December 2003

An Interpretive Framework for the Investigation of E-Business Engagement by SMEs: The Construction Industry.

Nigel Lockett
Lancaster University

David Brown
Lancaster University

AN INTERPRETIVE FRAMEWORK FOR THE INVESTIGATION OF E-BUSINESS ENGAGEMENT BY SMES: THE CONSTRUCTION INDUSTRY

Nigel J. Lockett
Lancaster University
n.lockett@lancaster.ac.uk

David H. Brown
Lancaster University
d.brown@lancaster.ac.uk

Abstract

The lack of anticipated engagement in e-business by small to medium sized enterprises (SMEs), who are an important contributor to economic activity, is of increasing concern to governments and service providers alike. This paper explores the use of an interpretive framework which includes theoretical contributions from ICT adoption by SMEs, strategic networks and inter-organisational systems and e-business models literatures in an industry specific context, in this case the UK construction industry. Current levels of e-business engagement are considered together with evidence of aggregation and the role of intermediaries by the use of quantitative (survey) and qualitative (case study) methods. The example of the construction industry is investigated within the interpretive framework resulting in critical comment and validation in order to provide the basis for future multiple case investigations.

Keywords: E-business, SMEs, ICT adoption, I-ONs, aggregation

Introduction

This completed research paper sets out an interpretive framework against which one initial case study based on an aggregation in the construction industry is considered. An aggregation means a grouping of enterprises engaged in similar or interdependent commercial activities. The research will form part of a wider comparison across additional industry sectors in order to deepen our understanding of the engagement of SMEs in e-business. E-Business is defined as the use of electronic communication networks to transact, process and collaborate in business markets. SMEs are defined as organisations of up to 250 employees and play an important part in any economy with 3.7 million in the UK generating 55% employment and 51% turnover (SBS 2002).

Before the Internet electronic interactions were based on proprietary networks, such as EDI protocols, and were mainly the province of larger companies primarily for reasons of cost. However, the advent of the Internet offered relatively low cost access to network infrastructure, which appeared to be particularly promising for smaller enterprises (Kalakota and Whinston 1996). This has been acknowledged by both international agencies and national governments. For example in the UK the Government has set three clear targets for the engagement of SMEs in e-business by the year 2002 (DTI 2001). The first was to ensure the connectivity of 1.5 million SMEs. This has already been exceeded and totalled 1.9 million by mid 2001. In contrast the second target of 1 million SMEs trading online has not been met with just 540,000 trading by 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 the UK. The third target of reaching parity with the best world practice was expressed in terms of SMEs' progress up a five stage 'e-adoption ladder' with each stage representing increased complexity. For this third target, presumably because the adoption rate is believed to be so low, the Government has not tried to measure engagement in complex applications beyond e-commerce (stage 3). SMEs in other leading economies exhibit similar traits, namely that with increasing complexity of e-business applications SMEs are proving slow to engage beyond elementary services (DTI 2001, EC 2002, Poon and Swatman 1999).

From a government policy perspective the behaviour of SMEs is of fundamental concern in that their lack of engagement will have important economic and societal implications. From a theory perspective the issues are significant and suggest that our understanding of SME behaviour and in particular their adoption of information and communications technologies (ICT) is too limited. To date, the majority of the research on ICT adoption (e.g. Cragg and King 1995, Iacovou et al 1995) has tended to focus on the technical or organisational factors underpinning adoption. However, the emerging pattern of SME practices and behaviours in the context of e-business suggest that the additional dimensions of application complexity, network relationships and industry specific context need to be incorporated into the theoretical perspectives.

The remainder of the paper comprises four sections, firstly the theory supporting the interpretive framework, secondly the methodology applied, thirdly the case narrative and finally the analysis and conclusions.

Interpretive Framework

Three principal theory domains are relevant to the interpretive framework, namely: (1) ICT adoption by SME (2) strategic networks and inter-organisational systems, and (3) the emerging e-business models literature. A fourth non-theoretical dimension of the framework is the UK construction industry specific context, Figure 1. Each is discussed briefly below.

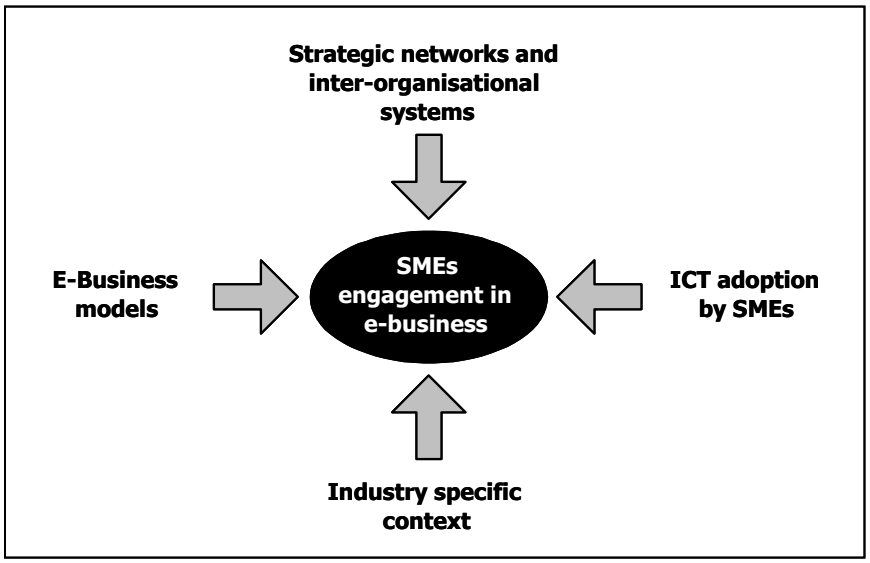

Figure 1. Overall Interpretive Framework

ICT Adoption by SMEs

Studies on the adoption of ICT by SMEs are relatively recent but research antecedents are well established. Rogers' work (1962, 1995) on the diffusion of innovations, whilst neither IT nor SME focused, has been particularly influential. This work has been extended into the area of information systems by including: inter-organisational networks (Swan et al 1998); complex ICT (Newell et al 2000); the role of intermediaries (Swan and Newell 1995); e-business (Kendal et al 2001). Importantly other work, however, has tried to develop better understanding of adoption in the specific context of IT and SMEs. Three strands of work can be identified, namely: strategic logic (Raymond 1985); complex processes of evaluation (Cragg and King 1993, Iacovou et al 1995); organisational stance (Southern and Tilley 2000).

Strategic Networks, Aggregation and Inter-organisational Systems

Particularly relevant here is the perspective of networks to help understand firm behaviour. 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 Prahaland (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. 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 1.

Table 1. Interpretive Framework of Aggregation Dimensions

Dimension	Sub-dimension	Authors
Micro-level ties	Resource flows	Ebers 1997; Dubois and Hakansson 1997; Ring 1997; Child and Faulkner 1998; Lipparini and Sobrero 1997; Holland and Lockett 1997
	Mutual trust	
	Information flows	
Governance	Intellectual property rights	Shaw and Conway, 2000; Johannisson 1998; Blundel and Smith 2001
	Co-ordination mechanism	
	Nature of transaction	
	Cost of networking	
Strategic	Motivation	Child and Faulkner 1998; Jarillo 1993; Ebers 1997
	Perspectives	
	Contingencies	
Diffusion of innovation	Change agent	Rogers 1962, 1995; Swan et al 1998; Newell et al 2000; Swan and Newell 1995; Kendal et al 2001
	Critical mass	
	Intermediaries	

E-Business Models

This emergent literature includes insights into alternative business models and changing industry structures as a result of Internet technologies (Earle and Keen 2000, Kalakota and Robinson 2000, Tapscott et al 2000, Timmers 2000, Lockett and Brown 2001). When examining the uptake of e-business approaches amongst SMEs the concepts of collaboration, interdependence, power and trust will 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-market maker (Kalakota & Robinson 2000); eClusters (Brown and Lockett 2001); value-adding intermediaries (Earle & Keen 2000) and are linked closely with this research.

Industry Specific Context

Clearly different industries exhibit different internal competitive structures and modes of doing business. This reported research centres on the UK construction industry which is characterised by its dependency on SMEs who provide 94% of employment and generate 92% of turnover, significantly higher that SMEs generally (SBS 2002).

Methodology

The primary aims of the wider research are to investigate the emergence of and potential for SME aggregation in facilitating SME e-business engagement. The conceptualisations of the eTrust Platform and a taxonomy of SME offline aggregations, Figures 2 and 3, were used help to shape the investigative process and research both theoretically and practically by assisting in the selection of data sources. This led to the following research indicative questions: What is the current position for SMEs with reference to e-business engagement?; What evidence is there of aggregations and what is their relevance to e-business engagement?; What are the potential roles for intermediaries in facilitating SME e-business engagement?

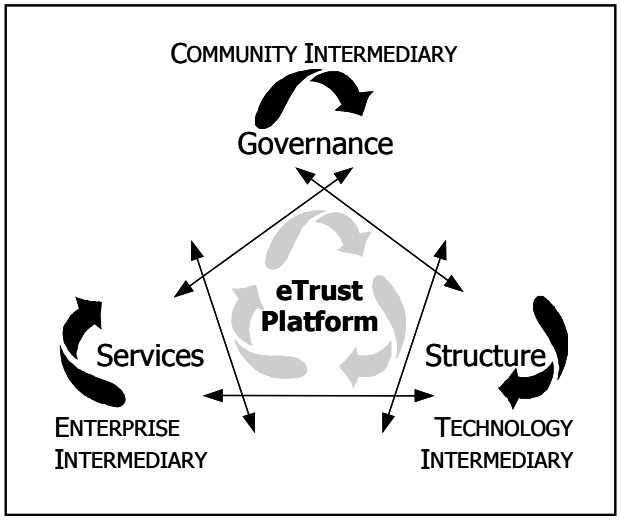

Figure 2. eTrust Platform (Lockett & Brown 2000)

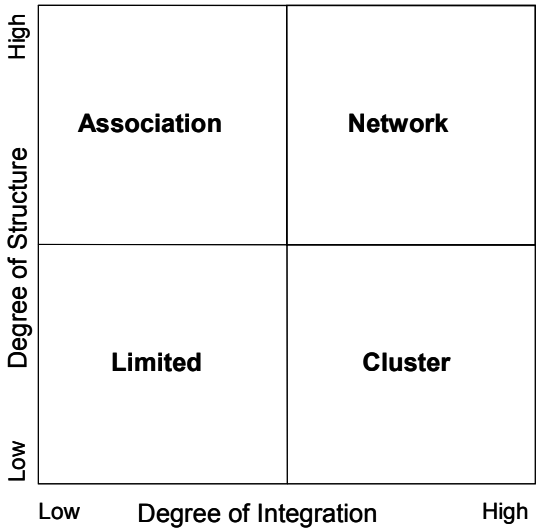

Figure 3.Taxonony of Offline Aggregations (Lockett & Brown 2001)

The first question was met by a review of quantitative secondary studies regarding the adoption of e-business by SMEs. The two subsequent questions were explored by both quantitative (survey) and qualitative (case study) methods. The research was planned and carried out as three stages – sampling, data collection and analysis. Each is discussed briefly below using the construction industry as the specific example.

Sampling

Potential aggregations were identified from the roles within the eTrust Platform interpretiveisation and the taxonomy of SME offline aggregations. This led to the identification of a specific aggregation in the construction industry using an online project management application to build stores for a leading UK supermarket chain. The application service provider (ASP) and trusted third parties (TTP) were approached in order to gain access. 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. Two samples for quantitative survey were derived as follows: users – at a meeting with the ASP account manager details of 15 SME users of the PMA were provided; non-users – 125 builders where selected alphabetically from www.yell.co.uk online directory for North West England. The selection of non-users was independent of other participants.

Data Collection

Qualitative field investigations were carried out during 2001 and 2002. Interview data collection took the form of semi-structured interviews with mostly senior managers in relevant organisations. Semi-structured interviews covered: the context for e-business engagement and SMEs; the evidence and nature of aggregation, including governance and relevance of taxonomy; intermediary roles and actors; provider business models, including strategy, structure, processes, revenues, legal issues and technology. Interviews lasted between 60 and 90 minutes with interview notes being taken and combined with other supporting data to form case notes. The two quantitative surveys were conducted between January and May 2002 as follows: users – a jointly agreed letter of introduction was sent to 15 contractors, these were then contacted by telephone and questionnaires subsequently posted, emailed or the URL given for online version and two subsequent reminders. 10 valid responses were received; non-users – 125 questionnaires where posted to the sample with a prepaid envelope, resulting in 18 valid responses being received. This limited number of responses provides illustrative rather that statistically defensible findings, however this data will be combined with three additional cases in order to provide an appropriate sample for future statistically analysis.

Analysis and Method

Qualitative data analysis was undertaken in parallel to the data collection. The unit of analysis was the aggregation. The overall method of data collection and analysis was rooted in the concept of embedded case design as suggested by Yin (Yin 1989). This necessitated a methodical, systematic approach to the multiple site investigations. Specifically the authors attempted to identify matching patterns (Yin, 1989:106) across and within the sample groupings in order to produce defensible research findings. Valid survey responses were included to illustrate key differences or similarities.

Profile of Construction Industry Case and Narrative

This case centres on a supermarket construction project aggregation consisting primarily of trusted third parties (TTP), application service provider (ASP) and SME contractors. The case is discussed within a interpretive framework derived selected literature on strategic networks, aggregation and IOS.

Aggregation: Industry Context

The aggregation was located in the UK construction industry, which could be characterised as aggregations centred on building projects consisting of multiple organisations and individuals with diverse skill sets. Finch highlights the "transient nature of construction projects and the teams that engage in them to create an environment of continual upheaval" (Finch 2000).

Aggregation: Formation

The construction aggregation was formed from existing trading partners 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. PMP speculatively development 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 main contractor rather than individual users. Having recruited the lead client PMP, with the explicit support of the client, attempted to recruit contractors. At the time of the investigation more than 80% of contractors were using the application on current projects for the lead client.

Actors: ASP – Project Management Application Provider (PMP)

Based on interviews, with the research director and account manager, and secondary data sources, such as web sites and documentation. 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 project being hosted at the time of the study and with over 100,000 user log-ins a month PMP was Europe's leading provider. The research director stated, "we are currently market leaders in the online project and asset management field." PMP secured £3m funding during 2001 and projects under management exceeded £1.6bn. The account manager stated that 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 life cycles of construction projects. It attempted to provide a secure, simple-to-use application service via the Internet. 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 users could see the advantages to the client and the opportunity to manage their contribution to the project better.

Actors: TTP – Construction Media Company (CMC)

Based on interviews, with the general manager and technical contributor, and secondary data sources, such as web sites and documentation. CMC was an established in 1999 and was widely recognised Internet media company, providing a wide range of information services, to the construction industry. The company employed 35 full-time people and was expected to breakeven

by the end of 2002. CMC was part the largest information supplier to the UK construction industry, including journals for architects and construction companies. CMC provided ten inter-linked web sites, 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 offering 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 CMC as a trusted source of information and CMS needed to address the business needs of users. CMC perceived its role was to raise awareness of e-business developments and in certain cases recommend services. CMC had recently researched online project planning services and organised conferences. CMC recommended PMP as the leading UK provider of hosted project management applications to the construction industry.

Actors: TTP – Supermarket Lead Client (SLC)

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 1960's, had over 200 stores and employing over 100,000 staff. SLC stores were supplied by over 2,800 suppliers via over 15 depots across the UK. No direct access was granted to SLC however the PMP account manager to SLC was subsequently interviewed in order to gain some insight into the position of the lead client. SLC first used PMP on a £10m new store construction project in 2000. This resulted 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. SLC contracted with PMP to provide the application for its entire building program. The service level agreement was between SLC and PMP. As part of this agreement PMP provided training and support to all users. This required PMP to visit all contractors in order to encourage and support them in the use of the application. SLC paid the application licence fee resulting in no direct charge being made by the contractor. All participating contractors needed Internet connectivity and web browser technology. SLC had decided not to make it compulsory for contractors to use the application but to encourage them instead. It was stated that SLC future selection of contractors would be influenced by their willingness to use the PMP application and provided contractors an additional business reason for using the application.

Survey

Illustrative findings from the survey of users of the online project management application and non-users within the wider aggregation are extracted in Table 2.

Interpretive Framework Comparison

In this section, and the final conclusions, the research outcomes are considered within the interpretive framework, especially the concept of strategic networks (aggregations), and in the qualitative case material. The survey data, which is obviously more limited is used for a general point of comparison.

Aggregation Dimensions: Micro-Level Ties

Resource flows through activity links: A shared information asset was created as part of the interactions between the client and users, whilst existing resources appeared unaffected. This was a potentially valuable resource for the PMP, SLC and users.

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

Information flows supported by catalysts: The roles played by the online application, firms and individuals in facilitating and shaping the formation of a specific aggregation was evident in this case. There was strong evidence of a facilitation role of SLC both by funding and promoting the use of the application.

Table 2. Comparison (Extract) between Users and Non-users

	Users	Non-users	df/critical value at 0.05	t-test
How would you describe your attitude to e-business?				
Positive	5	8		
Mainly Positive	5	5		
Neither	0	3		
Mainly Negative	0	2		
Negative	0	0	26	
Standard Deviation	*0.527*	*1.056*	1.706	1.484
How would you describe your knowledge of e-business?				
Good	2	3		
Fairly Good	5	9		
Neither	1	4		
Fairly Poor	1	1		
Poor	1	1	16	
Standard Deviation	*1.265*	*1.029*	1.746	0.143
E-Business allows you to do same activities more efficiently?				
Agree	4	3		
Tend to Agree	4	9		
Neither	2	5		
Tend to Disagree	0	1		
Disagree	0	0	19	
Standard Deviation	*0.789*	*0.808*	1.729	1.345
E-Business allows you to develop new ways of doing business?				
Agree	2	3		
Tend to Agree	8	12		
Neither	0	3		
Tend to Disagree	0	0		
Disagree	0	0	24	
Standard Deviation	*0.442*	*0.594*	1.711	1.034
What has happened or encouraged you to use e-business applications (enablers)?				
Sales & Marketing Important	8	12		
Fairly Important	6	11		
Neither	3	9		
Fairly Unimportant	0	1		
Unimportant	1	0	30	
Standard Deviation	*1.079*	*0.883*	1.697	0.272
Operational Important	13	15		
Fairly Important	12	12		
Neither	16	5		
Fairly Unimportant	0	2		
Unimportant	3	0	75	
Standard Deviation	*1.111*	*0.904*	1.665	**1.856**
Innovation Important	5	7		
Fairly Important	7	10		
Neither	5	12		
Fairly Unimportant	1	1		
Unimportant	0	3	45	
Standard Deviation	*0.900*	*1.262*	1.679	**1.720**
External Important	5	3		
Fairly Important	8	9		
Neither	20	10		
Fairly Unimportant	1	5		
Unimportant	2	4	55	
Standard Deviation	*0.961*	*1.811*	1.673	1.116

		Users	Non-users	df/critical value at 0.05	t-test
What is discouraging you from further use of e-business applications (barriers)?					
Security	Agree	8	9		
	Slightly Agree	5	15		
	Neither	14	10		
	Slightly Disagree	0	0		
	Disagree	0	1	55	
	Standard Deviation	*0.892*	*0.900*	1.673	0.471
Cost & Benefits	Agree	2	4		
	Slightly Agree	10	9		
	Neither	27	13		
	Slightly Disagree	3	4		
	Disagree	3	1	55	
	Standard Deviation	*0.859*	*0.985*	1.673	1.116
Infrastructure & Services	Agree	7	1		
	Slightly Agree	8	7		
	Neither	16	21		
	Slightly Disagree	3	8		
	Disagree	2	8	70	
	Standard Deviation	*1.079*	*1.022*	1.667	**3.181**
Information & Education	Agree	5	1		
	Slightly Agree	0	1		
	Neither	4	7		
	Slightly Disagree	20	18		
	Disagree	3	8	55	
	Standard Deviation	*1.191*	*0.973*	1.673	1.331

Aggregation Dimensions: Governance

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

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

Aggregation Dimensions: Economic

Nature of transaction with value activity: The application increased the structure of the information component of the transactions between the client and contractors. In doing so it increased the perceived value both for the users and client.

Cost of networking: The users had to the bare any internal cost associated with Internet connectivity, which in one case meant purchasing a computer.

Aggregation Dimensions: Strategic

Motivation: All participants were motivated to engage in the PMA. The client believed that they would achieve: increased control, cost savings and transparency whilst users recognised the opportunity for increased business with existing and new clients with no direct increase in costs.

Perspectives: The supermarket client and PMP both identified important long-term benefits from using the application and their decisions can be considered as strategic in matter. The users were less concerned with the wider opportunities emergent from the using the application but could identity strategic benefits to the relationships with the SLC and potential new business.

Contingencies: At an institutional level 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 PMA. At a relational level is it can be seen that existing relationships between the participants inferred trust in the choice of the online application provided by PMP.

Aggregation Dimensions: Diffusion of Innovation

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

Critical mass: The use, by both the client and PMP, of previously identified methods for increasing adoption of interactive innovation were identified. PMP: promoted the application to the lead clients thus targeting the top; supported users by training and promoted the benefits thus shaping the users perceptions; deployed the application project by project thus addressing intact subgroups and the free use offered an incentive to early.

Intermediaries: The role of SLC as a TTP for contractor's engagement was critical. Clearly contractors were willing to trade with SLC and provide products and services to the construction projects under existing agreements. CMC acted as a TTP to the industry by promoting PMP to potential users. The role of PMP was fundamental to the formation of the specific aggregation with their speculative provision of PMA being a prerequisite.

Conclusions

This case highlights the importance of the relationship, in this case non-exclusive, between the project management application service provider (PMP) and the 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 other trusted third parties (CMC) in sponsoring e-business applications. Clearly PMP's online application supported the business needs of the lead client and for contractors in managing construction projects, which nearly all users confirmed was of importance to their businesses. PMP initiated the application development however subsequently both the SLC and users became involved. The contractors relied on the lead client to negotiate and manage the service level agreement with the application service provider (ASP) and there was no direct cost to the contractors for the using the application. The lead client paid the ASP for contractors to use the application. Users had very high levels of ICT usage compared to non-users, who had very low levels of awareness of hosted aggregation specific applications. PMP's online application provided new functionality to all users who all trusted the ASP. 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, having a very positive attitude to and good knowledge and experience of e-business. They largely agreed that e-business improved efficiency and enabled new ways of business. Users were more engaged in e-business regardless of application complexity, Figure 4 and less concerned with barrier of infrastructure and services. They were more encouraged by the operational and innovative characteristics of e-business than non-users.

The specific aggregation exhibited many characteristics associated with I-ONs 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 firms, IOS and individuals. 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. The emergence of the online application outside the aggregation, its role in facilitating the formation of online networks and creating new value is not fully supported within the I-ON literature. This case also 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 networks evident by a change agent, critical mass building and intermediaries. The role of the online application addressing business needs within the specific aggregation provides a possible additional factor for diffusion of interactive innovations.

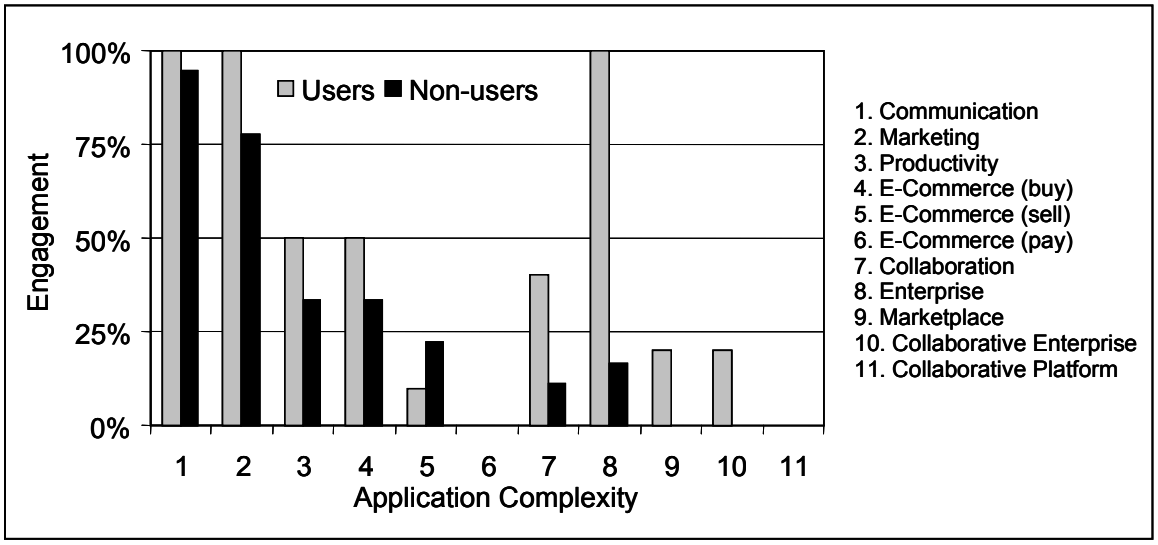

Figure 4. E-Business Engagement by Contractors

The interpretive framework proved to be a robust theoretical instrument for both shaping the investigation and structuring the research findings. However it did not anticipate the emergent property of the data accumulation from the specific aggregation and its potential subsequent economic and motivational value. The online project management application plays an important role in engaging SMEs in higher complexity e-business applications. This is in direct contrast to recent studies, which assume linear adoption. Clearly further cases will need to be analysed in order to identify similarities across other aggregations but the research does indicate the potential importance of hosted applications that address business needs of a specific aggregation supported by trusted third parties in engaging SMEs in e-business. Practitioner communities, such as application service providers, will need to consider how the appreciation of the activities and business needs of SMEs influences the development of online applications. Simply to provide existing functionality in an online environment would not appear to be sufficient to guarantee high levels of engagement.

References

Blundel, R., and Smith, D. Business Networks Report, Small Business Service, UK, 2001.

Booz Allen Hamilton International e-Economy Benchmarking: The World's Most Effective Policies for the e-Economy, IAP, UK, November 2002.

Brown, D.H., and Lockett, N. "Engaging SMEs in E-Business: The Role of Intermediaries within eClusters," EM: Electronic Markets, (11:1), 2001, pp. 52-58.

Child, J., and Faulkner, D. Strategies of Co-operation: Managing Alliances, Networks, and Joint Ventures, Oxford University Press, Oxford, UK, 1998.

Cragg, P., and King, M. "Small Firm Computing: Motivators and Inhibitors," MIS Quarterly, March 1993, pp. 47-60.

DTI "Business in the Information Age – International Benchmarking Study," Department of Trade and Industry, 5340 UK, 2001.

Dubois, A., and Hakansson, H. "Relationships as Activity Links," in The Formation of Inter-Organizational Networks (Ebers, M. Ed), Oxford University Press, Oxford, UK, 1997.

Earle, N., and Keen, P. From .com to .profit: Inventing Business Models that Deliver Value and Profit, Jossey-Bass, San Francisco, CA, 2000.

Ebers, M. The Formation of Inter-Organisational Networks, Oxford University Press, Oxford, UK, 1997.

EC. "Benchmarking National and Regional E Business Policies – Stage 1 – Synthesis report 7," February 2002. European Commission.

Finch, E. (2000) Net Gain in Construction. Butterworth Heinemann, Oxford, UK.

Hamel, G., and Prahaland, C.K. Competing for the Future, Harvard Business School Press, MA, 1994.

Holland, C., and Lockett, G. "Mixed Mode Operation of Electronic Markets and Hierarchies," in The Formation of Inter-Organizational Networks (Ebers, M. Ed). Oxford University Press, UK, 1997.

Iacovou, C., Benbasset, I., and Dexter, A. "EDI and Small Organisations: Adoption and Impact of Technology," MIS Quarterly, (19:4), 1995, pp. 47-60.

Jarillo, J. Strategic Networks: Creating the Boundless Organisation. Butterworth, Oxford, UK, 1993.

Johannisson, B. "Personal Networks in Emerging Knowledge-based Firms: Spatial and Functional Patterns," Entrepreneurship and Regional Development, (10:4), 1998, pp. 297-312.

Kalakota, R., and Robinson, M. E-Business 2.0: Roadmap for Success, Addison Wesley, NJ, 2000.

Kalakota, R., and Whinston, A. Frontiers of Electronic Commerce. Addison Wesley, MA, 1996.

Kendall, J., Tung, L., Chua, K., Ng, C., and Tan, S. "Receptivity of Singapore's SMEs to Electronic Commerce Adoption," Journal of Strategic Information Systems, (10:3), 2001.

Lipparini, A., and Sobrero, M. "Co-ordinating Multi-Firm Innovative Process: Entrepreneur as Catayst in Small-Firm Networks," in The Formation of Inter-Organizational Networks (Ebers, M. Ed). Oxford University Press, UK 1997.

Lockett, N., and Brown, D. H. "A Framework for the Engagement of SMEs in E-Business," in proceedings of the Americas Conference on Information Systems, Boston, MA, 2001, pp. 656-662.

Lockett, N., and Brown, D. H. "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, 2000, pp. 746-749.

Mazzi, P. "Small Business eBusiness: Bringing SMEs Online," at the IDC European eCommerce Forum 2001, International Data Corporation, 2001.

Newell, S., Swan, J., and Galliers, R. "A Knowledge-focused perspective on the diffusion and adoption of complex information technologies: the BPR example," Information Systems Journal (10), 2000, pp. 239.

Poon, S., and Swatmann, P. "An Exploratory Study of Small Business Internet Commerce Issues," Journal of Information and Management, (35:1), 1999, pp. 9-18.

Raymond, L. "Organizational characteristics and MIS success in the context of small business," MIS Quarterly, March 1985, pp. 37-52.

Ring, P. "Processes Facilitating Reliance on Trust in Inter-Organizational Networks," in The Formation of Inter-Organizational Networks (Ebers, M. Ed). Oxford University Press, UK, 1997.

Rodgers, E. Diffusion of Innovations. 1st and 4th Ed, Free Press, NY, 1962, 1995.

SBS. www.sbs.gov.uk/statistics, accessed 05 September 2002.

Shaw, E., and Conway, S. "Networking and the Small Firm," in Enterprise and Small Business: Principles, Practice and Policy. (Carter, R.S., and D. Jones-Evans. Eds.) Pearson Education, UK, 2000.

Southern, A., and Tillley, F. "Small Firms and Information & Communication Technologies: (ICTs): Toward a Typology of ICT Usage," New Technology Work & Employment, (15:2), 2000.

Swan, J., and Newell, S. The Role of Professional Associations in Technology Diffusion, Organization Studies, (16:5), 1995, pp. 847-874.

Swan, J., Newall, S., and Robertson, M. "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, 1998.

Timmers, P. Electronic Commerce: Strategies and Models for Business to Business Trading, John Wiley & Sons, Chichester, UK, 2000

Yin, R. Case Study Research: Design and Methods. Sage Publications, CA, 1989.