

Abstract

The Costs and Benefits of ICT on the Business Processes of South Wales SME

The 'State of the Nation' report (eCIC ibid) indicates that whilst the internet is used as an information source by Small and Medium Enterprises (SME), it is not necessarily seen as a means of selling products. Lack of suitability of products was cited as the single most important barrier to trading on the web by respondents, followed by perceived high costs and lack of skilled staff.

The question to be addressed by this research is:

Why do some companies sampled by the 2004 eCIC State of the Nation survey not sell products on the World Wide Web?

1.5 The hypothesis to be tested is:

1.5.1 There is no significant difference in the level of investment in ICT processes between companies that sell on the World Wide Web and those that do not.

1.6 The aims of this research proposal are:

1.6.1 To identify the companies that rejected eCommerce as a viable distribution channel.

1.6.2 To identify the nature of the rejected products, services and capabilities produced by the identified companies.

1.6.2 To determine the level of ICT investment, in manpower and financial terms, made by the identified companies

1.6.3 To determine the level of ICT investment, in manpower and financial terms, made by companies within the same SIC that accept eCommerce as a viable distribution channel.

1.7 The limitations of this research proposal are:

1.7.1 It must be complete prior to the next State of the Nation (2004/2005) survey begins in March 2005.

1.7.2 It must remain within budget and complement the work of eCIC.

It is anticipated that this research will demonstrate that there is a significant difference in the level of investment in ICT processes between companies that sell on the World Wide Web and those that do not. In other words the null hypothesis will be rejected.

If, as anticipated, there is a difference it raises the need for further research to determine how government funds may be better focussed to address the shortcoming

The Costs and Benefits of ICT on Business Processes of South Wales SME

1.0 Introduction

1.1 The brief for this investigation is to assess the costs and benefits of Information Communication Technology (ICT) on business processes which is a subject that has been studied in great detail during the last decade, particularly since the introduction of the World Wide Web (WWW) in the early 1990's. Determined and sustained political and financial support from local, regional, national and pan-national (ie the EU) government for information technology based 'solutions' to actual or supposed deficits in good business practice, appears to have reduced much of the available research material to little more than a series of flag-waving exercises whereby IT, and particularly web-enabled technology, is seen as the panacea for all shapes and sizes of commercial enterprise.

1.2 The 'State of the Nation' report (eCIC ibid) compiles data relating to the existence of internet connectivity and how this is used. Conducted on behalf of Opportunity Wales by the eCommerce Innovation Centre (eCIC 2004), part of the Cardiff Business School, the report indicates that whilst the internet is used as an information source by Small and Medium Enterprises (SME), it is not necessarily seen as a means of selling products. Lack of suitability of products was cited as the single most important barrier to trading on the web by respondents, followed by perceived high costs and lack of skilled staff.

1.3 A begged question is whether the same company that has rejected the internet as a suitable sales medium would also reject a distance sale by telephone or letter. If not then it may be the case that more detailed analysis of the product range may offer the opportunity for a strategy of comprehensive or selective marketing on the web. If products were seen as potential candidates for sale by web-enabled technology the latter two impediments, cost and training, may be reduced as demand for appropriate value-adding services increases.

1.4 The question to be addressed by this research is:

1.4.1 Why do some companies sampled by the 2004 eCIC State of the Nation survey not sell products on the World Wide Web?

1.5 The hypothesis to be tested is:

1.5.1 There is no significant difference in the level of investment in ICT processes between companies that sell on the World Wide Web and those that do not.

1.6 The aims of this research proposal are:

1.6.1 To identify the companies that rejected eCommerce as a viable distribution channel.

1.6.2 To identify the nature of the rejected products, services and capabilities produced by the identified companies.

1.6.3 To determine the level of ICT investment, in manpower and financial terms, made by the identified companies

1.6.4 To determine the level of ICT investment, in manpower and financial terms, made by companies within the same SIC that accept eCommerce as a viable distribution channel.

1.7 The limitations of this research proposal are:

1.7.1 It must be complete prior to the next State of the Nation (2004/2005) survey begins in March 2005.

1.7.2 It must remain within budget and complement the work of eCIC.

2.0 Background

2.1 Little attempt appears to have been made to identify the specific products, services and capabilities of those enterprises that have rejected their offerings as suitable for marketing on the WWW. The eCIC report defines the industrial sectors, by numbers of companies and percentage of total employment, in which the rejection is prevalent. This leaves a significant gap in the understanding of the limitations of eCommerce within the Welsh economy. It is not clear whether the heavy funding commitment undertaken by the government institutions of the EU, UK and Wales is justified or, for that matter, is sufficient to cope with a significant increase in demand by commercial enterprises whose assessment of product suitability is altered through objective analysis.

2.2 The Welsh Assembly is aware of the importance of eCommerce and has identified the employment of *‘.....world-class electronic communications to their full potential’* (Welsh Assembly, 2001) as a principle element of a coordinated strategy for economic regeneration. With a history of heavy industry, predominately coal and steel, Wales was not best placed to compete with the rest of the UK following the rapid realignment of the UK industrial base toward a more service-orientated economy. Identifying the need for a ‘knowledge economy’ the Welsh Assembly initiated a series of initiatives designed to enhance the poor communications infrastructure and promote a greater awareness of the necessary training required.

2.3 The potential e-Businessman has a wealth of data, factsheets and ‘How-To’ information available when considering the implementation of a web-site to support the promotion of the enterprise. The Department of Trade and Industry (DTI, 2004) carries guides on its website that offer best practice advice and includes several case studies such as Spencer Davies Engineering Ltd. This company, located in Carmarthenshire, has used the internet and WWW to improve the passage of information within the company and with clients, with email accounting for up to 60% of all client communication, including the movement of detailed engineering specification.

2.4 Perhaps it is here that the nub of the problem of product suitability lies. Spencer Davies Engineering Ltd has identified that they offer more than one product type. At first

hand their product may be viewed as the physical outcome of the engineering work with all of the problems inherent in the distribution of tangible goods. On the other hand before the tangible product is made there is a large amount of traffic in knowledge, an intangible commodity that is suited to the eBusiness environment.

2.5 It may be the case that the large number of SME business that considered their products as unsuited to marketing on the web take a 'one-dimensional' view of their industry. In other words they ignore the importance of customer communication and the transfer of knowledge as the primary and principle attribute of any commercial exchange and thus a potential source of value in its own right or as a means of generating increased turnover.

2.6 The nature of SME, particularly those classified as small with 10 – 49 employees or micro between 1 and 10 employees (iCIC, *ibid*), with limited finance, limited managerial depth and inability to influence the supply chain policies of major customers (Carson, 2003) may inhibit the development of a coherent eBusiness strategy. The manager/owner/entrepreneur may have their attention drawn to the daily demands of the business and be unable to spend much time contemplating alternative marketing methods.

2.7 Moreover any perceived lack of influence within respective markets, whether direct to the public or with customers within related industries, can discourage innovative techniques such as the eBusiness route taken by Spencer Davies Engineering Ltd. This company does not sell their product on the web but uses web-based technology to enhance the level of service offered to clients or conversely, and somewhat perversely, demand compliance with the standards imposed by the eProcurement policies of large business customers. It seems likely that SME, whose business environment includes buying from, or selling to, large companies with extant eCommerce platforms combined with a specific policy for their use, will not be part of the large group who defined their products incompatible with web-based sales.

2.8 At this juncture it may not be unreasonable to anticipate that companies that have rejected their product or service as suitable for selling on the web do not have significant business with customers whose preference is to buy using eCommerce formats and technologies. The question is immediately raised as to the nature of these products and services that are considered unsuitable for web-based marketing. It is difficult to

conceive of any product or service that can be marketed without communication of any sort taking place between the parties involved.

3.0 Comparison and selection of possible research methods.

3.1 The importance of access to the eCIC database that supports the State of the Nation report cannot be overstated although it has severe limitations. The sample of 2,819 respondents represents approximately 10% of the 28,816 postal questionnaires originally sent out. The population was chosen from the Yell Data Business Database, rebranded by Yell, shortly before being sold to Experian, as Yell Data. This limits the potential Welsh business population by roughly 36% if owner operated companies (a one man band so to speak) are ignored and by some 83% if this segment is included (Welsh Assembly, 2004). In order to be considered as a candidate for the eCIC survey the company must have an extant listing in Yellow Pages but the lack of a listing is no indicator that there is a lack of ecommerce awareness or expertise.

3.2 However the eCIC database exists and replication would cost somewhere in the region of £4,640 according to the current Experian (2004) website at a rate of £160 per thousand company records (£100/1,000 for name and location, £30/1000 for the 1992 Standard Industry Codes (SIC) and a further £30/1,000 for the number of employees). Thus the eCIC database, whilst not comprehensive, will reduce the cost of follow-on research such as this if access is obtained. Accessing the data may prove difficult, it depends upon who paid the bill. If the research has been funded on a time and materials basis then the data belongs to the Welsh Assembly in which case it may be accessible following acceptance of this project outline.

3.3 Assuming that the database already gathered by eCIC is available the next step is to identify those companies that rejected to potential for marketing their product on the WWW. Similar banding, company size, regional location and SIC, as has already been used by eCIC in their analysis, should be maintained for compatibility.

3.4 Once a list of candidate companies is identified it will be necessary to determine the sample population for the follow-up research. This can be the whole population or a subset, or series of subsets determined by the SIC. It could be possible to segregate the population by company size, location and turnover however none of these options anticipates the ubiquitous nature of the internet. For example a cost-efficient supplier of

specialist bolts to the aircraft industry was discovered to be no more than a one-man-band operating out of his garage. The discovery only came to light after a quality control check of the supplier's stock revealed that much of it was counterfeit; the supplier got the business as a result of the technical ignorance of the procurement office and the fact that he was the lowest bidder. It follows then that company size is no real inhibitor when trading on the internet – this particular supplier, had he delivered the correct articles, could have remained a source of supply for many years without any harm falling to the contracting parties and, more importantly, the passengers and crews of the aircraft in which the bolts were used. If it is the case that size is no great inhibitor to eCommerce processes then using the SIC seems to offer an equitable means of segregation.

3.5 This should not mean that size and turnover are to be ignored. These characteristics may have a significant effect on the ability of the company to cope with the requirements of eBusiness practices. It may be accepted that eCommerce is a subset of a larger set of infrastructure and process requirements that have gathered around the term eBusiness. eBusiness, a term invented by IBM, implies much more than eCommerce practices, incorporating the relationship between technological where-with-all and the need for information flow, in practical terms the flow of data between terminals, to maintain the chain of supply. It does not matter whether the product is tangible or intangible, it is the speed at which the flow of accurate information is maintained that defines the success or failure of a business enterprise. ICT assists this passage by enabling greater accuracy and speed of communication, as the Spencer Davies Engineering example given earlier implies.

3.6 The characteristics of the population defined the following methods are available to gather data for further analysis to test the hypothesis:

3.6.1 Aims 1 and 2 can be achieved by analysis of the extant eCIC database. The eCIC questionnaire addressed each of the questions raised.

3.6.2 Aims 3 and 4 relate to a question that was not addressed by the eCIC questionnaire. Candidates were asked about the nature of internet usage by staff and whether a company website existed. Candidates were not asked to define the level of investment in terms of manpower (the cost of training, manhours and job tasking) or finance (the cost of infrastructure either in cash terms or as a proportion

of the overall investment in the business). This leads to four options to gather data to address the missing data:

3.6.2.1 A survey conducted using a random sample calculated against each SIC grouping. This method mixes both those that do and those that do not use the web as a distribution channel. It may not provide sufficient evidence to allow an acceptance or rejection of the null hypothesis as it is possible that only eCommerce enabled companies will be selected.

3.6.2.2 A survey conducted using a random sample drawn from each of two sub divisions, namely accepting eCommerce and rejecting eCommerce, of each SIC. This addresses the problem identified above but it is possible that the respective population size will be low.

3.6.2.3 A survey focussed on all 2,819 original respondents. The cost and scale of this option is too large to be achieved given the limitations defined in paragraph 1.7 above and it is therefore rejected.

3.6.2.4 Identify potential candidate companies for in depth investigation by site visits and case study. The option is rejected by reason of the time and budget constraint.

3.7 There are several methods available to generate a random sample however one of the most simple is using the relative percentage of each identified segment and applying the following formula:

$$N = (4P (100-P))/L^2 \text{ where}$$

N = the sample size

P = the relative percentage

L = the limits of error

Thus if a particular segment represents 20% of the total and the limits of error a +/- 5% we obtain a sample size of $(80 \times 80) / 25$ or 256. This formula, drawn from industrial work study practices (Whitmore, 1975) when determining the number of observations a practitioner must complete, is less accurate than the z^2 test but easier to calculate.

3.8 Given the constraints of time and budget it seems reasonable that a random sample is drawn from the population identified in eCIC database. A review of the potential sizes of each generic SIC grouping indicates that the following numbers may be expected:

Table 1 – Possible number of companies by SIC

Generic SIC	% (Rounded) of total eCIC survey respondents	Number of companies (n = 2819
Agriculture	14%	397
Manufacturing	8%	211
Construction	9%	262
Services	32%	902
Retail & Wholesale	23%	646
Hotels & Restaurants	10%	279
Transport & Distribution	3%	90
Total	100%	2786

Within each SIC lie several sub-definitions which may be significant. Until the data from aims 1 to 3 are available the final decision on survey method must be held in abeyance.

4.0 Conclusions

4.1 The eCIC survey did address the question of how Welsh companies make use of the internet but there are several limitations which beg answers. The most important of these is the impact of the cost of implementing an ICT solution, or more accurately, an ICT supplementary business process of which eCommerce is a part. It may be that the cost of information technology in terms of infrastructure, manpower and training is less inhibiting for the micro business and the larger SME than for a company employing between 10 and 50 employees. The reasons for this are that a micro business can raise its profile on the WWW to match that of very large organisations but the effort expended on production of actual product or procuring goods for sale may remain relatively low. The administration of the business takes a proportionally larger share of the overall manpower effort than that experienced by a slightly larger company. The small company has a similar amount of

administration to each of its brethren (the micro and the large SME) but the overall effort expended is focussed on the product, service or goods sold with little extra available to maintain non-essential distribution channels.

4.2 There seems to be a critical mass below which the focus on administration takes a greater share of the firm's activities and thus allows attention to be paid to any means that can alleviate this burden, ie ICT solutions. Conversely, but with a similar effect, there seems to be a critical mass above which sufficient resource, principally manpower, exists to allow ICT solutions to be assessed for their strategic value to the business. It is the middle of the road SME that seems to suffer from a fire-fighting mind-set, unable to address any business strategy that does not relate to the task at hand, which is often survival.

4.3 It is anticipated that this research will demonstrate that there is a significant difference in the level of investment in ICT processes between companies that sell on the World Wide Web and those that do not. In other words the null hypothesis will be rejected.

4.4 If, as anticipated, there is a difference it raises the need for further research to determine how government funds may be better focussed to address the shortcoming.

References:

Carson D, (2003), Marketing for small-to-medium enterprises in The Marketing Book, 5th Edition (Baker MJ (Ed)), Butterworth-Heinemann, Oxford

DTI, (2004), SPENCER DAVIES ENGINEERING LTD accessed at <http://www.dti.gov.uk/bestpractice/assets/cssde.txt> on 11 January 2005 at 11:00.

eCIC, (2004), eCommerce in Welsh SMEs: The State of the Nation Report 2003/2004 accessed at <http://www.ecommerce.ac.uk/pdf/State%20of%20the%20Nation%202003%202004%20English.pdf> on 9 January 2005 at 12:05

Experian, (2004) Prospect Locator, accessed at http://www.prospectlocator.com/nbd/e_rates.html on 11 January 2005 at 14:00

Welsh Assembly, (2001), A Winning Wales: The national economic development strategy of the Welsh Assembly Government accessed at <http://www.wales.gov.uk/themesbudgetandstrategic/content/neds/awinningwalesfinal-e.doc> on 9 January 2005 at 13:09

Welsh Assembly, (2004), Wales in Figures, accessed at <http://www.statswales.wales.gov.uk/ReportFolders/reportfolders.aspx> on 11 January 2005 at 14:59

Whitmore DA, (1975), Work Measurement, Heinemann, London