



E-commerce trading activity and the SME sector: an FSB perspective

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Abstract

Purpose – This study aims to examine e-commerce within UK small and medium sized enterprises (SMEs). More specifically, it seeks to explore associations between e-commerce and internal and external antecedents including trading behaviour, owner/manager characteristics, innovation, public sector involvement, business advice and finance sources.

Design/methodology/approach – An 8,500 + sample derived from the 2008 UK Federation of Small Businesses survey was utilised. An OLS regression equation was generated where the percentage of sales made using e-commerce constituted the dependent variable. Independent variables were constructed for several sets of factors including innovation, business advice and sources of finance, as well as a range of owner and SME typology variables.

Findings – The results suggest that e-commerce is more strongly apparent in SMEs started from scratch and where they were involved in basic or high knowledge services or the tourist trade. SMEs undertaking e-commerce were also associated with innovation in the form of copyright, as well as public procurement with local authorities and the university sector. Specific business advice in the form of capacity, family and suppliers was also associated with e-commerce trading.

Research limitations/implications – These results have implications for SMEs and public sector stakeholders. SMEs must recognise the importance of several potential antecedents such as intellectual property rights, specific business advice and finance to encourage e-commerce. Moreover, it was apparent that certain SME characteristics, namely locality and trading behaviour, were associated with effective e-commerce.

Originality/value – This study will be of value to academia, SMEs and key public sector stakeholders in the formulation of policy for ICT development.

Keywords E-commerce, SME, ICT, United Kingdom

Paper type Research paper



Introduction

Generally, there remains an ongoing debate regarding the effectiveness of the SME sector's usage of information communication technology (ICT), and more particularly, e-commerce trading. This is important because effective e-commerce deployment provides opportunity to achieve increased profitability and operational efficiency (Piris *et al.*, 2004). ICT usage has grown in importance and prominence since the emergence and widespread usage of the Internet and PC within SMEs and has been defined as the process of doing business electronically, where the Internet, and its related technologies, represented the enabler of more effective and efficient business processes (Darch and Lucas, 2002). The importance of ICT for the SME community cannot be understated, Daniel and Grimshaw (2002) claiming it to no longer be an alternative, but an imperative for future business success.

Indeed, Waters (2000) described ICT as essential to effective business operations as the telephone. ICT therefore represents an enabling mechanism for the SME community, potentially improving the efficiency of business processes, enhancing communication and revolutionising existing business models (Chong, 2004). ICT utilisation and adoption in SMEs has, however, remained an under researched topic, especially with regard to recognising the antecedents to successful deployment (Bharati and Chaudhury, 2006; Fink and Disterer, 2006). Anumba and Ruikar (2002) also determined, however, that the Internet has revolutionised the way in which information was stored, exchanged and viewed. More recently J.P. Morgan forecast that e-commerce revenue will grow to \$680 billion worldwide up 18.9 per cent from 2010 and global e-commerce revenue will reach \$963 billion by 2013 (Techcrunch, 2012). Terms such as e-commerce, e-business, Internet commerce and Web commerce have thus grown in prominence (Barnes *et al.*, 2004; Fillis and Wagner, 2005).

Specifically, enterprise activity within electronic markets has been typically referred to as electronic business (e-business) or electronic commerce (e-commerce) (Turban *et al.*, 2006). Evolving the definition of e-commerce by Chaffey (2012, p. 20) we define e-commerce trading to be, more specifically, financial and non-financial transactions between organisations using ICT which involves the distribution and selling of products and services to consumers by the supplier organisation. Previously several researchers suggested that knowledge of the determinants of ICT usage and adoption was limited (Martin and Matlay, 2001; Pflughoeft *et al.*, 2003). The ongoing debate within the literature as exemplified by the recent literature, concerns the nature of effective SME ICT adoption and utilisation.

ICT and SMEs

ICT use

In enterprises where ICT has a central focus it is employed to support business goals and objectives, as a reaction to customers and competitive forces (Gale and Abraham, 2005). Poon and Joseph (2001) and Simmons *et al.* (2011) also reported ICT benefits as increased competitiveness and improved performance. Mehrtens *et al.* (2001) identified three ICT SME drivers as perceived benefits (Poon and Swatman, 1999a), organisational readiness and external pressures (Ibbotson and Fahey, 2004). The ability of the SME owner/manager to recognise and understand benefits and relevance of ICT utilisation also, however, represents an obvious driver towards usage and increased uptake (Bharati and Chaudhury, 2006). Within this, owner/manager attitudes

were a critical variable in deciding the competitive position of the enterprise. Fillis and Wagner (2005) concluded, for example, that some SMEs were only prepared to grow to a certain size, due to lifestyle influences and consequently the ICT adoption rate varied. Lifestyle business identified that they might adopt a particular level of ICT attainment, but would not actively pursue growth as a business objective (Chibelushi and Costello, 2009). Moreover, they noted the complex variables and relationships within SMEs meant that investment decisions, such as ICT, were not made in isolation. Hodson and Whitelock (2003), for example, differentiated between SMEs that operated as lifestyle businesses and entrepreneurial ventures which actively pursued growth. Kendall *et al.* (2001) identified that existing knowledge of the owner/manager and the relative advantages of ICT, drives adoption, while Lau and Voon (2004) suggest that successful ICT adopters were highly motivated, entrepreneurial with an ability to accept risk.

Fillis *et al.* (2004) suggested that longer-term, expected benefits drives ICT utilisation, as opposed to shorter-term gains. Organisational readiness was, however, also dependant on the personality of the owner/manager and existing ICT infrastructure. Beckinsale and Levy (2004) suggested that the more entrepreneurial and risk-taking the owner/manager, the greater the likelihood of ICT adoption. The adequacy of SMEs' ICT infrastructures also had immediate implications on suitability for adoption and potentially impaired core business activity (Poon and Swatman, 1999b). Similarly, Jeffcoate *et al.* (2002) identified critical success factors for successful ICT implementation as participation with ICT, top management support, commitment, control and planning structures, process improvement, effective integration, enterprise culture and training. Simultaneously, customers, suppliers and even employees (Beckinsale and Levy, 2004) exerted external pressure. For example, a lack of customer use must be regarded as an inhibitor (Sillence *et al.*, 1998). Croll *et al.* (2001) observed the importance of knowing ICT benefits and customer participation. Simpson and Docherty (2004), thus determined that overall perceived benefit was the most significant driver for ICT, but with external pressures and organisational readiness important issues.

Sadowski *et al.* (2002) and Bengtsson *et al.* (2007) suggest that successful adoption of ICT varies according to enterprise size, exporting activity, awareness of benefits, industrial sector, customers and influence of trading partners. Hadaya and Pellerin (2008) for example, considered the understanding of the role of virtual enterprises in supporting manufacturing SMEs' internationalisation processes. Furthermore, Poon (2000) identified that customer participation in ICT was critical to success including relationships with suppliers, customers, partners and competitors, as was the nature of the business environment (Furnell and Karweni, 1999). These studies demonstrate that enterprises benefited from ICT deployment (Daniel and Grimshaw, 2002), but specific conditions had to be met to achieve significant benefit. Drew (2003) also noted sectoral differences could result in different internal requirements for SMEs, in relation to strategy development, training and support. Whilst adoption success has been reported in non-SMEs (Van Beveren and Thomson, 2002), however, doubt has been expressed regarding SMEs, particularly micro-sized enterprises' ability to exploit ICT successfully, given their limited access to in-house expertise and resources (Beckinsale and Levy, 2004). Levy *et al.* (2004) recounted that under half the SMEs they surveyed believed that ICT was important.

MacGregor and Vrazalic (2005) suggested that SME owner/managers were not enthusiastic or proficient about adopting ICT and their advanced usage remained low (Goode, 2002; Maguire *et al.*, 2007). Brown and Lockett (2001) identified that where adoption had occurred, failure rates were high. For example, Nataraj and Lee (2002) recounted that the failure rate among SMEs undertaking ICT activities was in excess of 75 per cent within two years of business start-up, which equated to 15,000 job losses. The prime reason for this failure was identified as a lack of a strategic model for ICT implementation (Raymond *et al.*, 2005). Taylor and Murphy (2004) supported this, arguing that enterprises were adopting ICT related technologies, not as a product of reasoned planning strategy, but as victims of competitive pressures and media hype. Rodgers *et al.* (2002) argued that micro-sized enterprises could not compete with larger organisations without an ICT strategy. Attitudes towards ICT, both positive and negative, can therefore be largely attributed to perceptions, knowledge and understanding of the owner/manager (Grandon and Pearson, 2004). Ndubisi and Jantan (2003) noted that enterprises with favourable perceptions made more effective use of ICT than those with unfavourable attitudes.

Daniel and Grimshaw (2002) found ICT adoption required consideration of a formal and appropriate ICT strategy (Chaffey, 2002), enterprise culture (Coates, 2001) and potential restructuring (Gulati and Garino, 2001). It was noted that SME owner/managers were reluctant to provide the time and finance to ICT development (Wolcott *et al.*, 2008), without indications of attainable benefit (Lockett and Brown, 2000). Lesjak and Vehovar (2005) recognised that ICT use contributed to the creation of current and future economic benefits, which was reflected in increased market value. Lewis and Cockrill (2002) identified that 71 per cent of SMEs surveyed realised quality benefits in terms of reduced costs, increased efficiency and increased customers. In terms of key success factors, Daniel (2003) identified that integration of ICT services with internal information systems, was an important determinant of eventual effectiveness. Lee (2001) described the change process as a potentially disruptive innovation which could radically alter operating procedures. Indeed, several examples of highly innovative SMEs that were prepared to adopt higher levels of ICT technologies (Loebbecke and Schäfer, 2001), and thereby potentially change the nature of their business operations have also emerged.

In summary, therefore, much of the extant literature recognised that the SME community, particularly the micro-sized classifications, was incapable, unable or unwilling to exploit ICT to its maximum potential, with limited examples of successful adoption and implementation (Schlenker and Crocker, 2003). Piris *et al.* (2004) identified, however, and Tan *et al.* (2010) supported the view that ICT operations were becoming a necessity particularly in certain industry sectors, which were highly competitive.

Internet use

Conversely, SMEs' ICT usage has also become increasingly driven more broadly by the emergence and usage of e-mail and the Internet as a business tool and its increased affordability and availability (eCIC, 2005; Jones *et al.*, 2011). The growth of the business use of the Internet has been unprecedented, having taken just five years to reach 50 million global users, in contrast to 38 years for radio and 13 years for television (Bell and Tang, 1998). More recently, Internet World Stats (2012) approximated that

worldwide there were in excess of 2,095 million people with access to the Internet. Europe contributed approximately 476 million of these users, equating to 22.7 per cent of the total World population and 58.3 per cent of the European population.

Within the UK, Internet World Stats (2012) identified approximately 51 million users which represents a population penetration rate of 82 per cent. Internet usage in Europe had thus grown by 353 per cent since 2000, a trend that was expected to continue. The unprecedented growth of the Internet, however, caught many SME owner/managers unaware, with enterprises finding it difficult to incorporate it within their business operations. Contemporary internet use research has provided studies from a number of perspectives including capabilities and performance benefits, internationalisation, e-risk perceptions, competitiveness and market growth.

In particular, Harrigan *et al.* (2010) have undertaken an exploratory study of internet technologies, electronic customer relationships management (ECRM) and SME performance benefits, Chrysostome and Rosson (2009) considered the Internet and SME internationalisation, and Pezderka and Sinkovics (2010) explored the conceptualisation of e-risk perceptions and implications for small firms that are internationally active online. Further to this Thrassou and Vrontis (2008) have researched internet marketing by SMEs in terms of enhanced competitiveness and professional services being internationalised, and Mathews and Healy (2008) investigated the SME perspective of the internet and international market growth.

E-commerce

This has given rise to the phenomenon often described as e-commerce. Three frequently used terms are e-commerce, e-business and i-commerce (Turban *et al.*, 2006). Kalakota and Whinston (1996, p. 1) defined e-commerce more particularly as the:

... buying and selling of information, products and services via computer networks.

Sterrett and Shah (1998) and Stockdale and Standing (2004) have argued that micro-sized SMEs can compete with larger organisations through e-commerce as their size enabled them to be more adaptable and responsive to changing conditions. Effective e-commerce deployment thus means that enterprises are no longer restricted by geographical locations and are able to compete in new national and global markets, both for customers and suppliers (Damanpour, 2001; Dholakia and Kshetri, 2004). In terms of financial support, Schneider and Perry (2001) and Galloway and Mochrie (2005) have suggested that SME owner/managers require support from government and support agencies to enable an effective transition in mindset. Such support can take multiple forms including business advice and/or financial backing in grants and loans.

Associated with financial support, however, is the potential impact on innovative capacity within the SME sector. Jensen and Webster (2006) note that potential underinvestment in innovative activity by SMEs is an important policy issue as it implies that a significant source of creative economic potential is being underutilised or even neglected.

This literature has already noted the significant contribution made by the SME community to economic wealth in the UK. Arundel and Kabla (1998), Cordes *et al.* (1999) and Macdonald (2004) have noted that the potential contribution of the SME

sector is constrained by limitations to the use of the IPR process for example limited access to financial assistance to acquire or enforce a patent.

Therefore there may be a case for intervention by the government or support agencies to provide additional support. However, Jensen and Webster (2006) argue that SMEs are more likely to apply for patents, trademarks and designs given their innovative potential, than large enterprises. Thus, there is no clear evidence to suggest that SMEs are disadvantaged.

The relationship between IPR and ICT usage within the SME sector remains unproven. The use of ICT between SMEs and the public sector has been encouraged by the growth of the internet in areas such as procurement (Croom and Brandon-Jones, 2007). Chan and Lee (2003) suggests that the value of E-Procurement adoption, trust on supplier, trust on IT, power of E-Procurement and influence of suppliers are significant factors associated with further adoption behaviour. However, Stockdale and Standing (2004) note that despite many government initiatives to promote ICT adoption within electronic marketplaces, the SME sector still fails to realise associated benefits.

Blackburn and Athayde (2000) recommended three strategies to assist SMEs in developing e-commerce aptitude, namely awareness raising initiatives (Iacovou *et al.*, 1995), training provision to enhance ICT skills (Pollard and Hayne, 1998) and utilisation of consulting services to assist transfer of business practices to the internet (Zalud, 1999). More recently Pavic *et al.* (2007) suggested that governments needed to take a long-term view, with the provision of extensive telecommunications networks and a proactive regulatory framework.

There have also been a number of perspectives investigated with regard to e-commerce adoption and SMEs in recent studies. Of particular interest is the study by Wymer and Regan (2011) who have investigated the influential factors in the adoption of e-business and e-commerce technologies by SMEs. Further to this, Grandon *et al.* (2011) have compared e-commerce adoption theories, While Neilson *et al.* (2010) have examined the international perspective of the development of e-business by wine industry SMEs, and Beynon-Davies (2010) has considered e-business as a regional development driver. Additionally, Scupola (2009) has studied the perspectives of e-commerce adoption by SMEs in Australia and Denmark, and Williams *et al.* (2010) have explored small business sales growth in the UK and internationalisation links to web site functions.

E-commerce trading

Whilst many traditional SMEs utilise e-mail and the Internet, they often have no intention of undertaking e-commerce trading (Simpson and Docherty, 2004). Such enterprises might pursue business growth, but not seek ICT development and vice versa. Quayle (2002) identified that ICT was not considered important by many SMEs, with only a third actually undertaking e-commerce trading. However, Jones *et al.* (2010) found that SMEs' trading behaviour was dominated by excessive reliance on local and regional markets with minimal exploitation of wider UK, European and global markets in either traditional or e-commerce trading behaviour.

They stated that SME owner/managers were typically not deploying e-commerce strategically but instead were mirroring their selling behaviour in traditional markets although on a significantly smaller scale. Other research has demonstrated that services sectors, especially the professions, are not necessarily the highest adopters of

e-commerce trading. This therefore challenges the notion that “high knowledge services” are positively associated with Business-to-consumer e-commerce trading. However, there may be a chance that it could be associated with Business-to-Business trading. This review of the literature has highlighted, therefore, a need for a study that examines the relationship between SMEs’ e-commerce sales and a range of external and internal variables that have the potential to influence this activity. The literature suggests that these variables could include external factors such as trading market, innovation, public procurement, business advice, financial assistance, while internal issues including enterprise characteristics such as and industrial sector classification, size, and turnover and owner characteristics may also be of relevance (see Figure 1).

The purpose of the research, therefore, is to provide an empirical basis for understanding some of the internal and external drivers for and impediments to e-commerce trading for SMEs. A regression analysis will identify and confirm the significant associations that impact on the SME in terms of E-commerce trade. Seven research propositions are therefore offered for investigation empirically: -

- (1) Specific enterprise characteristics are associated with SMEs undertaking e-commerce trade.
- (2) Owner/manager characteristics are associated with e-commerce trading activity.
- (3) Enterprise e-commerce trade is associated with specific trading markets.
- (4) SMEs’ intellectual property rights (IPR) innovation activity is associated with their e-commerce trading activity.
- (5) SME public procurement activity is associated with their e-commerce trading activity.
- (6) SME business advice is associated with e-commerce trading activity.
- (7) SME financing is associated with e-commerce trading activity.

Each of these will be explored within this study. A possible limitation of this study is that it needs to be noted that the propositions in some cases could be seen to be limited, for example, equating “innovation” solely with IPR that has been formally protected. The following section will outline the methodology to be deployed.



Figure 1.
Conceptualisation of
research process approach

Methodology

The standard definition of the European Commission (EC) classification for SMEs is enterprises employing fewer than 250 employees with an annual turnover of less than 50 million Euros and/or an annual balance sheet total not exceeding EUR 43 million (European Community (EC), 2003). The data were gathered from the 2008 UK Federation of Small Businesses (FSB) survey. Previous examples of research using the equivalent FSB Barriers to Growth survey data include Mason *et al.* (2006, 2011), and Carter *et al.* (2009), the 2008 dataset itself being used in Pickernell *et al.* (2011a, b).

This survey was sent out to the FSB's 200,000 plus members and received 8,742 responses. Although only 4 per cent responded it still represents nearly 9,000 responses, which is comparable with recent government surveys (e.g. Small Business Survey, 2007, 2008). The research instrument was developed over several months, in consultation with the FSB. The questionnaire was piloted with FSB members to ensure the instrument design was logical and the question design transparent. Individual enterprises were considered the unit of analysis with the owner/manager the spokesperson. The term "owner/manager" is employed to describe the individual owning or managing the activities in the SME and includes both the entrepreneur and the owner/manager (Walker *et al.*, 2007). This individual determines the ethics, recruitment, working practices, financial resources and operating decisions of the enterprise, overseeing and driving ICT adoption and usage (Fillis *et al.*, 2004). In examining the issue of representativeness, the full FSB respondent dataset was itself compared with the two most relevant UK Small Business Surveys (2007, 2008) in terms of variables including sector, owner age, enterprise age and anticipated growth, the enterprises in the FSB dataset broadly representative of UK SMEs as a whole in terms of these variables (see Pickernell *et al.*, 2011a, b for more details).

Given that the sample was drawn from FSB members, they may differ to some degree from the broader population in certain areas. In terms of IPR, for example, Rogers *et al.* (2007) found that less than five per cent of SMEs had used IPR (patent or trademark) between 2001 and 2005, compared to the FSB dataset which shows around nine per cent of respondents holding either/both of these two types of IPR. For beneficial advice, 85 per cent of respondents had received such advice from one or more of the sources, Professionals, Friends and Family, Government Business Services, Customers and Suppliers, Universities or Informal Networks/Trade Associations. This is close to, although lower, than the figure of 95 per cent reported in Bennett and Robson (1999). Finally, in terms of finance, Hughes (1997) reported that 83 per cent of SMEs had received finance from banks. For the FSB dataset, the nearest equivalent figure was 59 per cent. The generalisability of the results obtained, therefore, must be seen in the context of potential differences, though again the values are still broadly comparable with prior research.

Because of the large number of independent variables, and investigative nature of this research, and the potential for high levels of inter-correlation between them, a multivariate stepwise regression approach was adopted (see Reynolds, 1997; Gray, 2002; Rahal and Rabelo, 2006, for similar approaches). Specifically, an ordinary least squares (OLS) equation was generated where the percentage of sales made using e-commerce was the dependent variable. Independent variables were constructed for SME growth aspirations, innovation, business advice and finance and owner and SME-level variables. The analytical approach adopted was to exclude statistically

insignificant independent variables (at the 5 per cent level) until (with the *R*-squared or value maximized) all remaining independent variables were significant, using a forward step-wise type approach (given the total of 68 potential independent variables, with tests for robustness of the overall equation also conducted). The next section will present the findings of the study.

Findings

The data set comprised just over 8,700 respondents drawn from a broadly representative sample of the UK SME population (see Table I). The most populace grouping was drawn from the one to four employee grouping (53.2 per cent) followed by the five to 19 employee grouping.

When the survey return is presented by industrial sector the most prominent sectors (see Table II) were retailing (16.6 per cent), business services (12.4 per cent) and

Table I.
Survey population by
SME size classification

Category	Frequency	%
No employees	212	2.4
1 to 4 employees	4,651	53.2
5 to 19 employees	2,833	32.4
20 or more employees	604	6.9
Missing values	442	5.1
Total	8,742	100.0

Table II.
SME population by
industrial sector

Category	Frequency	%
Agriculture, forestry, fishing	258	3.0
Mining and quarrying	40	0.5
Manufacturing	837	9.6
Electricity, gas and water supply	55	0.6
Construction and building related activities	970	11.1
Sale, maintenance and repair of motor vehicles and fuel retail	226	2.6
Wholesale trade	282	3.2
Retailing	1,452	16.6
Hotels, restaurants, bars and catering	607	6.9
Transport and activities related to transport	435	5.0
Post, courier and telecommunications services	39	0.4
Financial services	315	3.6
Real estate activities	176	2.0
Renting of machinery, equipment, personal and household good	37	0.4
Computer and related activities	346	4.0
Research and development activities	56	0.6
Business services	1,085	12.4
Education	238	2.7
Health and social work	305	3.5
Personal services	480	5.5
Other please state	237	2.7
Missing values	266	3.0
Total	8,742	100.0



construction and building related activities (11.1 per cent). The industrial sectors within the sample again represent an adequate representation of the UK SME population.

The results section will focus predominantly on the significant associations that were identified by the regression equation undertaken. Thus only the results of statistically significant (at the 5 per cent level) associations are displayed.

Enterprise characteristics

The characteristics of the SMEs analysed included variables such as growth perspective, how the firm started, firm age, size and location, as well as industrial classifications and activities (see Table III). A positive association was identified between SMEs with a growth focus (0.043) and e-commerce sales. This positive association was logical given the desire for SMEs undertaking e-commerce trading to grow their business through increased sales.

Enterprise age was found to have a negative association (-0.042) with e-commerce sales activity. This suggests that younger SMEs were more successfully associated with e-commerce trading activity than were older enterprises. This statistic also suggests that younger SMEs may be more aware of and competent with e-commerce trading than older SMEs.

A positive association was also identified between the business being started from scratch and e-commerce trading activity (0.048). This association suggests that new business start ups are more aware of the potential of e-commerce trading activity as an inherent part of the business model from the inception of the business. SME size was also found to have a negative size association (-0.081) with e-commerce trading activity. Thus smaller SMEs were more associated with positive e-commerce trading activity. Overall, this suggests that newer, smaller SMEs were more proficient at attaining e-commerce sales than larger, older equivalents. This section also considered the association between the industrial sector classification of the firm, and location and e-commerce trading activity. Five industrial sector classifications were considered along with a rural/urban classification and involvement with the tourist trade (see Table III).

The results identified three positive statistical associations. Basic services identified a positive association with e-commerce trading. In addition, high knowledge services were positively associated with e-commerce trading. It is logical that enterprises in the high knowledge sector would be positively associated with e-commerce trading activity. The high knowledge sector would have a closer association with more sophisticated ICT deployment than other industrial sectors, and furthermore, IT has been viewed as essential to the production, dissemination and management of knowledge (Alavi and Leidner, 2001; Chaffey and White, 2010). Interestingly, industries in basic services were also positively related with SMEs undertaking e-commerce trading activity, potentially related to sectors such as hotels and restaurants. Finally, enterprises that relied on the tourist trade to at least some extent were negatively associated with e-commerce trading activity. Whilst this association may seem surprising, many of the (e.g. hotel and restaurants in the) tourist trade being extremely proactive in their use of web sites to promote their activities, this impact may partly be being captured by the basic service industrial classification, while non

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Variable	Standardised beta coefficients (all within VIF limits)
Local market focus (% of sales in local market)	-0.052
Regional (but non-local) market focus (% of sales in market)	
Rest of UK focus (% of sales in market)	0.188
EIRE (% of sales in market)	
Rest of EU (% of sales in market)	0.059
Rest of Europe (non EU) % of sales in market	0.076
Rest of world (% of sales in market)	0.067
IPR: patents	
IPR: copyright	0.055
IPR: trademark	
IPR: design	
Public procure: MOD	
Public procure: central gov.	
Public procure: devolved gov.	
Public procure: EU institutions	
Public procure: Gov. agencies	
Public procure: LAs	0.057
Public procure: police/fire	
Public procure: schools	
Public procure: NHS	
Public procure: universities/colleges	0.057
Public procure: Olympics	
Advice: Start up	
Advice: Raising capital	
Advice: Sales up	
Advice: Costs down	
Advice: Supply chain	
Advice: existing products	
Advice: new products	
Advice: new markets	
Advice: contacts	
Advice: skills	
Advice: capacity	0.046
Advice: confidence	
Advice: recovery	
Advice: management	
Advice: environment	
Advice: professionals	
Advice: government business services	
Advice: university	
Advice: family	-0.033
Advice: customers/suppliers	-0.041
Advice: trade associations	
Growth focus (none to sustained growth focus)	0.043
Firm age (under four years, four to nine, nine to 19 over 20)	-0.042
Limited company (yes or no)	
Employment size of firm (none to 20 or more)	-0.081
Owner age (under 45 to over 55)	

Table III.
OLS regression
(highlighting only
significant variables left
in regression)

(continued)



Variable	Standardised beta coefficients (all within VIF limits)	E-commerce trading activity
Gender (male majority to female majority)		
Previously owned business (no or yes)		
Finance: friends and family		
Finance: own personal	0.042	
Finance: own company	-0.038	
Finance: business debt and equity		
Finance: suppliers		
Finance: government	0.042	
Educational attainment of owner (not degree vs degree and above)	-0.037	
Previously worked in MNE (no or yes)		
Started (other method v. from scratch)	0.048	
Regional growth (low Non core region or High growth core region)		
Primary and energy		
Construction industry (no or yes)		
Basic services (no or yes)	0.131	
High knowledge services (no or yes)	0.039	
Manufacturing industry (no or yes)		
Business relies on tourist trade directly or indirectly (no or yes)	-0.058	
Rural or urban		
Constant		
Adjusted R-squared	0.133	
F statistic	34.541	
Significance	0.000	
Durbin Watson	1.982	

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Notes: $n = 4886$; per cent of sales made using e-commerce; mean = 11.3%

Table III.

hotel and restaurant tourist businesses are likely to rely on more face-to-face relationships with their customers.

As might be expected there was no association with the primary and energy and construction industry sectors. These sectors by the nature of their activities make less use of ICT and e-commerce trading. Furthermore, no association was identified between SME rural or urban location and e-commerce trading activity. Thus, for the first research proposition it was found that e-commerce trading activity was associated with SMEs with a range of characteristics.

Owner/managers' characteristics

In terms of owner/manager characteristics associated with E-commerce trading activity, a range of variables were also examined. These included owner age, gender, prior educational attainment (degree or higher versus lower/no qualifications) and previous business experience (both in previously running a small business and working in a multinational enterprise (MNE)). The results (see Table III) indicated that only for educational attainment was there a statistically significant relationship, in this case a negative association between e-commerce trading activity and (degree and above) educational attainment of the owner/manager. This result could be viewed as somewhat surprising, though it could also be related to the types of businesses that are

strongly reliant on e-commerce trading. Thus, for research proposition two, only for educational attainment was a relationship with SME e-commerce trading activity found.

Trading market

This grouping examined the association between trading market and e-commerce trading (see Table III). Thus the significance of trade in each trading market is measured by its percentage of sales in local, UK, Eire, EU, Europe, non EU and Rest of World trading markets. The results indicated that SMEs with a local market focus had a negative association (-0.052) with E-commerce trading. Furthermore, regional trading markets were found to be not significant. This is a logical finding suggesting that SMEs with an e-commerce trading perspective trade more in geographically distant and larger markets which might be more conducive to achieving E-commerce sales. E-commerce activity was found to be significant in four categories (Rest of UK, 0.188; Rest of EU, 0.059; Rest of Europe (non EU), 0.076; Rest of World, 0.067). This finding suggests that SMEs with an e-commerce operation trade more in non-local markets. Such a result suggests that SMEs with e-commerce trading capabilities are more strategically aware of the impact and effectiveness of certain e-commerce trading markets. Thus, for research proposition three, e-commerce sales were found to be associated with geographically wider trading markets.

Innovation and intellectual property rights

This analysis examined the association between innovation activity and e-commerce trading (see Table III). The results were not significant for SMEs involved in IPR activity with regard to patents, trademarks or design. However, the IPR result for copyright (0.055) was significant. This result suggests that copyright protection is an important consideration for SMEs involved in e-commerce trading. This suggests an enhanced level of sophistication and awareness among this SME grouping in trading competitively and protecting their products through copyright. Thus for research proposition four IPR innovation activity (but only for copyright) was associated with e-commerce trading activity.

Public procurement

This analysis assessed the association between SME involvement with public procurement such as central government and schools and SME e-commerce trading activity (see Table III). Significant associations were identified in only two particular contexts, namely with Local Authorities (0.057) and Universities and Colleges (0.057). Whilst many public procurement customers are making increasing use of the internet in their procurement activities, it may be that Local Authorities and University sectors (both significant contributors' to gross domestic product and employment in the UK) are more able to deal successfully with SMEs because of the nature of the goods and services they are purchasing (i.e. contracts sizes being more applicable to SMEs). It would also be fair to suggest that progressive and ambitious SMEs would look to trade with such institutions to enhance their turnover and profitability and these types of organisations would be likely to encourage the use of ICT.



Research proposition five was therefore found to be relevant in that both local authorities and universities evidenced a positive association between public procurement and e-commerce trading activity. It could be suggested that one of the reasons the relationship is stronger with local authorities and universities is that they influence small business to trade in that manner if they want to conduct business with them. This appears to be more than “encouraging” the use of ICT.

Business advice

The importance of business advice to e-commerce trading activity was also assessed. As can be seen from Table III, 15 forms of business advice and six sources were assessed in terms of their relevance and association with SMEs undertaking e-commerce trading activity. Only three positive associations were identified between business advice and e-commerce trading. Business advice to enhance business capacity was found to have a positive association with e-commerce trading activity. This is logical suggesting that progressive SMEs interested in growing their business through e-commerce sales would seek business advice to enhance capacity.

In terms of sources of advice, only negative associations were identified, between e-commerce trading and beneficial advice from family (-0.033) and customers/suppliers (-0.041). It is apparent that family advice was negatively related to higher levels of e-commerce trading activity within the surveyed SME population. This evidence might imply that family advice lacks the specific knowledge and expertise required to assist SMEs enhance their e-commerce trading capacity.

For customers/suppliers, it may be that the negative relationship with e-commerce trading activity is related to the more arms length nature of the relationships with customers and suppliers for high e-commerce using SMEs. Therefore, for research proposition six results suggest that specific types, but also sources of business advice, are relevant to e-commerce trading activity. With regard to the use of family advice being negatively related to e-commerce this might not be mainly in regards to the actual advice given. These could be the smaller businesses with fewer resources and that they either have no need to pursue e-commerce trading and no desire to do it.

Business finance

This analysis assessed the association between business finance sources ranging from finance provided by friends and family to government sourced finance and e-commerce trading activity (see Table III). Positive associations between e-commerce trading activity and own personal finance (0.042) and government finance (0.042) were identified. The positive association between SMEs using a personal finance option and e-commerce trading activity is logical. SME owner/managers involved in new business start ups typically have to invest their own capital due to the perceived risks involved for financial lenders especially in the current economic climate.

The positive association between government finance and e-commerce trading warrants further discussion. In recent years, SMEs have been encouraged to adopt more sophisticated levels of technology into their operational and trading practices including e-commerce trading. Government grants have been available to assist SMEs set up trading web sites. This evidence suggests that the government finance may

have been relatively effective in enabling SMEs to engage in e-commerce trading activity. This evidence is significant in that it could identify effective funding streams to assist SMEs to engage with e-commerce trading. These potential funding streams could be further explored to investigate how additional support could enhance their effectiveness.

Finance obtained from within the enterprise was, however, identified as having a negative association with e-commerce trading. This may indicate the low level of equity available within the SME sector to support e-commerce activity. The results related to research proposition seven, therefore, again provide evidence that the source of finance is of relevance when exploring e-commerce activity. The results therefore indicate a number of associations between several sets of variables and e-commerce trading activity within the SME community. The implications of these associations are considered within the following section.

Discussion

These results, based as they are on a relatively large dataset, provide an interesting insight into the wide range of contributory variables within the SME environment that influence e-commerce trading activity. As such they contribute to addressing the relatively issue of there being a limited body of evidence identified previously (Martin and Matlay, 2001; Pflughoeft *et al.*, 2003).

This study therefore represents a comprehensive study of SME e-commerce deployment based on a large quantitative survey. The results of this study are generalisable to SME behaviour and attitudes throughout the UK and are relevant in different European and global contexts due to the size and representative nature of the study. It was evident, for example, that SMEs with a growth focus demonstrated greater prevalence towards e-commerce trading activity. Moreover, SMEs with higher e-commerce related sales were typically younger, as well as smaller enterprises. This evidence suggests that younger enterprises and the owner/managers therein were more aware of e-commerce trading activity and more prepared/able to sell their products/services electronically. This was reinforced by SMEs that were started from scratch being more associated with e-commerce trading activity.

The wider market geography suggests the existence of more ambition and strategically aware owner/managers who are prepared to trade in national, European and global markets. This implies that new SMEs start-ups and their owner/managers are more ICT aware and looking to exploit the opportunity offered by e-commerce trading activity. This could also take many forms and could include activities such as E-Procurement with local authorities and higher education institutions. This activity might therefore benefit economic growth in the UK and contribute towards employment and regional development as mooted by Jutla *et al.* (2002). These findings therefore tend to support the argument offered by Damanpour (2001) and Stockdale and Standing (2004) that smaller SMEs are more adaptable, responsive and are looking to compete in global as opposed to local markets.

E-commerce activity is of course also significantly associated with particular industrial classifications, within services (both basic and high knowledge). These could be down to a greater predominance and deployment of ICT within these industries. Further contributory evidence towards e-commerce trading activity was identified in a range of variables including the impact of innovation activity (IPR copyright), business



advice (in terms of type (capacity raising) and negatively, source (family and customer/suppliers) and financing sources (positively for personal and government, but negatively for own company).

Whilst it was good to note the association between IPR, copyright and e-commerce trading activity, the absence of a patents, trademark and design protection association conflicts with the findings of Jensen and Webster (2006). The SME financing association, however, supports the prior studies of Schneider and Perry (2001) and Galloway and Mochrie (2005) who noted that SMEs require financial support from government agencies to aid their ICT development. Some of these variables can, of course, be seen to be aspirational in terms of positively seeking advice and innovation activity in terms of holding IPR of certain types, as well as seeking access to government finance.

Conclusions

In conclusion, the results suggest that the use of e-commerce capability and capacity is positively associated in SMEs with greater growth aspirations and motivation to innovate, and demonstrating wider market trading activity. To increase ICT competency within the SME sector greater efforts must be made to target such enterprises and drive further usage and development. This study will be of value to several key stakeholders namely the academic community, the SME sector itself and public sector bodies. For academics the study helps increase the limited literature considering antecedents of SME e-commerce trading activity. Moreover, the results inform and assist the SME community in identifying potentially critical success factors for successful deployment of e-commerce trading activity. Thus the existing and future SME owner/manager community will be able to recognise the importance of a growth orientation and the need for trade in a diversity of markets and to link with the public sector to accentuate further opportunities.

This study will also be of interest to enterprise support bodies in encouraging SMEs towards a growth orientation. Moreover, the results inform public sector stakeholders regarding which bodies are successfully associating with the SME sector for e-commerce trading activity and the factors related to increasing such activity. This will help enable public sector bodies which are not currently undertaking e-commerce trading activity effectively to identify and improve their current practices. The authors also recognise, however, the key limitation of this survey data are its lack of insight into the issues underpinning the behaviour of these variables. It could be argued, for example, that some of the antecedents such as copyright were only considered by firms after e-commerce engagement. It is therefore unlikely that it will enable firms using e-commerce to “enhance their usage and deployment”.

Future research will need a more tightly developed theoretical lens to help define a clearer purpose involving a developed research design and analysis framework. Further, this study in no way provides a roadmap for implementation, though it does provide useful insight into some common characteristics of SMEs successfully engaged in e-commerce. It cannot be asserted that all of these are antecedents. For example, copyright was associated with e-commerce trading activity, but this may only have become a consideration after engagement with e-commerce rather than before. Further research is therefore required to explore the underpinning factors associated with successful e-commerce deployment. Such research can be a mechanism

for both academia and government support agencies to drive further usage. In conclusion, however, analysis and reaction to the results of this study should enable SMEs and key stakeholders to enhance their usage and deployment of e-commerce trading activity. Moreover, key stakeholders should be able to formulate policy for ICT development with greater proficiency and accuracy.

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