



False promises: e-business deployment in Wales' SME community

E-business
deployment
in Wales

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Abstract

Purpose – This study aims to examine usage and deployment trends of e-business technologies within the small and medium-sized enterprise (SMEs) community in Wales, since the turn of the millennium. Analysis of prior surveys such as the Department of Trade and Industry and Federation of Small Business reveals poor adoption levels of basic information and communication technology deployment and minimal uptake of sophisticated technologies in comparison to other UK regions. Uptake of e-business was assessed through a quantitative survey of SMEs and contrasted against prior studies undertaken within Wales since 2000 to identify trends and levels of adoption.

Design/methodology/approach – The study is comprised of a survey of 500 SMEs including a representative population from diverse geographical and economic regions within Wales. The survey deployed a proportionately stratified and representative sampling technique, whereby two-thirds of the enterprises selected were micro sized classified enterprises with no employees to ensure compatibility with the Welsh SME population.

Findings – Levels of e-business uptake within prior surveys varied significantly, due to the contrasting nature and size of the samples. As a consequence, several previous surveys presented an overly optimistic picture of e-business adoption and results must, therefore, be treated with caution. The authors' own survey revealed lower utilisation levels of e-business than prior studies, suggesting sophisticated use of e-business was limited, especially within the smaller SME size classifications.

Originality/value – To achieve increased e-business uptake, it is critical that there is a long-term strategic vision by policy makers to ensure coordinated action by relevant public and private sector groups. Short-term strategies must be avoided and policy makers must drive an agenda for change by ensuring bodies, such as enterprises support agencies, academia and public and private sectors undertake complimentary activities that encourage e-business adoption. This study will be of value to academia, the SME community and key public sector stakeholders in the formulation of policy for e-business development and deployment.

Keywords Electronic commerce, Small to medium-sized enterprises, Wales

Paper type Research paper

Introduction

This study examines adoption of e-business within small and medium-sized enterprises (SMEs) in Wales. The literature espouses the importance of the SME community in engendering economic prosperity and enhanced economic development although it is also categorised by high failure rates. The adoption of information technology offers the opportunity for increased competitiveness and enhanced profitability.



However, evidence suggests that SMEs, particularly the micro SME classifications, are not effectively exploiting e-business, with few examples of successful adoption.

Background

Information technology/information system (IT/IS) usage in SMEs has increased since the widespread availability of the personal computer (PC) in the 1980s (Cragg and King, 1993). However, studies suggested that the undoubted potential of IT/IS is underutilised (Dhillon, 2005), as there was a tendency to deploy such technologies only within an operational and administrative context (Love *et al.*, 2005). Several inhibitors to successful IT/IS exploitation were identified, including limited financial resources, time and knowledge and skills, which could deter the SME from further technological adoption (MacGregor and Vrazalic, 2005). A key factor in this adoption process was the role of owner/managers (Iacovou *et al.*, 1995) and their perceptions and knowledge towards IT/IS. Prior research suggests that SME owner/managers are ineffective planners, especially in terms of IT/IS deployment (King *et al.*, 2000). This discussion has widened, since the emergence of the internet and e-business although it is apparent that the same utilisation picture is emerging. Known benefits of e-business deployment have been identified, including accessibility to new markets, customers and suppliers, increased accessibility and convenience and improved communication (Kaynak *et al.*, 2005). However, as before, inhibitors to e-business usage exist which impair the adoption process (MacGregor and Vrazalic, 2005) including factors such as available skills, finance and cost and time required to implement and maintain an e-business presence (Fink and Disterer, 2006).

The National Economic Development Strategy (NEDS) (2001) identifies the key contributors to poor economic performance in Wales as a weak indigenous business base, low activity rates, depleted added value production, too few enterprises exporting and an underdeveloped service sector. Other areas of weakness identified, were a lack of high technology, knowledge-driven industries with insufficient research and development, minimal exploitation of information and communication technology, low wages, deprived levels of entrepreneurship, inferior business birth rates, high business failure rates, meagre growth rates from SMEs to Public Limited Companies and underdeveloped potential within the tourism industry (NEDS, 2001). Wales lags behind most British regions, with a rate for business start-up 30 per cent below average (NEDS, 2001). These are significant factors that contribute to low levels of internet use for business purposes. Fillis and Wagner (2005) described the internet as a new paradigm for business. The activity within electronic markets is referred to as electronic business (e-business) or electronic commerce (e-commerce) (Turban *et al.*, 2000). E-business can be viewed as an all-organisation transformation concept in relation to IT/IS, with the capability of connecting business processes, enterprise applications and influencing organisation structure (Al-Qirim, 2003).

The Department of Trade and Industry (DTI) (2004) survey enables comparison between Wales e-business performances in 22 areas, against 11 other UK regions. Wales is ranked 12th out of 12 in six of these areas, 11 in five areas and tenth in four areas. Wales only achieves six top six ratings and an average ranking of ninth. This analysis places Wales as the worst but one performing region, with only Northern Ireland (NI) deemed inferior. Wales performs poorly in access to the internet, use of e-mail, online trading, online ordering, paying for goods online enabling customers to pay online. In terms of barriers to implementing e-business, setup cost was identified as the most significant

inhibitor with 51 per cent an increase of 16 per cent on 2003. Other key barriers were identified as running costs (35 per cent), lack of time and resources (19 per cent) and lack of IT skills (13 per cent). Access to the internet within Wales has decreased, from 93 per cent in 2002 to 88 per cent in 2004. In addition, LAN usage within enterprises has decreased from 74 per cent in 2003 to 70 per cent in 2004. Wales and NI have the lowest proportion of businesses with internal network technologies. The trend for businesses with e-mail (85 per cent) declined by 2 per cent since 2002. Enterprise usage of websites has increased to 79 per cent, a growth of 7 per cent since 2003 and WAN uptake has increased by 8 to 53 per cent. Enterprise usage of intranets has increased from 38 per cent in 2002 to 51 per cent in 2004. Several surveys (Table I; Jacobs and Dowsland, 2000; Owens and Beynon-Davies, 2001; Lewis and Cockrill, 2002; Jones *et al.*, 2003; Potter and Pickernell, 2004; Murphy and Symonds, 2004) have been undertaken by government-related agencies and academia, investigating e-business development within SMEs in Wales.

Table II identifies public sector studies investigating e-business utilisation in Wales since 2000. The basis for this analysis is annual reports by the DTI, eCommerce Innovation Centre (eCIC) and the Federation of Small Businesses (FSB). Analysis of 15 academic and public sector reports in Wales reveals significant trends. Levels of basic e-business technologies such as internet usage has significantly increased from 46 per cent (NOP, 2000) to 59 per cent in 2006 (eCIC, 2006). Broadband access has continued to increase with 78 per cent of all enterprises utilising this connection method (eCIC, 2006). Web site usage has increased to 72 per cent (eCIC, 2006) up from 20 per cent in NOP (2000) and e-mail from 20 per cent (NOP, 2000) to 58 per cent (eCIC, 2005). Uptake of more sophisticated e-business technologies in the eCIC (2005) revealed minimal uptake and even decline. For example, eCIC (2005) reported minimal intranet (4 per cent) and extranet (2 per cent) deployment. Statistics for eCIC (2006), however, suggested intranet (18 per cent) and extranet (7 per cent) usage had increased dramatically. Use of technology was more prevalent in the larger sized SME classifications with employees (eCIC, 2006). The eCIC (2006) study reported

Study	Year of study	Sample size	SME size classification	Type of survey	Area covered
Jacobs and Dowsland	2000	42	Not identified	Postal	Swansea
Owens and Beynon-Davies	2001	60	1-9 = 28 10-50 = 32	Postal	Cardiff Bridgend Newport The Valleys
Lewis and Cockrill	2002	25	1-4 = 3 5-9 = 11 10-24 = 7 25-60 = 4	Postal	All Wales
Jones, Beynon-Davies and Muir	2003	100	1-9 = 36 20-49 = 42 50-249 = 18	Postal and Telephone	Cardiff, Bridgend, Newport and Valleys
Potter and Pickernell	2004	166	1-49 = 71 50-249 = 29	Postal	Not identified
Murphy and Symonds	2004	16	1-4 = 25 5-9 = 25% 10-24 = 50%	Interview	Powys and Newport

Table I.
Identification of academic surveys in Wales

Study	Year	Sample size	SME size classification	Type
DTI benchmarking study	2000	200	1-9 = 25% 10-99 = 25% 100-249 = 25% 250 + = 25%	Telephone
NOP SME Wales survey	2000	1826	No Emp = 17% 2-4 = 44% 5-9 = 19% 10-249 = 20% 250 + = 0.4%	Telephone
DTI benchmarking study	2001	200	1-9 = 25% 10-99 = 25% 100-249 = 25% 250 + = 25%	Telephone
FSB	2002	737	0-3 = 16% 4-5 = 14% 6-10 = 21% 11-20 = 24% 21-30 = 15% 31 + = 8%	Postal
DTI benchmarking study	2002	200	1-9 = 25% 10-99 = 25% 100-249 = 25% 250 + = 25%	Telephone
DTI benchmarking study	2003	200	1-9 = 25% 10-99 = 25% 100-249 = 25% 250 + = 25%	Telephone
eCIC state of the nation	2003	7,769	1 = 20% 2-4 = 38% 5-9 = 18% 10-49 = 19% 50-249 = 3%	Postal telephone
DTI benchmarking study	2004	200	1-9 = 25% 10-99 = 25% 100-249 = 25% 250 + = 25%	Telephone
eCIC state of the nation	2004	2,826	1 = 24% 2-4 = 39% 5-9 = 15% 10-49 = 16% 50-249 = 4%	Postal
FSB	2004	836	1 = 9% 2-4 = 28% 5-9 = 20% 10-49 = 16% 50-99 = 1% 100 + = 0.4%	Postal
eCIC state of the nation	2005	2,537	0-9 = 72% 10-49 = 21% 50-249 = 7%	Telephone

Table II.
Identification of public
sector related surveys
in Wales

(continued)

Study	Year	Sample size	SME size classification	Type
eCIC state of the nation	2006	2,130	0-9 = 69% 10-49 = 24% 50-249 = 7%	Telephone
FSB	2006	881	0 = 8, 1 = 10, 2-4 = 39, 5-9 = 21, 10-49 = 18, 50-99 = 1, 100 + = 0.1, Not answered = 0.1	Postal Wales

69 per cent of SMEs paying for goods and services online, a healthy increase of 20 per cent since 2005. Customers paying online (7 per cent) demonstrated a decrease of 3 per cent since 2004. The latest eCIC (2006) study identified 18 per cent of connected businesses with employees reported that they sold goods or services online which again reflected a significant decrease of 11 per cent since 2004. Use of customer relationship management (17.5 per cent), supply chain management (6.7 per cent) and enterprise resource planning (7.1 per cent) systems demonstrated greater prominence than prior surveys but deployment remained limited especially within the smaller sized enterprises. In summary, several facets measuring sophisticated e-business performance demonstrated growth between 2000 and 2003, and thereafter stabilisation and even decline. eCIC (2005) identified that drivers to e-business differed between existing and new users. SMEs that were not connected to the internet identified the desire to attract new customers (27 per cent) and improve efficiency (26 per cent). Existing e-business users identified drivers as the desire to attain further customers (18 per cent), more efficient internal processes (16 per cent), staying ahead of competitors (15 per cent) and attaining increased customer satisfaction (13 per cent) (DTI, 2000, 2001, 2002, 2003, 2004; NOP, 2000; eCIC, 2003, 2004, 2005, 2006; FSB, 2002, 2004, 2006).

This evidence suggests, therefore, that the perceived drivers of e-business become more sophisticated and realistic with increased usage. However, 23 per cent of SME owner/managers connected to the internet identified no specific drivers to e-business, implying limited awareness. Lewis and Cockrill (2002) differentiate between direct and indirect benefits attained. Indirect benefits were identified as access to new markets and customers. Direct benefits were identified as cost and time savings. The eCIC (2005) and FSB (2004) studies also identify that SMEs had obtained inquiries and sales and new business opportunities from the UK and overseas. Additionally, the eCIC (2005) study identifies efficiency gains from internal processes. However, over 20 per cent of SMEs owner/managers in eCIC (2005) identified no benefits obtained from e-business utilisation. Conversely, inhibitors to e-business were identified as limited bandwidth (eCIC, 2005), insufficient finance and high development and implementation cost (eCIC, 2005, 2006), time (Jones *et al.*, 2003), limited knowledge, advice and support (eCIC, 2005; DTI, 2004) and lack of skilled staff (eCIC, 2005). Other inhibitors were identified as customer and staff resistance (Murphy and Symonds, 2004), not applicable to the business operation (eCIC, 2006).

Understanding the influence of these barriers is critical to understanding the nature of e-business growth within the SME sector. Jones *et al.* (2003) suggested small and micro enterprises identified insufficient time and limited financial resources as the main factors constraining the speed of e-business development. By contrast,

barriers to speed of e-business development have less influence in medium and large SMEs. This suggests that micro sized SME owner/managers are finding it difficult to develop their e-business technologies, with their limited resources and skills, beyond a basic level. Kendall *et al.* (2001) found that internet adoption was faster where SME owner/managers recognised the business need for the technology. This raises the question regarding the level of ongoing maintenance and evaluation, which is occurring within the sector. A key issue in terms of achieving e-business growth is the maintenance policy, most significantly for the enterprise web site. If the web site content is being maintained, developed and updated, its usage is likely to become of more central importance to customers, employers and suppliers. Potter and Pickernell (2004) identified that only 38 per cent of small and 53 per cent of medium SMEs undertook regular web site maintenance. This response was reflected in the latest eCIC (2006), which identified that 37 per cent of enterprises reported managing the web site development externally, with 38 per cent noting in-house development and 24 per cent using a combination of the two.

A issue connected to the lack of maintenance, are the poor IT/IS skills within the SME workforce, due to the limited training provision. Potter and Pickernell (2004) identified only half of SMEs were satisfied with their IT skills expertise, although only 34 per cent provided training. eCIC (2006) noted levels of IT training for employees was 26 per cent for all enterprises with employees, but just 9 per cent for enterprises with no employees. The eCIC (2005) survey revealed the common method of e-business training was for staff self-teaching, with 20 per cent of micro and 24 per cent of small SMEs utilising this method. Worryingly, 6 per cent of micro enterprises identified no method of meeting staff IT/IS training needs. In contrast, 45 per cent of medium SMEs (10-49 employees) delivered IS/IT training on an *ad hoc* or regular basis, with 18 per cent providing outsourced training. Only 18 per cent of medium enterprises relied on staff self-training. A significant proportion of SMEs (41 per cent micro, 36 per cent small, 18 per cent medium) reported no provision for IT/IS training. These statistics support the view that SME owner/managers do not understand the benefits or the importance of e-business, and therefore, it is under resourced in terms of staff training. Another symptom of the SME sector, was the inability of owner/managers to measure costs and benefits incurred from e-business usage (DTI, 2004), whereby only 11 per cent of SMEs decision makers undertook any form of formative evaluation to assess added value. This lack of planning can be closely related to the limited degree of formal strategic. E-business planning undertaken within SMEs, with 11 per cent of enterprises with employees reporting that they had a documented formal e-business strategy. This deficiency was most prevalent within micro-sized businesses (9 per cent) and enterprises with no employees (8 per cent) (eCIC, 2006). The picture that emerges of e-business deployment in the SME sector is one of basic utilisation especially in the smaller sized micro SME classifications. Higher levels of organisational utilisation are restricted by a number of inhibitors, which delay initial adoption and inhibit further growth.

Methodology

The study comprised a questionnaire analysis of SMEs usage of e-business technologies. The authors identified a target of 500 SME enterprises thus providing sufficient size and quality to yield credible results in terms of accuracy and consistency. The survey utilised both self-completion (mailed questionnaires) and interview techniques (personal interview

and telephone questionnaire). The questionnaire utilised two forms of closed questions, namely, list and category style questions. The questionnaire was sequenced to initially consider enterprise use of IT, and thereafter increasingly sophisticated e-business technologies. To analyse the data, a number of univariate statistical methods were utilised to enable comparison with prior surveys to identify data trends. Frequency counts of the survey population were undertaken to identify summarised individual responses to questions. Cross-tabulations were utilised to allow comparison between subcategories of variables. In addition, measures of central tendency were utilised to identify averages, which were widely used within prior surveys as a method of evaluating technological trends. Similarly, measures of dispersion, such as standard deviation were utilised to evaluate levels of variance from the mean. To evaluate the relationship between variables, χ^2 measures were utilised.

Findings

Table III illustrates the response rate of each collection method, whereby over 1,500 enterprises were contacted. Surveyed enterprises were grouped into four categories in line with industry classifications (Small Business Service, 2005):

- a micro classification with no employees;
- a micro classification with between 1 and 9 employees;
- small enterprises with between 10 and 49 employees; and
- medium enterprises with between 50 and 249 employees.

When the survey was analysed by business type, the “no employee” micro sector represented 34 per cent of the total respondent population. The “1-9” micro-business group proved the most significant, contributing 44 per cent, followed by “10-49” small (14 per cent) and the “50-249” medium-sized enterprises (7 per cent) category.

Survey respondents were asked to identify their traditional trading markets without the influence of e-business on business practices. About 49 per cent of survey respondents indicated trade only within Wales, whilst 81 per cent identified that over 50 per cent of their turnover was within Wales. The mean revealed a high reliance on Wales as a trading market, with an average of 81 per cent and a standard deviation of 29.9 per cent. When the Welsh trading market is contrasted by SME classification, it is apparent that smaller SME size groupings place greater reliance on the Welsh market, with 64 per cent of no employees, 55 per cent of “1-9” and 34 per cent of “10-49” SMEs trading only within Wales. Further analysis revealed that 90 per cent of “no employees”, 92 per cent of “1-9” and 93 per cent of “10-49” SME classifications did more than 50 per cent of their trading within Wales. Contrastingly, the “50-249” grouping was less reliant on this traditional market, with only 15 per cent of this sector trading 100 per cent

Data collection method	Completed F	Total sample F	Percentage of data collection method	Percentage of total sample
Postal	185	872	21	37
Personnel interview	104	122	85	21
Telephone	211	549	38	42
Total	500	1,543	32	

Table III.
Questionnaire response
by delivery method
as a percentage

within Wales. Indeed, 43 per cent of “50-249” SMEs surveyed undertook less than 30 per cent of their trade within Wales and 19 per cent none whatsoever. In the UK traditional market, results revealed that 51 per cent of responding SMEs did not trade in a UK market outside Wales. Indeed, 69 per cent of all respondents identified that less than 10 per cent of their trade was within a UK market outside Wales. The overall mean was 15.73 per cent, with a high standard deviation (25.45 per cent), suggesting a wide range of performance. Smaller Welsh SMEs are not trading extensively within a wider UK market. For example, 61 per cent of “No employees”, 54 per cent of “1-9” but only 32 per cent of “10-49” SMEs undertook no trade within the UK, outside Wales.

Overall, only 13 per cent of “no employees”, 4 per cent of “1-9” and 7 per cent of “10-49” identified undertaking over 50 per cent of their total trade within a UK market outside Wales. By contrast, the “50-249” sector was extremely proactive, with 42 per cent undertaking over 50 per cent of their trade and only 15 per cent not trading, in a UK market. Analysis of trade within the EU, revealed minimal exploitation, with a resounding 85 per cent identifying that they did not trade within this market and only 10 per cent identified that up to 10 per cent of their trade came from this sector. Overall, only 10 per cent of “No employees”, 7 per cent of “1-9” and 18 per cent of “10-49” identified undertaking up to 10 per cent of their total trade within EU markets. The “50-249” sector demonstrated the highest level of trade within the EU, with 30 per cent identifying trade of up to 40 per cent of overall sales. Analysis of trade outside of the EU revealed 93 per cent of the “no employees”, 94 per cent of “1-9”, 90 per cent of “10-49” and 74 per cent of the “50-249” identified zero global trade. Only 8 per cent of the “50-249” and 15 per cent “10-49” sectors identified that global trade accounted for up to 10 per cent of their overall sales.

Levels of IT/IS utilisation

IT/IS utilisation revealed a diminishing usage of sophisticated e-business technologies (Table IV). About 45 per cent identified using one or more PCs and 7 per cent a basic LAN. In total, 12 per cent claimed usage of a LAN on a server, 3 per cent utilised several servers, whilst 4 per cent operated a number of LANs and WANs. However, 29 per cent of enterprises surveyed did not use any IT/IS, this being most significant within the “No employees” and “1-9” SME classifications, with 46 per cent noting no usage. IT/IS usage within the smaller SME classifications was limited (46 per cent in both classifications) to the usage of one or more PCs running application software. Usage of networks was limited, with only 4 per cent of the “no employees” and “1-9” sector utilising

Factor	Overall		Percentage by SME size			
	n	%	No. emp.	1-9	10-49	50-249
Do not use IT/IS	143	29	46	46	8	6
Use 1 PC running software	145	29	39	39	14	0
More than 1 PC running software	82	16	10	10	28	6
Number of PCs sharing a printer over LAN	35	7	4	4	13	0
Have LAN of PCs sharing applications on server	60	12	1	1	24	36
Have LAN of PCs sharing applications on several servers	13	3	0	0	8	17
Have number of LANs and WANs of PCs	21	4	0	0	6	36
Total	499	100	100			

Table IV.
Usage levels of IT/IS
by SME classification
by percentage

a network and 1 per cent a server. The “10-49” sector displayed significant usage of LANs (24 per cent), and servers (8 per cent), with 6 per cent utilising WANs. As expected, the “50-249” sector demonstrated the highest usage levels of more advanced IT/IS technologies, with 36 per cent utilising LANs, 17 per cent servers and 36 per cent WANs. When analysed by business activity, some interesting trends are apparent.

Sophisticated IT/IS usage was minimal, with only 12 per cent of respondents using a LAN and a server, 2.6 per cent LANs using multiple servers, 4.2 per cent LANs and WANs. When asked what percentage of staff utilised IT/IS on a daily basis, 32 per cent of all survey respondents identified up to a quarter of staff, 11 per cent up to a half, 5 per cent three-quarters and 24 per cent more than three-quarters. These statistics suggest that those enterprises that are utilising IT/IS are exploiting it in everyday business operations. When the SME size classifications are contrasted, the level of high usage within the “No employees” sector is significant, with 48 per cent identifying that more than three quarters of their staff were daily users. Within larger SME classifications (“1-9” 47 per cent, “10-49” 57 per cent, “50-249” 47 per cent), the most significant usage was only a quarter of staff using IT/IS on a daily basis. This statistic is explained by the presence of specialist IS/IT staff within the larger SME classifications and contrastingly, the necessity for personnel within the smaller SME classifications to multi-task and acquire IT/IS skills expertise.

Smaller sized SMEs classifications had less internet access than larger enterprises; the “no employees” sector identified 36 per cent, compared with 58 per cent of the “1-9” classification. The larger SME classifications demonstrated higher levels of internet connectivity (“10-49”, 86 per cent and “50-249”, 92 per cent). In terms of internet connection, 23 per cent of respondents identified employing a dial up analogue modem, 30 per cent a broadband connection (asymmetric digital subscriber line, digital subscriber Line, wireless, cable, satellite) and 3 per cent integrated services digital network. The majority of SMEs had access to a broadband connection, with the ongoing decline of dial-up suggesting that SMEs are utilising sophisticated internet connections methods that are becoming available (eCIC, 2006). A positive association was established between enterprise size classification and internet access through a χ^2 association test ($\chi^2 = 22.570$). This result indicates that enterprise size is a determinant in establishing an internet connection with higher levels of connection within larger SME classifications. These usage trends are reflected in use of e-mail, whereby 48 per cent of all survey respondents identified usage, with higher level of utilisation recorded within larger classifications (“50-249”, 92 per cent, “10-49”, 74 per cent) in contrast to the smaller enterprises (“1-9”, 45 per cent and “no employees”, 24 per cent). A χ^2 -test revealed an association between the variables “e-mail usage” and “SME classification” ($\chi^2 = 25.981$). This association suggests that the larger classifications of SME are more likely to use e-mail than smaller-sized enterprises. This is a natural assumption, as the larger SMEs tend to have greater financial and staff resources and be more technologically advanced. About 33 per cent of respondents identified web site ownership, comprising 17 per cent of “no employees”, 32 per cent of “1-9”, 44 per cent of the “10-49” and 89 per cent of the “50-249” sector. Thus, it can be seen that web site usage is more prominent within the larger SME classifications. A chi-square analysis reveals an association between SME classification and web site ownership ($\chi^2 = 23.439$). Electronic data interchange (EDI) facilities were recorded within only 7 per cent of survey respondents. Usage levels within larger enterprises were higher than within smaller enterprises, with the “no employees”

(1 per cent) and the “1-9” (3 per cent) sectors recording minimal uptake in comparison to the “10-49” (17 per cent) and “50-249” (33 per cent) sectors. Levels of sophisticated e-business technologies were disappointing, with only 2 per cent of respondents identifying usage of an extranet, 5 per cent intranet, 1 per cent groupware and 2 per cent video conferencing. These technologies were typically used by larger SME classifications, which is understandable given their greater financial and human resources.

Internet usage

The internet was used for e-mail (47 per cent), finding information (52 per cent), advertising and marketing (27 per cent), purchasing from suppliers (21 per cent) and online sales (10 per cent). In terms of enterprise size, there was a higher level of proportional representation within larger SME classifications (“10-49” and “50-249”). Prime uses of the organisational web site identified were to advertise and market products and services (29 per cent) and generate enquiries (23 per cent). Web site functions such as distributing information to suppliers (7 per cent), to employees (3 per cent) and generating online sales (5 per cent) had less importance.

Web site development

SMEs also identified the origin of their web site. Overall, 33 per cent of survey respondents identified web site ownership. Of these, 44 per cent were developed in house, 41 per cent had employed a specialist organisation, whilst 6 per cent had benefited from an e-business initiative. When analysed by SME classification, reliance on in-house development was most significant in the “no employees” (44 per cent) and “1-9” (51 per cent) size groupings. Thereafter, these SME classifications rely on specialist web design organisations (“no employees”, 40 per cent and “1-9”, 39 per cent). There was less reliance on in-house web site development with the “10-49” (32 per cent) grouping, but increased dependence thereafter within the “50-249” grouping (43 per cent).

Impact of e-business

Of the 165 enterprises with a web site, 155 (94 per cent) identified its cost. Overall, 74 per cent identified paying some monies for a web site development with 24 per cent noting a £100 cost and 25 per cent reported paying up to £500. However, 21 per cent of enterprises’ owner/managers were unable to identify the web site development cost. The inability to identify implementation costs suggests a lack of strategic awareness and control of this function. About 15 per cent of respondents identified paying more than £1,500 for web site development. The larger SME classifications were prepared to pay higher amounts for a web site development, with 33 per cent of the “50-249” sector paying over £2,000.

When asked to identify level of web site income in the last 12 months, 94 per cent ($n = 153$) of enterprises responded. Income was identified as orders taken directly from the web site or orders arising from viewing of the web site. This income was considered as additional to existing organisational earnings, as opposed to an alternative method of trading with customers. Of those that responded, 22 per cent identified that they had not made any money from their web site and 48 per cent did not know. These results must be treated with some caution as they represent a self assessment and might be overly optimistic. Only 15 per cent of web site owners identified making in excess of £1,000 from their web site in the last year. In terms of enterprise size, the survey population

represented 14 per cent of “No employees”, 31 per cent of “1-9”, 42 per cent of “10-49” and 83 per cent of the “50-249” classification. An extrapolation of performance in each size classification is informative. The “no employees” classification has a high proportion of enterprises that have not generated revenue from their websites (25 per cent) in the last 12 months. Moreover, 42 per cent of “No employees” SMEs identified that they did not know how much revenue their web site had generated. Encouragingly, 16 per cent of “No employees” had generated £1,000 plus and 8 per cent over £5,000 of revenue, which compares favourably with the larger SMEs. This suggests that there are examples of utilisation and good practice within this SME category. A χ^2 -test reveals an association between SME size and generating sales ($\chi^2 = 8.906$) from organisation use of the internet, which suggests that SMEs are motivated by the desire to attain online sales.

Enterprise size does not, however, seem to provide any advantage in terms of greater awareness of e-business performance. Both the “10-49” and “50-249” categories identify a high “don’t know” response, suggesting a lack of planning and evaluation of e-business internally. As would be expected, given the higher financial and personnel resources, the “50-249” sector records the highest level of income attainment. When asked to identify the location of their E-commerce trade, results suggested reluctance to trade outside Wales; 37 per cent of respondents indicated they did not trade within the UK outside Wales, 73 per cent did not utilise EC trade and 74 per cent global trade. Contrastingly, 49 per cent of respondents thought over 40 per cent of their E-commerce trade was within Wales. The Welsh market achieving an average of 43 per cent with less reliance on the UK (28 per cent), EC (9 per cent) and global trade (11 per cent). However, all these groupings reported significant variances within standard deviations (20 per cent +) suggesting extremes of practice. Using a three-way cross-tabulation of SME classification against web site cost and income reveals little of significance. Web site investment of over £5,000 only created an income of + £5,000 in three cases (two “50-249” and one “1-9”). A web site investment of up to £100 generated an income of over £5,000 for six enterprises (two “No employees”, two “1-9”, one “10-49” and one “50-249”), providing limited evidence of the potential of E-commerce revenue.

Drivers/barriers and benefits for e-business

Internet connected enterprises were asked to identify their drivers for adopting e-business. Nine drivers were identified the most significant being the opportunity to access a new marketing medium (63 per cent) improve the information communication with customers and suppliers/employees (63 per cent), gain access to new markets (59 per cent) and keep up with competitors (51 per cent). Less important was deemed the importance of meeting customers’ needs in improving connection to organisation services (44 per cent), cost savings in communication 42 per cent) and gaining a competitive advantage (40 per cent). No significant trends emerge when drivers are evaluated by enterprise size, except that the “1-9” grouping has provided the most respondents, which could emphasize their desire for e-business growth. The “no employees” SMEs size rank accessing new markets as their most significant driver, in contrast to the “10-49” and “50-249” sectors, which place greatest emphasis on improving the communication of information.

Inhibitors to adopting e-business

The strongest inhibitors to adoption of e-business were perceived as time to develop an e-business operation (40 per cent), limited IT/IS skills (34 per cent),

low customer/supplier usage and insufficient financial resources (26 per cent). Less importance was attributed to a lack of information, advice and support (21 per cent), lack understanding and confidence (21 per cent), relevance (21 per cent) and security (12 per cent). When analyzed by SME classification, variation is minimal, although “no employees” sector considered insufficient financial resources as more significant than the “1-9” and “10-49” groupings.

Perceptions of e-business

Key benefits were identified as new advertising methods (40 per cent), improved access to information (32 per cent) and reduced cost of communication with customers (32 per cent). The “no employees” grouping ranks the current key benefits as advertising and marketing (27 per cent), reduced cost of communication with customers (27 per cent) and new markets (27 per cent) with equal precedence. The “1-9” sector was concerned with increased revenue (63 per cent), accessing new markets (50 per cent) and reducing administrative costs (48 per cent). The “10-49” sector identify the significant benefits as reduced cost of communications with suppliers (24 per cent) and customers (23 per cent) and improved access to information (21 per cent). Within the “50-249” sector benefits were identified as the creation of strategic alliances (33 per cent) and reduced administrative costs and increased efficiency (23 per cent).

Problems with e-business

Four problems associated with e-business were identified as IT/IS expertise (40 per cent), security issues associated with E-commerce transactions (36 per cent) and cost of telecommunication services (33 per cent). In contrast, twenty per cent of respondents identified that there were no perceived current problems with e-business. There also remained ongoing concern towards E-commerce security, regarding the capabilities of technology to overcome mistrust of customers and providers. Further concerns regarding ongoing cost of telecommunications and the necessity for trained IT/IS staff were an obvious and fundamental business issue, with respect to effective allocation of the appropriate resource to fulfil a business need. The smaller SME classifications remained concerned regarding the cost of access.

Planning the e-business process

Respondents were asked, finally, to identify the number of people responsible for the IT/IS function; 55 per cent identified one person, 25 per cent between two and ten people and 18 per cent found that no one was responsible. When viewed by enterprise classification, it is apparent that within the “no employees” category, control is the sole responsibility of the owner/manager (84 per cent) although 16 per cent of “no employees” allocate no responsibility for this function. This trend continues in the large SME groupings, with a significant proportion providing no management of the IT/IS function (“1-9”, 17 per cent, “10-49”, 21 per cent and “50-249”, 26 per cent). Even within the larger SME classifications (“1-9”, 51 per cent, “10-49”, 46 per cent and “50-249”, 12 per cent) results suggest that there is a minimal management function of the process, with only one person with responsibility. This suggests that the human resource managing the IT/IS function is under-resourced within the SME sector. When asked whether e-business had been integrated within business planning, 156 enterprises responded, representing 31 per cent of the survey population of which 46 per cent responded

positively, 36 per cent negatively and 17 per cent were uncertain. When contrasted by SME size classification, minimal variation was apparent, with a data range recorded from 40 per cent within the “no employees” and “10-49” sectors to 46 per cent within the “50-249”. This suggests that enterprise size is not a factor when determining the integration of e-business within the business planning process.

Conclusions

This study has presented a survey of SME e-business usage in contrast with 19 prior significant studies in Wales. It was apparent that measurement of e-business these surveys varied significantly, due to the contrasting nature and size of the samples surveyed. In addition, the DTI surveys were based on a sample size of 200 in comparison to the eCIC reports which were in excess of 2,000 respondents. All the surveys present an overly optimistic picture of e-business usage and their results must be noted with caution. The authors’ survey of existing trading markets revealed a high dependency on markets within Wales, with minimal trade undertaken outside the UK, especially within the micro-sized SME classifications. This suggests SME owner/managers have limited growth aspirations and there is potential opportunity to expand trade within new markets outside Wales though e-commerce trading. Overall, this survey revealed lower utilisation levels of e-business than the other studies. This, undoubtedly, was down to the high proportion of “no employees” and “1-9” micro-sized enterprises included within the survey. Statistics charting internet access, use of LANs, WANs, intranets and extranets were generally comparable with recent studies (eCIC, 2006), although typically lower. Use of web sites (38 per cent), e-mail (48 per cent) and enterprises trading online (5 per cent) were significantly lower than the levels reported within prior surveys which can be attributed to the representative nature of the sample population surveyed. These statistics suggest that sophisticated use of e-business technologies within the SME sector in Wales is limited, especially within the micro size classifications.

Throughout the survey, the larger SME classifications reported higher uptake of technology than smaller enterprises (eCIC, 2006). In the authors survey, reported uptake of basic IT/IS was disappointing with 29 per cent of all respondents reporting no usage, with significantly higher levels reported within larger SME classifications. Utilisation of more sophisticated technologies, such as networks, was negligible, with the exception of the “50-249” size classification. Usage of the internet was disappointing, with 57 per cent reporting access and lower levels recorded within the micro-sized classifications. E-mail, EDI and web site usage demonstrated the same trend, with higher utilisation within the larger classifications. Web site development was reliant on in-house expertise, especially within the smaller classifications. Thus, it is apparent that there seems to be a lack of investment towards IT/IS, especially within the smaller SME classifications in contrast to larger enterprises (eCIC, 2006). This result suggests a lack of understanding regarding the opportunities that web site ownership offers the SME owner/manager and a reluctance to invest. This is supported when the level of web site investment is considered, with only 19 per cent investing over £2,000 and the average investment being £101-500. Subsequently, there is a lack of effective income attainment from web site utilisation, with only 15 per cent of users identified making in excess of £1,000 during the last year. There was evidence of effective web site utilisation within the “no employees” sector, suggesting pockets of good practice. A fifth of all SMEs (21 per cent)

surveyed were unable to identify web site income, suggesting a lack of e-business management and high level of ignorance.

The motivations of SME owner/managers regarding e-business deployment were also assessed. The prime motivations concerned improving organisational efficiency through marketing and communication with external and internal groups. Thus, e-business was regarded as a mechanism capable of improving trading performance and operational practices. Beynon-Davies (2007) describes e-business as a significant enabler of growth within the SME sector. However, it was apparent that key inhibitors existed to deter the development of e-business within SMEs. The most prevalent of these were time to develop and maintain an e-business operation, insufficient IT/IS skills, low usage by customers and suppliers and insufficient financial resources. A lack of information, advice and support and limited confidence, understanding and awareness were considered less significant. This suggests that the level of e-business awareness has improved and SME owner/managers are more concerned with day-to-day operational issues inhibiting IT/IS usage.

When questioned regarding perceived benefits of e-business, there was greater focus on attainable benefits, such as improved advertising, access to information, increased revenue and improved communication. In contrast, less prevalence was awarded to higher e-business opportunities, such as organisational transformation and increased business partnerships. This suggests a key issue with e-business adoption is SME owner/managers lack strategic focus and give greater precedence to critical operational processes and business sustainability. The obsession with immediate operational matters within SMEs is a reflection of the insufficient planning processes that occurs within SMEs and was also prevalent within the prior studies. It was apparent that the IT/IS function is under-resourced in terms of human resource, with minimal management and planning of e-business implementation. To improve the picture of e-business usage and adoption within the SME community requires coordinated and long-term strategic direction from key bodies, such as the Welsh Assembly Government, enterprise support agencies, Higher Education and telecommunication providers. Currently this direction is lacking.

Further and ongoing studies are required to measure the levels of e-business adoption within the SME sector in Wales including the effectiveness of enterprise support agencies activities. Qualitative studies need to be undertaken to examine and understand the issues faced by owner/managers in the SME community especially the micro sized classifications.

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