



No gender in cyberspace?

Empowering entrepreneurship and innovation in female-run ICT small firms

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Abstract

Purpose – To explore how information communication technologies (ICT) and the internet offer new opportunities for women to develop as entrepreneurs and innovators. To add to the literature and provide updated research to raise awareness about female-run ICT small businesses.

Design/methodology/approach – Uses qualitative research methodology for case studies of female entrepreneurs and thematic grid analysis to form a major part of text analysis. The approach is influenced by the need to examine closely the nature of the enterprises or phenomena under investigation and to ask pertinent questions related to their particular mode of operations.

Findings – Shows the background of small firm development and innovation as well as personal and company characteristics, personal contacts and IT networking in obtaining information and customers. Reflects also the concern of female entrepreneurs from ethnic minorities in gaining financial backing and recognition of themselves as committed and successful entrepreneurs.

Research limitations/implications – The main limitation is the small size of the sample (ten firms). There are implications for further work on gender analysis. The sample, though small, has contributed insights into the challenges facing women entrepreneurs in business and questioned the constraints on ethnicity for others. Technology is a great equaliser and the research has added further discussion on the economic contribution of female entrepreneurs.

Practical implications – Shows guidance on qualitative analysis using personal interviews and thematic grid analysis of textual data, as well as presenting findings.

Originality/value – Contributes to the literature due to the scarcity of publications concerning female-operated ICT small businesses. The paper is useful for researchers wishing to pursue entrepreneurship and gender studies.

Keywords Women, Entrepreneurialism, Communication technologies, Small enterprises, Empowerment, Sex and gender issues

Paper type Research paper

Introduction

The development of new information communication technologies (ICTs) over the last ten years has been accompanied by the development of diversity within related business sectors with “software” and “hardware” divisions including businesses such as virtual auction houses, virtual trading for traditional goods, and product-specific or sector-specific portal sites focussing on key niche markets. These new types of businesses have been the subject of increasing research to explore whether they

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operated similarly or in different ways to non-virtual business. One key expectation is that internet-based business might offer new opportunities to those currently under-represented in entrepreneurship and business ownership. Here the internet is seen as potentially providing a level playing field for businesses, where such factors as ethnicity and gender, for instance, may not be immediately obvious from a website presence or from purchase of goods in a virtual environment. Similarly, home working empowered via new technologies is seen as another way women may develop as employees and also entrepreneurs through ICTs (Goyal, 2001). Thus other issues in small firm development such as ethnicity and gender are focused upon in this paper, as well as the role of ICT in supporting women entrepreneurs in operating their businesses. The paper includes research with a sample of women entrepreneurs who “own, manage and run” small businesses. Hence the discussion does not differentiate between women business owners and women managers because the women entrepreneurs perform both of these roles.

ICT in enhancing small business development and female entrepreneurship

Business has been revolutionized by the ability to use the internet and the worldwide web to gather, exchange and disseminate information (McDonald and Burton, 2002), with clear gains for internet users (Koukova and Ratchford, 2001). Further, the importance of the potential of ICT to the small business sector cannot be underestimated since small businesses are in the majority in all economies in the world. Unlocking the potential of ICTs for small firms, e.g. reducing the number of intermediaries, search and transaction costs, along with the benefits of network externalization, would provide opportunities for radical change.

Small firms, with their more limited human and financial resources, are disadvantaged when competing with big organisations with large-scale economies in production and marketing. Smaller firms therefore need to concentrate on strategies to apply their knowledge and expertise in providing products and services that successfully attract customers in their markets. The use of ICT is crucial and arguably unique in allowing small businesses and their entrepreneurial owners to sharpen their strategies in order to achieve this success. In looking at generic competitive strategies Porter's (1985) cost leadership, differentiation and focus strategies provide a useful starting point. Low-cost producers aim to exploit economies of scale in production to offer lower prices and maintain or maximise their profit margins. Differentiation requires higher prices because of developing services or products defined as superior or different and attracting more discerning customers who are looking for quality. Focus on particular market segments is influenced by insufficient resources to compete on all fronts. Traditionally, it has been very difficult for many businesses, large and small, to achieve all three types of strategies. ICT enables businesses in general to maintain a low cost structure in order to achieve higher returns per customer.

With falling hardware and software costs in computing and greater multimedia accessibility, small businesses and women entrepreneurs, as in this study, have the abilities to become all three: in being low-cost producers; in being specialists to provide products or services to achieve differentiation; and to give greater focus via the internet to cover far more market segments than would have been possible through traditional distribution channels.

There is a scarcity in the literature about female entrepreneurship or the female-run ICT small business. Examples of focus in previous small business literature have been about: resource limitations' constraints where the small firms' owners-entrepreneurs have lacked the necessary time or personnel to engage in strategic planning or marketing (Carson and Cromie, 1989); personal contact networks which expand the span of action of small firm managers (Aldrich and Zimmer, 1986; Johannisson, 1986); that could also be seen as largely unplanned, intuitive and chaotic with operational aspects oriented primarily to daily survival. The small firm entrepreneur is portrayed as thriving in circumstances of discontinuity and chaos with limited quality information and on the other hand, as an individual capable of making highly informed and competent decisions (Hill and Scott, 2001).

While such issues form part of the small business discontinuity-continuity debate, the scarcity of literature points to a need to examine entrepreneurship from the perspectives of gender and the impact on the female-run ICT small business. Could the use of ICT help to establish the characteristics of female entrepreneurs-small business owners as being independent, highly centralized in their business efforts and highly personalized in being dependent on personal contact networks? Hill and Scott (2001) defined personal contact networks as fundamental to small firms, enabling entrepreneurial information-gathering techniques.

Issues concerning female entrepreneurship

In terms of companies set up and run by women, the literature has a focus on particular aspects, notably the start-up issues, business performance and comparison with male-run traditional businesses. Although this is a growing body of work, research into female entrepreneurship is still at a very early stage where established firms are concerned (Carter, 2000). Quite how long a company needs to be in business to be established is open to question. However, issues faced by those women running companies through various post-start up stages of the business life cycle have so far gone largely unconsidered. Few studies explore how female-run firms develop and grow or how women operate as small business owners and managers to the business exit stage (Martin, 2001; Catley and Hamilton, 1998).

Similarly, although the level of research into female entrepreneurship has increased, it has done so in specific ways. One route might be described as the "deficiency" model related to:

- under-performance (Watson, 2003; Mukhtar, 2002; Du Reitz and Henrekson, 2000);
- under-confidence (Fielden, 2003; European Commission, 2003); and
- under-representation across subject specialisms and business sectors (Chell, 2002; Carter *et al.*, 2001; Rosa *et al.*, 1996).

Others (e.g. Fernandes and Cabral-Cardoso, 2003; Ljunggren and Alsos, 2001; Claes, 1999) have explored the role of the female manager and entrepreneur related to aspects such as ambition, aspirations or characteristics, comparing female entrepreneurs with their male counterparts (Walker, 2000; Cowling and Taylor, 2001; GEM UK, 2003). Other issues and factors such as the relationship between ethnicity and female entrepreneurship remain under-researched (Smith-Hunter and Boyd, 2004)

In the same way, although research into the internet and small firms in general is increasing, little work has been carried out to explore whether ICT encourages the entry of more female entrepreneurs. There is often a research focus on technology rather than its impacts on key groups, particularly small firms (JISC, 2002; Martin and Matlay 2001). There are also gaps in terms of research into the way both ethnic minority and female small firms relate to ICTs (Foley and Monder, 2002; Martin, 2003).

In addition, as has been identified above, it would extend existing knowledge if such research on female entrepreneurs related to companies that were beyond their start up phase while focussing on the owner-manager. Although differing considerably with location, business sector, relative size and type of operation, the managerial competency of the key decision makers is seen as especially important to the way in which ICT implementation occurs (Martin and Matlay, 2001; Fallon and Moran, 2000; Chapman *et al.*, 2000). In small firms, the entrepreneurial owner/managers are the main decision makers and risk takers, seizing the opportunity offered by the internet in their own business context and recognising opportunities and threats within their chosen target markets (Culkin and Smith, 2000).

Research objectives

The first research objective deals with the investigation of personal and company characteristics and the establishment of female-run small businesses. In order to explore the context of women entrepreneurship related to ICT, research into the female owners' profiles, background and motivations are necessary given the critical role of the female entrepreneurial individuals in the success of ecommerce ventures, and as also identified by Feindt *et al.* (2002).

The second research objective is concerned with the investigation of how ICT can have an impact in helping to establish the characteristics of female entrepreneurs-small business owners as being independent and highly centralized or organized in their business efforts. For instance, it has been suggested that men's technology usage decisions are strongly influenced by their perceptions of usefulness, while women are seen to be more strongly influenced by perceptions of ease of use (Venkatesh and Morris, 2000; Venkatesh *et al.*, 2000).

The third research objective about the ongoing nature of female-run ICT businesses, investigates the ongoing personal contact networks and ICT association with the use of IT in fostering innovation and information, critical for business success. Previous e-business SME studies have identified barriers to adoption exploring characteristics such as:

- environmental contexts, the organisation, the organisational leaders or decision makers together with the nature of the technological innovation itself (Raymond, 2001; Warren and Hutchinson, 2000); and
- specific business sector, level of internationalisation, level of planning within the firm and current market forces (see Raymond, 2001; Martin and Matlay 2001, for alternative summaries).

Gender has not emerged from such studies as a key avenue for research except when internet access and usage are studied on an individual user level.

Finally, the fourth research objective looks at identifying what drives female entrepreneurs to succeed, given the barriers to female run-ICT small businesses

including barriers to those from ethnic minorities. The economic contributions of women are bringing about changing norms in business with the growing presence of female entrepreneurs (Adler, 2004). In terms of research into the effects of the internet on ethnic small firms, previous studies have also shown that smaller ethnic firms are least likely to have internet access or resources (Foley and Monder, 2002).

Methodology

A qualitative research approach was adopted because the collaboration of female entrepreneurs was essential due to their sensitivity in divulging information relating directly to their small business circumstances, their perceived barriers to growth and the personal contexts of their entrepreneurial drivers for success. As Silverman (2005) indicated, effectiveness in qualitative research embraces sensitivity in the choice of research instrument and a flexible approach to data collection including the art of asking questions. Qualitative research is appropriate where small samples are concerned. The tradition of using small studies in qualitative research (Hill and Wright, 2002) is influenced by the need to examine closely the nature of the enterprises or phenomena under investigation and to ask pertinent questions related to their particular *modus operandi*.

Over a six-month period, a series of semi-structured interviews was held with both owners and other staff in ICT industry companies run by ten female entrepreneurs. These interviews were held mainly on site at business premises and were supported by copies of company documentation such as plans, accounts etc., by online informational and activities and by observation. The object of the interviews was to develop a picture of the female ICT entrepreneur, her aims and aspirations for the future and her experience of entrepreneurship to date, and to develop a richer picture by including the views of key staff and family members where appropriate. Using the large amount of data from these semi-structured interviews, plus observed practices and copies of company documents etc. it was hoped to develop an in-depth view of each firm, as case studies. Via case studies it was hoped to provide an in-depth exploration of each entrepreneur and give rich insights into the entrepreneurial processes in such firms, recognising the complexity of business operations and the way in which social truths are embedded within organisations (Yin, 1994). Participants were encouraged to identify key stages and critical incidents given the value of this technique in exploring entrepreneurial learning and innovation (Cope and Watts, 2000; Martin, 2003).

Where validity and reliability are concerned, the main strength of using the ten case examples of the female entrepreneurs are supported elsewhere in the literature. As a research method, case study research with in-depth interviews has a good foundation in their progressive and iterative nature with synergistic effects (Yin, 1994). Qualitative methods usually utilise modes of inquiry aimed at exploring and discovering "new relationships of realities" (Hunt, 1990; Perry and Coote, 1994). This means building understanding of the meanings of experiences and not pursuance of the objective in verifying predetermined hypotheses. Case examples and case studies rely on particular findings that can be generalised to some broader theory to establish external validation. As a contrast, it is unlike quantitative research, which uses surveys aimed at statistical generalisation to achieve external validity.

In this study statistical techniques were not used to derive correlation etc., given the size and nature of the sample. Thematic grid analysis formed the major part of text

analysis along with other techniques linked to discourse analysis, given the usefulness of this technique to identify patterns and contradictions. Despite the small sample, the operations and procedures of the study in this paper can be repeated by other researchers thus enhancing the reliability of the research method adopted. For example, by keeping consistency in interviewing techniques and procedures, research findings could be replicated.

Via discussion of these aspects business start up and the processes accompanying business development would also be explored but important themes included the following, with more focus given in this paper to the use of ICTs, innovation and access to finance than some of the other categories:

- Personal characteristics of the female entrepreneur-owner manager; the role of ICTs in the entrepreneur's route to owning and managing a small firm.
- The company itself and its key company characteristics.
- Business sources, i.e. the way in which new business was generated, sources for new customers and how the marketing process occurred from the perspective of the entrepreneur and her staff.
- Aspects driving these entrepreneurs to be successful business people. Drivers here included ambitions and aspirations, role models, needs and barriers to success.
- Innovation and entrepreneurship to assess whether these women saw themselves as innovators and entrepreneurs; what characteristics they felt were needed and what levels of importance might be attributed to these.

Sample

Ten female entrepreneurs running ICT-related firms were identified as part of a two-stage process. They were located via web searches and with help from professional associations and business advisors, mainly focussed in the Midlands region of the United Kingdom. The increase in female entrepreneurship in the East Midlands and in both East and West Midlands, as well as the use of new technology is higher than in most of the other UK regions (Global Entrepreneurship Monitor, 2003). Hence this geographic area was expected to provide good examples of female ICT entrepreneurs.

Following research and discussion, 41 firms were originally targeted to provide a group of ten for detailed interviews and analysis. Thirteen declined, then another 18 were found to be unsuitable for other reasons: they were not prepared to be forthcoming about the aspects agreed for exploration; they were one-person operations; they were not trading effectively or in a position of growth; and they were doing other jobs so this was not their main occupation. To allow for better comparisons these firms were initially selected on the basis of:

Size

Firms were included with between two and nine employees to fit within the "micro-enterprise" category, given that this is the most commonly occurring group of small firms (98 per cent of all firms are in this size category according to the European

and UK governmental surveys). Hence it was hoped to provide insights into female firms within this grouping.

Age of firm

Firms should have been in business for at least three years to ensure that they had all moved through basic start up phases.

ICT business sector

Their businesses should fall within the ICT classifications and where possible from similar subsets.

The firms in the resulting sample had a mean life of 4.3 years and were all micro-enterprises with nine or less employees. However, further discussion of company size also showed that in “company size” the owners sometimes included not only employees, but also those regular sub-contractors who provided key parts of the product or service. In one case this included a Californian programmer who wrote specific types of software “not found easily in the UK and much cheaper than we could get here”. In another, it included a web designer in Bangalore.

All women taking part were ICT entrepreneurs, since four were web design businesses, three software companies and three hardware and cabling companies. In addition, six of the firms also had other web-based businesses, which they had developed alongside their mainstream businesses. The former were niche-businesses related to:

- The provision of an information portal for specific groups as a route into purchase of related items.
- The development of an auction site for specific groups.
- The provision of an interest group portal for mutual trade and B2B components purchase.
- Ebusinesses with physical products developed by the entrepreneurs and sold via the internet. Two entrepreneurs also worked with up to five other businesses to develop this business niche, e.g. web sites, as well as taking some of the equity.

Efforts were made to include a range of participants. Given the evidence of co-preneurship in the sample, this was balanced to ensure similar numbers of non-co-preneurs. However, it was more difficult to find and include a range of those with different social, educational and ethnic backgrounds. This is perhaps unsurprising given that “whether male or female, entrepreneurs are likely to be white with higher income and educational levels” (GEM, 2003, p. 26). Here three had very few qualifications, five had first degrees and a further two had post-graduate qualifications, echoing earlier studies suggesting that women entrepreneurs have a higher educational standard (Cowling and Taylor, 2001).

Results

Personal and company characteristics

By taking into account both types of characteristics a picture emerged of the build-up of the female-run small firms in the sample.

As shown in Table I this was a mixed group, with varying ages, family background and family status. The average age was 37.8, ranging from 28 to 51 years. Half of the

	Age	Ethnicity	Education background	E-status	Wk bckg	Family Eship	Family status	Children
Case A	29	1 ^a	0 ^d	Co ^e	1 ^g	1 ^j	M	2
Case B	28	1 ^a	2 ^c	Sole	3 ⁱ	0	S	0
Case C	43	0	1 ^b	Co ^e	3 ⁱ	1 ^j	M	3
Case D	51	0	1 ^b	Sole	1 ^g	1 ^j	M	1
Case E	37	0	1 ^b	Co ^e	2 ^h	0	M	0
Case F	39	0	0	Co ^e	3 ⁱ	0	S	0
Case G	28	0	2 ^c	Sole	1 ^g	1 ^j	M	1
Case H	30	0	1 ^b	Sole	3 ⁱ	0	S	0
Case I	44	0	1 ^b	Co ^e	1 ^g	1 ^j	S	0
Case J	49	0	0 ^d	Sole	2 ^h	0	M	1
Average	37.8							
Max	51							
Min	28							

Notes: ^a= ethnic minority member; ^b1 = degree; ^c2 = post degree; ^d0 = no degree; ^eCo preneurs worked with husbands, same or different sex partners as joint owners; ^f0 = no previous work; ^g1 = managerial work; ^h2 = professional work; ⁱ3 = temporary/casual; ^j1 = previous family experience of entrepreneurship, business ownership etc.

Table I.
Personal characteristics
– female entrepreneurs

group were “copreneurs,” as they ran their businesses as a joint venture with their husbands or a “significant other” in their relationships. Five had children with a mean age of 11.2 years old. This aspect was included to try to explore the balance of work and family life experienced by these female entrepreneurs, seen to still be a key aspect for women developing successful businesses (Martin, 2003). Although the researchers would have preferred a richer ethnic mixture to try to provide insights into possible differences and similarities in business development emerging from this qualitative survey, only two of the group came from ethnic minorities. One was Afro-Caribbean and the other Asian. Family background differed. Four had a parent, grandparent or sibling already running a business when they set up their companies. In two cases these owners had each of them already run another company, which had not been successful.

As identified above, in “company size”, the owners included not only employees, but also those regular sub-contractors who provided key parts of the product or service including overseas contacts who were found via the web. Despite being separate entities and geographically distant, these sub-contractors were considered to be part of the firm, with the owner having detailed knowledge of their family circumstances and their needs and ambitions.

Exploring their current company location provided a good route to identify how the firms had been set up and why they were currently sited where they were, plus where they could be in future (see Table II). Here, only three owners had each set up an external office of their own. The majority (six out of ten) opted for working from home, often from a purpose-built extension or outbuilding funded via normal mortgage processes. This was seen as a “win-win” situation. The homes would increase in value as a result of their building additions, saving on rent and other costs by such extensions or outbuildings funded via normal mortgage processes.

How important was the development of ICTs in enabling you to become an entrepreneur?

When this question was raised, it was clear that these ten entrepreneurs all felt that ICTs had opened up the possibility of developing a business. The role of ICT in the women’s choosing to become entrepreneurs was seen as paramount. In each case the reasons given were ranked and the following emerged. ICTs are important because they:

- offer a new field which is more open for female access than other fields – if they are prepared to work in terms of gaining new knowledge appropriate to the use of ICTs in business and to the technology surrounding ICTs, i.e. the “way ICTs work”;
- require less resources in cash and physical terms than traditional alternatives for women;
- empower home-based operation, leading to cost savings and to better family-work life balance since work can be done around family life, both where and when it fits best;
- enable “invisibility” despite the business itself having a high profile, since with ICTs “people don’t realise you’re women and take you more seriously – they judge you as a business not as an individual”;

	Company size	Where is the business located?	How long in operation?	Longest customer relationship	Type of business	Other additional businesses
Case A	5	External office	8	8	Hardware and cabling	Yes
Case B	2.5	Home office	3	1	Software developer	No
Case C	3	Home office	5	2	Web site design	Yes
Case D	9	External office	2.8	2	Hardware and cabling	No
Case E	8	Home office	7	3	Software developer	Yes
Case F	2.75	Home office	3	2	Web site design	Yes
Case G	4	Incubator	5	4	Software solutions	Yes
Case H	6	External office	2.5	1	Software developer	Yes
Case I	4	Home office	3	1	Hardware and cabling	No
Case J	3	Home office	5	2	Web site design	No
Average	4.8		4.4			

Table II.
Company characteristics
– female entrepreneurs

- provide a route to further personal development and growth via e-learning and via participation in eBusiness, since this allowed for “better understanding of how business works”, “better marketing”, “better information sourcing and use”; and
- provide a route to develop more than one business, to participate in the development of different types of business – virtual or otherwise – and to find suppliers for key services for the right price and at the right quality more easily than traditional means (such as the Californian programmer mentioned earlier).

All ten women felt that they had wanted to run their own business and that the right opportunity was all they had been waiting for. Here, ICT had provided that opportunity.

The role of ICTs in empowering these women to become entrepreneurs was seen as crucial in each case. If they had not had this chance to start their own business they couldn't imagine what else they might be doing, as the development of the internet accompanied their own development as entrepreneurs. They all saw the growth of new technologies including the internet as providing new opportunities for women to become entrepreneurs and to manage and run their own business successfully:

This is new – new business, new medium, new ways for women like me to start and run a business (entrepreneur with five web-related businesses).

People don't have pre-conceptions with this the way they might in other business sectors. It is a new field and women have the chance to make it their own (software developer).

In space no-one can hear you scream? In cyberspace no-one can tell if you're male or female – you are another web presence (software developer with two e-businesses trading online for physical products).

When I left school, they thought I might be a hairdresser or work in care because I was good with my hands, but I had not done so well. I worked on evening classes at computer studies and took a part-time job in a computer firm to understand the practical side. I began my business with one piece of equipment and low cash reserves – I couldn't have done that in hairdressing! (hardware and cabling business).

In addition to the “level playing field approach”, women also made the point strongly that the use of ICTs also allowed home-based operation, which fitted better with their home and family situation. Two also explained that this home-based aspect enabled them to build a lifestyle which included a dynamic business without losing a family base – in comparison with their earlier high profile managerial jobs which required long hours away from home.

Finance

Finance had been found in each case both at start-up and to fuel specific actions to enable development. However, this had not always been an easy process, as explained by the Afro-Caribbean entrepreneur who had originally resorted to multiple credit cards as a way to get her business started:

The bank look at me and say well – here is this big black woman, she got two children, no qualification and no husband . . . they were always polite but they didn't want to give me their money. They think I have enough problems already without starting a business.

She had come to accept this, worked around the problem and after 18 months of perilous cash flows had gone back to the bank and been welcomed as a successful entrepreneur. She felt that she had to earn her acceptance by the profits generated and the growth she had demonstrated and by the more acceptable female role model she presented:

It was precarious, continually keeping on top of the credit cards, so we didn't go into big debts, paying one back and borrowing from another, but we were successful and in the end that speaks for itself whatever the colour or the position you're in. I was married by then so maybe I fitted their profiles better. They used to bring out their special adviser who dealt with non-whites. He was Asian and I wasn't sure he really approved of me before I got my wedding ring.

Despite her experience, borrowing from a bank had been an easier process for three owners, whose bank advisers were "excited about this sector [ICTs] already so didn't take too much persuading. In fact they tried to get me to borrow more than I wanted". "Raising money against the house" had provided key cash, as had support from friends and family, but no venture capital had been accessed. The three women who considered this option felt that they were a "bad fit" with the type of people operating venture capital schemes:

I went to a meeting with four other businesses and these three guys from the venture capital company. Everyone else was male, over forty and they even seemed to be wearing the same suit! It was all very macho . . . although of course none of them had ever stuck their own necks out to start a company (hardware and cabling company).

They couldn't relate to me as a businesswoman, and my age seemed to be against me (oldest entrepreneur; software business).

Networking and associations

Keeping up with change was seen as very important and one way to do this was by networking with other firms. This referred not only to physical networking via meetings, etc., but also to virtual discussion and e-groups. Earlier studies have identified networking as a key weakness for female firms (Martin, 2001). However, six of the women in this sample did actively network as part of their normal business operations. There was also good evidence of attendance at shows and exhibitions to make new contacts. Interestingly the most enthusiastic and active networkers were mostly co-preneurs, who went along to the male dominated groups as well as the female business associations:

I don't think I would go without my husband having been an established member already, although he hardly ever comes. Somehow, it isn't an issue because people see me as [her husband]'s other half so it is fine for me to be there. I am sort of an honorary man so they will do business with me.

Part of the networking included forming loose associations to bid for work or to fulfil work, which had been successfully acquired. These associations were with other small firms, with sole traders and with professionals who had full-time jobs and worked occasionally on this type of work. The links with these firms had been built up over time, e.g. with past fellow university student links providing part-time professional services when needed. These personal contact networks were an essential part of the solicitation for information and customers.

Similarly, links with other small firms had been developed over time, often via virtual links originally. The use of ICTs to form new links was a key part of information sourcing for these women, with the use of information sites such as the governmental information sites (e.g. for the DTI, www.dti.gov.uk) or specific gender-related sites (www.mumpreneurs.com). These led to exchange of e-mails or to registration on e-groups where discussion of topics was *ad hoc* and relevant to members' needs.

Where do customers come from?

After placing sources in rank order, "referrals" came highest, followed by "word of mouth", "marketing" and "web site". The separation of marketing and web site is perhaps indicative of the way in which these owners saw the web site in the context of their firms, despite their being all ICT-related firms. Their web sites, where necessary, offered key information about their firms, though these in themselves did not generate new business. Marketing meant other things, such as "targeting key firms to make them aware of us" or "establishing a reputation for reliability". This was planned formally in seven out of the ten cases, with annual strategies adopted to try to develop successful new markets and successful new ideas for products and services. The mechanisms used varied, with the internet again seen as a back-up means to support the other range of activities.

However, referrals were seen as the key way to access new business and from long-term trust-based relationships with customers, who were mainly other businesses themselves. In particular, if companies with whom they had a relationship or association, gained large contracts, they would devolve work to these owners and their firms:

They have known us long enough now to know exactly how we work and our commitment to them. We have built up layers of trust with them so they know we won't let them down. At the end of the day it comes to that. If they need to provide a good quality job and deliver on time they need for us to put the same emphasis on both these issues, which of course, we do.

Overseas contracts accounted for up to 25 per cent of the business generated in the four firms trading internationally. Three firms had up to 15 per cent overseas business, one 25 per cent and the others no overseas work. Where this had occurred it had happened as a result of "referral – word of mouth". Here, the internet had provided a route:

The first big overseas contract came because we were recommended to an Australian company via e-mail, as being the best ones in this particular software field. They corresponded with us by e-mail and we developed an understanding. Then they gave us a small piece of work as a sort of test, that was that really. We worked to time or earlier, with very good solutions to the business problems they needed solving with this particular software route (software developer).

They had been trawling, looking at web sites to see how to develop their own and found two they liked. We designed both, so when they contacted the company involved asking who designed it, they were very pleased to find the same company providing the goods! We have designed four large-scale sites for them, together with ongoing development and maintenance and they have now put pressure on their supply chain to use the same approach so that is excellent follow-on business (Software developer).

However, it is also true to say that a characteristic of all these women entrepreneurs was their opportunism. New business ideas emerged, for example, at the school gate, while visiting a relative in hospital or while watching TV. It seemed that once the

“entrepreneurial switch” had been activated, these women found it difficult not to see business opportunities. Here, multiple businesses were being run with the original mainstream business and new virtual businesses developed to meet a particular need or to fit a particular business opportunity.

Conclusions

The qualitative methodology, which was adopted in this study, allowed for issues of relevance to emerge in an inductive manner. The underlying belief is that qualitative research lives and breathes through context. The study was effective in building a picture of female entrepreneurs operating in the new business sectors accompanying the growth of new technologies over the last ten years. The first research objective dealt with the investigation of personal and company characteristics, and the establishment of female-run ICT small businesses. In studying these firms the accent was on innovation and the development of the firm, including the role of ICTs in this process rather than a gender-specific perspective.

However, the types of companies set up and the way in which they were run, inevitably relates to the gender of the entrepreneur, where deliberate choices have to be made to combine home and work needs. Of the two groups of sole and co-preneurs, female co-preneurs gained advantage by testing new ideas at home and additionally by accessing networks and associations more usually open to their male counterparts. This was a result of being seen as synonymous with their husbands or partners and hence as “honorary men”. Comparatively, few studies have been carried out into co-preneurship, so these findings indicate that key insights might follow on from further research in this area

The second research objective related to ICT and the internet in enabling female entrepreneurs-small business owners to become independent and highly centralized or organized in their business efforts. Despite the points relating to operational and gender-related aspects of women-run small firms, both ICT and the internet did emerge as key enablers for female entrepreneurship. New opportunities for business development were identified. New aspects emerging from the study which differentiate them from earlier research on female entrepreneurship relate to: the consistently high level of profitability; the level of overseas work that was present in four out of ten firms with 15-25 per cent of business generated in the previous financial year; the outsourcing overseas of key work to specialists in all firms, e.g. outsourcing abroad to California and to Bangalore; and the accent on new ideas and innovation leading to multiple entrepreneurship.

The home-based location for business operation, the co-preneurship and the way children were seen as part of the day’s operation, marked out these companies as having a gender component, since no studies carried out so far with male entrepreneurs reflect these issues. However, the ten participating entrepreneurs supported the idea identified earlier that they might be able to become low-cost producers, specialising for differentiation; and having wider focus via the internet to cover far more market segments than would have been possible through traditional distribution channels. Here the development of ICTs was a key enabler for the setting up and growth of their businesses. They had developed new ideas, new products and services around the first basic start-up point, all based on ICT products and services and with key functionality delivered by ICT (e.g. home-based working; e-commerce).

The third research objective concerned ongoing personal contact networks and ICT association in fostering innovation and information, critical for business success. In order to identify whether these firms are typical of all ICT firms or of ICT firms run by women, a larger survey is recommended. However, by exploring the issues raised by women in terms of how and where business was conducted, the study gives insights into the possible outsourcing of work in the UK and overseas; the way innovation occurs, personal contact networks; and the development of multiple entrepreneurship.

The fourth research objective included identification of the drivers for female entrepreneurs to succeed given the barriers to female run-ICT small businesses and also those faced by the women entrepreneurs from ethnic minorities. While it is recognised that the experiences of the latter are too limited to make generalisations, their experiences of not “fitting” the expectations of male business advisers or of the banks indicate that for ethnic female entrepreneurs, further research is needed. This echoes the need for work in ethnic entrepreneurship and small firms (Smith-Hunter and Boyd, 2004). The use of ICT and the internet allowed female entrepreneurs in the sample to go about their daily business in their breadwinning roles for themselves and their families and to defend their autonomy in managing their enterprises.

Finally, the gender analyses in this study have contributed insights into the challenges facing women entrepreneurs in business and questioned the constraints on ethnicity for others. Technology is a great equaliser and the research has added further discussion on the economic contribution of female entrepreneurs.

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