EBUSINESS BARRIERS TO GROWTH WITHIN THE SME SECTOR

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ABSTRACT

The development of Ecommerce within Small and Medium Enterprises (SMEs) in Wales is restricted by a number of barriers. Various projects initiated by government and academic bodies exist to assist SMEs overcome these barriers. However, whether these projects represent the needs of SMEs is debatable. The opportunity for SMEs to exploit information communication technology has increased due to the improved affordability and sophistication of computing equipment, along with the development and utilisation of the Internet. This progress has seen the emergence of Ebusiness and Ecommerce, whereby SMEs can operate, communicate and trade in global markets. Recent surveys by academia, government and trade bodies have identified Wales as the worst performing region for Ebusiness in the UK with sceptical attitudes towards its increased adoption.

This paper reports on a quantitative study investigating Ebusiness utilisation within SMEs in Wales. Specifically this paper focuses on the key barriers influencing the adoption of Ebusiness within SMEs in Wales. The survey of the Cardiff Chamber of Commerce (CCC) membership was undertaken in 2001. The CCC is a trade body of approximately 1000 SMEs encompassing a geographical area covering Cardiff, Bridgend, Newport and the Valleys areas. The postal survey and telephone follow up achieved a response rate of 100 SME classified enterprises, a response rate of approximately 10%.

Academic research has identified these barriers as deficiencies in financial resources, time, information and skills; concerns over security, legal issues and competition and doubts over the applicability of Ebusiness to their business practices and cultural and infrastructure issues. These barriers are a major influence as to how Ebusiness will develop within SMEs and this paper identifies the significance of each factor in constraining growth. The paper concludes by investigating the assistance for SMEs from academia, government and trade to develop Ebusiness activities and questioning whether these are representative and effective mechanisms for this sector. This paper contributes to knowledge by appraising and contrasting existing barriers to Ebusiness literature and comparing it with the relevant SOGM literature. Secondly it classifies barriers in two ways by type and time of occurrence. Finally the paper

recognises that the support mechanisms for Ebusiness within SMEs remain unproven and require further investigation to verify their effectiveness.

***Keywords**: Ebusiness, Ecommerce, SME, Barriers*

INTRODUCTION

The speed of growth of Ebusiness technologies within Small and Medium Enterprises (SMEs) in Wales is restricted by several barriers to development. Various projects by academia, government and trade bodies have been initiated to aid SMEs in Wales overcome these barriers. However, whether these projects represent the needs and voice of SMEs is open to debate. This paper evaluates and contrasts the barriers to Ebusiness literature, charts the results of a recent survey identifying the significance of these barriers to growth; questioning the role of the public and private sector in overcoming them.

DEFINITIONS OF EBUSINESS AND ECOMMERCE

The terminology involved within the field of information communication technology (ICT) usage is vast and contradictory. The activity within electronic markets is generally referred to as Ebusiness or Ecommerce (Turban, Lee, King & Chung 2000). The authors regard Ebusiness as a superset of Ecommerce. In turn Ecommerce can be considered a superset of Internet commerce or Icommerce (Beynon-Davies, Jones, & Williams, 2002) see Figure 1. Ecommerce is defined by Kalakota & Whinston (1996) as '…buying and selling of information, products and services via computer networks'. Whilst Sewell & McCarthey (2001) define Ebusiness as 'business facilitated by the exchange of information across electronic networks. Ebusiness is about using the convenience, availability and worldwide reach of ICT to enhance existing business or create new business'.

- Ebusiness. Business can either be considered as an entity or as the set of activities associated with a commercial organisation. We treat Ebusiness as the utilisation of information and communication technologies to support all the activities of business
- Ecommerce. Commerce constitutes the exchange of products and services between businesses, groups and individuals. Commerce or trade can hence be seen as one of the essential activities of any business. Ecommerce focuses on the use of ICT to enable the external activities and relationships of the business with individuals, groups and other businesses
- Icommerce. Internet commerce is the use of Internet technologies to enable Ecommerce. Such technologies are becoming the key standards for intra and inter-organisational communication (Beynon-Davies et al., 2002a)

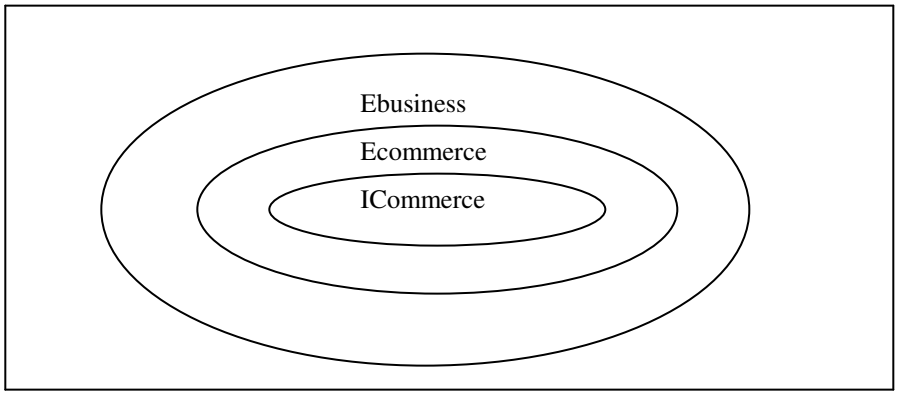


Figure 1: Classification of Ecommerce, Ebusiness & Icommerce
Source: Beynon-Davies et al., 2002a

Forms of Ebusiness

Generally we may distinguish between three major forms of Ebusiness (figure 2):

- Business to customer/consumer (B2C) Ecommerce - the use of ICT to enable forms of commerce between a company and its customers or consumers
- Business to business (B2B) Ecommerce - the use of ICT to enable forms of commerce between a company and its suppliers
- Intra-business Ebusiness - the use of ICT to enable communication and coordination between the internal stakeholders of the business (Beynon-Davies et al., 2002a). These distinctions are illustrated in figure 2.

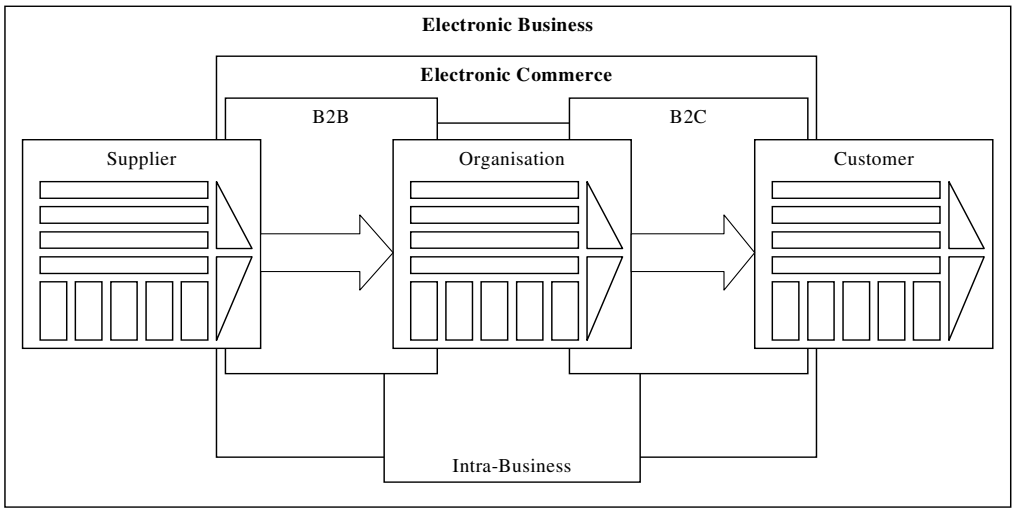


Figure 2: Forms of Ebusiness

Benefits of Ebusiness

Research investigating the utilisation of ICT recognised benefits in increased competiveness (Blili & Raymond, 1993), efficiency gains and cost reduction (Fink, 1998), increased management effectiveness (Fink & Kazahoff, 1997) and improved responsiveness and business performance (Venkatraman, 1994). Dedhia (2001), Poon & Swatman, (1999) and Chappell & Feindt (1999) recognise that Ecommerce can provide several potential and actual benefits to small and micro firms. Ebusiness research extends these advantages and for the purposes of this study we have divided them into five main areas:

- *Cost savings*, including lower logistic costs, lower postal cost, lower storage costs and lower personnel costs (Venkatraman, 1994; Poon & Swatman, 1997; Kalakota, 2000; Chappell & Feindt, 1999).
- *Time savings*, including quicker response time to markets, customers, suppliers, higher flexibility and a reduction in the delivery time and processing of payments (Fink, 1998; Chappell & Feindt, 1999; Lancioni, Smith & Oliva, 2000).
- *Connection Improvements* such as dis-intermediation. This is the process by which mediating organisations are removed in the customer chain (Currie, 1998; Kalakota, 2000).
- *Quality improvements*, such as access to new markets, new ways of marketing new products and services, improved communication plus the general improvement in customer relations (Currie, 2000; Chappell & Feindt, 1999).
- *Strategic improvements* such as more efficient and effective organisational forms and doing business on the global scale (Poon & Swatman, 1997).
- *Access to new markets,* Ecommerce provides the opportunity for business to offer products and services in new potentially global markets (Greaves, Kipling & Wilson, 1999).

SME DEFINITION

For the purposes of this study this paper shall adopt the European Commission (EC) definition of an SME. The EC define SMEs as enterprises employing fewer than 250 employees with an annual turnover of less than 40 million Euros or an annual balance sheet of no more than 27 million Euros (see Table 1) (EC 1996).

European Community Definitions of SMEs			
Criterion	**Micro**	**Small**	**Medium**
Maximum Number of Employees	9	49	249
Maximum annual turnover	-	7 million Euros	40 million Euros
Maximum annual balance sheet total	-	5 million Euros	27 million Euros

Table 1: European Community Definitions of SMEs
Source: DTI 2000a

SMALL AND MEDIUM-SIZED ENTERPRISES

In 2000, Baldwin, Lymer & Johnson recognised that SMEs played a significant role in the global economy, contributing to economic growth, social cohesion, employment and regional development as well as being a valuable source of business innovation. There is no universally accepted definition of a SME. The main feature of an SME is that it is 'not large', in the sense that a SME is not in the largest 10% or 20% of enterprises in the industry (Organisation for Economic Co-operation & Development (OECD) 2000). The 2000 conference by the OECD identified that governments world-wide recognise the importance of SMEs and their contribution to economic growth, social cohesion, employment, regional and local development. Beynon-Davies, Jones & Williams (2002)b identified that globalisation and technological change bring new opportunities for SMEs to enter foreign markets and to reduce business costs, moreover there are also transition costs, new competitive challenges and risks that have to be met.

As can be seen from Table 2, SMEs are the most significant sector of the economy accounting for 99.8% of all UK enterprises and 99.9% of total Welsh enterprises. Moreover the 'size class zero' enterprises - those made up of sole traders or partners (e.g. 2) without employees (Department of Trade & Industry (DTI) 2000a) account for 63% of all UK enterprises. In the UK they represent 95% of all businesses registered for VAT, employing 65% of the workforce (Ballantine, Levy & Powell, 1998). In contrast, medium sized (50 to 249 employees) and non-SME classified enterprises contribute only 0.7% and 0.2% of total UK enterprises respectively. Table 2 reveals that SMEs in the UK generate 55.5% of employment and 66% within Wales. In addition Table 2 illustrates that SMEs in the UK account for 44% of turnover compared to 57% within Wales (SME 1999). Therefore it can be seen that the UK economy, and Wales in particular, is dependent on the success of the SME sector. Welsh SMEs account for a greater proportion of total enterprises than in any other region, with the exception of Northern Ireland (99.9%), which has the same proportion (SBS, 1999). Moreover SMEs are a significant provider of employment and turnover within Wales (SBS 1999). Therefore it should be recognised that the success of the SME sector in Wales is crucial to its ongoing prosperity.

SME Statistics by Number, Employment & Turnover for the UK and Wales

Area		*SME classification by Size*									
Total Number of Enterprises		Size Class Zero	%	1-49	%	50-249	%	All SMEs	%	Non SME (250+)	%
SME classification by Number of Enterprises											
UK	3,676,940	2,323,826	63.2	1,320,021	35.9	25,739	0.7	3,669,586	99.8	7,354	0.2
Wales	144,135	91,958	63.8	51,168	35.5	865	0.6	143,991	99.9	144	0.1
SME by Employment											
UK	21,746,000	2,718,250	12.5	6,849,990	31.5	2,500,790	11.5	12,069,030	55.5	9,698,716	44.6
Wales	728,000	110,656	15.2	285,376	39.2	85,904	11.8	481,936	66.2	246,792	33.9

SME by Turnover											
UK	2,164,009	90,888	4.2	618,907	28.6	259,681	12.0	969,476	44.8	1,196,697	55.3
Wales	51,657	3,409	6.6	19,371	37.5	6,767	13.1	29,548	57.2	22,109	42.8

Table 2: SME Statistics by Number, Employment & Turnover for the UK and Wales (Source: SBS 1999)

THE WELSH EXPERIENCE

Historically the Welsh economy was based upon agriculture, iron, steel and the coal mining industries (Beynon-Davies, Evans & Owens , 2000). Wales became the first nation to employ more people in industry than in agriculture (Renton, 2001). However, the last three decades have seen a massive decline in the primary and secondary sectors within Wales due to increased global competition and falling demand especially in the coal and steel industries. The National Economic Development Strategy (NEDS) identifies the key contributors to poor economic performance in Wales as a weak indigenous business base, low activity rates, low added value production, too few enterprises exporting and an underdeveloped service sector. Other areas of weakness identified were a lack of high-tech knowledge-driven industries with low research and development (R & D), low exploitation of ICT, low wages, poor levels of entrepreneurship, low business birth rates, high business failure rates, poor growth rates from SMEs to Public Limited Companies (PLCs) and underdeveloped potential within the tourism industry (NEDS, 2001). The Global Entrepreneurship Monitor of the Welsh Development Agency (WDA), 2000) report identified that only 2.6% of the Welsh working age population were involved in either emerging or new firms, which placed Wales 18th out of the 23 nations surveyed.

The Welsh economy is now characterised by a large proportion of indigenous SMEs operating within the manufacturing and heavy industries, together with a small number of large, foreign-owned multinational assembly plant from the electronics (e.g. Sony, Panasonic etc) and motor vehicle (e.g. Ford) sectors (Beynon-Davies, Evans & Owens (2000). Inward investment has seen Japanese companies such as Sony and Panasonic receive an estimated £30m of Welsh regional aid (Renton, 2001). However such employment accounts for less than 8% of the total Welsh workforce and the jobs created have tended to be poorly paid (Renton, 2001). Low wages in the region has also contributed to migration among skilled workers and therefore skills shortages in certain sectors and a lack of sufficient professional and managerial positions (Beynon-Davies, Evans & Owens (2000). The lack of skills within Wales has resulted in some enterprises moving out of Wales

Parts of Wales are eligible for up to £1.3 billion worth of European Regional grants between 2001 and 2006 due to economic under-performance (Renton, 2001). In economic terms, this puts Wales on a par with Hungary rather than the rest of Britain. In 2001 there were only 23 publicly quoted Welsh companies and only 293 companies that had sales of more than £15m (Renton, 2001). Wales lags behind most British regions with a rate for business start up 30% below average. Gross domestic product (GDP) per head in Wales is only 70.4% of Britain's average, placing it well behind Scotland and the Irish republic, and the lowest of any UK region with the exception of Northern Ireland (DTI 2000). Wales suffers from low economic activity rates with local

markets dominating SMEs trading patterns (Jacobs & Dowsland, 2000). These are significant factors that contribute to low levels of Internet use for business purposes. Unemployment is average for Britain, however certain regions of Wales are affected by high long-term unemployment. Wales is certainly in need of economic regeneration with the transport and telecommunications infrastructures requiring significant investment.

BARRIERS TO EBUSINESS GROWTH

Established research such as Blili & Raymond (1993) recognised that SME's use of IT encountered unique problems in comparison with larger firms; namely limited financial resources, low skills and minimal strategic management. The development of the Internet and its usage by business has seen the emergence of Ebusiness and Ecommerce technologies. Therefore there is a need to re-evaluate SME usage of IT in light of these new technologies. The process of identifying actual benefits achieved from Ecommerce and Ebusiness remains contentious, whereby claimed advantages such as increased sales are often circumstantial and marginal (Poon & Swatman, 1999). The focus of this paper is predominantly Ecommerce, however areas of Ebusiness are considered within the remit of the research instrument. This section evaluates and contrasts the Ebusiness barriers to growth academic literature. Problems arise in contrasting the extant literature due to the differing definitions of Ebusiness, Ecommerce and SMEs employed by researchers. Current literature, Table 3 providing a summary of key factors, has identified a number of current problems and issues with Ebusiness: Moussi & Davey (2000) report on a survey by the Australian Bureau of Statistics (ABS) and undertake further investigation into the benefits and inhibitors of Ecommerce. The ABS study identified the main inhibitors as not being suited to nature of business (18%), technical difficulties (17%), cost (25%), skills (25%) and security concerns (28%). The survey of 147 enterprises extends this list to include: - cost, time, making it a priority, uncertainty, lack of understanding, security, knowledge of support bodies, unaware or unconvinced of benefits, staff misuse, no IT or not willing to invest in unproven technology. The top inhibitors for all enterprises identified by occurrence were time, priority of Ecommerce, security concerns, cost and lack of conviction of benefit. These factors were evaluated by enterprise size according to number of employees (1-5, 6-20, 21-50,51-200, 201>). The 1-5, 6-20 and 21-50 groups all identified time as their prime inhibitor. By contrast the large enterprises 51-200 and >201 identified time and security as their key inhibitors. This provides supportive evidence that smaller enterprise are deterred from developing their technological process due to key factors such as time, lack of awareness of benefits and the need to prioritise technological development. By contrast, larger enterprises with their greater access to employee skills and finance are more concerned with developing the capabilities and security of their Ecommerce operations. Lewis & Cockrill (2002) surveyed 25 small and micro enterprises within Wales. Forty four percent identified lack of advice and support as the key reason for non-participation as well as limited finance and skilled staff. Several respondents questioned the applicability of Ecommerce to their operation especially where these enterprises had low levels of IT. Interestingly 44% of current Ecommerce users encountered drawbacks, which included high cost, low use by suppliers and customers, lack of IT training and inefficient systems. This suggests that barriers exist on the initiation and development of Ebusiness within the enterprise.

Van Akkeren & Cavaye (1999) identify via three case studies of Australian small firms with less than 20 employees a number of inhibitors of Internet technologies. These included a lack of internal IT expertise, lack of employee and management experience, insufficient time, expense, IT professionals too expensive and not helpful, security, reluctance by employees to use new systems. Van Akkeren & Cavaye (1999) suggest a link between the Internet technology within a business and the inhibitors perceived by the owner of the business. When questioned on the role of government and enterprise support bodies in facilitating Ebusiness adoption all 3 businesses responded they had been a negative influence. Strader & Shaw (2000) provide a discussion based on the existing literature of key inhibitors to electronic market success including lack of IT infrastructure, IT skills and security concerns. Smith & Webster (2000) undertook a survey of SMEs in Scotland which achieved a response rate of 30% with 38 responses. The most commonly cited barriers were time (50%), lack of in house skills/knowledge (37%) and financial constraints (26%). In contrast to the Welsh companies approximately half of the surveyed enterprises had sought advice and support from government and industry bodies for which they were generally satisfied. Jacobs & Dowsland (2000) undertook a survey of 42 SMEs in South West Wales that revealed a number of perceived barriers to Ecommerce. These included general scepticism to Ecommerce; 33% indicated security concerns, 50% cited cost, whilst several commented on the quantity of work required, employee expertise and applicability of Ecommerce to their business. Nath, Akmnakigil, Hjelm, Sakaguchi & Schultz (1998) interviewed directors in ten businesses. Seven key impediments were identified namely security, costs, legal issues, training and maintenance, lack of skilled personnel, uncertainty and lack of information. The size of the organisations surveyed is not specified although 5 are identified as large. Elsammani, Scown & Hackney (2001) reports the findings of 192 SMEs and five case studies in England. This survey found that SMEs experience a number of problems at initial web design and development stages. These included poor communication with web designers, limited resources, inadequate advice on generic design, lack of technical support, lack of awareness of legal issues and the technological limitations of the Internet. These problems resulted in SMEs having a poor web presence. Elsammani et al. (2001) concludes by identifying the importance of support agencies in eliminating or alleviating these problems. Chappell & Feindt (1999) compiled a report based on quantitative and qualitative analysis of E-commerce experience in 89 SMEs from 17 countries under the framework of the ESPRIT project KITE. Within the report several barriers to Ecommerce are identified including cost 64%, cultural problems 66%, 57% infrastructure and 56% security. These barriers were seen as problems of perception or barriers that needed to be overcome.

Barriers to Ebusiness development non SOGM literature										
Factor	Chapman, James-Moore, Szczygiel Thompson (2000)	Elsammani, Scown & Hackney (2001)	Jacobs & Dowsland (2000)	Chappell & Feindt (1999)	Lewis & Cockrill (2002)	*Moussi & Davey (2000)*	Nath, Akmnakigil, Hjelm,	Smith & Webster (2000)	Strader & Shaw (2000)	Van Akkeren & Cavaye (1999)
Lack of financial resources & high cost	✔	✔	✔	✔						✔
Insufficient Time & amount of work required to maintain Ecommerce	✔	✔	✔							✔
Insufficient Education/ Information into benefits & Uncertainty on how to implement	✔	✔								✔
Lack of IT Expertise/ Skills/ Training/ Personnel	✔	✔	✔						✔	✔
Fears & concerns over Security			✔	✔					✔	✔
Competition			✔							
Applicability of Ebusiness to enterprise			✔							
Legal Issues		✔								
Cultural Barriers & Infrastructure issues				✔					✔	
Low use by customers & suppliers										
Hierarchical Transaction Governance									✔	
Lack of Management vision										
Reluctance to use new systems by employees										✔
Lack of Priority										

Table 3: Barriers to Ebusiness development non SOGM literature

Lack of financial resources and high cost

Nine out of the ten studies identified in Table 3 recognised the existence of a lack of financial resources and the high cost of telecommunications services as a key barrier to Ebusiness development. Nath et al. (1998) identified 4 components of the costs involved with Ebusiness as connection, hardware/software, set up and maintenance (see Table 4). The limited financial resources SMEs have at their disposal, especially the owner only sector exacerbates this factor. Currie (2000) has identified the cost of setting up a fully integrated web site as £1 million and increasing, this level of investment only being applicable to large enterprises and certainly not the SME sector. The need for substantial and ongoing financial investment could create a ceiling to the development of Ebusiness within an individual enterprise. Furthermore, SMEs might only be prepared to invest in Ebusiness technologies incrementally to reduce the cost burden. Thus they would only move to the next level of Ecommerce if there were available funds. Therefore it is vital that SMEs consider their Ebusiness development within their overall business strategy over a medium and long-term timescale.

Nath's et al Costs involved with Ebusiness	
Factor	**Explanation**
Connection	Connection costs to the Internet
Hardware/Software	Cost of hardware and software required
Set-up	Work required in setting up systems
Maintenance	Cost of training and maintenance

Table 4: Nath's et al Costs involved with Ebusiness
Source: Muir & Jones (2002)

Insufficient Time & amount of work required to maintain Ebusiness

Insufficient time and work required to build and maintain an Ebusiness operation was recognised as a significant barrier to growth within 7 of the 10 studies (see table 3). SMEs especially 'owner only' enterprises have limited personnel as their resource whereby undertaking and maintaining an Ebusiness operation in addition to existing roles might be difficult even impossible. Moreover there might be a reluctance to invest in more personnel or for existing personnel to invest more of their time towards developing Ebusiness without a clear identification of potential benefits (Dawson, 2000 & Lewis & Cockrill 2002).

Insufficient Education/Information into benefits & uncertainty on how to implement Ebusiness

Lyons, 1998 identified that SME owners are not utilising their Internet sites to their maximum potential. Four studies recognised that SME owners questioned the applicability of Ebusiness to their enterprise and were uncertain or ignorant of its benefits (Table 3). For example SMEs with an existing Ebusiness operation were uncertain of its effectiveness or how to measure it (Nath et al. 1998). Seven of the studies identified that a significant number of SMEs remain ignorant about the opportunities that Ebusiness provides and how affordable it has become (Table 3). This

evidence reinforces the need for government and enterprise support organisations to educate the SME population into the opportunities that Ebusiness provides.

Lack of Expertise/Skills/Training/ Personnel

Table 3 indicated that 9 of the studies identified a lack of expertise/skills/training and personnel as a key barrier to Ebusiness development. Business Information & the Internet (1998) identified problems of getting sufficient specialised technical expertise and training as a key disabling element to Ebusiness. This is significant when you consider that the web sites of SMEs that show the greatest return are those designed by web consultants and marketing enterprises (Lyons, 1998). Independent SMEs do not have the training resources and knowledge to up-skill or develop their staff to fully exploit the opportunities that Ebusiness provides. Therefore there is a need to identify whether government and industry bodies are providing a support network to develop the skills of business entrepreneurs to overcome this barrier.

Fears & concerns over Security

It is apparent that concerns over security remain a barrier to potential customers and users of Ebusiness with 6 of the studies identifying it as a factor (Table 3). Jacobs & Dowsland's (2000) recognised a lack of security associated with Ebusiness transactions as a significant barrier to adoption. Whilst Troy & Willcocks, (1999) identified a continuing perceived security risk of participating in Ecommerce transactions as inhibiting the use of the Internet for financial transactions. SMEs need to create secure systems and assure their potential customers of confidentiality. Furthermore there is a responsibility with government and enterprise support organisations to educate the public in the safety of Ecommerce transactions.

Legal Issues

Two of the studies identified uncertainty about the legal, regulatory and tax environment as an impediment to Ebusiness development within SMEs, in particular for enterprises undertaking international transactions (Bologna, 2000). Nath et al. (1998) identify a number of legal issues that are acting as a significant impediment to Ebusiness. There are a number of issues, which remain to be resolved with regard to encryption of data over national boundaries (Collins, Williams, Beynon-Davies & Jones, 2002). These uncertainties need to be resolved before consumers and customers have full confidence in utilising Ebusiness across national boundaries.

Ebusiness and Ecommerce Stages of Growth Models

Barriers to development have also been recognised within the emerging Ebusiness Stages of Growth model (SOGM) literature. Jones, Beynon-Davies & Muir (2002) identify that a number of SOGMs exist to chart the development of Ebusiness within SMEs. These SOGMs act as a mechanism to aid understanding and explanation of the growth and as a guide towards implementation and policy formulation. A number of these models consider the existence of barriers to Ebusiness development within their frameworks or supporting discussion. The following discussion considers the models that recognise their existence. Ause.Net (2001) identifies the existence of a number of barriers within its framework. The initial barriers are typically internal to the firm and

include concerns about cost, time and knowledge about technologies. At the later stages in the framework further internal and external barriers are identified including concerns over customer and suppliers use of technologies and security. Beynon-Davies et al. (2000)c identify in their supporting discussion that the low uptake amongst the SMEs sector in Wales is due to the existence of barriers such as cost, a lack of awareness of benefits, lack of skills and a fear of technology. Meir, Husemann, Luthi, Wismer, Hauschen, Meyer & Wohlwender (2001) identify a number of barriers from a large quantitative survey in their supporting discussion. Key issues that were identified included shortages of skilled personnel technical know how and problems of integrating Ebusiness technologies within existing systems. Elliot (2002) identified the major inhibitors to Ebusiness growth as uncertainty, lack of skills and lack of funding. Donovan (1997) identified limitations in attitudes and culture to adopting Ebusiness within enterprises. In a comprehensive review of Ebusiness barriers Cunningham & Froschl (1999) identify a range of significant problems that will affect the implementation of ICT such as financial and technology concerns, language barriers, security and interoperability as well as technical and legal issues. In summary our models have identified a wide diversity of potential barriers to Ebusiness, which are both internal and external to the enterprise. It is apparent that these barriers exist and must be considered a significant deterrent to Ebusiness to the emergence of such technologies within an enterprise.

Summary of Barriers to Development

The literature identified in Table 3 has identified the existence of 14 significant inhibitors to Ebusiness development from 10 surveys in a variety of countries including 2 within Wales. A number of these studies can be criticised in terms of sample size and inclusion of non-SME classified enterprises however they provide a useful insight into growth problems. Lack of financial resources & high cost, lack of expertise, skills, training, personnel, insufficient education and insufficient time were identified as the most frequently occurring barriers to Ebusiness development and significant inhibitors within each study. This analysis is supported by the percentages within the individual studies. These results can be contrasted with the SOGM literature, which identified 6 further studies, which considered barriers to Ebusiness development. The contrast between the 2 groups of literature identifies a high degree of commonality in the identification of key barriers such as skills, cost and financial. This supports the view that these barriers exist and must be regarded as a significant impediment to Ebusiness development within the SME sector. Therefore there is a need to undertake further research to identify the significance of each factor in constraining Ebusiness growth and recognise their existence within SOGMs.

RESEARCH INSTRUMENT

To achieve the aims discussed above a survey instrument was constructed. The recognition of the speed of Ebusiness development in SMEs in Wales was identified from a survey undertaken by the authors in late 2001. This survey was piloted in 1999 amongst members of the Cardiff Chamber of Commerce (CCC) along with a monthly newsletter. Sixty completed questionnaires were received from respondents to the pilot survey; this was one of the highest responses to a Chamber survey achieved in recent

times. The full survey was sent in 2001 to the Cardiff Chamber of Commerce (CCC), a trade body with 1035 organisations at time of survey along with a monthly newsletter. The CCC covers a geographical area encompassing South Wales, Cardiff, Bridgend, Newport and the Valleys areas. The survey was originally designed to investigate the current experience of the membership in relation to E-Commerce. However, many of the questions address more generic Ebusiness issues and these are discussed here. Seventy-seven organisations returned the full postal questionnaire giving an initial response rate of 7.45%. A further 23 organisations successfully completed the survey giving a total return of 100 organisations with a sample return of 9.68% of the membership which was regarded as a valid response rate. The authors accept there is an element of self-selection bias about the postal survey respondents, however the use of a telephone survey helps negate this factor. Thereafter a thorough literature search was undertaken of academic texts, conferences and journals for papers identifying barriers to Ebusiness development. The research instrument was structured as follows: -

The survey collected data about the following issues:

Company and ICT

This section gathered general information regarding the SME in question. The questions also were directed at determining the position of the company in terms of their general use of ICT. It revisited some of the focal issues addressed in an earlier Wales information society survey (WDA, 2001):

- Size of company – micro, small, medium, large
- Industrial sector
- Level of ICT infrastructure
- Proportion of employees using ICT in daily work
- Level of internal ICT support

Ebusiness

This section focused on the specific area of Ebusiness and how the sampled enterprises utilise technologies for Ebusiness. We particularly focused upon Icommerce – our presumption being that this is the most prevalent form of Ebusiness infrastructure for SMEs. We covered issues that included:

- Access to the Internet
- Means of Connection
- Use of the Internet
- Web site
- Other information technologies

Disablers to Adopting E-Business

Academic research has identified significant barriers inhibiting the adoption of Ebusiness by SMEs (see Table 3). Notably lack of financial resources and high cost, insufficient time and lack of skills. Many of these factors were identified within the results section of this study.

SURVEY RESULTS

The survey revealed 36% of enterprises surveyed classified as Micro, 42% as Small and 18% as Medium sized. Three enterprises were classified as large enterprises having more than 250 employees. The CCC membership consists of a smaller representation of micro organisations than in the current Welsh economic climate. It must be considered that the breakdown of the survey respondents by classification of SMEs does not reflect the structure of the Welsh economy as identified in Table 3, due to the inclusion of several Medium and non SME classified enterprises. Thus it seems likely that the results of this survey paints an unduly optimistic picture of the speed of Ebusiness adoption within Welsh SMEs.

Industrial Classification

Of the sample 35% were classified as service sector and 27% as manufacturing. These changes reflect the changing nature of the Welsh economy with increased reliance on the service sector industry and continued decline in the manufacturing industry.

Use of IT

One hundred percent of enterprises surveyed used information technology. This ranged from enterprises possessing one computer to organisations with wide area networks (WANs). However it was apparent from the results that SMEs with greater than 10 employees employed significantly higher levels of IT. Significantly 98% of enterprises surveyed had access to the Internet. The main uses of the Internet for SMEs were identified as finding information (90%), electronic mail (88%), and advertising and marketing (62%).

Website Ownership

The survey showed that 77% of enterprises possessed a website. Enterprises identified the main website use as advertising and marketing information to customers, distributing information to suppliers (18%). By contrast only 13% of enterprises identified that they were using their website for online sales. Again these statistics were significantly worse for smaller enterprises.

Barriers to Ecommerce

Table 5 identifies the main disablers for Ebusiness were insufficient time to develop and maintain a website (48%), insufficient financial resources (30%), low use by customers and suppliers (27%) and lack of IT specialist skills 27%.

When these factors are analysed by enterprise size similar trends are revealed (see Table 6 & Chart 1). Micro enterprises identified insufficient time to develop and maintain site (53%) and insufficient financial resources (44%) as their main disabling factors. This supports other findings from the survey that Micro enterprises are finding it difficult to compete in Ebusiness with their level of resources and skills. Similarly Small enterprises identified insufficient time to develop and maintain a web site (53%) and insufficient financial resources (31%) as their main disablers. Medium SMEs identified insufficient time to develop and maintain site (25%) and lack of IT specialist skills (11%) as their prime concerns. Thus it can be seen that the larger the enterprise the less the significance of the disabling factors.

Barriers to Ebusiness	HITS	%	RANK
Insufficient time to develop & maintain site.	48	48	1
Lack of IT/WWW specialist skills	27	27	3
Insufficient financial resources	30	31	2
Lack of information, advice and support	15	13	6
Lack of understanding, confidence & awareness	13	13	6
Organisation structure & culture	8	7	9
Fear of domination by large business	2	2	10
Low use by customers and suppliers	28	27	3
Concerns over security	25	24	5
Not relevant to my organisation	10	9	8
Other	2	2	10
No Response\Not Applicable	12	12	8

Table 5: Barriers to Ebusiness

Barriers to Ebusiness by Enterprise Size	1-9 Micro %	10-49 Small %	50-250 Medium %	250+ Large %
Insufficient time to develop & maintain site.	53	53	25	0
Lack of IT/WWW specialist skills	36	28	11	0
Insufficient financial resources	44	31	8	0
Lack of information, advice and support	25	11	6	0
Lack of understanding, confidence & awareness	11	17	8	0
Organisation structure & culture	8	8	6	0
Fear of domination by large business	0	6	0	0
Low use by customers and suppliers	36	31	8	33
Concerns over security	31	31	6	33
Not relevant to my organisation	11	11	6	0
Other	0	3	3	0
No response/Not applicable	6	14	8	67

Table 6: Barriers to Ebusiness by Enterprise Size

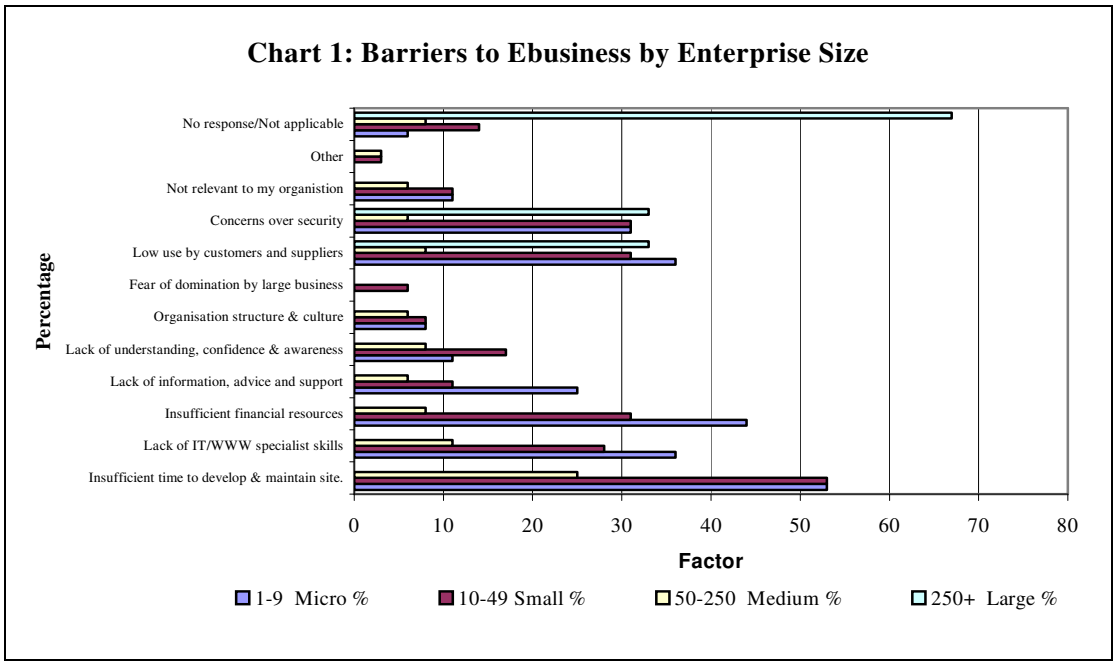
Problems of Ebusiness

Similarly CCC members were asked to rank current and future problems of Ebusiness (Table 7). Overall lack of security associated with Ebusiness transactions (42%), costs of telecommunications services (30%) and problems of getting sufficient IT expertise (24%) were identified as the main current inhibitors. Future problems were identified as lack of security associated with Ecommerce transactions (25%); cost of telecommunications services (15%) and problems of getting sufficient IT expertise

(14%). These findings support the evidence regarding barriers to speed of Ebusiness growth with survey respondents identifying skills and costs as critical issues. This evidence is supported by CCC members ranking of current and future problems (table 7) regarding developing their Ebusiness function. Members identified financial constrains and lack of skills as current and potentially future problems. This suggests that SMEs consider these factors remained unresolved and ongoing problems.

Current and Future Problems of Ebusiness	Current relevance HITS	%	RANK	Future Relevance HITS
Lack of security associated with Ecommerce transactions	43	43	1	26
Lack of technological standards	15	15	5	7
Costs of telecommunications services	30	30	2	14
Problems of bandwidth	16	16	4	11
Problems of getting sufficient IT expertise	24	24	3	13
Other (Please specify)	0	0	6	0

Table 7: Current and Future Problems of Ebusiness

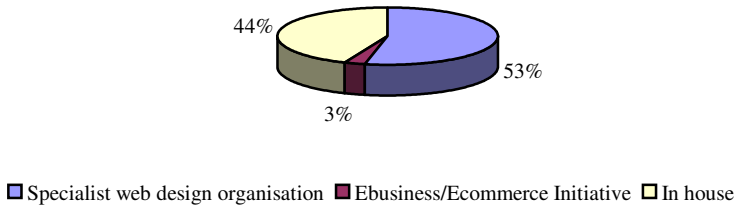


Which body developed your website

Having identified the significance of barriers to speed of Ebusiness development, it was necessary to identify the influence of development bodies in combating these

factors. Members were asked to identify who had developed their website (see chart 2). Fifty four percent (54%) of survey respondents identified a specialist web design organisation whilst 44% identified that their site had been developed in house. Only 3% of enterprises surveyed identified that their website had been developed by an Ebusiness initiative project. This result suggests that enterprise support organisations are having a limited influence on the speed of Ebusiness development.

Chart 2: Website Developer



Development Bodies

There is a proliferation of government bodies and agencies (e.g. National Assembly and Welsh Development Agency) within Wales encouraging business development. The University and government enterprise agencies offer a cornucopia of projects funded by European initiatives such as Objective One and the European Social Fund. The remit of these projects is incredibly diverse including training, business advice, ICT development and development of entrepreneurial skills. Ebusiness development is encouraged by a range of university projects (such as Swansea University's South Wales Information Gateway) and public and private sector initiatives projects progressed by organisations. A key question is whether such funding is being directed appropriately? Existing evidence suggests that Welsh SMEs are not taking full advantages of the opportunity that Ebusiness provides and that Wales is performing badly in comparison with other UK regions (Beynon-Davies et al. 2002a). Furthermore Beynon-Davies et al. (2002b) have identified that Welsh SMEs continue to trade within local and regional markets, lack awareness of the strategic implications of Ebusiness and there is a lack of adequate ICT infrastructure in Wales.

In recent years the Welsh Assembly have developed a key strategy known as Cymru-ar lein (NafW, 2001). One of the strands of this strategy is the development of the ICT infrastructure and IT skills within Wales. This paper forms part of an ongoing study to formulate an evidence-base to reflect against this established policy. As an explanatory tool to aid us in the evaluation process we have developed a dependency model as illustrated in figure 3 (Beynon-Davies et al, 2002)a. There are three components to the model: infrastructure (both physical and non-physical), activities of groups/organisations (distinguished in terms of public, private and voluntary sector organisations) and effects (social, political and economic); based upon original suggestions by Davenport, 1993 on the mediating position of organisational changes between IT and organisational performance. The purpose of this model (see Figure 3) is to allow us to trace some of the expectations associated with national ICT strategy on the part of key stakeholders.

Furthermore it will also act as a focus for establishing a range of evaluation projects to assess the impact of funding regimes and programmes focused on the ICT arena.

DISCUSSION

The opportunity for SMEs to exploit ICT has increased due to the improved affordability and sophistication of information technology (IT) equipment, along with the development and utilisation of the Internet (Riemenschneider & Mykytyn, 2000). These developments have seen the emergence of Ebusiness (Sewell & McCarthey, 2001), whereby SMEs can operate, communicate and trade in global markets. However, the Department of Trade and Industry (DTI), (2000) survey identifies Wales as the worst performing region for Ebusiness in the UK. Furthermore the NOP (2000) survey identified sceptical attitudes towards the adoption of Ebusiness within the SME sector. Welsh enterprises were found to be the least likely of UK regions to think of ICT as crucial to future competitiveness and were unclear about its benefits (DTI, 2000). If Welsh enterprises are unclear about the benefits that ICT can produce and are unenthusiastic about its potential, then this suggests they will be reluctant to utilise it. The author's research found all enterprises surveyed utilised IT. Unsurprisingly larger SMEs utilised IT to a greater extent than their smaller counterparts. When Ebusiness uptake was evaluated it was found that 77% of enterprises surveyed possessed a website. However only 13% of enterprises utilised their website for on-line sales. This suggests that barriers to development restrict the development of Ebusiness technologies within SMEs.

The research identified that the main constraints to Ebusiness development were time, financial resources, limited use by customers and suppliers and lack of IT skills thereby supporting the findings of previous research (see Table 3). When these barriers are analysed by size, Small and Micro enterprises identified insufficient time and limited financial resources as the main factors constraining the speed of Ebusiness development. By contrast, the survey identified that the barriers to speed of Ebusiness development have less influence in medium and large SMEs. This suggests that Micro and Small SMEs are finding it difficult to develop their Ebusiness technologies with their limited levels of resources and skills. Furthermore when CCC members ranked their current and future problems regarding developing their Ebusiness function they identified financial constrains and lack of skills as current and potentially future problems. This study found that it was possible to classify barriers to Ebusiness by perception and reality. Perception barriers were defined as SME owner's attitudes caused by a lack of knowledge and understanding of such factors as security, insufficient education into benefits and applicability, legal issues, employee reluctance and fears of competition. A process of continual education and reinforcement of the entrepreneur and employees can overcome these barriers. Reality barriers can be defined as the factors, which every SME has to contend with such as financial resources, available time and available skills within the enterprise. These factors require strategic direction from within the enterprise to manage, generate and improve and assistance where possible from outside bodies to develop these elements. Another important factor that must be considered is the way these barriers impact. This study recognised that Ebusiness barriers impact in two ways via initial impact or ongoing effect. Initially an enterprise has to overcome a mixture of perception and reality barriers to initiate an Ebusiness project. For example there might be a need to educate the key players within the SME to overcome factors such as

uncertainty into security issues and benefits and applicability to the enterprise. In addition consideration would have to be given to the reality barriers such as cost of the development, existing skills of workforce and time available to maintain and develop the operation (see Figure 4). The ongoing barriers influence how quickly and effectively an enterprise can develop its Ebusiness operation. Jones et al. (2002) have identified SOGMs, which chart Ebusiness growth in progressive linear stages. Ongoing barriers are likely to be reality barriers such as finance and time available to divert to an Ebusiness operation. These barriers might prove insurmountable and create a ceiling to Ebusiness growth within certain enterprises.

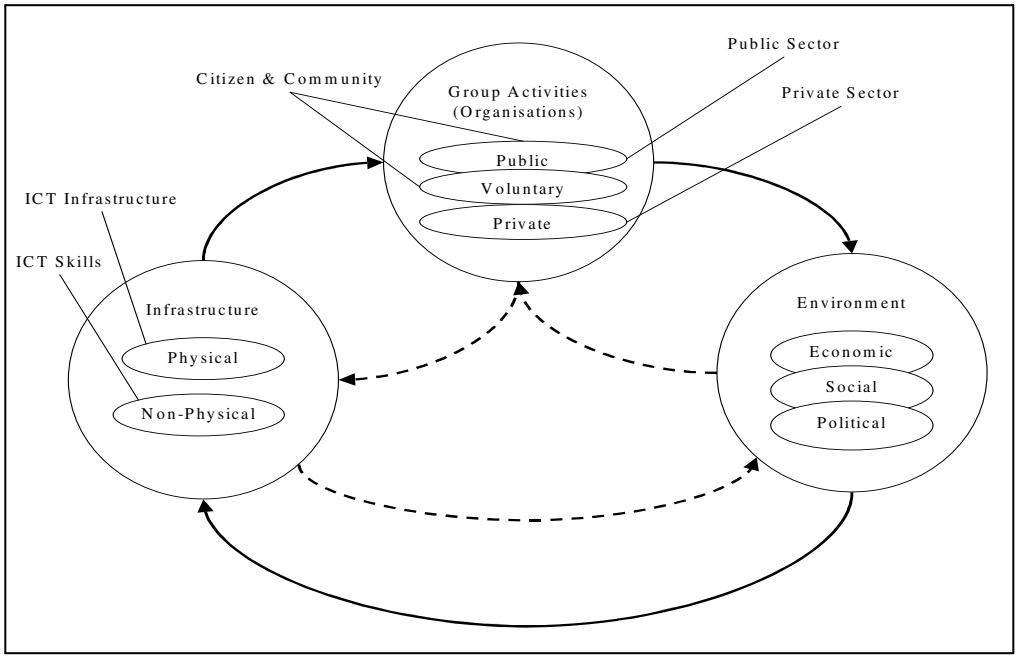


Figure 3: The Dependency Model Source: Beynon-Davies, Jones & Williams, 2002

Thus the author's research has identified the existence of significant barriers to Ebusiness development for SMEs, which is supported by the academic literature. However this requires ongoing and further investigation of Ebusiness barriers and recognition of the significance of each barriers and when and how they impact on an SME's development and the necessary measures to alleviate them. Therefore it is vital that SMEs receive support from government and trade bodies. However, when respondents identified any organisations involved in the development of their Ebusiness operation only 3% of enterprises surveyed acknowledged assistance from an Ebusiness initiatives & projects. This contrasts to research by Lewis & Cockrill (2002) which identified that 25% (6 out of 25 enterprises surveyed) had received some public funding and IT training to develop their Ebusiness operations. However their research confirmed that information about such projects and funding was difficult to find and understand

and the activities of these bodies were seen as uncoordinated and bureaucratic (Lewis & Cockrill, 2002).

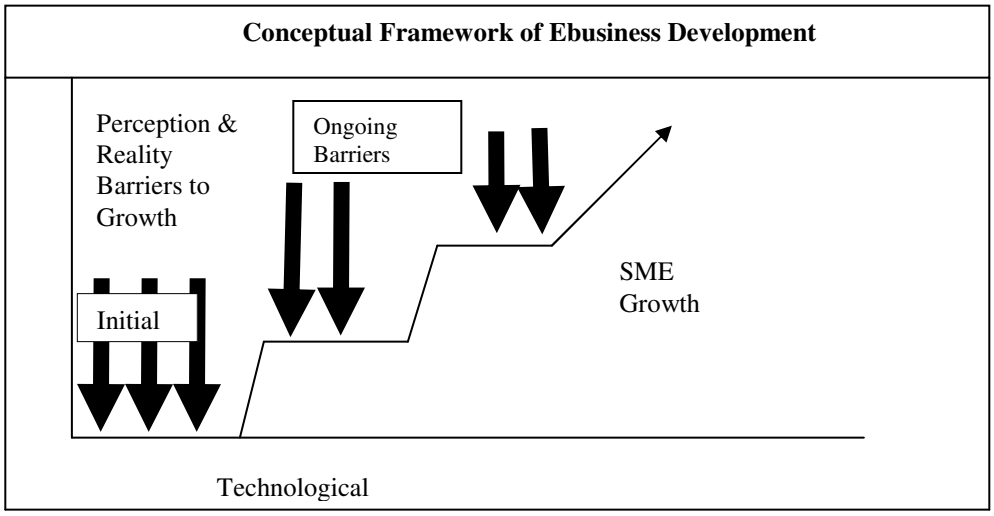


Figure 4: Conceptual Framework of Ebusiness Development

Therefore this suggests that current effective assistance by support bodies is minimal. Therefore a number of questions must be posed. Is the myriad of different Ebusiness projects for SMEs in existence the appropriate enabling mechanism for Ebusiness development? The authors would suggest that there is a need to investigate the Ebusiness support programs in existence and answer the following research questions. Identify the number and scale of these Ebusiness projects and their coverage of regions and industry sectors within Wales. Are these projects unique or are they competing with each other? Identify the degree of consultation with the SME sector, do the projects represent the needs of the SME, in that they allow them to develop their Ebusiness competencies? Has the success of these projects being appraised? Is there need for an overall development plan for Ebusiness within SMEs in Wales? The dependency model (see figure 3) that we have identified within this paper could act as a suitable framework to answer these research questions. Moreover the dependency model (figure 3) could act as a framework to justify the criticisms of existing funding into SME Ebusiness. Much of the funding has been focused on developing the physical infrastructure within Wales in terms of access to broadband and upgrading the social infrastructure within SMEs in the forms of upgrading ICT skills. However little consideration is given to encouraging enterprise transition in key business activities to effectively utilise Ebusiness technologies. Only when SMEs understand the benefit that Ebusiness provides and the process of integration with core business activities will acceptance and usage increase.

SUMMARY

In summary, evidence suggests there is need to further investigate the role of Ebusiness projects and initiatives in developing ICT growth within SMEs. These

Ebusiness projects, largely funded by the European Community should represent the voice of the SME and the enabling mechanism to future development. Furthermore the authors suggest that there is a need to coordinate the influence and implementation of these projects within Wales to ensure the effective growth of Ebusiness. Currently evidence suggests that these projects are largely irrelevant to individual SME development and significant deterrents to development within the sector remain. To claim that the Ebusiness projects act as the voice of the SME is unsupportable and requires further evidence to substantiate. This paper makes a contribution to knowledge in the following areas. Firstly it appraises and contrasts existing barriers to Ebusiness literature and compares this with the relevant SOGM literature. Secondly it classifies barriers in two ways by type and time of occurrence. Finally the paper recognises that the support mechanisms for Ebusiness within SMEs remain unproven and require further investigation to verify their effectiveness. We have used the current data to validate and refine a model of the linkages between funding and Ebusiness impact. In our future work we intend to address some of the limitations of the current survey data and triangulate with other data collection methods such as interviews and the development of case study material. This research work will form a continuing theory-based evaluation of regional policy in the Ebusiness area.

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