,000 users, employed over 1,200 staff and had formed a strategic alliance with AOL to provide services to its Netbusiness portal for small businesses. The company had a strategy of working with existing trusted third parties to develop marketplaces. However by 2002 the company had failed to generate a profit from the \$86 million of transactions per quarter and reduced its workforce to 120 employees. In December 2002 PurchasePro filed for Chapter 11 bankruptcy protection and its assets were purchased by an 'enterprise supply management' software company.

- Two marketplace application providers (service intermediaries) were monitored over the course of the investigation. Both were new intermediaries formed between 1996 and 1997 in order to provide e-marketplace and procurement services. Each is considered briefly, firstly Ariba, a global company, which provided services to large organisations in order to assist them in integrating and collaborating with trading partners. In 2000 the company formed a strategic alliance with i2 (a supply chain-focused company) and IBM in order to expand the range of services provided.

By 2003 the company had a turnover of \$60 million per quarter but still generated significant losses. Ariba had a strategy of working with lead organisations (trusted third parties) and in 2003 had been awarded a US Government contract to provide an SME-focused exchange. Secondly Commerce One, a global company, which provided services to large organisations in order to assist them in integrating and collaborating with trading partners. In June 2000 SAP (the largest enterprise software provider) invested \$250 million for a 20 percent shareholding. By 2003 the company had a turnover of \$13 million per quarter but still generated significant losses. Commerce One had a strategy of working with lead organisations (trusted third parties).

- Four enterprise application providers (enterprise intermediaries) were monitored over the course of the investigation. All were long-established companies and each is considered briefly, firstly Oracle, a global company, which was one of the largest providers of software. The company released its e-business suite in 2000 which was targeted at the large organisations that made up the majority of its clients. In 2001 Oracle formed a strategic alliance with NetLedger, a new horizontal ASP, to provide the hosted 'Oracle small business suite' at \$50 per month. NetLedger also developed other partnerships with VARs, trusted advisors and vertical application providers in order to engage more SMEs in its range of online enterprise applications. There was little evidence of the company working with existing trusted third parties to either recruit SME clients or develop e-aggregation applications. Secondly Peoplesoft, a global company that was the third largest enterprise application provider, was monitored. The company launched its web-based enterprise suite in 2000 which was targeted at the large organisations that made up the majority of its clients. In 2002 Peoplesoft announced a strategic alliance with Hewlett Packard to develop a centre for hosting its applications and providing pre-packaged services more suitable for SMEs.

There was little evidence of the company working with existing trusted third parties to either recruit SME clients or develop e-aggregation applications. Thirdly Sage, a UK-based global provider of enterprise applications to SMEs, was monitored. The company stated that in 1999 it had over 2 million customers, 15,000 VARs and a network of trusted advisors (i.e. accountants). In 2001 the company's US operation launched a hosted accounting suite (horizontal ASP) charged at \$150 per annum and targeted at small businesses. By 2003 Sage had over 3 million customers worldwide, 19,000 VARs and 5,500 employees. There was evidence of the company working with VARs and vertical application providers but no clear strategy of working with trusted third parties or developing e-aggregation applications. Finally Intuit, a US-based company, which was the leading provider of small business accounting software and had revenues of over \$1 billion by 2003. The company had developed a network of VARs and trusted advisors and in 2002 launched a range of industry-specific accounting applications. By 2003 the company offered a hosted accounting suite (horizontal ASP) starting at \$20 per month for 3 users and claimed 10,000 users by mid 2003. There was evidence of Intuit working with VARs and vertical application providers but no clear strategy of working with trusted third parties or developing e-aggregation applications although industry-specific accounting applications were available.

- Two supply chain application providers (enterprise intermediaries) were monitored over the course of the investigation. Each is considered briefly, firstly i2, a global company providing applications to large organisations. In 2000 the company formed a strategic alliance with Ariba and IBM in order to expand the range of services provided. There was some evidence of i2 successfully working with existing trusted third parties or developing e-aggregation applications. Secondly Wesupply, a UK-based

company that provided online supply chain management applications (horizontal ASP) to lead organisations in selected industries, was monitored. The hosted nature of this service facilitated deployment throughout the supply chain. Wesupply explicitly worked with lead organisations to recruit SMEs as trading partners. There was some evidence of the company working with other trusted third parties (i.e. trade associations) and developing e-aggregation applications for specific industries.

- Two application service providers (enterprise intermediaries) were monitored over the course of the investigation. Both were new intermediaries formed in 1998 in order to host horizontal enterprise applications (horizontal ASP). Each is considered briefly, firstly Agillion, which offered online customer relationship applications targeted at SMEs. The company formed strategic partnerships with Office Depot and IBM. It reportedly paid \$3 million for a 30 second advertisement during the American Superbowl 2000. There was no evidence of the company forming successful relationships with existing trusted third parties or developing e-aggregation applications. In March 2001 the company filed for Chapter 11 bankruptcy protection. Secondly Corio, a US-based company, which provided a range of hosted enterprise applications from leading application providers, including Oracle, Peoplesoft, SAP and Siebel. There appeared to be a deliberate strategy to work with existing enterprise intermediaries, including consultancy firms, such as Gap Gemini Ernst Young, Cedar and Wipro. In September 2002 Corio acquired the assets of Qwest's cybersolutions. Whilst the company initially included SMEs in its targeted customers by 2003 the company mostly concentrated on providing hosted services to large organisations or their subsidiaries. By 2003 Corio had over 300 employees and in the second quarter of 2003 generated \$17 million sales and although making a loss the company had a

positive cashflow. There was evidence of the company working with enterprise intermediaries but not regarding the development of e-aggregation applications.

- Two telecommunications providers (technology intermediaries) were monitored during the course of the investigation. Each is considered briefly, firstly British Telecom (BT), a UK-based global provider of residential and commercial telecommunication services. The company had many SME-focused e-business initiatives during the context monitoring, including the launch in 1999 of hosted templated enterprise applications in partnership with SAP (horizontal ASP), in 2000 the TradePark online industry-specific trading communities and in 2001 the launch of BT Ignite to provide hosted services to all sizes of enterprises. By 2003 the BT Ignite (then part of 'globalservices') initiative was still operational but was focused mainly at large organisations. BT remained strongly focused on providing connectivity and web site hosting services to SMEs, through BT Openworld. There was little evidence of the company forming successful relationships with existing trusted third parties or developing e-aggregation applications. Secondly Energis, a UK-based company that provided telecommunications services to businesses, was monitored. The company launched a number of e-business initiatives during the monitoring, including in 2000 developing an acquired company as an ASP offering Microsoft Office and Exchange services (horizontal) and with the intent of launching ERP and CRM hosted services to all sizes of enterprises. By 2003 the company provided connectivity and website hosting services to SMEs and data centres targeted at large organisations. There was no evidence of the company forming successful relationships with existing trusted third parties or developing e-aggregation applications.

The context monitoring attempted to identify changes within the environment in which the research was undertaken. In particular it tried to set the context of praxis, of the rapidly developing field of e-business, in which the findings could be set. Four community, eleven enterprise (three of which acted partly as community) and two technology intermediaries were monitored over the course of the investigation. Each yielded interesting illustrative contextual information, firstly whilst all of the community intermediaries developed e-aggregation applications and worked with other types of intermediary, three of the four deliberately established relationships with existing trusted third parties. These relationships seemed to be formed in order to increase the engagement of SMEs within the aggregations. Secondly all enterprise intermediaries worked with other enterprise intermediaries to provide services. Within this type, three of the five marketplace and both of the supply chain application providers deliberately worked with lead organisations (trusted third parties) to ensure engagement in their marketplaces by business partners. All three SME enterprise application providers had established networks of VARs and trusted advisors (i.e. accountants) promoting their products but there was little evidence of successful relationships with existing trusted third parties within aggregations or development of e-aggregation applications. The most successful ASP had established strategic partnerships with consulting firms as a means of promoting and installing services to their increasingly larger client base. This business model did not seem to enable or encourage uptake of hosted services by SMEs. Thirdly the two technology intermediaries had both attempted to engage SMEs in higher complexity e-business applications but by 2003 they appeared to be concentrating on providing connectivity (very low complexity) and web hosting (low complexity) services to SMEs. Furthermore there appeared to be no evidence of successful relationships with existing trusted third parties within aggregations or development of e-aggregation applications.

In conclusion, firstly where an intermediary had developed an e-aggregation application there was nearly always evidence of deliberate strategies to develop relationships with existing trusted third parties within the aggregations. Secondly four of the seven intermediaries acting as community types either withdrew or filed for bankruptcy protection. Thirdly where higher complexity horizontal e-business applications were promoted to SMEs there was usually a network of VARs or trusted advisors involved and finally in all cases the delivery of online services to SMEs consisted of multiple and various relationships between intermediaries.

7 FINDINGS

7.1 Introduction

This chapter draws together the multiple strands of the investigation in order to identify the key findings which are discussed and related to the original research questions, namely:

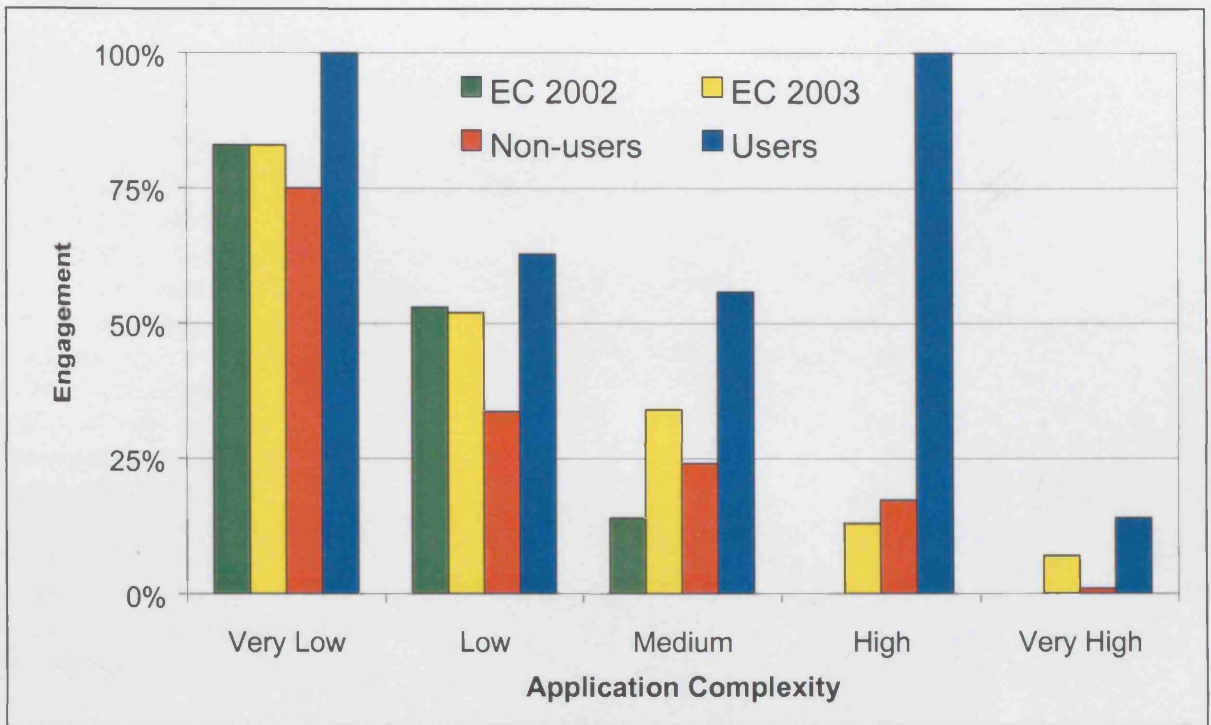
- (i) What is the current position for SMEs with reference to the adoption of e-business technologies?
- (ii) What evidence is there of aggregations of SMEs and what is their role both currently and potentially as a result of e-business developments?
- (iii) What are the potential roles and mechanisms for intermediaries in facilitating SME e-business engagement?
- (iv) What are the possible business models from a provider perspective?

The final research question, namely (v) does ICT adoption, inter-organisational network and e-business model theory provide an appropriate interpretive framework for understanding electronically facilitated networks? is discussed in the next chapter. Each of the research questions is considered separately by extracting the relevant contributions from each of the research outputs, namely (i) review of secondary data, (ii) case studies of aggregations, trusted third parties and service providers, including interviews and participant observation, (iii) survey research and (iv) context monitoring. The resulting key findings are as follows:

7.2 What is the current position for SMEs with reference to the adoption of e-business technologies?

There are significantly higher levels of e-business engagement by users of aggregation-specific e-business applications (e-aggregation applications) in the four aggregations surveyed compared with non-users in the wider aggregations and two European studies, Figure 7.1. This is true at all levels of complexity. This is hardly surprising for web access (very low complexity) and e-aggregation application (high complexity) as these are self-selecting requirements for the user sample. However engagement in low, medium and very high complexity applications was also significantly higher when compared with both non-users in the wider aggregation and the secondary data. The use of IT generally was greater in users with 74 percent of employees using computers daily compared with 45 percent in non-users. It was not possible to conclude whether this difference was due to the use of the e-aggregation application or that users had higher usage of IT previously, but there was no evidence to suggest users were significantly different from non-users in the wider aggregation or SMEs generally. We can however conclude that firstly there are groupings or aggregations of SMEs which have high levels of engagement in higher complexity e-business applications, in this case e-aggregation applications. Secondly we can conclude that the users of e-aggregations applications have significantly higher levels of engagement in e-business applications than other SMEs and thirdly that non-users in the wider aggregation are not markedly different from SMEs as evidenced by general surveys of e-business engagement in Europe.

Figure 7.1. E-Business engagement by SMEs



This latter finding is reassuring in that the aggregations selected as part of this study do not appear to be intrinsically different from SMEs generally. It also emerges from the survey that there are several statistically significant differences between users of e-aggregation applications and non-users in the wider aggregation, firstly it can be concluded that users are significantly more positive and more knowledgeable and experienced than non-users regarding e-business. Users are significantly more likely to agree that e-business allows the same activities to be done more efficiently and allows new ways of doing business to develop. Secondly users are significantly more influenced by ‘sales and marketing’ and innovation drivers when adopting e-business applications and thirdly that users are significantly less concerned regarding ‘cost and benefit’ and ‘information and education’ barriers than non-users, Table 7.1. Interestingly both users and non-users identified security issues as the main barrier to further e-business engagement. The survey of users of e-aggregation applications strongly indicates that the adoption of e-business technologies

was not linear indicating that other factors than application complexity influenced the adoption decision.

Table 7.1. Statistically significant differences between non-users and users.

* indicates a significant difference (greater than 0.05 or 5%)	df	Critical Value % 5.0%, 2.5%, 1.0%	t-test
Attitude to e-business *	100	1.660, 1.984, <u>2.364</u>	4.694
Knowledge & experience of e-business *	85	1.663, 1.988, <u>2.371</u>	3.612
E-Business allows you to do same activities more efficiently? *	100	1.660, 1.984, <u>2.364</u>	4.855
E-Business allows you to develop new ways of doing business? *	95	1.661, <u>1.985</u> , 2.366	2.285
What has helped or encouraged you to use e-business applications (enablers)?			
i) Sales & Marketing *	100	<u>1.660</u> , 1.984, 2.364	1.864
ii) Operational	100	1.660, 1.984, 2.364	0.466
iii) Innovation *	100	1.660, 1.984, <u>2.364</u>	4.642
iv) External	100	1.660, 1.984, 2.364	0.564
What is discouraging you from further use of e-business applications (barriers)?			
i) Security	100	1.660, 1.984, 2.364	1.193
ii) Cost & Benefits *	100	1.660, 1.984, <u>2.364</u>	5.130
iii) Infrastructure & Services	100	1.660, 1.984, 2.364	0.711
iv) Information & Education *	100	1.660, 1.984, <u>2.364</u>	3.870

Table 7.2. Arithmetic mean of perceived benefits.

	DTI 2001	Non-users	Users
What has helped or encouraged you to use e-business applications (enablers)?			
i) Sales & Marketing	3.35	3.56	3.89
ii) Operational	3.38	3.71	3.64
iii) Innovation	3.45	3.27	4.04
iv) External	-	2.98	3.07
What is discouraging you from further use of e-business applications (barriers)?			
i) Security	3.43	3.71	3.52
ii) Cost & Benefits	2.80	3.55	2.86
iii) Infrastructure & Services	3.06	3.25	3.14
iv) Information & Education	2.65	3.30	2.68

Comparison of the arithmetic means of non-users and users with a survey of UK SMEs (Table 7.2) supports the previous observation that sales & marketing and innovation are distinctive drivers for users of e-aggregations applications. However there were no significant differences between users and UK SMEs regarding the barriers to e-business engagement, Figure 7.2. This would indicate that the non-users in the wider aggregations are significantly more concerned with ‘cost and benefits’ and ‘information and education’ barriers than users and UK SMEs, Figure 7.3. This further supports the observation that the aggregations selected are at best similar to SMEs generally and at worst less likely to

engage in e-business, perhaps making the higher levels of e-business engagement by users of e-aggregation applications the more noteworthy.

Figure 7.2. Comparison of arithmetic means for drivers

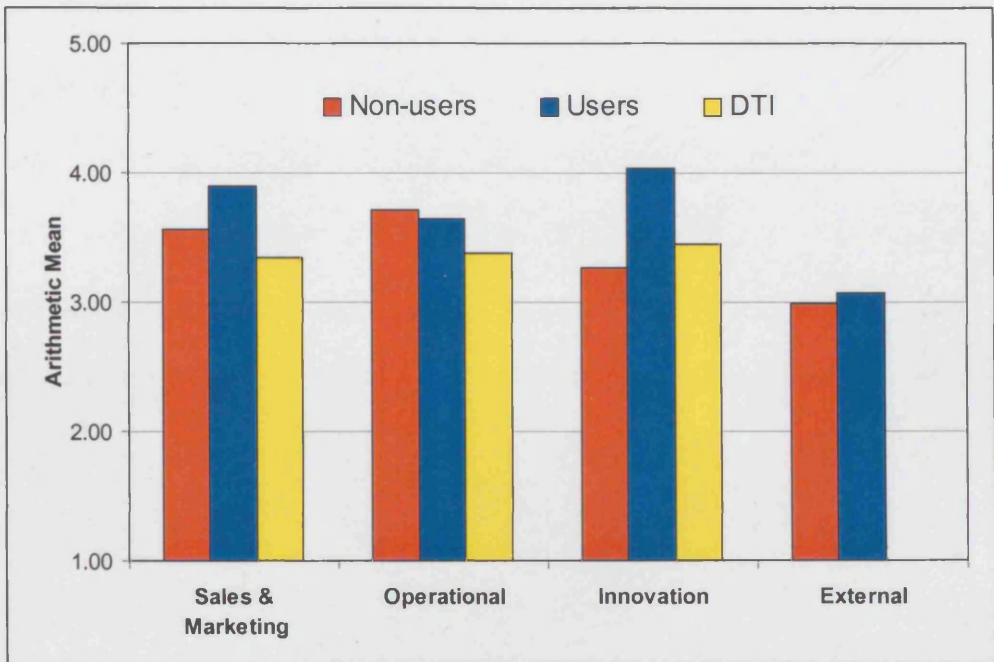
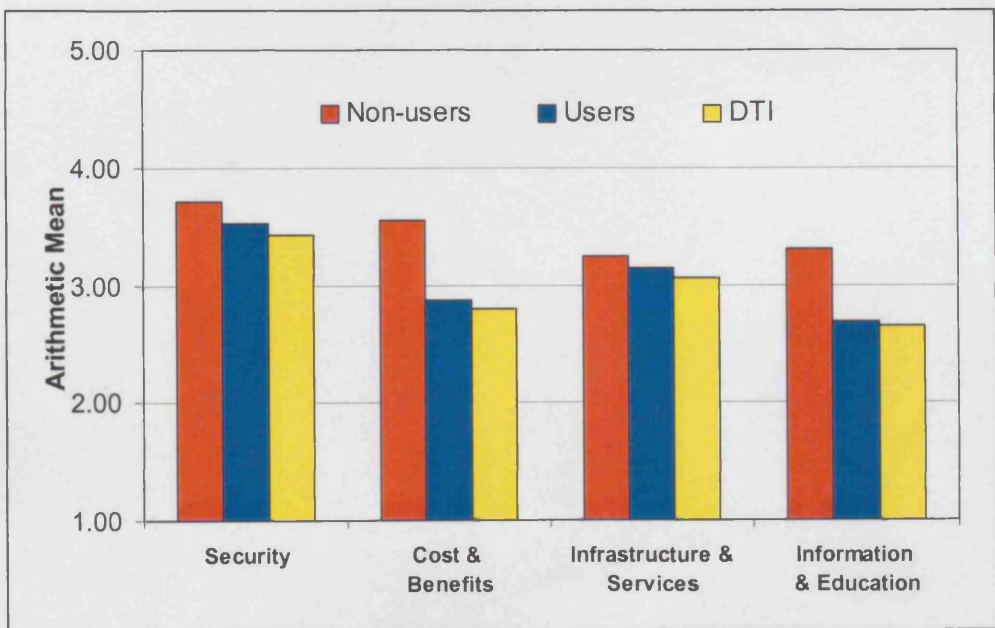


Figure 7.3. Comparison of arithmetic means for barriers



In conclusion both the secondary studies and the non-user survey indicate high levels of connectivity and usage of very low complexity applications, such as e-mail and web

browsers, amongst SMEs in the UK, Europe and North America. One recent study concluded that SME connectivity was static or declining (OfTel 2003) and another that connectivity was no longer a barrier to e-business engagement (EC 2003). This suggests that most SMEs appeared comfortable with e-mail and web access (lower complexity). However as application complexity increased levels of engagement declined significantly indicating that SMEs are tentative with the use of the Internet for online buying and selling (medium complexity), but had little or no engagement in the high or very high complexity applications, such as e-marketplaces, supply chains or inter-organisational collaborative networks. In direct contrast to these studies and the non-user survey there was evidence of groupings or aggregations of SMEs engaged in higher complexity e-business applications, most noticeably in critical e-aggregation applications, discussed in the next section, but that users had significantly higher levels of engagement in other e-business applications.

7.3 What evidence is there of aggregations of SMEs and what is their role both currently and potentially as a result of e-business developments?

7.3.1 Emergence of critical e-aggregation applications

All twelve community intermediaries and the eight vertical application service providers (VSP), a type of enterprise intermediary, confirmed the importance of SME-focused applications that attempted to address particular needs of SMEs within aggregations. In the four aggregations where both intermediary types were interviewed, namely dairy, knowledge workers, media and organic, the interaction between the community intermediary and VSP was stated to be a very important factor in achieving the engagement of users. This continuous interaction between the two intermediary types helped to identify business needs and the resultant modifications to the e-aggregation applications in order to benefit the users. The manager of one VSP stated that “working with them (the trade association) has been critical to us developing an application that meets the user’s needs. It has given us a competitive advantage and a better product”. Early examples of e-aggregation applications developed in this collaborative way and confirmed through the interviews include:

- Advertising artwork management - for artwork agencies in regional newspapers.
- Community management - for knowledge-based workers.
- Dairy herd management - for dairy farmers.
- Field management - for the organic farming industry.
- Project management - for the construction industry.
- Sporting community management - for club-based sports.

In the main these e-aggregation applications were relatively new and in the early stages of development but already they appeared to be successful measured by the level of uptake. For example the artwork management application provider reported that the recruitment of users had been exponential and that “more than 60 percent of potential users, small artwork agencies, had registered”. In the case of the project management application there were high levels of engagement by contractors and future building contracts would only be awarded to contractors using the e-aggregation application.

All eight of the VSPs supplying applications had identified what they believed to be an unmet business need of SMEs in a specific business market. Two of the five providers interviewed, in the aggregation cases, took the lead and developed the e-aggregation applications without a guaranteed market for the product. However they had identified community intermediaries early in the application’s development and sought to establish collaborative arrangements that mitigated the risk. The three remaining service providers developed the applications in response to the business needs identified by the community intermediary, but even here there was no guarantee of adoption by the aggregation of SMEs. This depended on the perceived effectiveness of the application, which could vary within the aggregation, and on cost.

All eight VSPs could be characterised as offering new functionality that was valued by aggregation members, was developed by interaction with community intermediaries and used a ‘one-to-many’ business model. In the user survey 85 percent confirmed this provision of new functionality with only some users of the dairy management application stating that it replaced an existing application and significantly 73 percent of users stated that it was important or fairly important to their business. On this basis these e-aggregation

applications can be seen as 'critical' both in terms of functionality and perceived importance. *The innovative nature of these 'critical e-aggregation applications' was the single most important factor for using the application in the aggregation cases.* However, in addition, critical e-aggregation applications also delivered important benefits to lead organisations in the aggregation cases. For example the advertising artwork management application enabled advertising agencies (users) to submit artwork and copy online to many independent regional newspapers. This saved time for the agency but also made it significantly easier to use regional newspapers to advertise. There was no direct charge levied on the agency by the service provider, with all operating costs being met by the trade association out of conventional membership fees. In the field management application organic farmers (users) could use the online application to record crop history and yields enabling them to more easily comply with the certification requirements of the industry. This was a very attractive but complex e-business application that also attempted to reduce fraud by providing a pan-European digitally certified audit trail, which could ultimately provide evidence to maintain consumer confidence in the organic industry. Larger users paid for the services directly to the service provider but this was in part offset by a reduced certification fee levied by the regulatory body acting as a community intermediary. In the case of the project management application SME contractors (users) benefited from access to the project plan and opportunities for increased sales however the lead client funded the application fees on the basis of increased transparency, standardisation and shorter construction times. This project management application was hosting over 500 projects covering £1.6 billion worth of assets and resulted in 100,000 user log-ins per month. In contrast the four horizontal enterprise intermediaries offered applications to SMEs that aimed to meet standard business functions, such as accounting and material control. Although these could be customised to meet local needs the providers

were explicitly not attempting to produce innovative applications requiring deep industry knowledge.

These critical e-aggregation applications emerged, at the instigation of both community and enterprise intermediaries, in order to address a perceived business need within aggregations dominated by SMEs. Most users confirmed the provision of this new functionality was important to their business. The main three drivers for engaging in these e-aggregation applications were (i) managing upgrades to the applications, (ii) the need to reduce costs and (iii) the reduced working life of applications and the three main benefits were (i) speed of deployment (ii) reduced costs and (iii) improved quality of service to customers. Interestingly 75 percent of users had no internal IT specialist.

No significant differences emerged from comparing non-users and users in the context of the McFarlan Strategic Grid, with 66 percent considering their use of IS to be 'support' and 25 percent 'turnaround'. This indicates a limited strategic perspective within SMEs.

7.3.2 Deliberate accumulation of strategic information

An important characteristic to emerge from the use of e-aggregation applications was the accumulation of important information regarding the users and the aggregation itself. Significantly, and in contrast to the SME users, both the trusted third parties and service providers were aware of the accumulation of this information and had identified its strategic importance. Not only was the e-aggregation application seen as important in addressing the business needs of users within the aggregations it had also to facilitate this data collection into an 'information repository'. This further reinforced the emergence of the 'platform' as a new type of IOS.

The nature of the information collected was, not surprisingly, as varied as the critical e-aggregation applications themselves. For example, firstly in the construction aggregation information was retained about the individual contracts for each lead client and about each component. Clearly the lead client wanted to access their project information but interestingly the service provider identified, as of strategic value, the use of information at a component level. The resulting information repository gave the service provider information about product specification and contractor performance. Secondly in the organic case information was accumulated regarding general crop yields and treatments across users and importantly regarding the movement of produce, supported by digital certification. Thirdly in the knowledge worker case information was accumulated around specific, sometimes highly focused, discussion groups, which was of potential benefit to the trade association and users generally and finally in the dairy case the accumulation of herd nutrition and milk yields across farms allowed for comparison between farms and agricultural college-managed units.

The building of these information repositories was a deliberate strategy of both service providers and trusted third parties and was supported by governance mechanisms. The perceived value of the repositories varied both with the intermediary types and across the aggregations. Unlike the critical e-aggregation application, which was of strategic importance to all service providers in that they could deploy it in different forms and markets, the value of the information repository seemed to depend on whether the trusted third party or service provider instigated the development of the applications, though in all cases the trusted third parties retained control of specific information. However where the trusted third party instigated the e-aggregation application, as in the dairy, knowledge workers and media cases, the value and control of the information repository resided with

the trusted third parties. This formed part of the trusted third parties' business model. In the organic and construction cases the service provider instigated the development of the e-aggregation application and retained the value of the generic information. In the organic case the certifying body retained information relevant to the certification of their producers however the service provider retained pan-European yield and movement information. In the construction case the lead client retained information regarding their projects however the service provider retained information about components of the building asset and planned to use this on future projects, and integrate it into other hosted applications, including design and facilities management services. In both cases this retention of generic information formed part of the service providers' business model. One of the effects of these information repositories was to increase asset specificity within the aggregations. There was no evidence of a similar strategy amongst horizontal service providers.

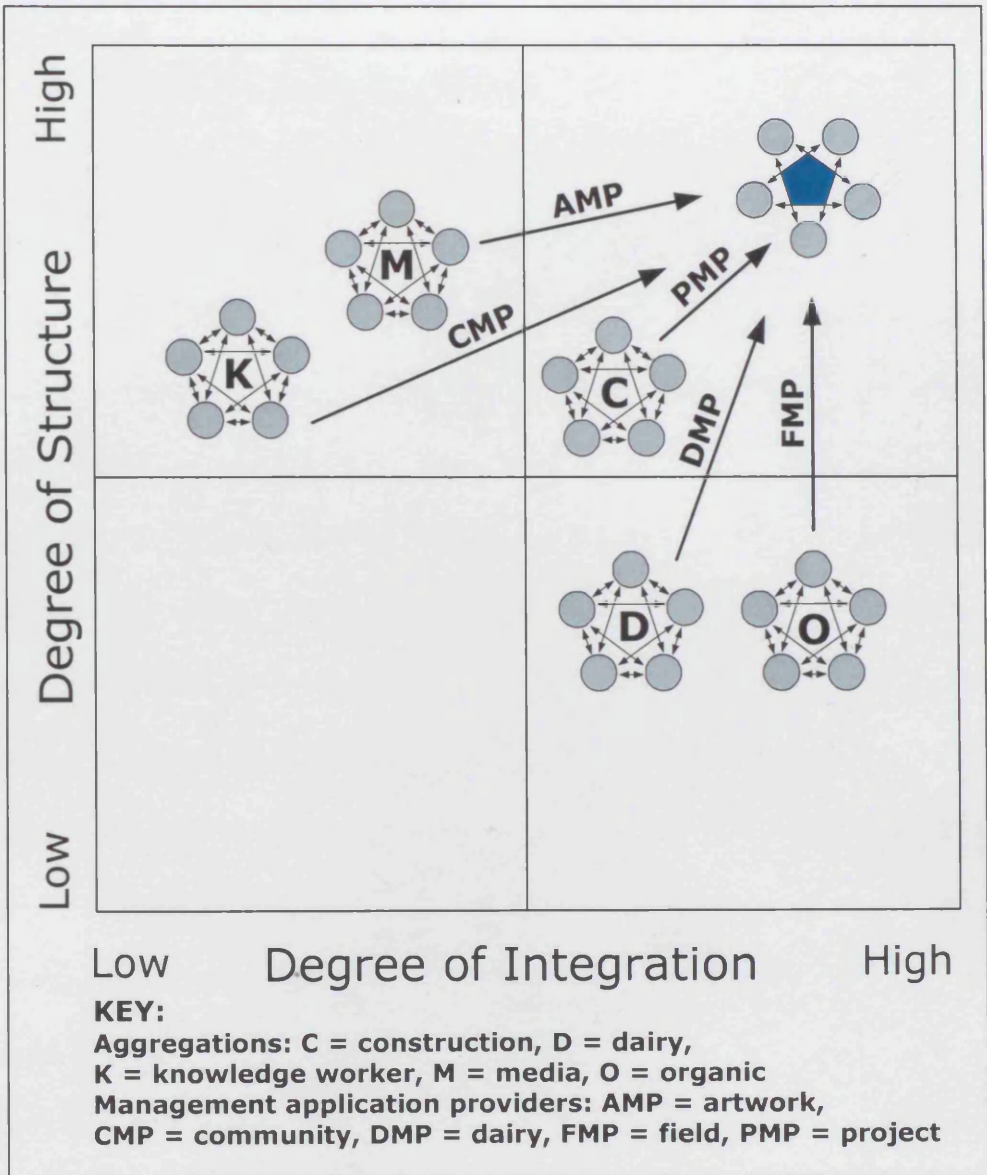
In conclusion the information repository was an emergent property of the critical e-aggregation applications and provided new value, which could not economically be acquired by other means. Both trusted third parties and service providers were aware of the strategic importance of this information and incorporated it into their business models. Users of the critical e-aggregation applications seemed mostly unaware of the importance of this information retention, seeking instead to gain value from using the application to reduce costs or reinforce existing relationships. This serves to highlight the different perspectives trusted third parties, service providers and SMEs can have to these critical e-aggregation applications.

7.3.3 Evidence of increased structure and integration

There was evidence from trusted third parties, service providers and users that critical e-aggregation applications increased both the degree of structure and integration within the aggregation. This important observation indicates that the impact of critical e-aggregation applications could be of strategic importance as it changes the very nature of inter-organisational networks.

The critical e-aggregation applications appeared to change the nature of the relationships within the aggregation. Firstly regarding structure, which was defined as rules or regulations imposed on SMEs in an aggregation, all eight critical e-aggregation applications increased the degree of structure by standardising the format of information in order to facilitate information exchange. Secondly the degree of integration was increased, to a greater or lesser extent, by the critical e-aggregation applications. For example the construction case necessitated increased integration for project and specification management, in the dairy case to allow for comparison, in the knowledge workers case for collective action and establishing new contracting relationships, in the media case for transferring artwork to regional newspapers and in the organic case for integrating into certifying bodies' databases and auditing the movement of produce. The general effect of the e-aggregation applications was to move the aggregation towards the 'network' type, Figure 7.4.

Figure 7.4. Impact of e-aggregation application in aggregation cases



7.4 What are the potential roles and mechanisms for intermediaries in facilitating SME e-business engagement?

In this empirical research all 26 data sources confirmed the importance of trust within the formation and development of SME aggregations engaged in e-business. Some of the community intermediaries noted that the emergence of new and unknown online intermediaries addressing aggregations added to the confusion many SMEs felt regarding e-business. There was recognition by many community and enterprise intermediaries that existing trusted offline relationships, be they a lead company in a business network or a trade association, could be important in recruiting SMEs to online services. Trade associations, in particular, identified a new role for themselves as a sponsor or facilitator, rather than a direct provider of e-business services. In their view this situation derived from the SMEs' view of them as trusted third parties that could be relied on to act in their interests. One general secretary of a trade association stated that "our members are finding it increasingly difficult to know which provider (e-marketplace) to use and are wanting us to endorse products. We are organising a special event at our next general meeting to discuss this with members" and "I cannot see how it could be cost-effective for us to develop our own (e-marketplace)". This new role was genuinely emergent - not one of the trade associations (not involved in a e-aggregation applications) had foreseen the possibility that this new role could have very significant strategic implications. Not surprisingly all VSPs specifically identified the role of the community intermediary as being important in the recruitment of users to their applications based on their trusted relationship within the aggregations. The nature of this relationship varied from simple provision as in the case of the advertising artwork service provider to active joint initiatives as in the case of the field management application.

There were some differences between the sample groups regarding trusted third parties with, on average, users preferring knowledgeable individuals (53%), suppliers (40%), business link (32%) and customers (30%) and with non-users preferring trade associations (43%), knowledgeable individuals (37%), business link (25%) and customers (25%).

The trusted third parties in the aggregation cases exhibited several clear differences from those not involved in e-aggregation applications. Firstly they deliberately worked with service providers (enterprise intermediaries) to appreciate the business needs within the aggregation and develop e-aggregation applications to meet these needs, secondly they were aware of the accumulation of valuable information about the aggregation resulting from interaction with the e-aggregation application and thirdly they participated in activities which attempted to increase e-aggregation application engagement of SMEs in the aggregation. These activities included (i) shaping users' perceptions, (ii) identifying and introducing the innovation to intact sub-groups within the aggregations, (iii) promoting (targeting) it to and through key actors, and (iv) providing incentives to early adopters. These critical mass building activities were evident, to a greater or lesser extent, in all of the aggregation cases. For example, firstly in the organic case the certifying body sent a mailshot to all producers promoting the benefits of the e-aggregation application and in the dairy case the agricultural college promoted the e-aggregation application by seminars and through its farm advisors, thus shaping users' perceptions. Secondly in the construction case the lead client introduced the e-aggregation on a project by project basis, thus introducing to intact sub-groups. Thirdly in the knowledge worker case the trade association encouraged highly active and knowledgeable members to act as moderators to focused web-based discussion forums, thus targeting key actors and finally in the organic

case the certifying body offered a reduced first year inspection fee to users of the e-aggregation application, thus providing incentives to early adopters.

In addition to the contribution made by the community intermediaries to the development of specific applications and to facilitating access to the SMEs they had two further roles that derived directly from their trusted third party status. Firstly as negotiators of the service fees charged either directly to users or themselves. Secondly they acted as negotiators for the service level agreement (SLA) with the service providers. For example the lead client of a construction consortium for new retail stores negotiated and paid the service provider fees for the project management application to be used by the designated network of contractors and sub-contractors. Similarly the newspaper trade association paid the service fees for advertising agencies submitting artwork via the artwork management application. In each of these cases the perceived or actual benefits of more effective project management and the ease of use resulting in increased advertising respectively were sufficient to provide the services with no direct charge to users. In nearly all instances both the community and enterprise intermediaries indicated that the SMEs appeared to rely heavily on the community intermediaries as the trusted third party to approve and hold the SLA with the service provider. This was supported by the user survey in which 84 percent of SMEs did not have an SLA with the service provider and in the cases where they did the community and service intermediary were difficult to distinguish. Considering the importance of these agreements in the context of hosted applications this implies a high level of trust on the part of the users, but also for many of them an indication of their dependence. This opinion was expressed by many of the interviewees based on the reality that large numbers of SMEs did not have the competence or confidence to negotiate SLAs for complex e-business applications.

Clearly the role of trusted third parties goes beyond simply negotiating fees and SLAs with service providers. They hold unique positions, based on resilient trust, within business sectors often gained over many years and across many aspects of trading relationships. This research highlights their importance in the engagement of SMEs in e-business applications. Interestingly this resilient trust between the community intermediary and users seemed, at least at a superficial level, to have been transferred to the service providers as evidenced by the 100 percent response by users when asked if they trusted their service provider.

In conclusion the role of trusted third parties, acting as community intermediaries, appears to be critical to the adoption of e-aggregation applications provided by VSPs, acting as enterprise intermediaries. These trusted third parties worked with service providers to identify the business needs of users within the aggregations and to develop applications to meet these. This finding was largely supported by context monitoring. Furthermore they used various previously identified means of building critical mass for interactive innovations, such as shaping users' perceptions, introducing to intact sub-groups, targeting key actors and providing incentives to early adopters. They also played important functional roles including negotiating service provider fees and service level agreements. Importantly there was strong and compelling evidence that trusted third parties used existing relationships based on mutual trust to facilitate these roles. This appeared particularly important because of the confusion felt by SMEs due to the rapidly changing technological environment and emergence of new unknown intermediaries.

7.5 What are the possible business models from a provider perspective?

All eight VSPs offered applications in a hosted environment on a ‘one to many’ basis and deliberately developed ‘one to many’ marketing models. All emphasised that the intermediaries best placed to promote the application were those who had existing relationships within the aggregation. Only two VSPs charged users directly with all others charging the community intermediaries. The latter approach both reinforced the ‘one to many’ marketing model and enabled community intermediaries to develop their own charging mechanism to users. This deliberate and explicit interaction between the service and community intermediaries was a key characteristic of critical e-aggregation applications and resulted in dual ‘one to many’ business models for both delivery (hosting) and marketing. This was in direct contrast to the four horizontal intermediaries who were committed to engaging SMEs on a ‘one to one’ basis even if subsequently they were hosted and supported on a shared ‘one to many’ basis. In all cases the payment model was direct between service provider and SME user. The business manager for one large e-business application provider admitted that “whilst we have some customers with only three users, it really isn’t economic for us to target customers with less than 20 users with hosted solutions”. Interestingly the manager indicated that 20 users was also the point at which resident or in-house systems became economically viable. This view resulted in a review of the business case for this large e-business application provider in promoting horizontal hosted solutions to SMEs. Inherently this business model is more expensive and the evidence from the service provider cases was that the horizontal providers were focusing on larger SMEs and divisions of large enterprises on economic grounds and these horizontal ASPs had limited relationships with trusted third parties within aggregations.

There was limited secondary evidence of application providers attempting to address SMEs through intermediaries. E-Business applications designed for SME markets were increasingly being offered through affiliate agreements such as the small business initiative (Oracle 2003) and through value added resellers (VARs) such as Netstore (Netstore 2002). However in both these instances there is no attempt to develop innovative e-aggregation applications. This model of engaging SMEs through VAR networks has served the enterprise software industry well in the context of standard applications however there was some evidence, from the context monitoring, that this model was becoming more widespread for implementing e-business applications.

7.6 Summary

By considering all secondary data, primary surveys, context monitoring and cases (aggregations, trusted third parties and service producers) this chapter proposes six main findings, namely:

- (i) There were significantly higher levels of e-business engagement by SMEs in aggregations, regardless of application complexity.
- (ii) Critical e-aggregation applications have emerged in order to address business needs within aggregations, either from new intermediaries or existing trusted third parties.
- (iii) The emergence of collaborative 'one to many' business models was evident in all aggregations and highlights the interactive nature of Internet-based technologies which make it cost effective for SMEs to collaborate in business markets.
- (iv) The importance of trusted third parties was highlighted in all aggregations as a critical factor in the decision of SMEs to engage in higher complexity e-business applications.

- (v) There was evidence of the deliberate accumulation of information, acquired through the use of the critical e-aggregation application, by trusted third parties and service providers. In many cases this was a strategic decision and formed part of the provider business models.
- (vi) Importantly all critical e-aggregation applications increased structure and integration within the aggregations and had the potential to fundamentally change the competitive environment within the business markets in which critical e-aggregation applications are deployed.

When considered separately these findings provide interesting insights into the characteristics of aggregations using critical e-aggregation applications but when considered in totality provide compelling evidence of how critical e-aggregations applications can fundamentally change relationships and market structures. These new applications can be defined as ‘an e-business application, promoted by a trusted third party, which engages a significant number of SMEs by addressing an important shared business concern within an aggregation’. In addition these findings begin to illustrate how these electronically facilitated aggregations form and operate and why SMEs, within aggregations, are engaging in higher complexity e-business applications. The last point is perhaps the most interesting because it challenges much of the evidence that SMEs are not engaging in higher complexity applications and could prove useful to service providers and policymakers alike. The next chapter considers what contributions this research can make to both praxis and theory.

8 THEORETICAL REFLECTION AND CONCLUSION

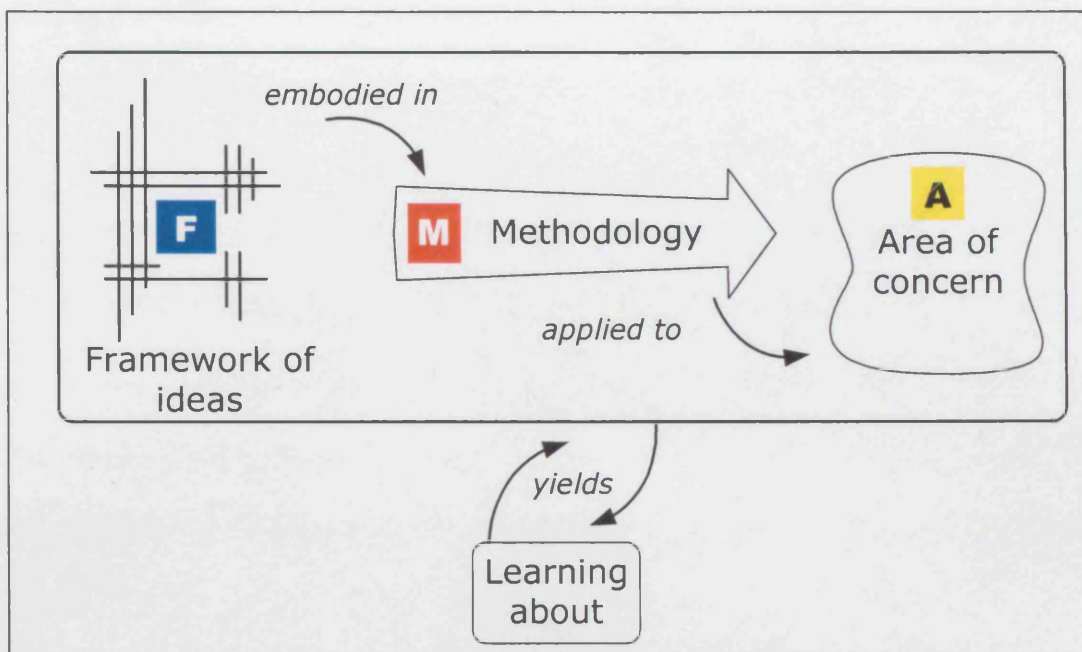
8.1 Introduction

In Chapter 7 the original research questions (i to iv) were restated and the findings of the empirical research were discussed against these. The exception was question v, namely: Does ICT adoption, inter-organisational network and e-business model theory provide an appropriate interpretive framework for understanding electronically facilitated networks?

This meta-level question refers to the learning and significance of the findings in a theoretical context and constitutes a conclusion for the research investigation.

To do this the chapter considers the different contributions made by this thesis to our understanding of the engagement of SMEs in e-business. The Checkland research model illustrates how these contributions can concern the framework of ideas (theory), area of concern (praxis) and methodology, Figure 8.1. The second part of this chapter follows this convention before considering the research questions, limitations of the research, overall contributions to knowledge and areas for possible future research.

Figure 8.1. Generic research model (Checkland 1985)



8.2 Theory

This thesis makes various contributions to the theory supporting the ‘interpretative framework for the dimensions of aggregations’ constructed from the review of (i) IT adoption by SMEs, (ii) inter-organisational networks (ION) and inter-organisational information systems (IOS), and (iii) e-business models and intermediaries. Each of which is discussed below.

In relation to other work on ICT adoption specific to SMEs (e.g. Blili and Raymond 1993; Cragg and King 1993; Fuller and Southern 1999; Levy *et al.* 2000; Mehrtens *et al.* 2001) the emphasis is on such factors as strategic logic, implementation enablers and organisation-specific factors - all viewed from a user perspective. This work has been influential but application complexity per se is not singled out. In this investigation, however, the findings emphasise that, in the experience of the providers, perceived application complexity (Table 2.2) is crucial to SMEs and that these organisations would

not proceed to adopt high complexity applications without substantial support. By including complexity as a key variable it highlights the need for a more profound understanding of what complexity actually means in the context of ICT adoption by SMEs.

Much of the research on ICT adoption by SMEs has tended to assume progressive adoption (e.g. DTI 1999; Wilcocks *et al.* 2000; Rao *et al.* 2003). This research challenges this rather deterministic model and supports recent studies which suggest adoption is influenced by other factors, such as owner's strategy for growth (Dixon *et al.* 2002; Levy and Powell 2003). In particular the importance of aggregation as a critical factor emerges from this research.

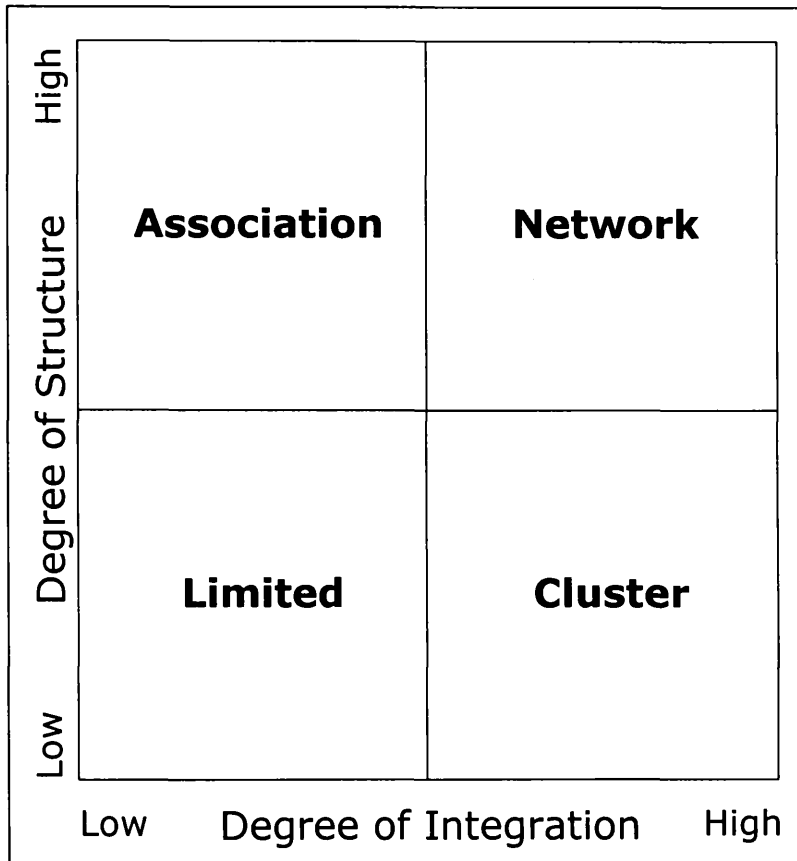
At the crux of this thesis is a concern to better understand e-business adoption by SMEs. The seminal work of Rogers on innovation diffusion, especially the later variant (1995), although not SME-focused, is highly relevant. This took a provider perspective and sought to explain adoption in terms of diffusion networks, change agent, critical mass and specific factors including complexity. This research suggests that Rogers' innovation model is helpful for understanding SMEs but importantly complements Rogers by offering a mechanism whereby critical mass can be achieved, namely facilitation through trusted third parties. In particular there was clear evidence of the use of critical mass building techniques, namely targeting top actors, shaping perceptions, introduction to intact subgroups and early adopter incentives, cited by Rogers as relevant to interactive innovations, such as the Internet. This further supports the use of Rogers work (1962; 1983; 1995) in recent studies conducting research into ICT adoption by SMEs (Kendall *et al.* 2001; Methrens *et al.* 2001).

The research findings in respect of aggregation as a means of helping SMEs develop their e-business capability can be reflected on theoretically in several ways. In terms of the rationale for inter-organisational network (ION) formation there have been significant contributions (e.g. Miles and Snow 1986; Thorelli 1986; Powell 1990; Oliver 1990; Ebers 1997; Glaister and Buckley 1996). Drawing on earlier literature Craven *et al.* (1996) usefully discussed the rationale for network formation in terms of organisation adaptation to the environment, management imperatives for the rationalisation of resources and competing in rapidly changing environments, including the acquisition of technology. This investigation echoes the importance of these factors for both SMEs and service providers. From the provider perspective the aggregation of SMEs offers a realistic means of understanding, addressing and providing appropriate applications on an economic basis. In this sense the aggregation becomes in Sydow and Windelers' terms 'an object of action framing. In addition to the single firm the network also becomes an object of signifying, organising and legitimising' (1998: 267). In this specific context the enterprise intermediary is able to subsume the behaviour of individual SMEs within the wider network practices. Similarly the community intermediary is able to act on behalf of the aggregation in matters of negotiation relating to service costs and service levels, but at the same time can act internally within the aggregation in respect of the governance of individual firm behaviour.

The thesis contributes to the important theoretical area of IONs by the development of a taxonomy of aggregations, Figure 8.2. This embodies two notions. Firstly that the concept of aggregation is best conceived as a meta concept and that there are different types of aggregations. Secondly that these different types can be distinguished by the dimensions of

structure and integration. This emphasises the importance of existing groupings or aggregations, consisting predominantly of SMEs.

Figure 8.2. Taxonomy of aggregations for SMEs (Brown and Lockett 2004)



For the individual SME the question of whether or not to adopt e-business applications specific to their sector is too simplistic. In reality such applications would generally not be available from providers for the reasons previously given. It is the actual, or likely, existence of an 'organised' aggregation (i.e. a network, association or cluster in terms of the taxonomy of aggregations) that underwrites the providers' interest. Once an aggregation has formed then the relevance for individual SMEs of a range of factors such as common interests, resource efficiencies and stability governs whether to participate in the network. Their decision is greatly supported by the mitigation of risk that involvement in a collaborative arrangement offers (Contractor and Lorange 1988). Overall, although the

theory frameworks and models for IONs were developed before Internet technologies, this research confirms the broad relevance of these concepts for interpreting the behaviour of electronically mediated collaborative relationships.

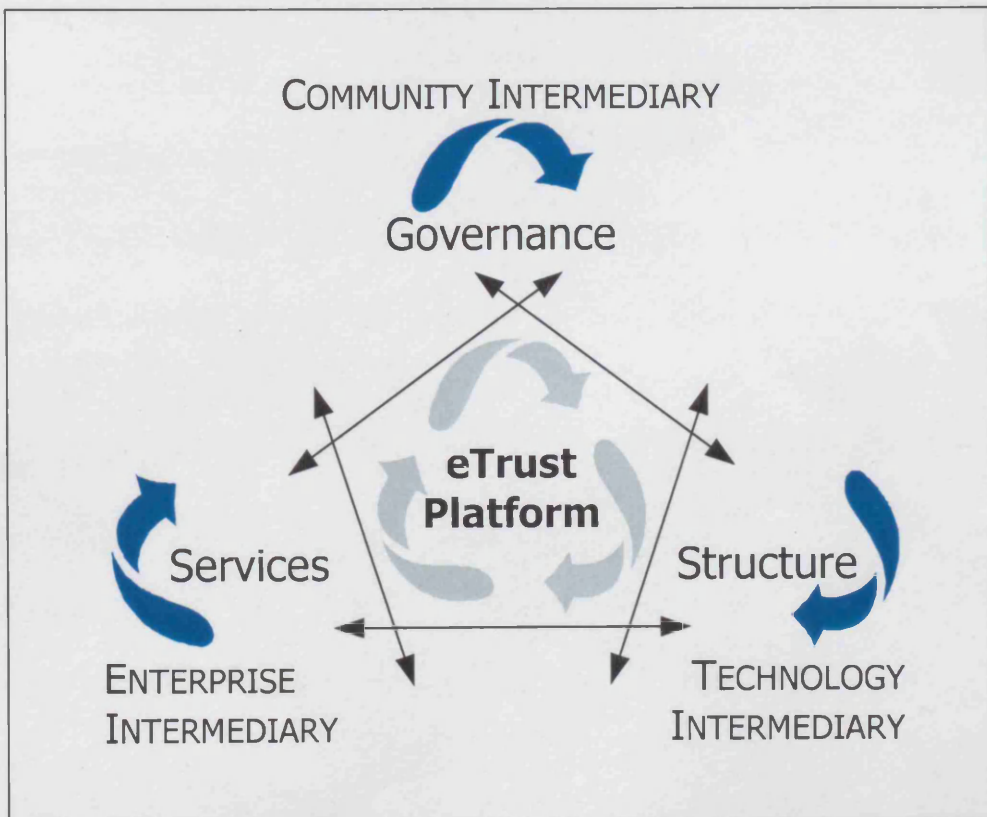
Of particular relevance to the literature of IONs was the use of elements in the interpretative framework, namely (i) micro-level ties: resource flows (Easton and Araujo 1997); mutual expectation (Ring 1997); information flows (Holland and Lockett 1997), (ii) economics: nature of transactions; cost of networking, (iii) strategic: motivation (Contractor and Lorange 1988); perspective (Levy and Powell 2000); contingencies (Ford *et al.* 1998)), and (iv) governance: distribution of property rights (Fama and Jensen 1983) and co-ordination mechanism (Grandori and Soda 1995). Clear evidence was established supporting the use of these elements, most noticeably by (i) the generation of shared resources, resilient trust and IOS acting as catalysts for network formation, (ii) repeated transactions and perceived benefits greater than networking costs supporting network formation, (iii) high scope and scale, deliberate strategies and existing relational contingencies for network formation, and (iv) both formal and informal mechanisms for the distribution of property rights necessary for network formation. This grounded the study of aggregations of SMEs engaging in e-business applications firmly within the ION literature and provided an initial framework for considering the impact of critical e-aggregation applications. Importantly the research identified an increase in the degree of both structure and integration resulting from the use of these critical e-aggregation applications, which tended to migrate the cluster and association types towards network form. This contributes to the work of Jarillo on strategic networks (1988; 1993), which argues that competitiveness is increased through such networks.

Finally, there are some observations on the theory of e-business models and in particular intermediaries. The value of conceptualising the different roles in the form of the eTrust Platform (Figure 8.3) has already been highlighted. In the small but growing literature on e-business models (e.g. Timmers 2000; Earle and Keen 2000; Tapscott 2000) there is considerable emphasis on the opportunities for disintermediation and reintermediation (i.e. the removal of intermediaries and the creation of new intermediaries, respectively - see Chaffey 2002: 37-45 for recent examples). However, this research highlights the importance of existing relationships in business markets. This was graphically the case with the community intermediaries. It was their relationship with SMEs that provided the basis for a meaningful interaction between the potential providers of e-aggregation applications and the aggregations of SMEs. At the core of this relationship was trust but in the context of the eTrust Platform this is complex. In terms of the relationship between the community intermediary and the SME the research findings in section 7.4 suggested that the trusted relationship was based on confidence in another's goodwill. However, the relationship between the community and enterprise intermediaries was based on a business risk view, as a result of the community intermediary's involvement in the negotiation of service level agreements and costs (this perspective is identified and discussed further in Ring and Van de Ven 1994). Swan and Newell's work (1995), although not specific to SMEs, highlights the importance of the professional associations as intermediaries in the diffusion of complex technologies in terms of a knowledge-focused perspective - they are 'boundary spanners' in Trushman and Scanlan's (1981) terminology. Newall *et al.* (1998), however, identified the problem when the intermediary (in their case a professional association) becomes an uncritical passive purveyor of 'black box' technologies to the users on behalf of the technology provider. In this thesis the community intermediary was more likely to be active through its negotiating role and hence more aware of potential

limitations of the technology. In general this research suggests that the findings of Swan and Newall could be generalised to other community intermediaries, such as trade associations.

In terms of theory, even before any empirical data was interpreted, the research has confirmed the usefulness of the eTrust Platform conceptualisation, Figure 8.3, as a means of framing the discussion with the different types of organisation involved. Previously a number of authors (e.g. Timmers 2000; Tapscott *et al.* 2000; Earle and Keen 2000) provided models of the revised relationships that can follow from the introduction of e-business technologies, and many of these models identify the new intermediaries, such as application service providers, that would be needed. Alt and Zimmerman (2001) provided a useful framework for discussing and comparing e-business models.

Figure 8.3. eTrust Platform (developed from Brown and Lockett 2001)



However, there were no specific conceptualisations of the role of intermediaries in the context of shared applications by aggregations. The usefulness of such a conceptualisation was proven many times in the research process. None of the organisations interviewed had thought about their role other than in terms of their everyday identities as an application service provider, lead contractor or trade association etc. The ability to discuss their situation in terms of their role as an enterprise or community intermediary was welcomed. It contributed to the sense-making of specific situations and to the wider problem of generalising experience.

The extension of Kumar and Dissel's work (1996) on inter-organisational information system (IOS) led to the proposal of a fourth type, namely 'platform', and supported the conceptualisation of the eTrust Platform within the IOS literature. In this way the research contributes to the extensive body of research regarding the impact of IOS and in particular the roles of intermediaries in facilitating e-business engagement by SMEs.

8.3 Area of concern

In terms of praxis the findings are unequivocal with respect to how the service providers are organised. In the context of large enterprises the 'one to one' marketing business model is viable for both vertical (i.e. sector-specific applications) and horizontal (i.e. generic business applications). Enterprise resource planning (ERP), from either a specialist or generic provider, serves as a good example. In this instance the implementation of this complex application will generate further demands on financial and human capital as the requirements of customisation, integration and ongoing support are recognised, and these demands can normally be met by large enterprises. In the setting of SMEs, whilst it is economic to provide higher e-business applications on a 'one to many' basis the cost of

marketing and supporting on a 'one to one' basis appears to be larger than the potential return. This is clearly not the case for lower complexity applications such as e-mail. It would be possible to conclude that as awareness by SMEs of the advantages of higher complexity e-business applications increases so too will adoption rates, but as is showed earlier in Figure 2.11 this was not borne out by the statistics. The clear evidence from all of the community and enterprise intermediaries interviewed was that the aggregation model is likely to be the most viable means of engaging SMEs. By confirming this provider perspective the research adds to our understanding of the likely mechanisms for engaging SMEs in complex e-business applications that are both desirable and economically feasible.

In particular this research contributes to the praxis of e-business engagement by identifying and exploring the role of critical e-aggregation applications both from user and provider perspectives. Firstly, it was possible to identify, from user surveys, that groupings of SMEs using critical e-aggregation applications had significantly higher levels of e-business engagement than both non-users in the wider aggregation and SMEs generally, Figure 5.5. Secondly, innovation was the main driver for e-business adoption for users of critical e-aggregation applications, which resulted in benefits of reduced costs and improved quality of service. Barriers to adoption for non-users were security concerns, cost and benefits and lack of information and knowledge. Interestingly all primary and secondary data identified security as the main barrier but this was evidently not sufficient to deter users from engaging in e-business generally and in e-aggregation applications in particular. Thirdly, for service providers, critical e-aggregation applications can emerge by the combined effort of several intermediaries and in particular where there is a community intermediary acting as a trusted third party. This role may include operational functions,

such as fee and service level agreement negotiation, but also the strategic role of helping to identify the business needs within an aggregations and working with the enterprise intermediary to develop e-business applications to meet these needs. However perhaps the critical role these community intermediaries play appeared to be in using their existing trusted relationships to encourage adoption by SMEs, that is providing a mechanism for achieving 'one to many' for both delivery and marketing business models. For enterprise intermediaries who are already familiar with strategic partnerships with other service providers this would appear to be a logical extension. However both parties needed to be willing to work together to identify the specific needs within an aggregation but once this had been achieved it not only appeared, from the provider perspective, economic to provide these applications but that trust was transferred from the community intermediary to the enterprise intermediary. Fourthly, for existing trusted third parties, such as trade associations and lead organisations, there is evidence that e-aggregation applications can increase the degree of structure and integration within the aggregation, thus migrating the aggregation towards the 'network' type. Importantly the development of the majority of these critical e-aggregation applications came from an existing trusted third party. Finally, a potentially important emergent property of the use of e-aggregation applications is the accumulation of information about the aggregation, an 'information repository', which provided new value that could not be economically acquired by other means.

For policymakers, the important role of critical e-aggregation applications in facilitating e-business engagement by SMEs has emerged as part of this research. However there was minimal evidence of governments having identified this as one possible method of achieving their stated objectives of increasing e-business engagement by SMEs. The one notable exceptions was the ITOL initiative by the Australian government acting as a

catalyst by funding projects to existing aggregations dominated by SMEs and offered strong supporting evidence of emergence of e-aggregation applications, identified in this thesis (NOIE 2003).

8.4 Methodology

From the beginning of the investigation there was a concern that because of the rapidly changing nature of e-business, the context for this research, a method needed to be used in order to identify any material changes in the environment which might assist in understanding the findings. The seminal work of Vicker's appreciative systems (1965), later expanded by Checkland and Casar (1986), provided a theoretical basis for the intermittent consideration of the flux of events and ideas unfolding over time, termed 'context monitoring'. This innovative methodology did provide some useful and defensible findings regarding changes in the environment in which the research was set. Because of the high risk of developing and using a new methodology only limited contextual information was acquired in support of the main findings. On reflection more reliance might be placed on these findings if a more detailed interpretative framework was declared at the start and more data was systematically recorded. However, whilst still embryonic in its development, context monitoring did prove useful in understanding the findings of this investigation.

8.5 Limitations of research

The phenomenological nature of the research necessitated a triangulation of methodologies to be used in the investigation. Whilst this reduced the risk of limited or inappropriate data collection it also imposed limitations to the depth of the investigation. The selection of a single method, such as action research or extensive survey instruments, might have

produced more detailed data and led to a better understanding of the role of aggregations and e-business engagement by SMEs. However this would have required the identification of a successful e-aggregation application and privileged access to both the community and enterprise intermediaries - both of which were problematic in early 2000. The use of context monitoring whilst useful was limited, perhaps rightly, and requires more development and peer review to become a reliable research instrument.

The structured nature of the interpretative framework for the dimensions of aggregations proved useful in the investigation. However not all of the resultant findings were supported fully, in particular the appreciation of the emergent roles of the trusted third parties and the deliberate building of information repositories was evident all aggregation cases. The interpretative framework could have benefited from a wider consideration of both the trust and the strategic use of information systems literature.

The quantitative user and non-user surveys provided important insights into the extent of e-business engagement and the reasons for using (or not) critical e-aggregation applications. However the relatively low numbers of users and the challenges of gaining access meant that for comparisons, between users and non-users, to be statistically robust the data from the four aggregations needed to be combined. The limited number of responses from the individual aggregations meant an opportunity for statistical comparisons between aggregations was lost and purely illustrative observations could be made. Fortunately the qualitative cases substantially mitigated this loss but this thesis would nonetheless have benefited from statistical comparison across the aggregations.

8.6 Contribution to knowledge

This thesis makes contributions to several areas of knowledge, which are detailed within sections 8.2, 8.3 and 8.4, including:

- The extensive literature of ICT adoption and in particular (i) the limited provider perspective, (ii) the integration with diffusion of innovations theory in the context of SMEs and ICT, and (iii) the more recent publications highlighting the non-progressive nature of adoption by SMEs.
- Proposing a taxonomy of aggregations of SMEs, Figure 8.2, based on the dimensions of structure and integration and resulting in four aggregation types, namely limited, association, cluster and network. This significant contribution evolved throughout the course of the research and provides a link from ION theory to ‘electronically facilitated’ aggregations.
- The interpretative framework for the dimensions of aggregations drew heavily on network theory expressed in the ION literature and the findings make contributions to this body of knowledge, particularly in supporting the use of micro-level ties, such as resource flows, mutual expectation and information flows, and governance mechanisms. The research highlighted the importance of IOS as catalysts to both network formation and development and in particular the increased structure and integration evident in groupings using critical e-aggregation applications. The deliberate building of information repositories as a means of achieving new value was unsupported in the literature and represents an original contribution from the research.
- The conceptualisation of the different roles in the eTrust Platform, Figure 8.3, contributes to the emerging e-business literature and supports a proposed new type of IOS, namely ‘platform’, Figure 3.5.

- The exploration of critical e-aggregation applications, from both the provider and user perspectives, provides a contribution to the e-business model literature, particularly regarding the role of intermediaries, and also provides insights for policymakers, the service provider community and existing trusted third parties.
- The development and use of context monitoring proved useful in identifying changes in the environment in which the research was set and supported the appreciation of the research findings. This provides an interesting, albeit limited, methodological contribution, in particular for investigations set in rapidly changing situations.

Effective dissemination of the research was achieved, during the course of the investigation, by several conference and journal papers being published and numerous presentations being given to both academic and commercial audiences. Dealing firstly with the publishing, the process of preparing papers has been extremely useful in both exploring the theory and developing the concepts relevant to SME e-business engagement. The progression of the investigation was developed through these journal papers (Lockett and Brown 2000; Brown and Lockett 2001; 2004). Conference papers provided shorter contributions but elicited feedback from reviewers and audiences (Lockett and Brown 2000; 2001; 2003). Secondly the interaction with academic and commercial audiences contributed greatly to the appreciation of theory and praxis. In particular presentations to researchers at Hewlett Packard research laboratories, in both Bristol and Palo Alto, and SAP (UK) provided a bridge between theory and praxis. The research attracted requests for keynote presentations, including DTI e-working seminars (2000; 2001), Trade Association Forum conference (2002) and the first e4smes conference (2003). Each interaction contributed to the understanding of the theory and praxis.

8.7 Future research

In terms of further research the need for more work on the conceptualisation of the adoption process by SMEs of advanced information technologies, such as e-business, is clear. In particular the areas of application complexity and how users perceive this, the significance of users within aggregations and the roles of trusted third parties warrant further consideration. Such work would advance our theoretical understanding of adoption from both the provider and user perspectives. This might be achieved by more extensive quantitative sampling and qualitative research of users and non-users of critical e-aggregation applications. In the course of the investigation more of these applications emerged and both users and providers have had more experience of them in use. Future research will need to set in the context of emerging research regarding application service provision, most noticeably by Currie's ESRC and EPSRC projects which finished in late 2003. Moving beyond adoption to evaluation there is no significant work on the impact on SMEs of e-business applications, particularly regarding changes to structure and integration. Do they affect the productivity and profitability of adopters, or do they provide an environment that supports innovation? Clearly both policymakers and service providers, not to mention SMEs themselves, would benefit from a greater understanding of the economic advantages of critical e-aggregation applications.

8.8 Summary

This chapter clearly states the contributions to knowledge in terms of theory, praxis and methodology from this thesis, before stating the final research question and how it was addressed, the limitations of the research and suggesting areas for further work. In conclusion this empirically based research set out to learn more about the engagement of SMEs in e-business from both provider and user perspectives and to relate this to previous

research in the area of ICT adoption, networks and e-business models. Of particular interest were the role of critical applications (since these have been shown to be significant in the adoption of complex applications by large enterprises) and the role of intermediaries in the engagement process (since the move to e-business has created new kinds of intermediaries, particularly service providers). In the world of praxis the context for this work was the unexpectedly low levels of SME engagement in e-business, beyond simple e-mail or web catalogues. In terms of previous research the concern was that in the main ICT adoption has been viewed, either explicitly or implicitly, from the user perspective. As indicated earlier the unstated assumption here being that the provider issues were non-problematic.

Given the above aims the research findings appear helpful. Firstly the thesis establishes the importance of the critical e-aggregation applications, defined as ‘an e-business application, promoted by a trusted third party, which engages a significant number of SMEs by addressing an important shared business concern within an aggregation’ as a way of encouraging SMEs to engage in the more complex e-business applications. Secondly, it confirms the potential for addressing SMEs as aggregations as a highly efficacious method for the marketing and provision of shared services. Finally it highlights to service providers the crucial role of the trusted third party in sponsoring or promoting specific e-business applications to aggregations of SMEs. Indeed the research shows that this role works best when both the enterprise and community intermediaries are aware of each other’s respective contribution and a working relationship is established.

These findings are of significance for both policy and praxis. The thesis started with an appreciation of the low engagement by SMEs in the more complex e-business applications.

There appeared to be little recognition by UK policymakers of the mechanism of engaging SMEs as aggregations, as opposed to individual organisations, for the express purpose of adopting e-business practices. Policy was couched in terms of targets for e-business adoption by SMEs with little about the means for achieving this (DTI 2001a). Arising from the research, and in particular the recognition of the role of the community intermediary in facilitating and legitimising the adoption of e-business applications, are important implications for policy.

This thesis has attempted to improve our understanding of e-business engagement by SMEs and has to a reasonable extent achieved this. Most noticeably by contributions to theory, including IT adoption by SMEs, network theory and e-business models, and importantly to praxis. This thesis and peer-reviewed publications have helped to disseminate this research to the academic community and more widely, principally through presentations, to policymakers, service providers and trusted third parties.

REFERENCES

- Achilles (2002) www.achilles.com, accessed 06 March 2002.
- Afuah, A and Tucci, C. (2001) *Internet Business Models and Strategies*. McGraw-Hill, New York, NY.
- Aldrich, H. and Glinow, M. (1992) 'Personal Networks and Infrastructure Development', in *The Technopolis Phenomenon: Smart Cities, Fast Systems, Global Networks*. (Gibbon, D., Kozmetsky, G. and Smilor, R. Eds), Rowman and Littlefield, NY. 125-145.
- Alt, R. and Zimmermann, H. (2001) 'Introduction to Special Section - Business Models', *EM: Electronic Markets*. 11(1).
- Amit, R. and Zott, C. (2001) 'Value Creation in eBusiness' *Strategic Management Journal*, 22, pp 493-520.
- Amor, D. (2000) *The E-Business (R)evolution: Living and Working in an Interconnected World*. Prentice Hall, Upper Saddle River, NY.
- ASP News (2003) www.aspnews.com, accessed 06 February 2003.
- Axelsson, B. and Easton, G. (1992) *Industrial Networks: A New Reality*. Routledge, London.
- Barreyre, P.Y. (1988) 'The Concept of 'Impartition' Policies: A Different Approach to Vertical Integration Strategies', *Strategic Management Journal*. 9(5), 507-520.
- Barry, H. and Milner, B. (2002) 'SMEs and electronic commerce: a departure from the traditional prioritisation of training?', *Journal of European Industrial Training*. 26(7), 316-326.
- Barzel, Y. (1989) *Economics Analysis of Property Rights*. Cambridge University Press, Cambridge, UK.
- Bell (2002) www.bellzinc.ca, accessed 15 October 2002.
- Bizprolink (2002) www.bizprolink.com/communities.shtml, accessed 15 August 2002.
- Blackburn, R. and McClure, R. (1998) *The Use of Information and Communication Technologies (ICTs) in Small Business Service Firms*. Small Business Research Centre, Kingston Business School, London.
- Blili, S. and Raymond, L. (1993) 'Information Technology: Threats and Opportunities For Small and Medium-sized Enterprises', *International Journal of Information Management*. 13(6), 439-448.
- Blundel, R. and Smith, D. (2001) *Business Networks Report*. Small Business Service, UK.

References

- Booz Allen Hamilton (2002) *International e-Economy Benchmarking: The World's Most Effective Policies for the e-Economy*. IAP, UK.
- Brown, D.H. and Lockett, N. (2001) 'Engaging SMEs in E-Business: The Role of Intermediaries within eClusters', *EM: Electronic Markets*. 11(1), 52-58.
- Brown, D.H. and Lockett, N. (2004) 'The Potential of Critical Applications for Engaging SMEs in E-Business', *European Journal of Information Systems*. 13(1), 21-34.
- BT (2002) www.btopenworld.com/businesshome/, accessed 15 October 2002.
- Buildonline (2002) www.buildonline.com, accessed 10 November 2002.
- BusinessEurope (2002) www.business europe.com, accessed 15 October 2002.
- Cabinet Office (1999) *e-commerce@its.best.uk*. Performance and Innovation Unit, Cabinet Office, UK.
- Cambridge Network (2002) www.cambridgenetwork.co.uk, accessed 15 August 2002.
- CFIB (1999) *Virtually a Reality: Results of 1999 CFIB Survey on Internet use Among SMEs*. Canadian Federation of Independent Business, Canada.
- CFIB (2000) *E-Business Update: Internet use Among SMEs, Canadian Federation of Independent Business*. Canada.
- CFIB (2002) *The Impact of the Internet on SMEs during a Recession*. Canadian Federation of Independent Business, Canada.
- Chaffey, D. (2002) *E-Business and E-Commerce Management*. Prentice Hall, Harlow, UK.
- Checkland, P. (1985) 'From Optimising to Learning: A development of Systems Thinking for the 1990s', *Journal of the Operational Research Society*. 36(9), 757-767.
- Checkland, P. and Casar, A. (1986) 'Vickers' concept of an appreciative system', *Journal of Applied Systems Analysis*. 13, 3-17.
- Child, J. and Faulkner, D. (1998) *Strategies of Co-operation: Managing Alliances, Networks, and Joint Ventures*. Oxford University Press, Oxford, UK.
- Clegg, C. (2001) *E-Commerce Impacts: A Review of 14 sector studies* Small Business Service. UK.
- Contractor, F. and Lorange, P. (1988) *Cooperative Strategies in International Business*. Lexington Books, Lexington, MA.
- CORIDOS (2002) www.cordis.lu/euroabstracts/en/home.html, accessed 01 October 2002.
- Covisint (2002) www.covisint.com, accessed 09 October 2002.
- Cragg, P. and King, M. (1993) 'Small Firm Computing: Motivators and Inhibitors', *MIS Quarterly*. March, 47-60.

References

- Cravnes, D., Piery, N. and Shipp S. (1996) 'New Organisational Forms for Competing in Highly Dynamic Environments: the Network Paradigm', *British Journal of Management*. (7), 203-218.
- Currie, W. and Seltsikas, P. (2001) 'Exploring the Supply-side of IT Outsourcing: Evaluating the Emerging Role of Application Service Providers', *European Journal of Information Systems*. 10(3), 123-134.
- Davies, R. (2001) *vEDZ Bid: InfoLab21 An ICT Centre of Excellence at Lancaster University*. Lancaster University, UK.
- DEFRA (2000) www.defra.gov.uk, accessed 18th June 2000.
- Denzin, N. (1978) *Sociological Methods: A Sourcebook*. McGraw-Hill, New York.
- Desai, B. and Currie, W. (2003) 'The Application Service Providers Business Model: Issues and Challenges', in *Proceedings of the Americas Conference on Information Systems*. Tampa, FL. 131-138.
- Dewire, D. (2001) 'ASPs: Applications to Rent', in *Proceedings of the Americas Conference on Information Systems*. Boston, MA. 2275-2282.
- Dierckx, M. and Stroken, J. (1999) 'Information Technology and Innovation in Small and Medium Enterprises', *Technological Forecasting and Social Change*. 60(2), 149-166.
- Dixon, T., Thompson, B. and McAllister, (2002) *The Value of ICT for SMEs in the UK: A Critical Literature Review*. Small Business Service, UK.
- Doz, Y. and Hamel, G. (1998) *Alliance Advantage: The Art of Creating Value through Partnering*. Harvard Business School Press, MA.
- Doz, Y. (1996) 'The Evolution of Cooperation in Strategic Alliances: Initial Conditions or Learning Processes?', *Strategic Management Journal*. 17 (Supplement), 55-83.
- DTI (1999) *Business into the Information Age: International Benchmarking Study 1999*. Department of Trade and Industry, UK.
- DTI (2000) *Business into the Information Age: International Benchmarking Study 2000*. Department of Trade and Industry, 5127, UK.
- DTI (2001a) *Business in the Information Age: International Benchmarking Study 2001*. Department of Trade and Industry, 5340, UK.
- DTI (2001b) *Business Clusters in the UK: A First Assessment*. Department of Trade and Industry, UK.
- DTI (2002) *Business into the Information Age: International Benchmarking Study 2002*, Department of Trade and Industry, 6366, UK.
- DTI (2003) www.ukonlineforbusiness.gov.uk/, accessed 06 February 2003.

References

- Dubois, A. and Hakansson, H. (1997) 'Relationships as Activity Links', in *The Formation of Inter-Organizational Networks*, (Ebers, M. Ed). Oxford University Press, Oxford, UK.
- Earle, N. and Keen, P. (2000) *From .com to .profit: Inventing Business Models that Deliver Value and Profit*. Jossey-Bass, San Francisco, CA.
- Easton, G. and Araujo, L. (1997) 'Inter-firm Responses to Heterogeneity of Demand over Time', in *The Formation of Inter-Organizational Networks*, (Ebers, M. Ed). Oxford University Press, Oxford, UK.
- Easterby-Smith, M., Thorpe, R. and Lowe, A. (2002) *Management Research: An Introduction, 2nd Ed*. Sage Publications, London, UK.
- Ebers, M., (1997) *The Formation of Inter-Organisational Networks*. Oxford University Press, Oxford, UK.
- EC (2002) *Benchmarking National and Regional E-Business Policies for SMEs: Final Benchmarking Report*. European Commission.
- EC (2003) *The European E-Business Report 2002/03 edition*. European Commission. ISBN 92-984-5118-1.
- Fama, E. and Jenson, M. (1983) 'Separation of Ownership and Control', *Journal of Law and Economics*. 26, 301-25.
- Finch, E. (2000) *Net Gain in Construction*. Butterworth Heinemann, Oxford, UK.
- Ford, D., Gadde, L., Hakansson, H., Lundgren, A., Snehota, I., Turnbull, P. and Wilson, D. (1988) *Managing Business Relationships*. John Wiley & Sons, Chichester, UK.
- Freeserve (2002) www.clearlybusiness.com, accessed 15 October 2002.
- Fuller, T. and Southern, A., (1999) 'Small Firms and Information and Communication Technologies: Policy Issues and some Words of Caution', *Environment and Planning: Government and Policy*. 17, 287-302.
- Glaister, K. and Buckley, P. (1996) 'Strategic Motives for International Alliance Formation', *Journal of Management Studies*. 33, 301-332.
- Gillian, C., Graham, S., Levitt, M., McArthur, J., Murray, S., Turner, V., Villars, R. and McCathy Whalen, M. *The ASPs' Impact on the IT Industry*. IDC Corporation.
- Grandori, A. and Soda, G., (1995) 'Interfirm Networks: Antecedents, Mechanisms and Forms', *Organisation Studies*. 16(2), 183-214.
- Granovetter, M. (1985) 'Economic and Social Structure; The Problem of Embeddedness', *American Journal of Sociology*. 91(3), 481-510.
- Hagmann, C. and McCahon C. 'Strategic Information Systems and Competitiveness', *Information & Management*. 25 (2) 183-192.

References

- Hamel, G. (2000) *Leading the Revolution*. Harvard Business School Press, Boston, MA.
- Hamel, G., and Prahalad, C.K. (1994) *Competing for the Future*. Harvard Business School Press, MA.
- Hawkins, R. and Prencipe, A. (2000) *Business to Business E-Commerce in the UK: A Synthesis of Sector Reports*. Department of Trade and Industry, UK.
- Heart, T. and Pliskin, N. (2001) 'Is IT Application Services (ASP) Alive and Well?', *Journal of Information Technology Theory and Application*. 3(4), 33-41.
- Holland, C. and Lockett, G., (1997) 'Mixed Mode Operation of Electronic Markets and Hierarchies', in *The Formation of Inter-Organizational Networks*, (Ebers, M. Ed). Oxford University Press, Oxford, UK.
- Hussin, H., King, M. and Cragg, P. (2002) 'IT Alignment in Small Firms', *European Journal of Information Systems*. 11(2), 108-127.
- Iacovou, C., Benbassat, I. and Dexter, A. (1995) 'EDI and Small Organisations: Adoption and Impact of Technology', *MIS Quarterly*. 19(4), 465-85.
- IDC (2003) www.idc.com, accessed 6th February 2003.
- Jarillo, J. (1988) 'On Strategic Networks', *Strategic Management Journal*. 9(1), 31-41.
- Jarillo, J. (1993) *Strategic Networks: Creating the Boundless Organisation*. Butterworth-Heinemann, Oxford, UK.
- Jayatilaka, B., Schwarz, A. and Hirschheim, R. (2003) 'Determinants of ASP Choice: an Integrated Perspective', *European Journal of Information Systems*. 13(3), 196-210.
- Johannisson, B. (1986) 'Network Strategies, Management Technology for Entrepreneurship and Change', *International Small Business Journal*. (5)1.
- Johannisson, B. (1998) 'Personal Networks in Emerging Knowledge-based Firms: Spatial and Functional Patterns', *Entrepreneurship and Regional Development*. 10 (4), 297-312.
- Johanson, J. and Mattsson, L. (1987) 'Interorganizational Relations in Industrial Systems: a Network Approach Compared with Transaction-cost Approach', *International Journal of Management and Organisation*. 1, 34-38.
- Johnston, H. and Lawrence, P. (1988) 'Beyond Vertical Integration, The Rise of Value-Adding Partnership', *Harvard Business Review*. 66(4) 94-101.
- Junkers, B. (1960) *Fieldwork: An Introduction to Social Sciences*. Cambridge University Press, Cambridge, UK.
- Kalakota, R. and Robinson, M. (2000) *e-Business 2.0: Roadmap for Success*. Addison Wesley, Upper Saddle River, NJ.

References

- Kalakota, R. and Whinston, A. (1996) *Frontiers of Electronic Commerce*. Addison Wesley, Reading, MA.
- Kendall, J., Tung, L., Chua, K., Ng, C. and Tan, S. (2001) 'Receptivity of Singapore's SMEs to Electronic Commerce Adoption', *Journal of Strategic Information Systems*. 10(3) 223-242.
- Kern, T, Kreijer, J. and Willcocks, L. (2002) 'Exploring ASP as sourcing strategy: Theoretical Perspectives, Propositions for Practice', *Journal of Strategic Information Systems*. 11(2), 153-177.
- Konsynski, B. and MacFarlan, F., (1990) 'Information Partnerships: Shared Data, Shared Scale', *Harvard Business Review*. 68(5), 114-120.
- Kowtha, N. and Choon, T. (2001) 'Determinants of website development: a study of electronic commerce in Singapore', *Information and Management*. 39, 227-242.
- Kluber, R., Alt, R., Osterle, H. (1999) 'Emerging Electronic Services for Virtual Organizations – Concepts and Framework', *Electronic Journal of Organizational Virtualness*. (1:1), 190-212.
- Kumar, K. and Dissel, H. (1996) 'Sustainable Collaboration: Managing Conflict and Cooperation in Interorganisational System', *MIS Quarterly*. 20(3) 279-300.
- Lane, C. and Bachmann, R. (1996) 'The Social Constitution of Trust: Supplier relationships in Britain and Germany', *Organization Studies*. 17, 365-93.
- Lechner, U., and Schmid, B.F. (2000) 'Communities and Media – Towards a Reconstruction of Communities on Media'', in Hawaiian International Conference on Systems Sciences (HICSS).
- Lefebvre, L., Harvey, J. and Lefebvre, E. (1991) 'Technological Experience and Technology Adoption Decisions in Small Manufacturing Firms', *R & D Management*. 21(3), 241-249.
- Levy, M. and Powell, P. (2000) 'Information Systems Strategy for SMEs: an Organisational Perspective', *Journal of Strategic Information Systems*. 9(1), 63-84.
- Levy, M., Powell, P. and Yetton, P. (2001) 'SMEs: Aligning IS and the Strategic Context', *Journal of Information Technology*. 16(1), 133-144.
- Levy, M. and Powell, P. (2003) 'Exploring SME Internet Adoption: Towards a Contingent Model', *EM: Electronic Markets*. 13(2).
- Lipparini, A. and Sobrero, M. (1997) 'Co-ordinating Multi-Firm Innovative Process: Entrepreneur as Catalyst in Small-Firm Networks', in *The Formation of Inter-Organizational Networks*, (Ebers, M. Ed). Oxford University Press, UK.

References

- Lockett, N. and Brown, D.H. (2000) 'eClusters and the Role of Intermediaries in enabling Digital Enterprise Communities of SMEs', in *Proceedings of the Americas Conference on Information Systems, Long Beach, CA*. 746-749.
- Lockett, N. and Brown, D.H. (2001) 'A Framework for the Engagement of SMEs in E-Business', in *Proceedings of the Americas Conference on Information Systems, Boston, MA*. 656-662.
- Margretta, J. (2002) 'Why Business Models Matter' *Harvard Business Review*, May, pp 86-92.
- Marshall, A. (1920; 1968) *Principles of Economics*. Macmillan, London, UK.
- Mason, J. (1996) *Qualitative Researching*. Sage Publications, London, UK.
- Mazzi, P. (2001) 'Small Business eBusiness: Bringing SMEs Online', *The IDC European eCommerce Forum 2001*. International Data Corporation.
- McFarlan, F. (1984) 'Information Technology Changes The Way You Compete', *Harvard Business Review*. 62 (3), 93-108.
- Mehrtens, J., Cragg, P. and Mills, A. (2001) 'A Model of Internet Adoption by SMEs', *Journal of Information & Management*. 39(3), 165-176.
- Michaelis, C., Smith, K. and Richards, S. (2001) *Regular Survey of Small Business Opinions*. Databuild.
- Microsoft (2002) www.bcentral.com/default.asp, accessed 15 October 2002.
- Miles, R. and Snow, C. (1986) 'Organisations: New Concepts for New Forms', *California Management Review*. 28(2), 62-73.
- Mintzeberg, H., Ahlstrand, A. and Lampel, J. (1990) *Strategy Safari: The Complete Guide Through the Wilds of Strategic Management*. Prentice Hall, London, UK.
- NCBI (2002) www.allbusiness.com/index.jsp, accessed 15 October 2002.
- Netscape (2002) netbusiness.netscape.com, accessed 15 October 2002.
- Netstore (2002) www.netstore.net, accessed 15 October 2002.
- Newell, S., Swan, J. and Galliers, R. (2000) 'A Knowledge-focused Perspective on the Diffusion and Adoption of Complex Information Technologies: the BPR example', *Information Systems Journal*. (10), 239-259.
- NOIE (2003) <http://www.noie.gov.au/projects/ebusiness/developing/ITOL/>, accessed 5 June 2003.
- OECD (1998) *The Economic and Social Impacts of Electronic Commerce*. OECD.
- Oftel (2003) *Business use of Internet Oftel small and medium business survey: Q12 February 2003*. Office of Telecommunications, UK.

References

- Oftel (2002) *Business use of Internet Oftel small and medium business survey: Q11 November 2002*. Office of Telecommunications, UK.
- Oftel (2001) *Business use of Internet Oftel small and medium business survey Wave 7 November 2001*. Office of Telecommunications, UK.
- Oliver, C. (1990) 'Determinants of Interorganisational Relationships: Integration and Future Directions', *Academy of Management Review*. 15(2), 241-265.
- Oracle (2002) www.oraclesmallbusiness.com, accessed 15 January 2002.
- Oracle (2003) www.oracle.com/applications/index.html, accessed 01 February 2003.
- Patnayakuni, R. and Seth, N. (2001) 'Incorporating a Social Perspective to the Adoption of Application Service Provider Model', in *Proceedings of the Americas Conference on Information Systems*. Boston, MA. 1848-1850.
- Patton, M. (1987) *How to Use Qualitative Methods of Evaluation*. Sage Publications, Newbury Park, CA.
- Poon, S. and Swatmann, P. (1999) 'An Exploratory Study of Small Business Internet Commerce Issues', *Journal of Information and Management*. 35(1), 9-18.
- Porter, M. (1998) 'Clusters and the New Economics of Competition', *Harvard Business Review*. 96(6), 77-91.
- Powell, W. (1987) 'Hybrid Organizational Arrangements: New Form of Transitional Development?', *California Management Review*. 30(1), 67-87.
- Powell, W. (1990) 'Neither Market nor Hierarchy: Network Forms of Organisation', in *Research in Organisational Behaviour*, (Staw, B. and Cummings, L. Eds). JAI-Press, Greenwich, CT.
- Provan, K. and Milwood, H. (1995) 'A Preliminary Theory of Interorganisational Network Effectiveness', *Administrative Science Quarterly*. 40, 1-33.
- Quayle, M. (2002) 'E-Commerce: the challenge for UK SMEs in the twenty-first century', *Journal of Operations & Production Management*. 22(10), 11-48.
- Rao, S., Metts, G. and Mora-Morge, A. (2003) 'Electronic Commerce Development in SMEs: A Stage Model and its Implications', *Business Process Management Journal*. 9(1), 11-32.
- Ring, P. (1997) 'Processes Facilitating Reliance on Trust in Inter-Organizational Networks', in *The Formation of Inter-Organizational Networks*, (Ebers, M. Ed). Oxford University Press, Oxford, UK.
- Ring, P. and Van de Van, A. (1994) 'Developmental Processes of Cooperative Interorganizational Relationships', *Academy of Management Review*. 19(1), 90-118.

References

- Robertson, M., Swan, J. and Newell, S. (1996) 'The Role of Networks in the Diffusion of Technological Innovation', *Journal of Management Studies*. 33, 333-359.
- Rogers, E. (1962;1983;1995) *Diffusion of Innovations*. 1st 2nd and 4th Ed, Free Press, NY.
- Sadowski, B., Maitland, C. and van Dongen, J. (2002) 'Strategic use of the Internet by small to medium-sized companies: an exploratory study', *Information Economics & Policy*. 14(1), 192-203.
- SAP (2002) www.sap.com/solutions/, accessed 15 October 2002.
- Saxenian, A. (1994) *Regional Advantage*. Harvard University Press, Cambridge, MA.
- SBA (1999) *E-Commerce: Small Businesses Venture Online*. US Small Business Administration, US.
- SBA (2000) *Small Business Expansions in Electronic Commerce*. US Small Business Administration, US.
- SBA (2003) www.sba.gov, accessed 14 March 2003.
- SBS (2002) www.sbs.gov.uk/press/news90.php, accessed 05 October 2002.
- SBS (2003) www.sbs.gov.uk/statistics/smedef.php, accessed 20 February 2003.
- Shaw, E. and Conway, S. (2000) 'Networking and the Small Firm', in *Enterprise and Small Business: Principles, Practice and Policy* (Carter, S. and Jones-Evans, D. Eds). Pearson Education, UK.
- Silverman, D. (2000) *Doing Qualitative Research: A Practical Handbook*. Sage Publications, London, UK.
- Snow, C., Miles, R. and Coleman Jr, H. (1992) 'Managing 21st Century Network Organisations', *Organisational Dynamics*. 21(4), 5-20.
- Southern, A., and Tilley, F. (2000) 'Small Firms and Information & Communication Technologies: (ICTs): Toward a Typology of ICT Usage', *New Technology Work & Employment*. 15(2).
- Stake, R. (1995) *The Art of Case Study Research*. Sage Publications, Thousand Oaks, CA.
- Stanfield, M. and Grant, K. (2003) 'An Investigation into Issues Influencing the Use of the Internet and Electronic Commerce among Small-Medium-sized enterprises', *Journal of Electronic Commerce Research*. 4(1), 15-33.
- Susarla, A., Barua, A. and Whinston, A. (2003) 'Understanding the Service Component of Application Service Provision: An Empirical Analysis of Satisfaction with ASP services', *MIS Quarterly*. 27(1), 91-123.
- Suter, B. (1999) 'The VEGA Cooperation Platform: Providing Real Support for Virtual Enterprise', *Electronic Journal of Organizational Virtualness*. (1:1), 171-189.

References

- Swan, J. and Clark, P. (1992) 'Organisational decision-making in the appropriation of technological innovation: Cognitive and political dimensions', *European Work and Organisational Psychologist*. 2, 103-127.
- Swan, J. and Newell, S. (1995) 'The Role of Professional Associations in Technology Diffusion', *Organization Studies*. 16(5), 847-874.
- Swan, J., Newall, S. and Robertson, M. (1998) 'Inter-Organizational Networks and Diffusion of Information Technology: Developing a Framework', in *Information Systems Innovation and Diffusion: Issues and Directions*, (Larsen, T. and McGuire, E., Eds). Idea Group Publishing, UK.
- Sydow, J. (1992) 'On the Management of Strategic Networks', in *Regional Development and Contemporary Industrial Response*, (Ernst, H. and Meier, V., Eds). Pinter, London, UK.
- Sydow, J. and Windeler, A. (1998) 'Organising and Evaluating Interfirm networks: A Structurationist perspective on Network Processes and Effectiveness', *Organisation Science*. 9(3), 263-284.
- Tapscott, D., Ticoll, D. and Lowe, A. (2000) *Digital Capital: Harnessing the Power of the Business web*. Nicholas Brealey, London, UK.
- Thong, J. and Yap, C. (1995) 'CEO Characteristics, Organisational Characteristics and IT adoption in Small Businesses', *Omega International Journal of Management Science*. 23(4), 429-442.
- Thorelli, H. (1986) 'Networks: Between Markets and Hierarchies', *Strategic Management Journal*. 7, 37-51.
- Timmers, P. (2000) *Electronic Commerce: Strategies and Models for Business to Business Trading*. John Wiley & Sons, Chichester, UK.
- Todd, D. (1979) 'Mixing qualitative and quantitative methods: triangulation in action', *Administrative Science Quarterly*. 24, 602-11.
- Trushman, M. and Scanlan, T. (1981) 'Boundary Spanning Individuals: their Role in Information Transfer and their Antecedents', *Academy of Management Journal*. 24, 289-305.
- Turban, E., Lee, J., King, D. and Chung, H. Michael. (2000) *Electronic Commerce: A Managerial Perspective*. Prentice Hall, Upper Saddle River, NJ.
- UKoforB (2002) <http://www.ukonlineforbusiness.gov.uk/>, accessed 10th October 2002.
- VerticalNet (1999) <http://www.verticalnet.com/>, accessed 21 July 1999.
- Vertmarkets (2002) www.vertmarkets.com, accessed 20 November 2002.

References

- Vickers, G. (1965) *The Art of Judgement*. Chapman & Hall, London, UK.
- Volkoff, O., Chan, Y. and Newson, E. (1999) 'Leading the development and implementation of collaborative interorganisational systems', *Information & Management*. 35, 63-75.
- Walczuch, R., Van Braven, G. and Lundgren, H. (2000) 'Internet Adoption Barriers for Small Firms in the Netherlands', *European Management Journal*. 18(5), 565-571.
- Ward, J. and Peppard, J. (2002) *Strategic Planning for Information Systems*, 3rd Ed. Wiley and Sons, Chichester, UK.
- webopedia (2003) www.webopedia.com, accessed 06 February 2003.
- WED (2002) *New Frontier: The State of E-Business in Western Canada*. Western Economic Diversification, Canada.
- Weill, P. and Vitale, M. (2001) *Place to Space: Migrating to eBusiness Models*, Harvard Business School Press.
- Whatis (2003) www.whatis.com, accessed 06 February 2003.
- Whitley, R. and Kristensen, P. (1995) *The Changing European Firm*. Routledge, London. UK.
- Willcocks, L. and Lacity, M. (1998) *Strategic Sourcing of Information Systems: Perspective and Practices*. John Wiley and Sons, London, UK.
- Willcocks, L., Sauer, C. and Associates, (2000) *Moving to E-Business*. Random House. London, UK.
- Yahoo (2002) <http://smallbusiness.yahoo.com/>, accessed 15 October 2002.
- Yao, Y. (2003) 'An Integrative Model of Clients' Decision to Adopt an Application Service Provider', in *Proceedings of the Americas Conference on Information Systems, Tampa, FL*. 3438-3444.
- Yin, R. (1994) *Case Study Research: Design and Methods*. Sage Publications, Beverley Hills, CA.
- Zajac, E. and Olsen, C. (1993) 'From Transaction Cost to Transaction Value Analysis: Implications for the Study of Interorganizational Strategies', *Journal of Management Studies*. 30, 131-45.

Internet Business Communities

Overview

An Internet Business Community is a well-defined set of businesses that interact over the Internet to improve their business effectiveness and efficiency. Interactions include both people and processes. An Internet Business Community Service provider supports the business interaction to provide technology, business, and trust management. The community concept, with the service provider at its core, moves the computing paradigm for businesses from "do it yourself" to "do it for me".

The Internet Business Community campaign is a programme to lead Hewlett Packard into a major new business. The opportunity is to provide E-Business services to organisations that wish to outsource their business processes then move on to interact more business purpose.

Vision

There is a revolution going on in the world of business in which companies (mostly new ones) are redefining the structure of whole industries by changing the model of interaction in delivering their value. The obvious example is that of Dell, which in a stroke redefined the value chain for the PC industry.

This revolution is all about managing interactions, improving the efficiency of interactions so that new models of business are possible. A report from McKinsey¹ shows that as much as 51% of labour activity in the US is on interactions representing over a third of GDP. The potential of the revolution is far reaching.

Why join a community?

At present to interact with other businesses over the Internet you must establish a specific secure connection with each business. By using a community service provider each community member has a **single connection** to the service provider which then mediates the business communication.

The mediation allows the service provider to maintain important **trust** relationships that enable business processes to inter-work. By outsourcing much of the business process to the service provider the business benefits from **best practice** development. The service

provider manages the **technology risks** associated with providing and operating the business services.

The consequences of a well-supported business-to-business interaction service for an individual business can be powerful. The business will find its existing interactions are more efficient and easier to execute; resulting in **improved cash flow**. Alliances with new business partners in the community are much easier; resulting in **more business**. The Internet Business Community is an environment in which businesses grow.

Who should join a community?

Looking across the range of businesses from Fortune 1000, through medium businesses with their own internal IT capability, to small and medium businesses (SME) which need IT support; it seems that the group best able to benefit from the initial adoption of a community is the SME.

An SME needs to outsource most of its IT, it needs to focus on its added value and build alliances with providers of complimentary value. Typically an SME that needs to collaborate, and compete, in a community is already in an industry cluster of businesses working together. By improving their collaborative capabilities and their ability to execute new business, an SME can level the playing field with its larger competitors. The community becomes the next generation enterprise!

What happens next?

Initial interactions in a community will be quite mundane: trading or supply chain management. This will grow to include more speculative associations: say around an alliance bidding for a contract. Businesses will begin to move more processes out to the community so they can focus their effort on what they do best.

Networks of communities supporting different, and sometimes specialist business interactions, will develop. For instance a community to provide customer support (call-centres, logistics, suppliers, etc).

Further Information

Contact: Alan Hydes, +44 117 312 8821
Alan_Hydes@hp.com

¹ Butler, P. et al. (1997) - A revolution in Interaction. McKinsey Quarterly Report, Number

Template for semi-structured interviews: Provider Perspective

- 1) What is your understanding of the current position for SMEs with reference to e-business engagement?
 - a) Is the application complexity scale relevant to your situation?
 - b) How does the current secondary data relate to your situation?
 - c) Are there any special factors to consider?
 - d) What is your personal experience of adopters/non-adopters? (Strategic logic; other rationales).

- 2) What evidence is there of aggregations of SMEs and what is their nature and role both currently and as a result of e-business developments?
 - a) What evidence is there of aggregations of SMEs, including governance bodies in your sector?
 - b) Is the taxonomy of aggregations relevant to your sector?
 - c) What is their nature and role?
 - i) Currently?
 - ii) As a result of e-business developments?
 - d) Is the taxonomy relevant to identifying reasons for or results of e-business engagement?

- 3) What are the potential roles and mechanisms for intermediaries in facilitating SME e-business engagement?
 - a) Relevance of Trust Platform model to your situation?
 - b) Identification and detail of own role (Enterprise; Community)?
 - c) What are own and other actors roles and mechanisms for facilitating SME e-business engagement?
 - d) Any additional actors or role?

- 4) What are the possible business models from a provider perspective?
 - a) Mission: high-level understanding of overall vision, strategic goals and value proposition (product).
 - b) Structure: actors & roles that constitute the business community, governance and focus on industry, customer & product. (marketing strategy & potential benefits for actors).
 - c) Processes: more detailed view (product service and information flows)
 - d) Revenues: sources of revenue (gross & net) and investment.
 - e) Legal Issues: Influences all aspects of business model.
 - f) Technology: Both enabler & constraint – influences all aspects of business model.

A. About you & your company

Thank you for agreeing to take part in the research – your responses are confidential. All the data collected will be generalised and not be traceable to any individual or company. Nigel Lockett.

Information Technology (IT) is defined as the processing of data using computer software and hardware. **E-Commerce** is the selling or buying of goods or services using Internet-based technologies. **E-Business** is defined as the use of Internet-based technologies to integrate processes, enable transactions and support collaboration in business markets. E-Business incorporates e-commerce. **Information Communication Technology (ICT)** includes IT, e-commerce & e-business.

1. What is your **position** in the company?

2. How many **employees** does your company have?

3. How **long** has your company been established?

4. What is your annual **turnover**?

5. What is your **main** business activity?

6. Do you consider yourself to be part of a **business network**?

7. How would you describe your **attitude** to e-business?

Positive	Mainly Positive	Neither	Mainly Negative	Negative
1	2	3	4	5

8. How would you describe your **knowledge & experience** of e-business?

Good	Fairly Good	Neither	Fairly Poor	Poor
1	2	3	4	5

9. E-Business allows you to do **same** activities **more efficiently**.

Agree	Tend to Agree	Neither	Tend to Disagree	Disagree
1	2	3	4	5

10. E-Business allows you to develop **new ways** of doing business.

Agree	Tend to Agree	Neither	Tend to Disagree	Disagree
1	2	3	4	5

11. Do you **employ** any specialist ICT personnel?

12. Do you use any **external** specialist ICT personnel?

13. Do you take **advice** from ICT companies when making decisions?

14. Do you take **independent** ICT advice when making decisions?

15. What do you see as the direct & indirect **short-term benefits** from e-business?

16. What do you see as the direct & indirect **long-term benefits** from e-business?

17. Do have a **written** business strategy and/or objectives and how do you monitor performance against these?

18. If **not** do you have an **informal** business strategy and/or objectives and how do you monitor performance against these?

19. Which **category** best describes your current use of ICT?
Support - for operational efficiency, well established ICT, concerned with present operations.
Turnaround - new ICT or industry changes impacting on business, managers are flexible and receptive to additional opportunities.
Factory - have implemented ICT with a strategic impact, but there are no new developments planned.
Strategic - senior managers set strategy, planning is pro-active, risks can be high.

B. Your current & future engagement in e-business

Classification		Examples	Complexity
Communication	1	E-Mail, Web access	Very Low
Marketing	2	Web site	Low
Productivity	3	Online office suite, Remote data backup, Intranet (web access to desktops)	Low
E-Commerce	4	Buying on-line	Medium
E-Commerce	5	Selling on-line	Medium
E-Commerce	6	Selling on-line (including payment)	Medium
Collaboration	7	Extranet (allowing external access to intranet)	Medium
Enterprise	8	Financials, Accounting, Sales force automation, Vertical applications	High
Marketplace	9	E-Marketplaces	High
Collaborative Enterprise	10	Supply chain management, customer relationship management	Very High
Collaborative Platform	11	Emerging e-business platforms	Very High

20. What **percentage** of your employees use **PCs** on normal working days?

21. Briefly describe your company's use of ICT

Hardware:

Network:

Software:

22. How is your Internet **connection** provided? (Modem, ISDN, DSL, lease line)

23. What **e-business** applications do you use? (with reference to the above guide)

Do you **currently** use?

1 2 3 4 5 6 7 8 9 10 11

Do you **plan** (next 12 months) to use?

1 2 3 4 5 6 7 8 9 10 11

24. What has **helped or encouraged** you to use e-business applications (enablers)?

(1. important, 2. fairly important, 3. neither, 4. fairly unimportant, 5. unimportant)

- | | | | | | |
|--|---|---|---|---|---|
| a) Improving company image (sales & marketing) | 1 | 2 | 3 | 4 | 5 |
| b) Opportunity for increased sales (sales & marketing) | 1 | 2 | 3 | 4 | 5 |
| c) Reducing operating costs (operational) | 1 | 2 | 3 | 4 | 5 |
| d) Reducing costs of selling (operational) | 1 | 2 | 3 | 4 | 5 |
| e) Reducing costs of purchasing (operational) | 1 | 2 | 3 | 4 | 5 |
| f) Improving service to customers (operational) | 1 | 2 | 3 | 4 | 5 |
| g) Improving access to & service from suppliers (operational) | 1 | 2 | 3 | 4 | 5 |
| h) Improving collaboration with partners (innovation) | 1 | 2 | 3 | 4 | 5 |
| i) Provides new ways of doing business (innovation) | 1 | 2 | 3 | 4 | 5 |
| j) Customer demands (external) | 1 | 2 | 3 | 4 | 5 |
| k) Supplier demands (external) | 1 | 2 | 3 | 4 | 5 |
| l) Danger of losing business to competitor using e-business (external) | 1 | 2 | 3 | 4 | 5 |
| m) Recommendation by trusted third party (external) | 1 | 2 | 3 | 4 | 5 |
| n) Others – please state | | | | | |

25. What is **discouraging** you from further use of e-business applications (barriers)?

(1. agree, 2. slightly agree, 3. neither, 4. slightly disagree, 5. disagree)

- | | | | | | |
|---|---|---|---|---|---|
| a) Concerned about confidentiality (security) | 1 | 2 | 3 | 4 | 5 |
| b) Concerned about security (security) | 1 | 2 | 3 | 4 | 5 |
| c) Concerned about risk of fraud (security) | 1 | 2 | 3 | 4 | 5 |
| d) Technology costs too high (cost & benefits) | 1 | 2 | 3 | 4 | 5 |
| e) Communication costs too high (cost & benefits) | 1 | 2 | 3 | 4 | 5 |
| f) No benefits to company (cost & benefits) | 1 | 2 | 3 | 4 | 5 |
| g) Cost of renting e-business applications too high (cost & benefits) | 1 | 2 | 3 | 4 | 5 |
| h) Lack of capital (cost & benefits) | 1 | 2 | 3 | 4 | 5 |
| i) Concerned about quality of communications (infrastructure & services) | 1 | 2 | 3 | 4 | 5 |
| j) No suitable e-business applications available (infrastructure & services) | 1 | 2 | 3 | 4 | 5 |
| k) Lack of customer/supplier/partner connectivity (infrastructure & services) | 1 | 2 | 3 | 4 | 5 |
| l) Shortage of ICT skilled (internal) staff (infrastructure & services) | 1 | 2 | 3 | 4 | 5 |
| m) Lack of internal support (management) (information & education) | 1 | 2 | 3 | 4 | 5 |
| n) Lack of knowledge of e-business (information & education) | 1 | 2 | 3 | 4 | 5 |
| o) Lack of information, support or training (information & education) | 1 | 2 | 3 | 4 | 5 |
| p) Others – please state | | | | | |

The questions below refer specifically to the BIW **Information Channel** provided by **BIW Technologies**.

26. Does the e-business application **replace** an **existing** application used by your company?

27. Why did you **choose** this e-business application?

28. How **important** is this e-business application to your business and **why**?

Important	Fairly Important	Neither	Fairly Unimportant	Unimportant
1	2	3	4	5

29. What is the **cost** to your organisation in using the application and what **benefits** do you get?

30. Do you have a **contract** and or service level agreement (SLA) with the provider?

31. Have you had cause to **refer to** the contract or SLA during the use of the application?

32. Are you **satisfied** with the contract or SLA?

33. How do you **interact** with your service provider and how **often**?

34. How would you describe the **commitment** of your service provider?

35. Do you **trust** your service provider?

36. How important are the following **drivers** in deciding to use this e-business application?
 (1. important; 2. fairly important; 3. neither; 4. fairly unimportant; 5. unimportant)

a) Increasing complexity of ICT	1	2	3	4	5
b) Reduced working life of applications	1	2	3	4	5
c) Managing upgrades to applications	1	2	3	4	5
d) Increasing difficulty in managing ICT	1	2	3	4	5
e) Increasing availability of e-business applications	1	2	3	4	5
f) Difficulty in recruiting ICT staff	1	2	3	4	5
g) Need to reduce costs	1	2	3	4	5
h) Globalisation of services and markets	1	2	3	4	5

37. Do you agree with the following **statements** regarding using this e-business application?
 (1. agree; 2. slightly agree; 3. neither; 4. slightly disagree; 5. disagree)

a) Reduces costs	1	2	3	4	5
b) Reduces risk	1	2	3	4	5
c) Speeds up deployment of application	1	2	3	4	5
d) Improves quality of service to customers & suppliers	1	2	3	4	5
e) Gives access to leading applications	1	2	3	4	5
f) Reduces flexibility	1	2	3	4	5
g) Allows for internal comparisons	1	2	3	4	5
h) Easier to identify value of applications	1	2	3	4	5
i) Enhances status of company or manager	1	2	3	4	5

A trusted third party (TTP) is any organisation or individual who you believe appreciates your perspective and understands your business needs.

38. **Who** would you consider to be trusted third parties within your industry and **why**?

a. Government Department; b. Customer; c. Supplier; d. Trade Association; e. Local Council;
f. Business Link; g. Knowledgeable Individual; h. Other

39. **Which TTPs advice** would you consider when making considering ICT and **why**?

40. What **role** did they play in your decision to use the **e-business** application?

41. What is their **ongoing** role (governance, business rules)?

42. Can you suggest any **improvements** in their role?

43. **Other comments** about the use of e-business applications?

Thank you – a small number of suitable participants will be selected for personal interviews. Are you happy to be contacted? Nigel Lockett

Definitions

IT (Information Technology) the processing of data using computer software and hardware.

E-Commerce the selling or buying of goods or services using Internet-based technologies.

E-Business uses Internet-based technologies to integrate processes, enable transactions & collaborate, it includes e-commerce.

ICT (Information & Communication Technologies) includes IT, e-commerce & e-business.

1. What is your **job title**?

2. What is your main **business activity**?

3. What is your annual **turnover**?

4. How many **employees** does the business have?

5. Do you consider yourself to be part of a **business network**?

Yes

No

6. How would you describe your **attitude** to e-business?

Positive

Mainly Positive

Neither

Mainly Negative

Negative

7. How would you describe your **knowledge & experience** of e-business?

Good

Fairly Good

Neither

Fairly Poor

Poor

8. E-Business allows you to do **same** activities **more efficiently**.

Agree

Tend to Agree

Neither

Tend to Disagree

Disagree

9. E-Business allows you to develop **new ways** of doing business.

Agree

Tend to Agree

Neither

Tend to Disagree

Disagree

10. Which one **category** best describes your current use of ICT?

Support → For operational efficiency, well established ICT, concerned with present operations.

Turnaround → New ICT or industry changes impacting on business. Are flexible & receptive to new opportunities.

Factory → Have implemented ICT with a strategic impact, but there are no new developments planned.

Strategic → Set strategy, planning is proactive, risks can be high

11. What **e-business** applications do you use? (with reference to the guide below)

Do you **currently** use? 1 2 3 4 5 6 7 8 9 10 11

Do you **plan** (next 12 months) to use? 1 2 3 4 5 6 7 8 9 10 11

	Classification	Examples	Complexity
1	Communication	E-Mail, Web access	Very Low
2	Marketing	Web site	Low
3	Productivity	Online office suite, Remote data backup, Intranet (web access to desktops)	Low
4	E-Commerce	Buying on-line	Medium
5	E-Commerce	Selling on-line	Medium
6	E-Commerce	Selling on-line (including payment)	Medium
7	Collaboration	Extranet (allowing external access to intranet)	Medium
8	Enterprise	Financials, Accounting, Sales force automation, Vertical applications	High
9	Marketplace	E-Marketplaces	High
10	Collaborative Enterprise	Supply chain management, customer relationship management	Very High
11	Collaborative Platform	Emerging e-business platforms*	Very High

12. Percentage of employees using a **PC** on working days?

Less than 20%

20%-40%

40%-60%

60%-80%

80%-100%

13. What has **helped or encouraged** you to use e-business applications (enablers)?

	Important	Fairly important	Neither	Fairly unimportant	Unimportant
Improving image	1	2	3	4	5
Opportunity for increased sales	1	2	3	4	5
Reducing operating costs	1	2	3	4	5
Improving service to customers	1	2	3	4	5
Improving collaboration with partners	1	2	3	4	5
Provides new ways of doing business	1	2	3	4	5
Customer demands	1	2	3	4	5
Supplier demands	1	2	3	4	5

Others – please state

14. What is **discouraging** you from further use of e-business applications (barriers)?

	Agree	Slightly agree	Neither	Slightly disagree	Disagree
Concerned about confidentiality	1	2	3	4	5
Concerned of security	1	2	3	4	5
ICT costs too high	1	2	3	4	5
No benefits to company	1	2	3	4	5
Lack of customer/supplier/partner connectivity	1	2	3	4	5
No suitable e-business applications available	1	2	3	4	5
Shortage of ICT skilled staff	1	2	3	4	5
Lack of knowledge of e-business	1	2	3	4	5
Lack of information , support or training	1	2	3	4	5
Others – please state					

15. Do you **use** of any e-business applications **specific** to your industry, such as profession-based (member only) collaboration & communication services? (e.g. www.tax.org.uk) - if so which?

Yes	No
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16. If **NO** to question 15 were you **aware** of such e-business applications? - if so which?

Yes	No
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17. If **YES** to question 16 why do you **not use** such an e-business application?

Trusted 3rd party is an organisation or individual who you believe appreciates your perspective & understands your business needs.

18. **Who** would you consider to be trusted 3rd parties within your industry and **why**?

Government Department; Customer; Supplier; Trade Association; Local Council; Business Link; Knowledgeable Individual; Other?

19. **Which** trusted 3rd parties **advice** would you value when making considering e-business decisions and **why**?

Government Department; Customer; Supplier; Trade Association; Local Council; Business Link; Knowledgeable Individual; Other?

Thank you for your co-operation.

All the data collected will be generalised and not be traceable to any individual.

Please return in the stamped address envelope provided.

Nigel Lockett BSc MSc

Table 1. Users in specific aggregations

	Construction	Knowledge	Organic	Dairy	Total
Number of respondents	10	20	5	8	43
How many employees does your company have?	100	1	4	3	108
What is your annual turnover (m)?	30.6	0.8	0.9	0.3	32.5
Do you consider yourself to be part of a business network?	5 4	12 6	3 2	5 1	25 13
	Yes No	67% 33%	60% 40%	83% 17%	66% 34%
How would you describe your attitude to e-business?	5 5 0 0 0	6 12 2 0 0	0 5 0 0 0	1 5 2 0 0	12 27 4 0 0
	Positive Mainly positive Neither Mainly negative Negative	30% 60% 10% 0% 0%	0% 100% 0% 0% 0%	13% 63% 25% 0% 0%	28% 63% 9% 0% 0%
How would you describe your knowledge & experience of e-business?	2 5 1 1 1	3 11 2 1 1	1 1 3 0 0	1 2 3 2 0	7 19 9 4 2
	Good Fairly good Neither Fairly poor Poor	17% 61% 11% 6% 6%	20% 20% 60% 0% 0%	13% 25% 38% 25% 0%	17% 46% 22% 10% 5%
E-Business allows you to do same activities more efficiently?	4 4 2 0 0	6 10 1 1 0	1 4 0 0 0	1 6 1 0 0	12 24 4 1 0
	Agree Tend to agree Neither Tend to disagree Disagree	33% 56% 6% 6% 0%	20% 80% 0% 0% 0%	13% 75% 13% 0% 0%	29% 59% 10% 2% 0%
E-Business allows you to develop new ways of doing business?	2 8 0 0 0	6 9 2 4 0	1 3 1 0 0	3 5 0 0 0	12 25 3 4 0
	Agree Tend to agree Neither Tend to disagree Disagree	29% 43% 10% 19% 0%	20% 60% 20% 0% 0%	38% 63% 0% 0% 0%	27% 57% 7% 9% 0%
Do you employ any specialist ICT personnel?	6 4	0 0	0 5	0 8	6 17
	Yes No	0% 0%	0% 100%	0% 100%	26% 74%
Do you use any external specialist ICT personnel?	8 1	0 0	1 3	2 6	11 10
	Yes No	0% 0%	25% 75%	25% 75%	52% 48%
Do you take advice from ICT companies when making decisions?	7 3	0 0	0 4	2 6	9 13
	Yes No	0% 0%	0% 100%	25% 75%	41% 59%
Do you take independent ICT advice when making decisions?	7 2	0 0	0 4	4 4	11 10
	Yes No	0% 0%	0% 100%	50% 50%	52% 48%

Do you have a written business strategy and/or objectives?	Yes	5	56%	0	0%	1	25%	3	38%	9	43%
	No	4	44%	0	0%	3	75%	5	63%	12	57%
If not do you have an informal business strategy and/or objectives?	Yes	2	50%	0	0%	3	100%	4	80%	9	75%
	No	2	50%	0	0%	0	0%	1	20%	3	25%
Which category best describes your current use of ICT?	Support	6	55%	10	50%	4	100%	6	86%	26	62%
	Turnaround	2	18%	9	45%	0	0%	0	0%	11	26%
	Factory	1	9%	1	5%	0	0%	1	14%	3	7%
	Strategic	2	18%	0	0%	0	0%	0	0%	2	5%
What percentage of your employees use PCs on normal working days?			90%		100%		38%		66%		74%
How is your Internet connection provided?	Modem	2	18%	1	5%	4	100%	8	100%	15	36%
	ISDN	5	45%	5	26%	0	0%	0	0%	10	24%
	DSL	1	9%	5	26%	0	0%	0	0%	6	14%
	Lease line	2	18%	5	26%	0	0%	0	0%	7	17%
	Other	1	9%	3	16%	0	0%	0	0%	4	10%
What e-business applications do you use? - Currently	Communication	10	100%	20	100%	5	100%	8	100%	43	100%
	Marketing	10	100%	14	78%	3	60%	0	0%	27	63%
	Productivity	5	50%	8	44%	1	20%	2	25%	16	37%
	E-Commerce Buy	5	50%	13	72%	1	20%	5	63%	24	56%
	E-Commerce Sell	1	10%	6	33%	1	20%	0	0%	8	19%
	E-Commerce Pay	0	0%	2	11%	0	0%	0	0%	2	5%
	Collaboration	4	40%	5	28%	0	0%	1	13%	10	23%
	Enterprise	10	100%	20	100%	5	100%	8	100%	43	100%
	Marketplace	2	20%	4	22%	1	20%	0	0%	7	16%
	Collaborative Enterprise	2	20%	4	22%	0	0%	0	0%	6	14%
	Collaborative Platform	0	0%	2	11%	0	0%	0	0%	2	5%
What e-business applications do you use? - Next 12 months	Communication	10	100%	20	100%	5	100%	8	100%	43	100%
	Marketing	10	100%	15	83%	3	60%	3	38%	31	72%
	Productivity	6	60%	10	56%	1	20%	3	38%	20	47%
	E-Commerce Buy	6	60%	14	78%	1	20%	5	63%	26	60%
	E-Commerce Sell	2	20%	9	50%	1	20%	2	25%	14	33%
	E-Commerce Pay	1	10%	5	28%	0	0%	1	13%	7	16%
	Collaboration	4	40%	6	33%	0	0%	1	13%	11	26%
	Enterprise	10	100%	20	100%	5	100%	8	100%	43	100%
	Marketplace	2	20%	6	33%	1	20%	0	0%	9	21%
	Collaborative Enterprise	3	30%	5	28%	0	0%	1	13%	9	21%
	Collaborative Platform	2	20%	5	28%	0	0%	0	0%	7	16%

What has helped or encouraged you to use e-business applications (enablers)? Improving company image (sales & marketing)	Important	6	67%	7	39%	1	25%	1	17%	15	41%
	Fairly important	2	22%	5	28%	2	50%	0	0%	9	24%
	Neither	1	11%	6	33%	1	25%	3	50%	11	30%
	Unimportant	0	0%	0	0%	0	0%	0	0%	0	0%
Opportunity for increased sales (sales & marketing)	Fairly unimportant	0	0%	0	0%	0	0%	2	33%	2	5%
	Important	2	22%	8	44%	1	25%	2	29%	13	34%
	Fairly important	4	44%	7	39%	2	50%	1	14%	14	37%
	Neither	2	22%	2	11%	1	25%	1	14%	6	16%
Reducing operating costs (operational)	Unimportant	0	0%	0	0%	0	0%	2	29%	2	5%
	Fairly unimportant	1	11%	1	6%	0	0%	1	14%	3	8%
	Important	4	44%	6	33%	2	50%	3	38%	15	38%
	Fairly important	2	22%	5	28%	0	0%	3	38%	10	26%
Reducing costs of selling (operational)	Neither	3	33%	2	11%	0	0%	2	25%	7	18%
	Unimportant	0	0%	3	17%	2	50%	0	0%	5	13%
	Fairly unimportant	0	0%	2	11%	0	0%	0	0%	2	5%
	Important	2	22%	5	28%	1	25%	2	29%	10	26%
Reducing costs of purchasing (operational)	Fairly important	0	0%	5	28%	0	0%	2	29%	7	18%
	Neither	5	56%	4	22%	2	50%	1	14%	12	32%
	Unimportant	0	0%	1	6%	1	25%	0	0%	2	5%
	Fairly unimportant	2	22%	3	17%	0	0%	2	29%	7	18%
Improving customer services (operational)	Important	2	22%	3	17%	0	0%	0	0%	6	16%
	Fairly important	2	22%	6	33%	0	0%	3	50%	11	30%
	Neither	4	44%	7	39%	3	75%	1	17%	15	41%
	Unimportant	0	0%	1	6%	1	25%	1	17%	3	8%
Improving access to & service from suppliers (operational)	Fairly unimportant	1	11%	1	6%	0	0%	0	0%	2	5%
	Important	5	56%	9	50%	1	25%	1	14%	16	42%
	Fairly important	3	33%	5	28%	2	50%	1	14%	11	29%
	Neither	1	11%	3	17%	1	25%	3	43%	8	21%
Improving access to & service from suppliers (operational)	Unimportant	0	0%	0	0%	0	0%	0	0%	0	0%
	Fairly unimportant	0	0%	1	6%	0	0%	2	29%	3	8%
	Important	1	11%	6	33%	0	0%	1	17%	8	22%
	Fairly important	5	56%	4	22%	2	50%	2	33%	13	35%
Improving access to & service from suppliers (operational)	Neither	3	33%	7	39%	1	25%	3	50%	14	38%
	Unimportant	0	0%	1	6%	1	25%	0	0%	2	5%
	Fairly unimportant	0	0%	0	0%	0	0%	0	0%	0	0%
	Important	0	0%	0	0%	0	0%	0	0%	0	0%

Improving collaboration with partners (innovation)	Important	3	33%	8	44%	2	50%	4	57%	17	45%
	Fairly important	3	33%	6	33%	1	25%	0	0%	10	26%
	Neither	3	33%	3	17%	1	25%	2	29%	9	24%
	Unimportant	0	0%	0	0%	0	0%	0	0%	0	0%
Provides new ways of doing business (innovation)	Fairly unimportant	0	0%	1	6%	0	0%	1	14%	2	5%
	Important	2	22%	8	44%	1	25%	4	57%	15	39%
	Fairly important	4	44%	6	33%	3	75%	0	0%	13	34%
	Neither	2	22%	2	11%	0	0%	3	43%	7	18%
Customer demands (external)	Unimportant	1	11%	1	6%	0	0%	0	0%	2	5%
	Fairly unimportant	0	0%	1	6%	0	0%	0	0%	1	3%
	Important	3	33%	5	28%	0	0%	1	14%	9	24%
	Fairly important	3	33%	2	11%	0	0%	1	14%	6	16%
Supplier demands (external)	Neither	3	33%	8	44%	2	50%	4	57%	17	45%
	Unimportant	0	0%	1	6%	1	25%	0	0%	2	5%
	Fairly unimportant	0	0%	2	11%	1	25%	1	14%	4	11%
	Important	0	0%	0	0%	0	0%	0	0%	0	0%
Danger of losing business to competitor using e-business (external)	Fairly important	1	11%	0	0%	0	0%	1	17%	2	11%
	Neither	8	89%	0	0%	2	50%	2	33%	12	63%
	Unimportant	0	0%	0	0%	1	25%	2	33%	3	16%
	Fairly unimportant	0	0%	0	0%	1	25%	1	17%	2	11%
Recommendation by trusted third party (external)	Important	2	22%	1	5%	0	0%	1	17%	4	10%
	Fairly important	4	44%	2	10%	0	0%	1	17%	7	18%
	Neither	3	33%	14	70%	0	0%	2	33%	19	49%
	Unimportant	0	0%	2	10%	2	50%	1	17%	5	13%
i) Sales & Marketing	Fairly unimportant	0	0%	1	5%	2	50%	1	17%	4	10%
	Important	0	0%	2	11%	2	50%	0	0%	4	11%
	Fairly important	0	0%	1	6%	0	0%	2	33%	3	8%
	Neither	6	67%	12	67%	1	25%	3	50%	22	59%
i) Sales & Marketing	Unimportant	1	11%	1	6%	1	25%	0	0%	3	8%
	Fairly unimportant	2	22%	2	11%	0	0%	1	17%	5	14%
	Important	8	44%	15	43%	2	25%	3	23%	28	38%
	Fairly important	6	33%	11	31%	4	50%	1	8%	22	30%
i) Sales & Marketing	Neither	3	17%	8	23%	2	25%	4	31%	17	23%
	Unimportant	0	0%	0	0%	0	0%	2	15%	2	3%
	Fairly unimportant	1	6%	1	3%	0	0%	3	23%	5	7%
	Important	8	44%	15	43%	2	25%	3	23%	28	38%

ii) Operational	Important	14	31%	29	33%	4	20%	8	24%	55	29%
	Fairly important	12	27%	23	26%	4	20%	11	32%	50	27%
	Neither	16	36%	23	26%	7	35%	10	29%	56	30%
	Unimportant	0	0%	6	7%	5	25%	1	3%	12	6%
iii) Innovation	Fairly unimportant	3	7%	7	8%	0	0%	4	12%	14	7%
	Important	5	28%	16	44%	3	38%	8	57%	32	42%
	Fairly important	7	39%	12	33%	4	50%	0	0%	23	30%
	Neither	5	28%	5	14%	1	13%	5	36%	16	21%
iv) External	Unimportant	1	6%	1	3%	0	0%	0	0%	2	3%
	Fairly unimportant	0	0%	2	6%	0	0%	1	7%	3	4%
	Important	5	14%	8	14%	2	13%	2	8%	17	13%
	Fairly important	8	22%	5	9%	0	0%	5	20%	18	14%
What is discouraging you from further use of e-business applications (barriers)? Concerned about confidentiality (security)	Neither	20	56%	34	61%	5	31%	11	44%	70	53%
	Unimportant	1	3%	4	7%	5	31%	3	12%	13	10%
	Fairly unimportant	2	6%	5	9%	4	25%	4	16%	15	11%
	Agree	4	44%	0	0%	1	25%	1	14%	6	16%
Concerned about security (security)	Slightly agree	1	11%	6	33%	1	25%	4	57%	12	32%
	Neither	4	44%	9	50%	1	25%	2	29%	16	42%
	Slightly disagree	0	0%	1	6%	0	0%	0	0%	1	3%
	Disagree	0	0%	2	11%	1	25%	0	0%	3	8%
Concerned about risk of fraud (security)	Agree	4	44%	3	17%	1	25%	1	14%	9	24%
	Slightly agree	1	11%	3	17%	1	25%	5	71%	10	26%
	Neither	4	44%	6	33%	1	25%	1	14%	12	32%
	Slightly disagree	0	0%	3	17%	0	0%	0	0%	3	8%
Concerned about risk of fraud (security)	Disagree	0	0%	3	17%	1	25%	0	0%	4	11%
	Agree	0	0%	2	11%	1	25%	2	29%	5	13%
	Slightly agree	3	33%	3	17%	1	25%	3	43%	10	26%
	Neither	6	67%	5	28%	1	25%	2	29%	14	37%
Technology costs too high (cost & benefits)	Slightly disagree	0	0%	6	33%	0	0%	0	0%	6	16%
	Disagree	0	0%	2	11%	1	25%	0	0%	3	8%
	Agree	2	22%	2	11%	0	0%	0	0%	4	11%
	Slightly agree	2	22%	7	39%	1	25%	2	29%	12	32%
Technology costs too high (cost & benefits)	Neither	4	44%	7	39%	2	50%	3	43%	16	42%
	Slightly disagree	0	0%	0	0%	0	0%	2	29%	2	5%
	Disagree	1	11%	2	11%	1	25%	0	0%	4	11%
	Slightly disagree	1	11%	2	11%	1	25%	0	0%	4	11%

Communication costs too high (cost & benefits)		Agree	0	0%	3	15%	0	0%	0	0%	0	0%	3	8%
		Slightly agree	3	33%	5	25%	3	75%	2	29%	2	29%	13	33%
		Neither	5	56%	7	35%	0	0%	4	57%	4	57%	16	40%
		Slightly disagree	1	11%	3	15%	0	0%	1	14%	1	14%	5	13%
		Disagree	0	0%	2	10%	1	25%	0	0%	0	0%	3	8%
No benefits to company (cost & benefits)		Agree	0	0%	1	5%	0	0%	2	29%	2	29%	3	7%
		Slightly agree	2	22%	2	9%	1	25%	0	0%	0	0%	5	12%
		Neither	4	44%	8	36%	1	25%	2	29%	2	29%	15	36%
		Slightly disagree	1	11%	0	0%	1	25%	1	14%	1	14%	3	7%
		Disagree	2	22%	11	50%	1	25%	2	29%	2	29%	16	38%
Cost of renting e-business applications to high (cost & benefits)		Agree	0	0%	1	6%	0	0%	1	14%	1	14%	2	5%
		Slightly agree	3	33%	1	6%	2	50%	1	14%	1	14%	7	18%
		Neither	6	67%	12	67%	2	50%	3	43%	3	43%	23	61%
		Slightly disagree	0	0%	1	6%	0	0%	1	14%	1	14%	2	5%
		Disagree	0	0%	3	17%	0	0%	1	14%	1	14%	4	11%
Lack of capital (cost & benefits)		Agree	0	0%	3	17%	0	0%	0	0%	0	0%	3	8%
		Slightly agree	0	0%	3	17%	2	50%	0	0%	0	0%	5	13%
		Neither	8	89%	7	39%	0	0%	4	57%	4	57%	19	50%
		Slightly disagree	1	11%	2	11%	1	25%	2	29%	2	29%	6	16%
		Disagree	0	0%	3	17%	1	25%	1	14%	1	14%	5	13%
Concerned about quality of communications (infrastructure & services)		Agree	2	22%	0	0%	0	0%	1	14%	1	14%	3	8%
		Slightly agree	2	22%	3	17%	1	25%	4	57%	4	57%	10	26%
		Neither	4	44%	11	61%	1	25%	0	0%	0	0%	16	42%
		Slightly disagree	1	11%	1	6%	1	25%	1	14%	1	14%	4	11%
		Disagree	0	0%	3	17%	1	25%	1	14%	1	14%	5	13%
No suitable e-business applications available (infrastructure & services)		Agree	1	11%	0	0%	1	25%	0	0%	0	0%	2	5%
		Slightly agree	2	22%	6	33%	0	0%	2	29%	2	29%	10	26%
		Neither	5	56%	8	44%	1	25%	2	29%	2	29%	16	42%
		Slightly disagree	0	0%	1	6%	0	0%	2	29%	2	29%	3	8%
		Disagree	1	11%	3	17%	2	50%	1	14%	1	14%	7	18%
Lack of partner connectivity (infrastructure & services)		Agree	3	33%	3	17%	1	25%	1	14%	1	14%	8	21%
		Slightly agree	2	22%	2	11%	0	0%	2	29%	2	29%	6	16%
		Neither	3	33%	8	44%	0	0%	4	57%	4	57%	15	39%
		Slightly disagree	0	0%	2	11%	1	25%	0	0%	0	0%	3	8%
		Disagree	1	11%	3	17%	2	50%	0	0%	0	0%	6	16%

Shortage of ICT skilled (internal) staff (infrastructure & services)	Agree	1	11%	0	0%	0	0%	1	13%	2	10%
	Slightly agree	2	22%	0	0%	3	75%	2	25%	7	33%
	Neither	4	44%	0	0%	1	25%	4	50%	9	43%
	Slightly disagree	2	22%	0	0%	0	0%	1	13%	3	14%
Lack of internal support (management) (information & education)	Disagree	0	0%	0	0%	0	0%	0	0%	0	0%
	Agree	0	0%	0	0%	0	0%	1	14%	1	5%
	Slightly agree	2	22%	0	0%	3	75%	2	29%	7	35%
	Neither	6	67%	0	0%	0	0%	1	14%	7	35%
Lack of knowledge of e-business (information & education)	Slightly disagree	1	11%	0	0%	1	25%	3	43%	5	25%
	Disagree	0	0%	0	0%	0	0%	0	0%	0	0%
	Agree	0	0%	1	6%	2	50%	2	25%	5	13%
	Slightly agree	1	11%	5	28%	1	25%	3	38%	10	26%
Lack of information, support or training (information & education)	Neither	7	78%	8	44%	0	0%	2	25%	17	44%
	Slightly disagree	1	11%	1	6%	1	25%	1	13%	4	10%
	Disagree	0	0%	3	17%	0	0%	0	0%	3	8%
	Agree	0	0%	1	6%	0	0%	1	14%	2	5%
i) Security	Slightly agree	1	11%	5	28%	2	50%	2	29%	10	26%
	Neither	7	78%	9	50%	1	25%	3	43%	20	53%
	Slightly disagree	1	11%	1	6%	1	25%	0	0%	3	8%
	Disagree	0	0%	2	11%	0	0%	1	14%	3	8%
ii) Cost & Benefits	Agree	8	30%	1	4%	3	25%	4	19%	16	19%
	Slightly agree	5	19%	5	21%	3	25%	12	57%	25	30%
	Neither	14	52%	11	46%	3	25%	5	24%	33	39%
	Slightly disagree	0	0%	7	29%	0	0%	0	0%	7	8%
iii) Infrastructure & Services	Disagree	0	0%	0	0%	3	25%	0	0%	3	4%
	Agree	2	4%	2	5%	0	0%	3	9%	7	5%
	Slightly agree	10	22%	6	15%	9	45%	5	14%	30	21%
	Neither	27	60%	16	40%	5	25%	16	46%	64	46%
iii) Infrastructure & Services	Slightly disagree	3	7%	3	8%	2	10%	7	20%	15	11%
	Disagree	3	7%	13	33%	4	20%	4	11%	24	17%
	Agree	7	19%	1	4%	2	13%	3	10%	13	12%
	Slightly agree	8	22%	7	29%	4	25%	10	34%	29	28%
iii) Infrastructure & Services	Neither	16	44%	8	33%	3	19%	10	34%	37	35%
	Slightly disagree	3	8%	3	13%	2	13%	4	14%	12	11%
	Disagree	2	6%	5	21%	5	31%	2	7%	14	13%
	Agree	2	6%	5	21%	5	31%	2	7%	14	13%

iv) Information & Education	Agree Slightly agree Neither Slightly disagree Disagree	5 0 4 20 3	16% 0% 13% 63% 9%	1 0 7 4 2	7% 0% 50% 29% 14%	2 2 6 1 3	14% 14% 43% 7% 21%	3 4 7 6 4	13% 17% 29% 25% 17%	11 6 24 31 12	13% 7% 29% 37% 14%
Does the e-business application replace an existing application?	Yes No	0 10	0% 100%	0 18	0% 100%	0 4	0% 100%	6 2	75% 25%	6 34	15% 85%
How important is this e-business application to your business?	Important Fairly important Neither Unimportant Fairly unimportant	2 6 0 1 0	22% 67% 0% 11% 0%	4 7 4 4 0	21% 37% 21% 21% 0%	1 2 0 1 0	25% 50% 0% 25% 0%	2 5 0 1 0	25% 63% 0% 13% 0%	9 20 4 7 0	23% 50% 10% 18% 0%
Do you have a contract and or SLA with the provider?	Yes No	0 8	0% 100%	0 18	0% 100%	0 4	0% 100%	7 1	88% 13%	7 31	18% 82%
Have you had cause to refer to the contract or SLA?	Yes No	0 0	0% 0%	0 0	0% 0%	0 0	0% 0%	3 5	38% 63%	3 5	38% 63%
Are you satisfied with the contract or SLA?	Yes No	0 0	0% 0%	0 0	0% 0%	0 0	0% 0%	6 2	75% 25%	6 2	75% 25%
Do you trust your service provider?	Yes No	3 0	100% 0%	17 0	100% 0%	4 0	100% 0%	7 0	100% 0%	31 0	100% 0%
How important are the following drivers to deciding to use this e-business application? Increasing complexity of ICT	Important Fairly important Neither Unimportant Fairly unimportant	0 2 6 0 0	0% 25% 75% 0% 0%	0 0 0 0 0	0% 0% 0% 0% 0%	0 1 3 0 0	0% 25% 75% 0% 0%	0 2 5 0 0	0% 29% 71% 0% 0%	0 5 14 0 0	0% 26% 74% 0% 0%
Reduced working life of applications	Important Fairly important Neither Unimportant Fairly unimportant	1 0 7 0 0	13% 0% 88% 0% 0%	0 0 0 0 0	0% 0% 0% 0% 0%	0 3 1 0 0	0% 75% 25% 0% 0%	0 3 3 1 0	0% 43% 43% 14% 0%	1 6 11 1 0	5% 32% 58% 5% 0%
Managing upgrades to applications	Important Fairly important Neither Unimportant Fairly unimportant	1 0 7 0 0	13% 0% 88% 0% 0%	0 0 0 0 0	0% 0% 0% 0% 0%	0 3 1 0 0	0% 75% 25% 0% 0%	0 5 2 0 0	0% 71% 29% 0% 0%	1 8 10 0 0	5% 42% 53% 0% 0%

Increasing difficulty in managing ICT	Important	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Fairly important	1	13%	0	0%	1	25%	2	29%	2	29%	4	21%
	Neither	7	88%	0	0%	3	75%	3	43%	3	43%	13	68%
	Unimportant	0	0%	0	0%	0	0%	2	29%	2	29%	2	11%
Increasing availability of e-business applications	Fairly unimportant	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Important	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Fairly important	1	13%	0	0%	2	50%	2	29%	2	29%	5	26%
	Neither	7	88%	0	0%	2	50%	3	43%	3	43%	12	63%
Difficulty in recruiting ICT staff	Unimportant	0	0%	0	0%	0	0%	2	29%	2	29%	2	11%
	Fairly unimportant	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Important	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Fairly important	1	13%	0	0%	0	0%	0	0%	0	0%	1	5%
Need to reduce costs	Neither	7	88%	0	0%	3	75%	0	0%	0	0%	10	53%
	Unimportant	0	0%	0	0%	0	0%	2	29%	2	29%	2	11%
	Fairly unimportant	0	0%	0	0%	1	25%	5	71%	5	71%	6	32%
	Important	1	13%	0	0%	0	0%	4	50%	4	50%	5	25%
Globalisation of services and markets	Fairly important	0	0%	0	0%	1	25%	2	25%	2	25%	3	15%
	Neither	7	88%	0	0%	2	50%	1	13%	1	13%	10	50%
	Unimportant	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Fairly unimportant	0	0%	0	0%	1	25%	1	13%	1	13%	2	10%
Do you agree with the following statements regarding using this e-business application?	Important	1	13%	0	0%	0	0%	2	25%	2	25%	3	15%
	Fairly important	0	0%	0	0%	1	25%	3	38%	3	38%	4	20%
	Neither	7	88%	0	0%	2	50%	2	25%	2	25%	11	55%
	Unimportant	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Reduces costs	Fairly unimportant	0	0%	0	0%	1	25%	1	13%	1	13%	2	10%
	Agree	1	13%	0	0%	1	25%	4	50%	4	50%	6	30%
	Slightly agree	3	38%	0	0%	2	50%	3	38%	3	38%	8	40%
	Neither	2	25%	0	0%	1	25%	0	0%	0	0%	3	15%
Reduces risk	Slightly disagree	1	13%	0	0%	0	0%	0	0%	0	0%	1	5%
	Disagree	1	13%	0	0%	0	0%	1	13%	1	13%	2	10%
	Agree	1	13%	0	0%	0	0%	2	29%	2	29%	3	16%
	Slightly agree	0	0%	0	0%	3	75%	2	29%	2	29%	5	26%
Do you agree with the following statements regarding using this e-business application?	Neither	5	63%	0	0%	1	25%	1	14%	1	14%	7	37%
	Slightly disagree	1	13%	0	0%	0	0%	0	0%	1	14%	2	11%
	Disagree	1	13%	0	0%	0	0%	0	0%	1	14%	2	11%
	Agree	1	13%	0	0%	0	0%	1	14%	1	14%	2	11%

Speeds up deployment of application	Agree	1	13%	0	0%	0	0%	4	50%	5	25%
	Slightly agree	4	50%	0	0%	2	50%	2	25%	8	40%
	Neither	3	38%	0	0%	2	50%	1	13%	6	30%
	Slightly disagree	0	0%	0	0%	0	0%	0	0%	0	0%
Improves quality of service to customers & suppliers	Disagree	0	0%	0	0%	0	0%	1	13%	1	5%
	Agree	1	13%	0	0%	1	25%	3	38%	5	25%
	Slightly agree	6	75%	0	0%	2	50%	0	0%	8	40%
	Neither	1	13%	0	0%	1	25%	3	38%	5	25%
Gives access to leading applications	Slightly disagree	0	0%	0	0%	0	0%	1	13%	1	5%
	Disagree	0	0%	0	0%	0	0%	1	13%	1	5%
	Agree	0	0%	0	0%	0	0%	2	25%	2	10%
	Slightly agree	3	38%	0	0%	3	75%	3	38%	9	45%
Reduces flexibility	Neither	5	63%	0	0%	1	25%	0	0%	6	30%
	Slightly disagree	0	0%	0	0%	0	0%	2	25%	2	10%
	Disagree	0	0%	0	0%	0	0%	1	13%	1	5%
	Agree	2	25%	0	0%	0	0%	0	0%	2	11%
Allows for internal comparisons	Slightly agree	1	13%	0	0%	0	0%	0	0%	1	5%
	Neither	3	38%	0	0%	2	50%	2	29%	7	37%
	Slightly disagree	2	25%	0	0%	2	50%	2	29%	6	32%
	Disagree	0	0%	0	0%	0	0%	3	43%	3	16%
Easier to identify value of applications	Agree	1	13%	0	0%	0	0%	3	38%	4	20%
	Slightly agree	1	13%	0	0%	1	25%	4	50%	6	30%
	Neither	4	50%	0	0%	3	75%	0	0%	7	35%
	Slightly disagree	2	25%	0	0%	0	0%	1	13%	3	15%
Enhances status of company or manager	Disagree	0	0%	0	0%	0	0%	0	0%	0	0%
	Agree	0	0%	0	0%	0	0%	1	13%	1	5%
	Slightly agree	0	0%	0	0%	0	0%	2	25%	3	15%
	Neither	6	75%	0	0%	3	75%	4	50%	13	65%
	Slightly disagree	2	25%	0	0%	0	0%	0	0%	2	10%
	Disagree	0	0%	0	0%	0	0%	1	13%	1	5%
	Agree	0	0%	0	0%	0	0%	1	13%	1	5%
	Slightly agree	1	13%	0	0%	1	25%	0	0%	2	10%
	Neither	5	63%	0	0%	3	75%	3	38%	11	55%
	Slightly disagree	2	25%	0	0%	0	0%	1	13%	3	15%
	Disagree	0	0%	0	0%	0	0%	3	38%	3	15%
	Agree	0	0%	0	0%	0	0%	0	0%	0	0%

Who would you consider to be trusted third parties within your industry and why?		Government Department		Customer		Supplier		Trade Association		Local Council		Business Link		Knowledgeable Individual		Other	
		1	14%	7	39%	2	40%	4	57%	14	38%	4	57%	14	38%		
		5	71%	5	28%	1	20%	3	43%	14	38%	3	43%	14	38%		
		2	29%	10	56%	1	20%	4	57%	17	46%	4	57%	17	46%		
		1	14%	0	0%	5	100%	1	14%	7	19%	1	14%	7	19%		
		0	0%	1	6%	2	40%	1	14%	4	11%	1	14%	4	11%		
		1	14%	11	61%	3	60%	1	14%	16	43%	1	14%	16	43%		
		3	43%	4	22%	4	80%	5	71%	16	43%	5	71%	16	43%		
		0	0%	0	0%	0	0%	1	14%	1	3%	1	14%	1	3%		
Which TTPs advice would you consider when considering ICT and why?		Government Department		Customer		Supplier		Trade Association		Local Council		Business Link		Knowledgeable Individual		Other	
		0	0%	1	6%	0	0%	0	0%	0	0%	0	0%	1	3%		
		2	40%	3	17%	1	20%	1	20%	7	21%	1	20%	7	21%		
		2	40%	6	33%	1	20%	2	40%	11	33%	2	40%	11	33%		
		0	0%	5	28%	5	100%	2	40%	12	36%	2	40%	12	36%		
		0	0%	1	6%	2	40%	0	0%	3	9%	0	0%	3	9%		
		0	0%	4	22%	2	40%	1	20%	7	21%	1	20%	7	21%		
		3	60%	12	67%	4	80%	2	40%	21	64%	2	40%	21	64%		
		0	0%	2	11%	0	0%	3	60%	5	15%	0	0%	5	15%		

Table 2. Non-users in wider aggregation

	Construction	Knowledge	Organic	Dairy	Total
Number of respondents	18	21	38	27	104
How many employees does your company have?	34	3	6	4	46
What is your annual turnover?	15.6	0.2	3.2	0.4	16.5
Do you consider yourself to be part of a business network?					
Yes	7	11	9	6	33
No	39%	55%	26%	27%	35%
How would you describe your attitude to e-business?					
Positive	8	5	4	3	20
Mainly positive	44%	24%	11%	11%	19%
Neither	5	8	14	11	38
Mainly negative	28%	38%	37%	41%	37%
Negative	3	5	11	10	29
	17%	24%	29%	37%	28%
	2	2	6	1	11
	11%	10%	16%	4%	11%
	0	1	3	2	6
	0%	5%	8%	7%	6%
How would you describe your knowledge & experience of e-business?					
Good	3	2	3	1	9
Fairly good	17%	10%	8%	4%	9%
Neither	9	8	6	5	28
Fairly poor	50%	38%	16%	19%	27%
Poor	4	6	10	6	26
	22%	29%	26%	22%	25%
	1	4	9	9	23
	6%	19%	24%	33%	22%
	1	1	10	6	18
	6%	5%	26%	22%	17%
E-Business allows you to do same activities more efficiently.					
Agree	3	5	4	4	16
Tend to agree	17%	24%	12%	16%	16%
Neither	9	8	8	7	32
Tend to disagree	50%	38%	24%	28%	33%
Disagree	5	5	10	11	31
	28%	24%	29%	44%	32%
	1	1	7	3	12
	6%	5%	21%	12%	12%
	0	2	5	0	7
	0%	10%	15%	0%	7%
E-Business allows you to develop new ways of doing business.					
Agree	3	5	5	4	17
Tend to agree	17%	24%	15%	16%	18%
Neither	12	7	13	12	44
Tend to disagree	67%	33%	39%	48%	45%
Disagree	3	4	11	8	26
	17%	19%	33%	32%	27%
	0	3	1	1	5
	0%	14%	3%	4%	5%
	0	2	3	0	5
	0%	10%	9%	0%	5%
Which category best describes your current use of ICT?					
Support	10	8	11	10	39
Turnaround	63%	47%	61%	63%	58%
Factory	3	5	4	5	17
Strategic	19%	29%	22%	31%	25%
	3	3	3	1	10
	19%	18%	17%	6%	15%
	0	1	0	0	1
	0%	6%	0%	0%	1%
What percentage of your employees use PCs on normal working days?					
	67%	75%	21%	19%	45%

What e-business applications do you use? - Currently	Communication	17	94%	17	81%	25	66%	19	70%	78	75%
	Marketing	14	78%	6	29%	13	34%	2	7%	35	34%
	Productivity	6	33%	8	38%	5	13%	1	4%	20	19%
	E-Commerce Buy	6	33%	7	33%	6	16%	6	22%	25	24%
	E-Commerce Sell	4	22%	0	0%	6	16%	0	0%	10	10%
	E-Commerce Pay	0	0%	0	0%	4	11%	0	0%	4	4%
	Collaboration	2	11%	3	14%	1	3%	0	0%	6	6%
	Enterprise	3	17%	5	24%	4	11%	6	22%	18	17%
	Marketplace	0	0%	3	14%	4	11%	0	0%	7	7%
	Collaborative Enterprise	0	0%	0	0%	1	3%	0	0%	1	1%
Collaborative Platform	0	0%	1	5%	0	0%	0	0%	1	1%	
What e-business applications do you use? - Next 12 months	Communication	17	94%	18	86%	25	66%	20	74%	80	77%
	Marketing	17	94%	13	62%	18	47%	3	11%	51	49%
	Productivity	6	33%	8	38%	6	16%	1	4%	21	20%
	E-Commerce Buy	7	39%	8	38%	6	16%	9	33%	30	29%
	E-Commerce Sell	6	33%	3	14%	8	21%	1	4%	18	17%
	E-Commerce Pay	1	6%	2	10%	5	13%	1	4%	9	9%
	Collaboration	3	17%	3	14%	1	3%	0	0%	7	7%
	Enterprise	4	22%	7	33%	4	11%	7	26%	22	21%
	Marketplace	0	0%	3	14%	6	16%	2	7%	11	11%
	Collaborative Enterprise	0	0%	2	10%	1	3%	0	0%	3	3%
Collaborative Platform	0	0%	2	10%	0	0%	0	0%	2	2%	
What has helped or encouraged you to use e-business applications (enablers)? Improving company image (sales & marketing)	Important	5	29%	3	18%	6	33%	0	0%	14	20%
	Fairly important	9	53%	10	59%	6	33%	3	17%	28	40%
	Neither	3	18%	1	6%	1	6%	5	28%	10	14%
	Fairly unimportant	0	0%	1	6%	2	11%	4	22%	7	10%
	Unimportant	0	0%	2	12%	3	17%	6	33%	11	16%
Opportunity for increased sales (sales & marketing)	Important	7	44%	5	26%	13	59%	2	12%	27	36%
	Fairly important	2	13%	10	53%	5	23%	4	24%	21	28%
	Neither	6	38%	1	5%	1	5%	6	35%	14	19%
	Fairly unimportant	1	6%	1	5%	1	5%	0	0%	3	4%
	Unimportant	0	0%	2	11%	2	9%	5	29%	9	12%

Reducing operating costs (operational)	Important	6	38%	5	28%	5	28%	6	35%	22	32%
	Fairly important	4	25%	7	39%	5	28%	4	24%	20	29%
	Neither	4	25%	2	11%	2	11%	3	18%	11	16%
	Fairly unimportant	2	13%	1	6%	2	11%	2	12%	7	10%
Improving customer services (operational)	Unimportant	0	0%	3	17%	4	22%	2	12%	9	13%
	Important	9	50%	8	42%	9	47%	1	7%	27	38%
	Fairly important	8	44%	6	32%	6	32%	1	7%	21	30%
	Neither	1	6%	2	11%	2	11%	9	60%	14	20%
Improving collaboration with partners (innovation)	Fairly unimportant	0	0%	1	5%	0	0%	2	13%	3	4%
	Unimportant	0	0%	2	11%	2	11%	2	13%	6	8%
	Important	4	24%	3	19%	2	13%	2	13%	11	17%
	Fairly important	3	18%	6	38%	3	19%	2	13%	14	22%
Provides new ways of doing business (innovation)	Neither	7	41%	3	19%	5	31%	8	50%	23	35%
	Fairly unimportant	0	0%	0	0%	1	6%	1	6%	2	3%
	Unimportant	3	18%	4	25%	5	31%	3	19%	15	23%
	Important	3	19%	3	16%	4	20%	3	20%	13	19%
Customer demands (external)	Fairly important	7	44%	9	47%	8	40%	6	40%	30	43%
	Neither	5	31%	3	16%	3	15%	3	20%	14	20%
	Fairly unimportant	1	6%	1	5%	0	0%	0	0%	2	3%
	Unimportant	0	0%	3	16%	5	25%	3	20%	11	16%
Supplier demands (external)	Important	3	19%	4	22%	5	28%	1	7%	13	19%
	Fairly important	6	38%	5	28%	5	28%	2	13%	18	27%
	Neither	5	31%	3	17%	4	22%	8	53%	20	30%
	Fairly unimportant	1	6%	3	17%	1	6%	1	7%	6	9%
i) Sales & marketing	Unimportant	1	6%	3	17%	3	17%	3	20%	10	15%
	Important	0	0%	2	12%	1	7%	1	7%	4	6%
	Fairly important	3	20%	3	18%	2	13%	2	13%	10	16%
	Neither	5	33%	5	29%	6	40%	9	60%	25	40%
i) Sales & marketing	Fairly unimportant	4	27%	1	6%	2	13%	1	7%	8	13%
	Unimportant	3	20%	6	35%	4	27%	2	13%	15	24%
	Important	12	36%	8	22%	19	48%	2	6%	41	28%
	Fairly important	11	33%	20	56%	11	28%	7	20%	49	34%
i) Sales & marketing	Neither	9	27%	2	6%	2	5%	11	31%	24	17%
	Unimportant	1	3%	2	6%	3	8%	4	11%	10	7%
	Fairly unimportant	0	0%	4	11%	5	13%	11	31%	20	14%

No suitable e-business applications (infrastructure & services)	Agree	0	0%	2	13%	6	29%	3	18%	11	16%
	Slightly agree	3	20%	5	31%	2	10%	2	12%	12	17%
	Neither	9	60%	5	31%	10	48%	8	47%	32	46%
	Slightly disagree	0	0%	3	19%	1	5%	1	6%	5	7%
Lack of partner connectivity (infrastructure & services)	Disagree	3	20%	1	6%	2	10%	3	18%	9	13%
	Agree	1	7%	4	25%	8	33%	4	24%	17	24%
	Slightly agree	4	27%	3	19%	4	17%	3	18%	14	19%
	Neither	4	27%	6	38%	9	38%	5	29%	24	33%
Shortage of ICT skilled staff (infrastructure & services)	Slightly disagree	4	27%	1	6%	2	8%	3	18%	10	14%
	Disagree	2	13%	2	13%	1	4%	2	12%	7	10%
	Agree	0	0%	4	25%	4	17%	7	41%	15	21%
	Slightly agree	0	0%	4	25%	8	35%	3	18%	15	21%
Lack of knowledge of e-business (information & education)	Neither	8	53%	6	38%	6	26%	3	18%	23	32%
	Slightly disagree	4	27%	0	0%	3	13%	1	6%	8	11%
	Disagree	3	20%	2	13%	2	9%	3	18%	10	14%
	Agree	1	6%	4	21%	9	35%	11	58%	25	31%
Lack of information, support or training (information & education)	Slightly agree	4	25%	11	58%	10	38%	2	11%	27	34%
	Neither	7	44%	1	5%	4	15%	3	16%	15	19%
	Slightly disagree	3	19%	3	16%	2	8%	2	11%	10	13%
	Disagree	1	6%	0	0%	1	4%	1	5%	3	4%
i) Security	Agree	0	0%	3	17%	8	33%	8	53%	19	26%
	Slightly agree	3	20%	10	56%	6	25%	1	7%	20	28%
	Neither	6	40%	3	17%	8	33%	5	33%	22	31%
	Slightly disagree	5	33%	2	11%	1	4%	0	0%	8	11%
ii) Cost & benefits	Disagree	1	7%	0	0%	1	4%	1	7%	3	4%
	Agree	9	26%	20	53%	11	22%	21	55%	61	38%
	Slightly agree	15	43%	7	18%	7	14%	8	21%	37	23%
	Neither	10	29%	7	18%	15	31%	3	8%	35	22%
ii) Cost & benefits	Slightly disagree	0	0%	3	8%	3	6%	2	5%	8	5%
	Disagree	1	3%	1	3%	13	27%	4	11%	19	12%
	Agree	4	12%	8	21%	20	37%	13	36%	45	28%
	Slightly agree	9	27%	9	24%	14	26%	9	25%	41	25%
ii) Cost & benefits	Neither	13	39%	15	39%	14	26%	6	17%	48	30%
	Slightly disagree	4	12%	3	8%	1	2%	4	11%	12	7%
	Disagree	3	9%	3	8%	5	9%	4	11%	15	9%
	Agree	3	9%	3	8%	5	9%	4	11%	15	9%

iii) Infrastructure & services	Agree Slightly agree Neither Slightly disagree Disagree	1 7 21 8 8	2% 16% 47% 18% 18%	10 12 17 4 5	21% 25% 35% 8% 10%	18 14 25 6 5	26% 21% 37% 9% 7%	14 8 16 5 8	27% 16% 31% 10% 16%	43 41 79 23 26	20% 19% 37% 11% 12%
iv) Information & education	Agree Slightly agree Neither Slightly disagree Disagree	1 1 7 13 8	3% 3% 23% 43% 27%	10 7 21 4 5	21% 15% 45% 9% 11%	18 17 16 12 3	27% 26% 24% 18% 5%	14 19 3 8 2	30% 41% 7% 17% 4%	43 44 47 37 18	23% 23% 25% 20% 10%
Do you use a vertical e-business application?	Yes No	3 15	17% 83%	5 14	26% 74%	3 34	8% 92%	6 20	23% 77%	17 83	17% 83%
Have you heard about vertical e-business applications?	Yes No	2 12	14% 86%	1 12	8% 92%	9 21	30% 70%	6 13	32% 68%	18 58	26% 85%
Who would you consider to be trusted third parties within your industry?	Government Department Customer Supplier Trade Association Local Council Business Link Knowledgeable Individual Other	2 0 1 4 3 4 3 4	18% 0% 9% 36% 27% 36% 27% 36%	4 2 2 8 1 1 0 2	31% 15% 15% 62% 8% 8% 0% 15%	2 14 12 11 3 6 10 1	7% 52% 44% 41% 11% 22% 37% 4%	4 5 5 5 3 4 6 3	27% 33% 33% 33% 20% 27% 40% 20%	12 21 20 28 10 15 19 10	18% 32% 30% 42% 15% 23% 29% 15%
Which TTPs advice would you consider when considering ICT?	Government Department Customer Supplier Trade Association Local Council Business Link Knowledgeable Individual Other	4 0 0 2 2 5 4 3	40% 0% 0% 20% 20% 50% 40% 30%	2 1 2 8 1 1 3 1	15% 8% 15% 62% 8% 8% 23% 8%	0 8 5 8 3 7 11 1	0% 40% 25% 40% 15% 35% 55% 5%	3 2 2 7 3 3 8 4	20% 13% 13% 47% 20% 20% 53% 27%	9 11 9 25 9 16 26 9	16% 19% 16% 43% 16% 28% 45% 16%

Table 3. Comparison of users and non-users

(* denotes significant difference)	Users		Non-users		Mean SD	df	Critical Value % 5.0%, 2.5%, 1.0%	t-test
	Users	Mean SD	Non-users	Mean SD				
Number of respondents	43		104					
How many employees does your company have?	108	27	46	12				
What is your annual turnover (m)?	32.5	8.1	16.5	4.1				
Do you consider yourself to be part of a business network?								
	Yes		33	35%				
	No		62	65%				
How would you describe your attitude to e-business? *								
	Positive	12	28%	20	19%			
	Mainly positive	27	63%	38	37%			
	Neither	4	9%	29	28%			
	Mainly negative	0	0%	11	11%	135		
	Negative	0	0%	6	6%	100	1.660, 1.984, 2.364	4.694
	Good	7	17%	9	9%			
	Fairly good	19	46%	28	27%			
	Neither	9	22%	26	25%			
	Fairly poor	4	10%	23	22%	86		
	Poor	2	5%	18	17%	85	1.663, 1.988, 2.371	3.612
E-Business allows you to do same activities more efficiently? *								
	Agree	12	29%	16	16%			
	Tend to agree	24	59%	32	33%			
	Neither	4	10%	31	32%			
	Tend to disagree	1	2%	12	12%	117		
	Disagree	0	0%	7	7%	100	1.660, 1.984, 2.364	4.855
E-Business allows you to develop new ways of doing business? *								
	Agree	12	27%	17	18%			
	Tend to agree	25	57%	44	45%			
	Neither	3	7%	26	27%			
	Tend to disagree	4	9%	5	5%	97		
	Disagree	0	0%	5	5%	95	1.661, 1.985, 2.366	2.285
Which category best describes your current use of ICT?								
	Support	26	62%	39	58%			
	Turnaround	11	26%	17	25%			
	Factory	3	7%	10	15%			
	Strategic	2	5%	1	1%			
What percentage of your employees use PCs on normal working days?								
			74%		45%			

What e-business applications do you use? - Currently	Communication Marketing Productivity E-Commerce Buy E-Commerce Sell E-Commerce Pay Collaboration Enterprise Marketplace Collaborative Enterprise Collaborative Platform	43 27 16 24 8 2 10 43 7 6 2	100% 63% 37% 56% 19% 5% 23% 100% 16% 14% 5%	45% 78 35 20 25 10 4 6 18 7 1		
What e-business applications do you use? - Next 12 months	Communication Marketing Productivity E-Commerce Buy E-Commerce Sell E-Commerce Pay Collaboration Enterprise Marketplace Collaborative Enterprise Collaborative Platform	43 31 20 26 14 7 11 43 9 9 7	100% 72% 47% 60% 33% 16% 26% 100% 21% 21% 16%	1 80 51 21 30 18 9 7 22 11 3		
What has helped or encouraged you to use e-business applications (enablers)? Improving company image (sales & marketing) *	Important Fairly important Neither Unimportant Fairly unimportant	15 9 11 0 2	41% 24% 30% 0% 5%	14 28 10 7 11	20% 40% 14% 10% 16%	2.311 1.663, 1.988, 2.371
Opportunity for increased sales (sales & marketing)	Important Fairly important Neither Unimportant Fairly unimportant	13 14 6 2 3	34% 37% 16% 5% 8%	27 21 14 3 9	36% 28% 19% 4% 12%	87 85 1.344 1.327
Reducing operating costs (operational)	Important Fairly important Neither Unimportant Fairly unimportant	15 10 7 5 2	38% 26% 18% 13% 5%	22 20 11 7 9	32% 29% 16% 10% 13%	0.453 1.664, 1.990, 2.374 1.663, 1.988, 2.371 0.888

Improving customer services (operational)	Important	16	42%		27	38%		
	Fairly important	11	29%		21	30%		
	Neither	8	21%		14	20%		
	Unimportant	0	0%	3.97	3	4%	3.85	79
	Fairly unimportant	3	8%	1.174	6	8%	1.226	75
Improving collaboration with partners (innovation) *	Important	17	45%		11	17%		
	Fairly important	10	26%		14	22%		
	Neither	9	24%		23	35%		
	Unimportant	0	0%	4.05	2	3%	3.06	92
	Fairly unimportant	2	5%	1.089	15	23%	1.368	90
Provides new ways of doing business (innovation) *	Important	15	39%		13	19%		
	Fairly important	13	34%		30	43%		
	Neither	7	18%		14	20%		
	Unimportant	2	5%	4.03	2	3%	3.46	91
	Fairly unimportant	1	3%	1.026	11	16%	1.282	90
Customer demands (external)	Important	9	24%		13	19%		
	Fairly important	6	16%		18	27%		
	Neither	17	45%		20	30%		
	Unimportant	2	5%	3.37	6	9%	3.27	81
	Fairly unimportant	4	11%	1.217	10	15%	1.298	80
Supplier demands (external)	Important	0	0%		4	6%		
	Fairly important	2	11%		10	16%		
	Neither	12	63%		25	40%		
	Unimportant	3	16%	2.74	8	13%	2.68	45
	Fairly unimportant	2	11%	0.806	15	24%	1.198	45
i) Sales & Marketing *	Important	28	38%		41	28%		
	Fairly important	22	30%		49	34%		
	Neither	17	23%		24	17%		
	Unimportant	2	3%	3.89	10	7%	3.56	168
	Fairly unimportant	5	7%	1.154	20	14%	1.342	100
ii) Operational	Important	55	29%		49	35%		
	Fairly important	50	27%		41	29%		
	Neither	56	30%		25	18%		
	Unimportant	12	6%	3.64	10	7%	3.71	283
	Fairly unimportant	14	7%	1.185	15	11%	1.306	100

iii) Innovation *	Important	32	42%		24	18%		
	Fairly important	23	30%		44	33%		
	Neither	16	21%		37	27%		
	Unimportant	2	3%	4.04	4	3%	3.27	187
	Fairly unimportant	3	4%	1.051	26	19%	1.334	100
	Important	17	13%		17	13%		
	Fairly important	18	14%		28	22%		
	Neither	70	53%		45	35%		
	Unimportant	13	10%	3.07	14	11%	2.98	251
	Fairly unimportant	15	11%	1.095	25	19%	1.283	100
iv) External	Important	17	13%		17	13%		
	Fairly important	18	14%		28	22%		
	Neither	70	53%		45	35%		
	Unimportant	13	10%	3.07	14	11%	2.98	251
	Fairly unimportant	15	11%	1.095	25	19%	1.283	100
	Important	17	13%		17	13%		
	Fairly important	18	14%		28	22%		
	Neither	70	53%		45	35%		
	Unimportant	13	10%	3.07	14	11%	2.98	251
	Fairly unimportant	15	11%	1.095	25	19%	1.283	100
What is discouraging you from further use of e-business applications (barriers)?	Agree	6	16%		29	36%		
	Slightly agree	12	32%		20	25%		
	Neither	16	42%		16	20%		
	Slightly disagree	1	3%	3.45	4	5%	3.65	93
	Disagree	3	8%	1.058	11	14%	1.379	90
	Agree	9	24%		32	40%		
	Slightly agree	10	26%		17	21%		
	Neither	12	32%		19	24%		
	Slightly disagree	3	8%	3.45	4	5%	3.78	76
	Disagree	4	11%	1.245	8	10%	1.305	75
Concerned about security (security)	Agree	5	13%		20	26%		
	Slightly agree	10	26%		22	29%		
	Neither	14	37%		26	34%		
	Slightly disagree	6	16%	3.21	2	3%	3.63	75
	Disagree	3	8%	1.119	6	8%	1.141	75
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
Concerned about risk of fraud (security) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
ICT costs too high (cost & benefits)	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%	1.315	85
No benefits to company (cost & benefits) *	Agree	3	7%		11	16%		
	Slightly agree	5	12%		12	17%		
	Neither	15	36%		32	46%		
	Slightly disagree	3	7%	2.43	5	7%	3.16	80
	Disagree	16	38%	1.309	9	13%	1.184	80
	Agree	4	11%		25	29%		
	Slightly agree	12	32%		19	22%		
	Neither	16	42%		22	26%		
	Slightly disagree	2	5%	3.26	10	12%	3.48	86
	Disagree	4	11%	1.083	9	11%		

iv) Information & Education *							
Agree	11	13%	43	23%			
Slightly agree	6	7%	44	23%			
Neither	24	29%	47	25%			
Slightly disagree	31	37%	37	20%	3.30	168	
Disagree	12	14%	18	10%	1.280	100	1.660, 1.984, 2.364
Who would you consider to be trusted third parties within your industry and why?							
Government Department	14	38%	12	18%			
Customer	14	38%	21	32%			
Supplier	17	46%	20	30%			
Trade Association	7	19%	28	42%			
Local Council	4	11%	10	15%			
Business Link	16	43%	15	23%			
Knowledgeable Individual	16	43%	19	29%			
Other	1	3%	10	15%			
Which TTPs advice would you consider when considering ICT and why?							
Government Department	1	3%	9	16%			
Customer	7	21%	11	19%			
Supplier	11	33%	9	16%			
Trade Association	12	36%	25	43%			
Local Council	3	9%	9	16%			
Business Link	7	21%	16	28%			
Knowledgeable Individual	21	64%	26	45%			
Other	5	15%	9	16%			

Construction intermediaries

BuildOnline

This UK-based company was launched in January 2000 as a 'business to business' (B2B) e-commerce website for the UK construction industry, estimated as a £62 billion industry (www.buildonline.com). The company stated that B2B e-commerce would enable savings of £14 billion per annum. First round funding of \$2 million was secured from venture capital firms, BancBoston and Dleta Partners. Its initial service offerings included applications to support community collaboration, tender management, catalogues and trading. BuildOnline sought to meet the needs of all the industry participants, including architects, contractors, engineers, quantity surveyors and building merchants. The company described itself as the first B2B e-commerce site for the construction industry.

By 2003 BuildOnline had developed as a leading European provider of Internet-based collaboration software and supplier-relationship management tools to the infrastructure, construction and utility industries. This represented an increase in markets from the original construction industry focus. The company's main product had become ProjectsOnline, which focused on improving the communication and productivity of teams working in single or multiple locations through document management, co-ordinated workflow, online drawing mark-ups and knowledge management. The company continued to offer a tool to automate electronic tendering, TenderOnline, and a tool to improve the efficiency of managing supply-chain partners, SupplyChainOnline. The company had established relationships with leading companies in its sectors. In the UK, BuildOnline worked with leading utility companies including Transco, National Grid and Thames Water as well as the large infrastructure providers, the Highways Agency, Railtrack and London Underground through Metronet. Construction clients included Balfour Beatty, Kier, Ballast, Carillion, Skanska, Bovis Lend Lease and AMEC. Across Europe the company had strategic partnerships with some of the largest construction companies including Strabag, Bilfinger Berger and Razel, and innovative clients including Alstom, Siemens, Accenture and Hines. The company had also developed a range of support services, including customer support desk, online support, user guides and training. It sought to work with lead clients by providing consultancy services in order to promote and support adoption by contractors (mostly SMEs) involved in construction projects.

BuildOnline had secured, by third round funding, significantly increased equity funding of €36 million from BancBoston Capital, Delta Partners, ETF Group, Goldman Sachs, GRP, Sal Oppenheim and Viventures. The company stated that it had no debts and in November 2002 it announced "BuildOnline wins race to become profitable - the first major collaboration provider in the UK to reach profitability". The company sought to influence participants in its market by promoting itself through established industry publications, broadcast e-newsletters and publishing case studies on major client projects. Importantly BuildOnline sought to establish relationships with existing trusted third parties including large clients and trade associations (National Federation of Builders) or professional bodies (Royal Institute of British Architects) and with new intermediaries such as e-marketplaces (Aquadia). In early 2003 the company described itself as "Europe's largest collaboration software provider for construction, utilities and infrastructure projects".

BuildNet

This US-based company was founded in 1999 and provided online management software tools to the home-builders and suppliers to the residential construction industry (www.buildnet.com). Its objective was to become the leading B2B e-commerce solution for the residential construction industry. During 2000 the BuildNet developed and started to deploy its 'e-building exchange'. The company resulted from the merger of ten building industry software companies and attempted to use the resultant customer base to provide online services. The value proposition was reducing supply chain inefficiencies and reducing transaction costs. The online applications integrated into six project management systems, including JD Edwards Homebuilder. In this way BuildNet sought to establish relationships with existing software providers in order to become a trusted infomediary and the standard for e-business within the building industry.

In August 2001 the company was unable to secure further equity funding and filed for Chapter 11 bankruptcy protection. By September the company's assets were acquired by MH2Technologies (MH2), which provided Internet-based job management, scheduling and materials ordering solutions (www.mh2.com). The company's strategy was to create efficiencies in highly fragmented industries through Internet applications and handheld, wireless devices. The company achieved some success in the homebuilding industry and focused on the implementation of its systems with homebuilders. In addition it had recruited dealers and suppliers, with combined sales of over \$5 billion, to use the company's technology. Among the items acquired was FAST, one of the industry's most popular homebuilder accounting systems and this was considered the most valuable BuildNet asset. The CEO of MH2 stated that "our strategy has been to listen to the builders and they have said this is what they need. The moves we made are designed to give the homebuilder all the technology and software they need to improve their efficiencies." The company developed a wide range of service and technology alliances but focused on recruiting the lead clients in residential construction sector. There was little evidence of attempts to establish relationships with trade associations or professional bodies.

Healthcare intermediaries

NetDoctor

This European-based company was established in Denmark in 1998 to provide healthcare related online services to doctors, consumers and chronic sufferers and expanded its operations to six countries by 2002 (www.netdoctor.com). The company recruited over 500 healthcare professionals to provide patient-focused content delivered through country-specific internet portals, including discussion forums, expert advice, self-diagnosis tools and extensive information sources. In March 2001 the company secured €5 million financing from venture capital fund company Apax Europe IV and reached breakeven by the end of 2001. The company focused on establishing partnerships with a number of large healthcare-related companies, including Alliance UniChem and Royal Sun Alliance.

By 2003 NetDoctor was Europe's leading technology-based healthcare communications company and stated that it was "a collaboration between physicians, healthcare professionals, information specialists, and patients who believe that best medical practice

should be based on quality information and evidence-based clinical practices and principles". The company took a patient-driven perspective and built a suite of Internet-based care management tools to support both the needs of patients and doctors. The software tools attempted to assist doctors in delivering improvements for chronic diseases by offering tools for patient involvement, home monitoring, support networks, clinical health record systems, and data sharing between healthcare professionals and patients. These solutions were provided on a fully hosted technical platform allowing faster deployment and low ongoing maintenance costs. The websites served almost 1 million pages of content every day and reach 1.2 million unique visitors every month. NetDoctor targeted a range of advertising and sponsorship products to appropriate patient communities. In addition the company licensed access to its growing information database and provided managed services to larger healthcare product and service providers.

WebMD

This US-based company was formed in November 1999 as a result of a merger of four internet-based healthcare service companies (www.webmd.com). The company sought to act as an intermediary in order to enable communication and information exchange between patients, doctors and related professionals. WebMD recruited a network of almost 300,000 doctors, 46,000 pharmacies, 70 delivery networks and 500,000 users to its patient portals. The company had a strategy to acquire competitors and specialist companies. Turnover was £66 million during the first quarter 2000 resulting in a loss of \$73 million.

By 2003 WebMD had become the leading provider of online services to doctors, patients, providers and health plan managers. These products and services attempted to streamline administrative and clinical processes, promote efficiency and reduce costs by facilitating information exchange, communication and electronic transactions. These included:

- 'Envoy' for electronic data interchange (EDI) services for healthcare providers and commercial health plans.
- 'Medical Manager' for integrated practice management solutions including administrative, financial and clinical management (appointments and billing).
- 'Health' for online information, educational services and communities with more than 15 million visitors every month.
- 'Medscape' for clinical information and educational tools with over 575,000 members registered as physicians and 1.6 million allied healthcare professionals worldwide.

The company turnover was £234 million during the first quarter 2003 resulting in a loss of \$7 million. Envoy, Medical Manager and Health generated sales of \$115, \$72 and \$22 million respectively. The company stated that "by successfully introducing products that offer value to our patient, physician, payer, pharmaceutical and medical device customers, we will achieve sustainable long-term revenue and earnings growth". The company was quoted on NASDAQ (HLTH) and had over 5,000 employees.

Marketplace aggregators

BizProLink

This US-based company was established in 1999 to provide online services to over 100 vertical B2B communities consisting predominately of SMEs (www.bizprolink.com). It

operated as an information aggregator and business ASP over 15 vertical portal platforms, from aerospace to food services, on which e-commerce transactions could occur. The company hosted over 80 online business tools ranging from payroll services to business financing. BizProLink established strategic partnerships with other software providers, such as BroadVision. By the end of 2000 the company hosted 124 industry-specific online communities using over 90 personalised ASP tools and services and had over 30 strategic partners providing content and technology, such as Siebel Systems and Daleen Technologies.

By 2003 BizProLink's focus was to provide company-branded industry-tailored resources for large web-based service providers, including AOL and Monster. The company's products and services are used by clients to convert website visitors (predominately SMEs) into customers. The company's managed solutions included over 1,700 online business resources, organised across 43 industry sectors, with the advanced user personalisation features of an Enterprise Portal. Key strategic relationships include IBM, AOL, ADP, Oracle, Sun Microsystems, and Siebel Systems. The company was privately owned and had 21 employees. There was no evidence of relationships with TTPs within the targeted industry sectors.

VerticalNet

This US-based company was formed in 1995 as a B2B e-commerce service provider and operator of online vertical trade communities (www.verticalnet.com). These online B2B communities included industry-targeted content, such as news, directories, classified and job advertisements. VerticalNet provided members (predominantly SMEs) with tools to create online storefronts. The strategy was to attract both buyers and seller to these narrowly focused websites by providing a combination of content, community and commerce. By 2000 the company had established 11 industry-specific communities and had increased these by organic growth and acquisition to 56 by 2001. These industry specific communities ranged from Bakery Online to PlasticsNet each with vertical content and a range of online applications. The company continued to expand forming a joint venture with BT to provide European-based communities in early 2001. VerticalNet established relationships with other strategic technology and service partners but there was no evidence of relationships with TTPs within the industry-specific exchanges. By the end of 2001 the company offered exchange management services to large organisations, in order to help them develop their own online trading communities around supplier and customer networks, and consolidated the 56 vertical marketplaces into a small and medium-sized business (SMB) unit. During 2001 the SMB unit revenue had declined from \$105 million (2000) to \$90 million whilst exchange services had increased from \$8 million (2000) to \$36 million. The company was described as having gone from an 'operator of industry-specific websites' designed as online B2B communities in April 1999 to a 'B2B e-commerce enabler' in October 2000, and then from an 'enterprise software provider' in September 2001 to a developer of 'extended enterprise management applications' in December 2001. The company continued to trade at a loss, running at \$10 million per quarter by end of 2001.

In June 2002 the company announced the sale of its SMB unit to Corry Publishing, which specialised in magazines and newsletters targeted at executives and business owners (www.corrypub.com). The division was re-launched as VertMarkets and promoted as "the leader in supplier enablement, with solutions that connect buyers and suppliers through extensive industry-specific public & private marketplaces" (www.vertmarkets.com). By

2003 VertMarkets operated 68 online marketplaces in 8 industry groups and VerticalNet described itself as “a leading provider of ‘strategic sourcing and supply management solutions’ that enabled companies to identify, negotiate, realise, and maintain supply chain savings”. The company then provided services to lead organisation such as IKEA home furnishings and Premier, the largest ‘healthcare group purchasing organisation in the US with over 1,600 members. The company was quoted on NASDAQ (VERT) and had nearly 700 employees. VerticalNet worked with TTPs to develop their supplier and customer networks.

PurchasePro

This US-based company was formed in 1999 to provide B2B e-commerce solutions to link buyers and suppliers (predominantly SMEs) in online trading communities for private clients such as Mirage Resorts to Office Depot (www.purchasepro.com). The company focused on decreasing the cost and inefficiencies in procurement by allowing SMEs to purchase supplies electronically without the high set-up costs associated with EDI. In 2000 the company operated 160 marketplaces with over 25,000 users and announced a three-year strategic alliance with AOL to provide online services to the Netscape Netbusiness portal for small businesses. During 2001 the company continued to grow employing over 1,200 staff and developed private SME focused marketplaces for many leading companies, including Hewlett Packard. In mid 2001 the company announced continued increased losses for the second quarter of \$61 million (\$12 million Q2 2000) on revenues of \$17 million (\$10 million Q2 2000). During the same period \$61 million of transactions were placed on PurchasePro’s network.

By the beginning of 2002 the company had reduced its workforce to 120 employees and claimed over 300,000 registered (SME) users trading \$86 million in transaction per quarter. In December 2002 PurchasePro filed for Chapter 11 bankruptcy protection and the assets were sold to Perfect Commerce, a provider of internet-based sourcing and procurement solutions (www.perfect.com). Within three months Perfect had transferred all of PurchasePro’s customers to its own ‘enterprise supply management’ solution. The company was privately owned and had over 70 employees.

Marketplace applications

Ariba

Ariba is a global company formed in 1996 as a network services and software platform for B2B commerce provider to large organisations (www.ariba.com). The company sought to enable online trading, integration and collaboration between e-marketplaces, buyers, suppliers and commerce service providers. In March 1999 the company launched the Ariba Network as an independent platform that connected corporate buyers and sellers. The company also made some strategic acquisitions, including TRADEX and Trading Dynamics. In 2000 Ariba announced a strategic alliance with IBM and i2 with the objective of combining Ariba’s B2B marketplace strength with i2’s supply chain integration and IBM’s consulting and hosting expertise in order to provide services to business networks such as Transora. In 2001 this alliance was not maintained due to lack of new business generation but Ariba and IBM continued to develop new business opportunities together. In addition to working with large organisations Ariba announced

SME-focused exchanges, such as BuyingPower in March 2001. The company announced increased losses for the fourth quarter of \$161 million for 2001 (\$112 million Q4 2000) on revenues of \$55 million (\$39 million Q4 2000).

By 2003 the company stated that it “ leads the ‘enterprise spend management’ market, a new class of solutions that focus on delivering a closed loop of control and leverage over a company's spend, including assessing spending activities, conducting effective sourcing and capturing and reconciling spend enterprise-wide”. Its ‘supplier network’ marketplace application had over 3,750,000 users and more than 34,000 unique suppliers. It claimed 40% market share of the Fortune 100 companies, including BMW, Cisco Systems, Hewlett-Packard, and Unilever. Ariba had continued to develop strategic partnerships with technology suppliers and resellers such as IBM, JD Edwards and Unisys. By the second quarter 2003 the company announced reduced losses of \$52 million (\$151 million Q2 2002) on revenues of \$60 million (\$57 million Q2 2002). The company was quoted on NASDAQ (ARBA) and had over 1,500 employees. Ariba established relationships with many lead organisations and assisted in recruiting their SMEs trading partners but there was little evidence of relationships with other TTPs. However the company recently announced its participation in a US Government-sponsored initiative to provide an SME-focused exchange (www.sba.gov/sbaexchange/).

Commerce One

Commerce One is a global company formed in 1997 to provide B2B e-commerce solutions that linked buyers and suppliers of both indirect and direct goods and services in online trading communities (www.commerceone.com). The company developed the ‘global trading web’ in order to link many e-marketplace portals. Each portal was owned by an independent market maker and had 19 members by mid 2000. In June 2000 SAP invested \$250 million in exchange for a 20% shareholding and formed a joint alliance to develop a range of products for the online exchange market. This was branded as SAP MarketSet. By April 2001 Commerce One's ‘global trading web’ was the largest B2B trading community with 157 e-marketplaces. The company announced increased losses for the fourth quarter of \$168 million for 2001 (\$117 million Q4 2000) on revenues of \$56 million (\$39 million Q4 2000). In July 2002 Samsung Electronics announced its private exchange ‘worldwide trading network’ would use MarketSet. In early 2003 the company announced three new customers, namely Food Connex, a grocery wholesale services provider, Global Healthcare Exchange, a healthcare goods and services exchange, and GTWebKorea, an Asian marketplace.

By the first quarter 2003 the company had announced reduced losses of \$29 million (\$211 million Q1 2002) on revenues of \$13 million (\$31 million Q1 2002). The company announced the release of its replacement for the ‘global trading web’ the ‘conductor’ composite application platform. The company was quoted on NASDAQ (CMRC) and had over 1,300 employees. CommerceOne established relationships with many lead organisations and assisted in recruiting their SME trading partners but there was little evidence of relationships with other TTPs.

Enterprise applications

Oracle

Oracle is a global company founded in 1977 and one of the world's largest suppliers of software products, including database, application server, development tools, collaboration suite and enterprise applications (www.oracle.com). The company released its innovative e-business suite for the ASP sector in 2000 and upgraded it 2001 to version 11i. The company described it as "a complete set of business applications that enables you to efficiently manage customer interactions, manufacture products, ship orders, collect payments and more - all from a business system that shares a unified and open architecture". The suite included marketing, sales, service, contracts, financials, projects, human resources, supply chain management, order management, procurement, manufacturing, maintenance management, product lifecycle management, and learning management. The company had a range of vertical applications for a number of industries. This was targeted at large organisations which represented the majority of the company's customer base. In 1999 NetLedger, a software developer part-owned by Larry Ellison the CEO of Oracle, was founded to develop web-based information systems for SMEs and by 2001 was being marketed by Oracle as the 'small business suite' (www.netledger.com). The software was only available as a hosted service with charges starting at less than \$100 per month and targeted at companies with less than 100 employees. By the beginning of 2003 NetLeger had adopted a \$50 per user per month fee structure and claimed to have 7,000 customers. The application range had been increased to offer an advanced NetSuite for companies with less than 500 employees and increased the functionality of the entry level service to include sales force automation and web store integration. The company marketed to users on a direct basis and through a network of VARs, which included solution providers and 'trusted advisors' such as accountants and independent financial advisors. Interestingly in April 2003 the company announced an expansion into vertical market solutions through easy integration to third parties with the initial focus being agriculture, biotechnology and construction. The latter involved integrating with an online construction management application promoted through a network of construction industry VARs (www.buildtopia.com).

Peoplesoft

Peoplesoft is a global company founded in 1987 providing a range of e-business applications to a variety of enterprises (www.peoplesoft.com). In 2000 the company launched an innovative integrated suite of web-based applications. This enabled customers to access the applications with standard Internet browsers only and integrate with third party solutions using XML. This involved migrating existing applications, including human resources, enterprise resource planning, financial management, supply chain management and customer relationship management, to operate in a hosted environment. The company had 14 vertical applications for specific industries and a division focused on the mid-market sector. In January 2002 Peoplesoft announced a strategic alliance with Hewlett Packard to develop the eCenter, a specialist facility to host the company's e-business suite of applications. eCenter offered a choice of three different levels of application hosting and management solutions, namely 'onramp hosting' for pre-packaged applications suites, 'flex hosting' with hardware, infrastructure, maintenance and applications management by PeopleSoft and 'concierge hosting' which provided extended customer service and application support. Onramp hosting was identified as being

particularly suitable for SMEs. The company developed accelerated solutions for SMEs available through its own consulting operation or a range of partners and offered a hosting service as part of the eCenter. There was no evidence of relationships with TTPs.

Enterprise applications

Sage

This UK-based company was formed in 1981 to develop accounting software for SMEs. In 1999 the company had a turnover of £307 million, over 3,000 employees and operated in the UK, France, Germany and US. The company stated that it had over 2 million customers and sold through over 15,000 resellers (www.sage.com). Sage formed partnerships with accountants, as being trusted by small businesses, developers of third party applications and importantly value added resellers (VARs). The company developed additional hosted services and e-commerce solutions, which integrated into its resident accounting application and included catalogue, web trading and e-banking. The company had a range of applications from instant accounting, purchased at less than £100, Sage 50, 100, 200 and 500 depending on the size and complexity of the business. In 1999 Sage acquired Tetra a provider of applications to medium-sized companies and from which Sage 200 and 500 were developed. The US operation marketed under the Best Software (acquired in 2000) and Peachtree brands with the latter being focused on small businesses. In 2001 Peachtree launched a hosted accounting service targeted at small businesses with charges starting at less than \$150 per annum (www.epeachtree.com).

By 2002 Sage Group stated that it had more than 3 million customers worldwide, over 900,000 customers with an annual support contract, a network of over 19,000 VARs, over 5,500 employees, annual revenues of £552 million and profit before tax of £135 million. The company had no published plans to offer an online service in the UK in July 2002.

Intuit

This US-based company was formed in the 1980s as a provider of personal and small business accounting software (www.intuit.com). The company had over 7,000 employees and annual revenues of over \$1 billion. The company provided a range of applications including Quicken, for individuals, QuickBooks for SMEs and 'professional accounting solutions' for professional service providers, such as accountants. In addition the company had more recently provided a number of industry-specific applications, including construction, public sector, real estate, retail, and wholesale distribution. The company had established a network of advisors (VARs) and developers of integrated industry-specific applications. In 2001 the Intuit made its QuickenBook available as an online edition and by early 2003 was actively promoting this hosted option to new and existing customers. The charges were scaled on number of users, with up to 3 users paying \$19.95 per month, up to 10 users \$29.95 and up to 20 users \$49.95. The company claimed a 200% increase in customers to 10,000 subscribers by the mid 2003. The UK division of the company had no published plans to offer an online service in the UK in July 2002.

Supply chain applications

i2

This global company was founded in 1988 to provide supply chain management applications to large organisations (www.i2.com). The company developed TradeMatrix as a business portal offering added value services for buyers, sellers, designers and service providers. In 2000 i2 announced a strategic alliance with IBM and Ariba with the objective of combining i2's supply chain integration strength with Ariba's B2B marketplace and IBM's consulting and hosting expertise in order to provide services to business networks such as Transora. The company described its i2's core competencies as "the end-to-end supply chain including products in supplier relationship management (SRM), supply chain management (SCM), demand chain management, service parts management and transportation". The company worked with lead organisations to promote the engagement of SMEs in the supply chain. By 2003 the company had reduced its focus on e-marketplaces and concentrated on 'supply chain optimisation products, including fulfilment, logistics, production and speed in order to improve clients' revenue and profit.

Wesupply

This UK-based company was formed in 2000 to provide hosted supply chain management applications to selected industries, including beverages, building materials, automotive and aerospace. Early clients included Jewson and SC Johnson. In January 2002 the company secured second round funding of £2.5 million. Wesupply enabled real-time sharing of demand and fulfilment information between a company and its network of suppliers. The company stated that it delivered "superior management across the entire supply chain - regardless of company size, capability, sophistication or degree of business process integration". Wesupply provided a specific adoption programme for their clients' trading partners, including programme management and planning, trading partner adoption, support & training. This programme was developed in order to recruit smaller businesses to the applications by workshops, demonstrations and on-site training. The company worked with the lead clients and trade associations to promote the benefits of the hosted supply chain applications to SMEs in supply chains. By 2003 the company had over 50 employees.

Application service providers

USInternetworking

This US-based company was formed in 1998 as an application service provider (pure-play). The company offered broad a range of applications from Ariba, Broadvision, Lawson, Siebel, Microsoft, PeopleSoft, Oracle. Investors included Microsoft who contributed \$320m in November 2000.