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# 24P. Does ICT hold the key to SME development?

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## ***Abstract***

As the European Union (EU) and its Member States face the pressures of recession, ongoing *global competition* and the challenges of implementing a new *knowledge economy*, improving the capabilities and participation of the huge small and medium enterprise (SME) sector is vital. This is particularly true of the microfirms (less than 10 employees) that account for 93 per cent of the EU's 25 million firms and 40 per cent of its 170 million workforce but exhibit much lower participation rates than larger organisations. Regular quarterly surveys of national samples of 600-1,000 SMEs conducted since 1990 by the Open University Business School (OUBS) and other large-scale EU and UK surveys of SMEs show near saturation use of PCs, widespread access to the Internet and increased use of networked computers, mobile telephony, palmtops and so on. ICT is also seen as opening new possibilities for accessing information, supporting e-learning and developing new business opportunities for SMEs. Yet, once again, SME participation is very low, particularly among the microfirms and there is little evidence that the use of information and communications technologies (ICT) has led to an increase in innovation or the emergence of new business models among SMEs. The most common reasons given by SME owners include lack of time, inconvenient access and low relevance. Government surveys also identify a generally low level of ICT skills, especially among the microfirms.

This paper examines the effects of increased ICT-adoption on SME acquisition of knowledge necessary for survival, growth and success in the new economy, the development of e-business and whether ICT mediated e-learning and knowledge transfer holds the solutions for acquiring these necessary competences and skills, and overcoming the common SME participation barriers.

## ***Keywords***

SME, learning needs, training, management development, ICT, knowledge management, e-learning.

## **1. Introduction**

Across the European Union (EU) and in individual member states, there is tremendous pressure in government and industry to encourage greater participation by small and medium enterprises (SMEs) in the emerging knowledge economy. The reasons for this pressure are not hard to find. SMEs – essentially, independently controlled and managed firms with fewer than 250 employees – account for 99 per cent of all 25 million enterprises in Europe, between half and two-thirds of the workforce in EU member states and more than half of the annual sales turnover (EC, 2004). They form the fabric of local and national economies. This is reflected at policy level in pushing the role that SMEs can play in innovation, in improving the functioning and

competitiveness of supply chains and in the wider spread and stronger effectiveness of e-commerce (DTI, 1998; EC, 1997, 1998). Since the advent of the ‘credit crunch’ in 2008 and the subsequent very deep economic recession, this pressure has intensified, driven now not only by a competitive need to innovate but also by the pressing need to absorb and reverse growing unemployment across Europe.

The key to innovation and entrepreneurial success lies in the ability to make effective use of individual and shared knowledge (Audretsch and Thurik, 2001) which, in successful economies, is directly linked to the development of human and social capital developed through education and experience (OECD, 2001). Knowledge is vital to business success and can be seen as information that has meaning and is situated in a context. It can be learned through formal study and codified, it can be acquired through conscious reflection on experience and it can be absorbed directly from experience in a more hidden or tacit form. With respect to SMEs, two broad areas of knowledge are important:

- functional areas of the business, which relate to operations and people in the firm;
- strategy and the need to remain competitive, or at least viable, which relate to the firm itself as an organisation and its relations to the outside world.

The degree of functional knowledge in a firm reflects the level and relevance of formal training, informal learning, personal and collective experience of all members of staff and the response by managers to their perceived need for capability in the functional areas. In turn, this seems to be related to levels of education, source of knowledge acquisition (college, university, consultant, etc.) and how experience is acquired. However, external factors also have to be taken into account. SMEs face tougher competition for necessary competences and skills in local labour markets due partly to low average educational levels, partly a related poor supply of such skills in the labour markets from which they draw their employees and partly to intensified competition from larger firms for employees with appropriate experience and qualifications. In its 2002 report on work-based learning in SMEs, Britain’s Learning Skills Development Agency (Hughes et al, 2002), which had identified a number of critical skills shortages among different sectors of SMEs, summarised the policy challenges as:

‘In a fast-changing world of work, the ability to adapt and develop new learning and skills is a crucial ingredient in a successful economy. Globalisation and the knowledge-driven economy require the UK to develop a more highly-skilled workforce in order to compete within high-value-added sectors of the world economy,’ (page, 14)

In spite of the strong pressures, however, the report also acknowledged that SME participation is very poor and that most training is informal. The report concluded that workforce learning is very important in developing knowledge in the firm necessary to its survival and growth but that ‘there are other ways in which the workforce may be developed and a wide range of methods may be used. The range includes open and distance learning (paper- or ICT-based)’. Increasingly, government policy in Britain is focusing on providing online services to SMEs and promoting e-learning as a key ways of using ICT applications to address directly the development and information needs of SMEs and thus increase SME familiarity with ICT as part of a process of encouraging new e-business models.

Indeed, the increased use and commercial applications by SMEs of more advanced ICT and related services are seen generally by policymakers as the key to improved competitiveness and a knowledge economy. ICT applications are clearly extremely

valuable in disseminating information and promoting inter-connectivity within and between firms. The key role played by ICT in the management of knowledge in SMEs was specifically addressed by Corso and colleagues (2003) who stated that ICT applications can 'play a key role in this process. By providing quick and easy access to external sources of knowledge and new and more intense communication channels with partner organizations, ICT can erase traditional constraints on SMEs innovation ability, while leveraging their flexibility and responsiveness.'(page 398).

The effective use of ICT has been explicitly linked to the effective development and use of knowledge and to innovation and entrepreneurial advantage (E-Skills UK, 2006). The most significant cause of recent productivity improvements in industrialised economies has been attributed to the effective use of ICT (IEU, 2004) which, in turn, has been linked to the education and training of employees (E-Skills UK, 2006). ICT is a powerful tool in its own right but it is even more powerful in its potential for facilitating the effective use of knowledge in firms. In parallel, policy has also focused on creating bridges and channels of communication from centres of knowledge in universities directly into knowledge-based SMEs and, at the same time, encouraging more entrepreneurship in higher education institutions.

In relation to knowledge acquisition, SMEs face two major challenges that reflect the two main areas of knowledge need:

- how to keep the firm's capabilities, resources and routines up to date;
- maintaining the owner-manager's entrepreneurial and management competences.

The acquisition of new knowledge raises issues concerning the source of information, the internal capacity for interpreting and absorbing the new information as applicable knowledge and the use of the new knowledge. Firms with a higher *absorptive capacity* are able to acquire and make better use of knowledge (Cohen and Levinthal, 1990). ICT is seen as providing support for this processes both internally and also in relations externally with other firms. The use of internal e-mail or intranets within the firm and e-mail, extranets or well managed, interactive websites externally with customers, suppliers or partners is the sign of advanced SMEs that are participating in the knowledge economy.

It is a model that sees leadership more in terms of facilitation and support than of direction. Clearly, for some SME owners this could be a problem but for many it reflects existing participative management styles. Furthermore, in keeping with the knowledge management model, it is also becoming clear that one of the most important factors of production that secure competitive advantage is the use of experienced and skilled labour. In its final report the UK National Skills Task Force (2000) was very clear that it saw networks and clusters as the way for SMEs to overcome their skills and knowledge gaps. It recommended the 'development of new sectoral and local learning networks to support the training and development needs of clusters of small and medium sized businesses'.

Although there are few direct studies on knowledge management and SMEs, a 1995 survey conducted by OUBS among some 2,500 SME owners revealed that growth-oriented owners were more likely to be participative in their management styles and more likely to network (Gray, 1998). Later OUBS research, as part of a wider study into the determinants of management development, revealed that high growth firms are more systematic and strategic in their management development policies. There is a higher

commitment from these SME owners to the development of strategic competences and skills (Thomson and Gray, 1999; Thomson et al, 2001; Gray, 2004). These are practices associated with learning organisations that can benefit from using networks and clusters to use and create new knowledge. This is also a process where the increased connectivity of ICT might be expected to help. However, in all these cases it becomes apparent that the participation rates of the smallest but most numerous SMEs, particularly on the part of microfirms with fewer than 5 employees, is very low and that this low participation is strongly linked to low entrepreneurship on the part of these SME Owners. This paper expressly examines how more entrepreneurial firms differ from the majority of SMEs in their use of ICT applications and whether this is more proactive and more strategic.

## **2. Methodology**

This paper uses empirical data from the Quarterly Survey of Small Business in Britain to examine the three above areas of research focus and to consider more critically models of e-business adoption in entrepreneurial small firms. Based in the OU Business School since 1990, the Quarterly Surveys have tracked SME adoption and use of ICT from time to time since 1985 (see Figure 1). Until the fourth quarter (Q4) of 2008, the surveys sampled a database that had been replenished with random additions of small firms (mainly drawn from public databases such as Dun and Bradstreet , Experian, etc). These surveys had around 50% over-lapping samples that enabled particular issues to be tracked over time. Since 2008Q4, the sample consists of three main cohorts – two monthly samples of c.400 firms with £50K - £1 million sales turnover structured to reflect BERR sectoral and regional populations plus c.270 respondents from the original sample who agree to respond online via the survey's website. Thus, there is, a total of around 1,000 small UK firms each quarter. The main analysis is based on the findings of the 2007 Q2 survey which had 528 respondents and focused on SME use of ICT.

Firms that have implemented e-commerce are identified as those that have a website and can process online payments. Firms that have adopted or are in the process of adopting e-business are identified as those that develop their own software, use customer relationship marketing (CRM) applications or have implemented enterprise resource planning (ERP) systems. The assumption is that SMEs engaged in e-commerce or e-business, as early adopters, will exhibit more entrepreneurship (as measured by a self-rated 10-point scale in the Quarterly Survey) and a more professional approach to managing and using ICT applications (as measured by computer upgrades, backup of business data and frequency of website updating). It is also assumed that there will be industry, age and firm-size effects that distinguish advanced, entrepreneurial ICT users.

## **3. Findings**

Firstly, in relation to the access to and adoption of basic ICT, apart from some 13% of sole-traders and 8% of microfirms (fewer than 10 employees), there is virtually universal ownership and use of computers in SMEs (QS 2007Q2). The adoption of the Internet and email is also widely diffused among SMEs though the adoption of a business website has stabilised at around 63% and the capacity to accept online payments seems stuck at around 10% - both of which are essential ICT applications for the implementation of e-business. There are, however, very strong firm-size effects that have to be taken into account in the adoption of different ICT applications as Table 1

based on the 2005 survey shows. For comparison, the left and right columns show the overall adoption rates for the 2003 and 2007 surveys. This reveals that adoption rates of the more mature applications (networked computers, e-mail and websites) as begun to stabilise while the growth in adoption of more recent applications is increasing sharply, especially among larger SMEs.

ICT Adoption	All 2003	Micro (<10 emp.)	Small (10-19 emp.)	Medium (20+ emp.)	All 2005	All 2007
Networked computers	50	44	70	81	54	58
Internet e-mail	82	83	95	97	87	81
Website	58	55	80	82	63	63
Broadband	35	62	77	80	67	81
Wireless	14	25	38	39	29	38
e-commerce	8	8	17	18	11	10
Total (n)	687	462	94	114	670	528

**Table 1:** Size effects in SME adoption of ICT 2005 (column %)   
 Source: *Quarterly Survey of Small Business in Britain* 21:3; 23:2

Virtually all firms use e-mail and broadband. The majority of all SMEs have adopted their own website, especially the larger SMEs, even if the rate of adoption has stabilised. Thus, most SMEs already have, or will soon have, the right infrastructure to support e-business, e-commerce and e-learning. Whatever barriers there are among SME owners, they are likely to be due to factors other than technical.

Secondly, in relation to demand issues, although the awareness of the need to further develop ICT skills is high among SMEs, it is still below one half of respondents and bears little relation to prior knowledge as reflected in highest levels of education. In 2004, OUBS, surveyed 600 SMEs on perceived areas of knowledge functional need by their highest formal qualifications to explore learning needs across the groups (Table 2).

	Degree	Professional	Technical/vocational	School	None	All
ICT	40	44	38	39	41	40
Marketing	41	34	35	43	31	38
Finance	32	30	40	30	34	32
General mngt.	26	26	35	33	29	29
Leadership	19	25	24	26	10	21
People/HR	22	23	18	23	15	21
Personal dev.	19	15	14	23	10	17
None	23	13	8	7	3	11
Sample (n)	227	131	72	100	55	589
%	39	22	12	18	10	100

**Table 2:** Graduate and other SME development needs 2004. (Column%)   
 Source: *NatWest SERTeam Quarterly Survey of Small Business in Britain*. (2004).20:2.

Overall, ICT and marketing dominate as SME learning needs with finance in third place. In all these areas, the needs will be a mix of management competences and technical or operational skills. Although there is likely to be some divergence between actual and perceived needs, the preferences are fairly consistent across the groups and the main knowledge needs are in functional areas. It is of some concern that people who only have school-level qualifications were more likely to report that they have no

development needs. This suggests that there may be a lack of awareness of their actual knowledge gaps among less qualified people. This lack of awareness plus the lack of ICT skills (which is confirmed by other surveys), rather than low adoption of ICT applications, pose real barriers to the spread of e-learning and the development of ICT knowledge through sharing with peers. More reassuringly, the fairly high 40% for all firms expressing a need to develop of ICT knowledge and skills suggests that the more entrepreneurial SMEs are very open to developing themselves as e-businesses.

This supported by the growth in electronic means of accessing business advice and information. The general use of the Internet and of e-mail to obtain useful advice and information has increased enormously in recent years.

Sources	2002	2007	2009
Face-to-face contact with an advisor	63	64	71
E-mail updates of new information	30	41	64
Information on web-sites	48	66	62
Media (newspapers, radio, TV etc.)	28	28	29
Paper pamphlets/ guides on request	54	45	27
Telephone help-lines	33	35	25
Sample size (n)	654	526	242

**Table 3:** Sources of business advice and information 2002-09. (Column%)

Although then value of personal face-to-face contact has grown and is the preferred medium, the rate of growth in the new e-media (emails and websites) has grown dramatically. With advent of more mobile communication, the decline of paper-based media looks set to decline further. Given the importance of websites as a source of business advice and information, the shift over to e-business methods and models may be more evolutionary that it first appeared, However, again here are strong firm-size effects that have to be taken into account with respect to how actively SMEs manage and use their websites with respect to e-business and s-commerce. The capacity to conduct e-commerce (the online buying and selling of goods and services), relies on having an active website and the capacity to accept and make online payments, yet Table 4 shows that the better resourced and larger SMEs are better placed to adopt the systems required for effective e-business and e-commerce.

Website update within:	sole proprietor	microfirm (1-9 emp)	small (10 - 19 emp)	medium 20+ emp.
Past day	14	34	60	79
Past week	19	28	25	10
Past month	21	15	7	7
Past 3 months	16	5	8	1
Past year	7	6	0	1
More than 1 year	20	10	1	1
Total (n) 528	84	285	77	82
$Chi^2 = 10.915. \therefore df = 18 ; p < 0.000$				

**Table 4:** Update of websites by firm-size (column %) 2007 Source: *Quarterly Survey of Small Business in Britain. 2007Q2. OUBS. Milton Keynes.*

There is an interesting one third (33%) of sole-proprietors who actively manage their websites by updating on a weekly basis or more frequently. This compares with just

under two-thirds (62%) of microfirms, 85% of small firms and a very high 89% of medium firms. These strong size effects are also reflected in patterns of small firm entrepreneurship, innovation and networking (Gray, 2006b; 2007) which suggests a richer resource base and more strategic approach by early e-business adopting small firms. As may be expected, Table 5 reveals that e-business and e-commerce firms have much more professional approaches towards backing up data and updating their websites.

<b>Backed up data within:</b>	<b>e-business applications</b>	<b>online payments</b>	<b>Website update within:</b>	<b>e-business applications</b>	<b>online payments</b>
<b>Past day</b>	71	59	<b>Past day</b>	16	26
<b>Past week</b>	18	25	<b>Past week</b>	22	32
<b>Past month</b>	7	2	<b>Past month</b>	19	25
<b>Past 3 months</b>	2	9	<b>Past 3 months</b>	14	9
<b>3+ months ago</b>	2	4	<b>Past year</b>	11	2
<b>Never</b>	0	2	<b>1+ year</b>	12	6
<b>Total (n)</b>	<i>125</i>	<i>53</i>	<b>Total (n) 528</b>	<i>125</i>	<i>53</i>

**Table 5:** Computer and website management by e-businesses (column %) 2007  
Source: *Quarterly Survey of Small Business in Britain. 2007Q2.* OUBS. Milton Keynes.

Some 90% of small firms that are early adopters of e-business applications, and 84% of those that are able to process online payments, have backed up their data within the past week. This is very high, even when compared with the larger 20+-employee firms in Table 4 and indicates that factors other than firm-size are important. Also, there is a considerable overlap with half (51%) the e-commerce firms also using e-business applications. These overlap firms can be regarded as full e-businesses with the adoption of e-business applications and systems more central to their daily and weekly operations. Updated websites are not so central to e-business systems. Only 38% of early adopters of e-business applications update their websites within a week. Having effective and up to date websites is more important (58%) to e-commerce firms that accept online payments but other factors seem to be also important.

## 4. Conclusion

Increasingly, the Internet helps SMEs to participate in useful networks or to pursue commercial and industrial linkages without a strong need for spatial proximity. However, there are vast differences between different segments of SMEs with respect to ICT adoption and use, the business potential of ICT applications and, indeed, their internal resources and capabilities and their growth and survival strategies. One obvious difference lies in firm-size as measured by numbers of employees. In general, ICT adoption and use and growth orientation appear to be strongly related to the size of the firm, with larger and growth-oriented entrepreneurial SMEs using far more ICT applications and functions than other firms (Eurostat, 2001; Gray, 2003). It is already clear, and confirmed by the findings of this paper, that the vast majority of SMEs, whatever their driving motivations and business expectations, have become part of the wider ICT revolution to the business environment. This has increased their need to have up-to-date knowledge of ICT applications and to manage the massive increase in connectivity that ICT supports both within firms and between them.

Indeed, the more entrepreneurial SMEs have long ago moved on from stand-alone computers to more complex internal and external ICT applications that facilitate the exchange of information and, in some cases, the management of knowledge. The Internet also offers significant opportunities for improving competence, skills and understanding through rapid access to relevant and timely information and, increasingly, the online development of skills (e-learning). This is strongly linked to the development of absorptive capacity in small firms, paving the way for the more effective use of more complex knowledge management and e-business applications. In turn, this will lead to the transformation of the more entrepreneurial SMEs into new business models that gain more and more added value from new internal configurations of their organisation and more effective participation in external networks and supply-production systems. This paper has found significant differences in how more entrepreneurial firms differ from the majority of SMEs in their use of ICT applications and revealed that they are both more proactive and more strategic. It is clear that SME development does not automatically flow from the adoption of ICT *per se* but from its management and use by owners in pursuit of strategic goals and new opportunities.

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