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Keywords

Electronic, Commerce, Adoption, Strategic, Alliance, Membership, Study, Regional, SMEs, Sweden

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Electronic Commerce Adoption and Strategic Alliance Membership: A Study of Regional SMEs in Sweden

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Abstract

The changes brought about by electronic commerce have had a profound effect on small to medium enterprises (SMEs). To manage these changes, SMEs have been encouraged to form strategic alliances. Yet despite the proclaimed advantages of such alliances, little research has been carried out to determine whether these structures have any impact on an SME's decision to adopt e-commerce. There has also been a lack of research into comparing e-commerce adoption in those SMEs that are members of a strategic alliance to those that have opted to remain outside such arrangements. This paper aims to correct the situation by presenting the findings of a study of 313 regional SMEs in Sweden, which investigated the impact of strategic alliance membership on e-commerce adoption criteria. The results of the study indicate that there are no significant differences in e-commerce adoption criteria between members and non-members of a strategic alliance.

1. Introduction

Electronic Commerce (e-commerce) is not just another technology that sustains and enhances business practice; it is an innovation that has disrupted traditional ways of doing business [32]. While it may be argued that any technology shapes and is shaped by the organisation [17], prior to the advent of e-commerce, these changes always emanated and were maintained from within the organisation, be they large or small. Most changes were designed around strict hierarchies, exhibited unity of purpose and were primarily concerned with extending control over resources considered essential to the quality of the organisation's products and services. The advent of e-commerce has seen a radical change away from this hierarchy-based philosophy. Not only has e-commerce altered perceptions of organisational structures and functions [29], it has altered the use of technology within the organisation [19].

The changes brought about by e-commerce have had a profound effect on small to medium enterprises (SMEs). To manage these changes SMEs have been encouraged to pool their limited skills into strategic alliances. There are many studies that advocate the importance of strategic alliances in the early adoption of e-commerce, particularly by SMEs (see for example [15, 23, 42]). These studies suggest that SME strategic alliances provide a ready source of technical information, market expertise and business

know how, and a more flexible business structure for dealing with environmental turbulence.

Despite the proclaimed advantages of strategic alliances, little research has been carried out to determine whether these structures have an impact on an SME's decision to adopt e-commerce. Furthermore, there has been a lack of research into comparing e-commerce adoption in those SMEs that are members of a strategic alliance to those that have opted to remain outside such arrangements. This paper aims to correct the situation by presenting the findings of a study of regional SMEs in Sweden that investigated e-commerce adoption driving forces or criteria (amongst other things). One of the aims of the study was to compare the criteria in those SMEs that were members of a strategic alliance and those that were not.

The paper begins by examining the nature of SMEs and identifying features that are unique to the sector. SMEs in regional areas are discussed in particular. This is followed by a literature review of e-commerce adoption criteria in SMEs and the role of SME strategic alliances. The research methodology and the results of a study of 313 regional SMEs in Sweden are then presented. The rating of e-commerce adoption criteria between those SMEs that are part of a strategic alliance and those that are not is then presented. The study also subdivided the data across four organisational factors: business size, business age, market focus and business sector, and the results of this analysis are discussed. Finally, the limitations of the study are presented along with the conclusions and future research directions.

2. Small to Medium Enterprises

More than 99% of all businesses in Sweden are classified as SMEs, which means they employ less than 250 people. Of those, 94% are small businesses with less than 10 employees [37]. Although size is a major distinguishing factor, SMEs have a number of other unique features that set them apart from large businesses. There have been various studies carried out in order to isolate these features (see for example [8, 14, 21, 38, 54, 59]). An extensive review of the available literature was undertaken to identify the features and create a context for the study. Following this process, an analysis of the features identified revealed that they could be classified as being internal or external to the organisation. Internal features include management, decision-making and planning processes within the

organisation, and the availability of resources, while external features are related to the market (products/services and customers) and the external

environment (risk taking and uncertainty). For brevity, these features are presented in Table 1.

Table 1: Internal and External Features Unique to SMEs

Features Unique to SMEs	Related Literature		
Features Related to Management, Decision Making and Planning Processes			
SMEs have a centralised management strategy with a short range planning perspective	[8, 62]	INTERNAL FEATURES	
SMEs have poor management and business skills	[7]		
SMEs exhibit a strong desire for independence and avoid business ventures which impinge on their independence	[14, 54]		
SME owners often withhold information from colleagues	[14]		
Decision making processes in SMEs are intuitive, rather than based on detailed planning and exhaustive study	[8, 54]		
SME owners have a strong influence in the decision making process	[8, 54]		
Family values and concerns may intrude with the decision making processes of SMEs	[8, 14]		
SMEs have informal and inadequate planning and record keeping processes	[38, 59]		
Features Related to Resource Availability			
SMEs face difficulties obtaining finance and other resources, and as a result have fewer resources	[7, 9, 62]		
SMEs are more reluctant to spend on information technology and therefore have limited use of technology	[14, 46, 61]		
SMEs have a lack of technical knowledge and specialist staff and provide little information technology training for staff	[8, 35]		
Features Related to Products/Services and Markets			
SMEs have a narrow product/service range	[8, 54]	EXTERNAL FEATURES	
SMEs have a limited share of the market (often confined towards a niche market) and therefore heavily rely on few customers	[31, 51]		
SMEs are product oriented (large businesses are customer oriented)	[8]		
SMEs are not interested in large shares of the market	[33, 54]		
SMEs are unable to compete with their larger counterparts	[31]		
Features Related to Risk Taking and Dealing with Uncertainty			
SMEs have lower control over their external environment than larger businesses, and therefore face more uncertainty	[21, 63]		
SMEs face more risks because their failure rates are higher	[13]		
SMEs are more reluctant to take risks	[14, 61]		

Some of the features unique to SMEs are also constraints faced by the SME. For example, SMEs have fewer resources and expertise available to them [7, 9] and have less control over their external environment [21, 63]. These constraints limit the expansion and growth opportunities of SMEs. SMEs in regional areas are particularly susceptible to these types of constraints.

3. SMEs in Regional Areas

SMEs located in regional areas are affected by circumstances inherent to their location. Regional areas are defined as geographical areas located outside metropolitan centres and major cities. Regional areas can be classified into inner and outer regions, remote and very remote areas [2]. Determining the classification of a region is usually based on a formula which primarily relies on the measures of proximity to services in terms of physical distance, and population size. Rather than remote and rural areas (which are sparsely

populated), the research presented in this paper focuses on inner and outer regional areas (which are more urbanised).

Regional areas are of particular interest to governments because they are characterised by high unemployment rates [30], a shortage of skilled people, limited access to resources and a lack of infrastructure [28]. Yet, at the same time, businesses located in regional areas often play a major role in developing these areas. This potential has not gone unnoticed by government organisations. The European Union views SMEs as a catalyst for regional development [16]. In 2001, the Swedish Parliament passed legislation that resulted in the creation of Regional Development Councils [25]. The Councils have a mandate to promote a positive business climate and sustainable growth in their respective regions. SMEs have been earmarked as playing an important role in promoting growth

because they are seen as a key source of jobs and employment prospects [28, 30].

To encourage growth and development in regional areas, government organisations have been heavily promoting the adoption of information and communication technology by SMEs, including e-commerce technology. This has primarily been undertaken by funding projects that assist SMEs in their adoption of e-commerce technologies. These projects have ranged from simple Internet adoption to the establishment of virtual business networks [24, 43]. Consistent with these government efforts have been the efforts of researchers who have studied e-commerce adoption in SMEs.

4. E-commerce Adoption in SMEs

Studies carried out at the onset of e-commerce [4, 20, 40] predicted that since SMEs had always operated in an externally uncertain environment, they were more likely to benefit from e-commerce. Other authors, while agreeing in principle with this viewpoint did so with a degree of caution. Hutt and Speh [22] felt that most areas of the SME spectrum, with the exception of those SMEs involved in the industrial market (which already concentrated on an established base of customers and product offerings), would benefit from e-commerce. Swartz and Iacobucci [58] felt that the service industries would benefit far more than other areas of the SME community. The predicted benefits to SMEs included a global presence [5], improved competitiveness [4], mass customisation and 'customerisation' of products and services [19], shorter supply chains and higher responsiveness to customer needs [5].

Recent studies have found that these predictions have not eventuated and that it has been the larger businesses that have been more active with respect to e-commerce [55, 56]. In light of this, researchers have begun to examine the processes by which SMEs make their decisions about e-commerce and have begun to question those processes in terms of their applicability to the SME population. Much of the recent work carried out in examining e-commerce adoption and use in SMEs falls into one of four categories:

1. criteria or driving forces behind e-commerce adoption,
2. benefits derived from e-commerce adoption and use,
3. disadvantages of e-commerce adoption and use, and

4. barriers to e-commerce adoption.

This study will concentrate on the first of these categories (i.e. the criteria or driving forces behind e-commerce adoption in SMEs). The other categories are the subject of research presented by the authors elsewhere (*references omitted for blind review*).

5. E-commerce Adoption Criteria

There have been numerous studies investigating the criteria or driving forces that have led SMEs to adopt e-commerce. For example, in their study of 146 SMEs, Poon and Swatman [46] derived a list of five drivers or criteria for e-commerce adoption based on data collected from the respondents. These include: new modes of direct or indirect marketing, strengthening of relationships with business partners, the ability to reach new customers, improvements to customer services and the reduction of communication costs. Other studies have derived similar criteria. Abell and Lim [1] found that reduction in communication costs, improvement in customer services, improvement in lead time and improvement in sales were the major criteria for e-commerce adoption and use by SMEs in New Zealand.

Lawrence [31], in an examination of Tasmanian SMEs noted that improved marketing and the ability to reach new customers were the most common incentives for adopting and using e-commerce. She also noted that decisions concerning e-commerce adoption were often forced onto SMEs by their larger trading partners. This is supported by studies carried out by MacGregor et al [33], and Raymond [53]. Auger and Gallaughan [4] noted that improvements in customer services and internal control of the business were strong criteria for e-commerce adoption in SMEs, while Power and Sohal [49] found that some SMEs nominated pressure from customers as one of the motivating criteria for adopting e-commerce. A more comprehensive list of e-commerce adoption criteria research is provided in summary form in Table 2.

While Table 2 lists a number of research studies that have identified the criteria for e-commerce adoption in SMEs, there has not been any attempt to examine the impact of belonging to a strategic alliance on an SME's decision to adopt e-commerce. This is of particular interest since stronger relations with business partners have been singled out as a criterion of e-commerce adoption.

Table 2: Summary of Research on E-Commerce Adoption Criteria in SMEs

E-Commerce Adoption Criteria	Related Literature
Demand and/or pressure from customers	[49]
Demand and/or pressure from suppliers	[31, 33, 53]
Pressure from competitors	[47, 52]
Reduced costs	[1, 46, 52]
Increased sales	[1, 32, 44]
Improvements to customer service	[1, 46, 49]
Improvements to lead time	[1, 49]
Improvements to internal efficiency	[48]
Stronger relations with business partners	[46, 53]
Ability to reach new customers and/or markets	[31, 46, 49]
Improved competitiveness	[53, 60]
Improved marketing	[31, 46, 49]
Improved control	[45]
External technical support	[1]

6. Strategic Alliances and SMEs

It could be argued that by the very nature of business, all organisations relate to others and are thus part of some form of SME strategic alliance. On the surface these relationships may appear to be nothing more than exchanges of goods and payments but relationships with customers, suppliers, competitors can never be simply described in terms of financial transactions. Dennis [14] suggests that any dealing with other organisations must impinge on the decision making process even if these decisions only involve the strengthening or relaxing of the relationships themselves. Nalebuff and Brandenburg [39] state that for a relationship to be truly a strategic alliance it must be conscious, interdependent and cooperating towards a predetermined set of goals. There are many definitions of strategic alliances in the literature. Dennis [14] suggests that SME strategic alliances

"... are dynamic arrangement(sic) that are constantly evolving and adjusting in order to accommodate changes in the business environment. Member companies have interconnected linkages that allow them to move more efficiently towards set objectives than those operating as a separate entity." (p.287)

She adds that while all companies form relationships with suppliers, customers, and business partners, it is the extent of the closeness, interdependence and consciousness of these relationships that determines whether they are truly part of an SME strategic alliance. This definition implies that only those interorganisational links that have formal governance can be termed SME strategic alliances. By comparison, Yeung [64] defines an SME strategic alliance as

"... an integrated and coordinated set of ongoing economic and non-economic relations embedded within, among and outside business firms." (p.476)

Thus for Yeung [64], an SME strategic alliance is not only a structure but embodies processes between organisations. These processes may be formal economic processes or may be informal cooperative relationships, sharing expertise and know-how. Indeed, Dahlstrand [11] suggests that informal links may be conscious or unconscious mechanisms.

While recent studies [41, 42] stress the importance of informal interorganisational links, the definition of these links in SMEs varies widely. As this study has as its focus SME strategic alliances with some form of governance (be they organisationally linked SMEs or firms that have made use of SME associations), the definition provided by Achrol and Kotler [3] will be adopted, viz.

"... an independent coalition of task- or skill-specialised economic entities (independent firms or autonomous organisational units) that operates without hierarchical control but is embedded by dense lateral connections, mutuality, and reciprocity, in a shared value system that defines "membership" roles and responsibilities." (p.148)

Properly utilised, SME strategic alliances can provide a number of advantages over stand-alone organisations. These include the sharing of financial risk [26] and technical knowledge [34], market penetration [3] and internal efficiencies [12]. In addition to providing much needed information, SME strategic alliances often provide legitimacy to their members. For businesses that provide a service and whose products are intangible, company image and reputation become crucial since customers can rarely test or inspect the service before purchase. Cropper [10] suggests that membership of an SME strategic alliance very often supplies this image to potential customers. However, the question of whether belonging to a strategic alliance has an impact on an SMEs decision to adopt e-commerce remains unexplored. The study described in the

following section attempts to extend our knowledge about e-commerce adoption criteria in SMEs that are members of a strategic alliance and those that are not.

7. Survey Instrument

A series of six in-depth interviews with randomly selected regional SMEs was undertaken to determine whether the e-commerce adoption criteria listed in Table 2 were applicable and complete (amongst other things). All of the criteria were found to applicable and no additional ones were forthcoming. Based on the six in-depth interviews, a survey

instrument was developed to collect data about e-commerce adoption criteria (amongst other things). Respondents were asked whether their firm was part of a strategic alliance of SMEs or an organisation for SMEs. They were also asked whether they had adopted electronic commerce. Those respondents who indicated that they had adopted e-commerce were asked to rate each of the criteria (see Table 2) across a 5 point Likert scale (see Figure 1). The Likert scale responses were assumed to possess the characteristics of an interval measurement scale for data analysis purposes.

This question relates to the reasons why your organisation decided to implement e-commerce. Below is a list of statements indicating possible reasons. Please rank each statement on a scale of 1 to 5 to indicate how important this reason was to your decision to implement e-commerce, as follows:

- 1 = the reason was very unimportant to your decision to implement e-commerce**
- 2 = the reason was unimportant to your decision to implement e-commerce**
- 3 = the reason was neither unimportant nor important to your decision to implement e-commerce**
- 4 = the reason was important to your decision to implement e-commerce**
- 5 = the reason was very important to your decision to implement e-commerce**

Our organisation decided to implement e-commerce because:	Rating				
We experienced demand and/or pressure from customers.	1	2	3	4	5
We experienced demand and/or pressure from suppliers.	1	2	3	4	5
We experienced pressure from competitors.	1	2	3	4	5
We believed that e-commerce would reduce costs.	1	2	3	4	5
We believed that e-commerce would lead to increased sales.	1	2	3	4	5
We believed that e-commerce would improve our customer service.	1	2	3	4	5
We believed that e-commerce would improve our lead time.	1	2	3	4	5
We believed that e-commerce would improve our internal efficiency.	1	2	3	4	5
We believed that e-commerce would lead to stronger relations with business partners.	1	2	3	4	5
We believed that e-commerce would increase our ability to reach new customers and/or markets.	1	2	3	4	5
We believed that e-commerce would improve our competitiveness.	1	2	3	4	5
We believed that e-commerce would improve our marketing.	1	2	3	4	5
We believed that e-commerce would improve our control.	1	2	3	4	5
We believed that we would benefit from external technical support.	1	2	3	4	5

Fig 1. Survey question

Previous research has also shown that various organisational factors also appear to impinge e-commerce adoption. Fallon and Moran [18], for example, found significant links between the size of the SME in terms of the number of employees and the level of internet adoption. Matlay [36] showed that the business sector was significantly associated with e-commerce adoption. This was supported by Riquelme [55] who, in a study of 75 private Chinese SMEs, found that those involved in the service sector tended to adopt e-commerce far more than their counterparts in the manufacturing sector. These studies clearly suggest that when examining e-commerce adoption, organisational factors such as business age, business size, business sector and market focus need to be considered.

Many studies have simply categorised *business age* in 'sets of five' (e.g. 0 to 5 years, 6 to 10 years, etc). The results of the in-depth interviews showed that within the first of these groups (0 to 5 years), three subsets existed. The first was the very new businesses (in business less than one year), the second included a number of businesses that had joined the dot-com revolution and were usually one to two years old. The second group also included SMEs that were acting as outsourcers to larger businesses. The third group was the residue (3 to 5 years in business). The interviews showed that all three of these groups acted very differently where e-commerce adoption and use were concerned. The in-depth interviews also found that for older businesses, the subgroups 6 to 10 years, 11 to 20 years and over 20 years were adequate groupings. Thus, six categories of business age were used in the

survey: Less than 1 year; 1 to 2 years; 3 to 5 years; 6 to 10 years; 11 to 20 years; more than 20 years.

In relation to *business size*, a number of authors have arbitrarily categorised SMEs with less than five employees as 'micro' businesses. Studies by Fallon and Moran [18] and Matlay [36] suggest that SMEs with fewer than ten employees is a far more significant subdivision than an arbitrary decision that an SME is micro or simply small. The in-depth interviews carried out prior to the study support this finding, but add a separate category for single owner-operated businesses (termed 0 employees). The interviews also suggested that SMEs with 20-50 employees tended to operate in a largely homogeneous manner, at least for size. Thus five categories of business size were adopted: Sole owner-operated (0 employees); 1 to 9 employees; 10 to 19 employees; 20 to 49 employees; 50 to 199 employees.

Other studies [3, 6] suggested that *market focus* was associated with the level of adoption of e-commerce in SMEs. Based on the findings of the interviews, the location of an SME's major customer base was found to be an adequate surrogate for market focus. Four distinct location bases were identified. These were: local (customers normally within a boundary of 5 to 10 kilometres); regional (customers within a 50 kilometre radius); national (trading extend across the whole nation); international (products and services are exported).

Based on the findings of the interviews, four categories of *business sectors* were determined as adequately covering the SME community. These were: industrial (including manufacturing, engineering and transport); service (including professional SMEs such as lawyers, doctors etc.); retail (including business to business and business to end customer); finance (including insurance, banking, accounting).

The study was primarily concerned with SMEs located in regional areas, especially since no other research has investigated e-commerce adoption criteria in these areas specifically. As a result, this study was conceived primarily as exploratory in nature. Sweden was chosen for several reasons. Sweden has a large number of SMEs located in regional areas and the government is keen to promote e-commerce adoption by SMEs in these areas (as described above). Furthermore, Sweden is classified by the World Bank Group as a high income nation and a member of the Organisation for Economic Co-operation and Development (OECD),

which would suggest an advanced IT infrastructure and higher levels of e-commerce adoption. Finally, ease of access to SMEs in regional areas in Sweden was a major contributing factor. To qualify as a regional area, the following criteria was developed and applied to several areas in Sweden:

- The location must be an urban regional area, and not a major/capital city or rural area;
- A viable government initiated Chamber of Commerce must exist and be well patronised by the SME community;
- The location should have a full range of educational facilities (including a University);
- The business community must represent a cross-section of business ages, sizes, sectors and market foci.

Karlstad was chosen as a suitable location and a total of 1170 surveys were distributed by post to randomly selected SMEs in the region. The SMEs were selected randomly from government lists. The mode of the data collection was chosen based on previous research by de Heer (1999) which indicated that Scandinavian countries (including Sweden) had historically high survey response rates (although he notes that this is declining). Therefore, a low cost mail survey was used. (The research presented in this paper forms part of a larger study that examined e-commerce adoption in Swedish SMEs.)

8. Findings and Results

Responses were obtained from 313 SMEs, giving an unexpectedly low response rate of 26.8%. (It is interesting to note that the low response rate confirms de Heer's (1999) findings that survey response rates in Sweden are falling.) The responses formed the basis for the statistical analysis carried out using SPSS. The total number of adopters (i.e. SMEs using e-commerce) was 183, representing 58.5% of the valid responses. An inspection of the frequencies indicated that the full range of the scale was utilised by the respondents (i.e. every e-commerce adoption criteria had at least one instance of each rating from 1 to 5). The number of respondents that indicated they belonged to a strategic alliance was 124, while 61 of those were e-commerce adopters. A more detailed profile of the survey respondents who had adopted e-commerce is shown in Table 3.

The data was analysed using a chi-square analysis to determine whether the decision to adopt e-commerce was associated with the SME being part of a strategic alliance or not. Table 4 shows the results of the chi-square analysis.

Table 3: Profile of survey respondents

Total Respondents: 313			
E-COMMERCE ADOPTION			
E-commerce Adopters	183	Non-Adopters	130
STRATEGIC ALLIANCE - E-commerce Adopters			
Strategic Alliance Members	61	Non-Members	115
		Missing	7
BUSINESS AGE - E-commerce Adopters			
Less than 1 year	1	6 to 10 years	35
1 to 2 years	7	11 to 20 years	42
3 to 5 years	25	More than 20 years	73
SIZE OF BUSINESS - E-commerce Adopters			
Single Owner	15	20 to 49 employees	30
1 to 9 employees	77	50 to 199 employees	25
10 to 19 employees	30	Missing	6
MARKET FOCUS - E-commerce Adopters			
Local	74	National	69
Regional	17	International	23
BUSINESS SECTOR - E-commerce Adopters			
Industrial	54	Finance	9
Service	65	Other	17
Retail	33	Missing	5

Table 4 : Results of Chi-Square Analysis

	Strategic Alliance Members	Strategic Alliance Non-Members	Significance Level
E-commerce adopters	61	115	.004
Missing	7		

A comparison of the means of the rating for each criteria was carried out using a two-tailed t-test, for strategic alliance members and non-members. Table

5 shows the means and the t-values for each criterion.

Table 5: Comparison of means of e-commerce adoption criteria in SMEs that were members of a strategic alliance and those that were not

E-Commerce Adoption Criteria	Strategic Alliance Members		Strategic Alliance Non-Members		t-value
	Mean	SD	Mean	SD	
Demand and/or pressure from customers	1.82	1.4	2.10	1.41	1.259
Demand and/or pressure from suppliers	1.61	1.33	1.71	1.26	0.483
Pressure from competitors	2.10	1.69	2.34	1.39	0.951
Reduced costs	3.03	1.76	3.00	1.26	-0.111
Increased sales	2.70	1.86	2.98	1.59	0.988
Improvements to customer service	3.64	1.79	3.64	1.58	0
Improvements to lead time	2.44	1.77	2.59	1.68	0.544
Improvements to internal efficiency	3.38	1.71	3.71	1.40	1.294
Stronger relations with business partners	2.69	1.72	2.98	1.52	1.107
Ability to reach new customers/markets	2.84	1.85	2.91	1.64	0.248
Improved competitiveness	2.97	1.89	3.42	1.59	1.586
Improved marketing	2.72	1.85	3.01	1.72	1.014
Improved control	2.25	1.68	2.72	1.55	1.814*
External technical support	1.16	0.9	1.42	1.16	1.692*

* significant at .05 level

The data was then subdivided into two groups (strategic alliance members and non-members) and a two-tailed t-test was applied to each of the groups to

determine whether the perception of criteria was significantly different between those SMEs that were members of a strategic alliance and those that

were not for each of the organisational factors: business size, business age, market focus and

business sector. For brevity, only the significant data is shown in Table 6.

Table 6: Comparison of means of e-commerce adoption criteria in SMEs, subdivided by business size, business age, market focus and business sector

E-Commerce Adoption Criteria	Strategic Alliance Members - Mean	Strategic Alliance Non-Members -Mean	t-value
<i>Business Size (Single Owner)</i> Improvements to lead time.	2.86	1.33	-2.258*
<i>Business Size (10 to 19 employees)</i> Pressure from competitors.	1.60	2.95	2.489*
Improved competitiveness	4.80	4.15	-2.196

* significant at .05 level

9. Discussion

Before examining the data in detail it is interesting to note that of the 313 respondents only 124 indicated that their organisation was part of a strategic alliance. There are two possibilities for this lower than expected result:

1. While many respondents may have dealt with other businesses, these interactions were informal rather than under some form of enforced governance. This is supported by the findings of Premaratne [50].
2. As the study was conducted on regional SMEs the ability to form and maintain any form of alliance was more difficult than it might have been for city-based SMEs. This is supported by the findings of Dahlstrand [11] who suggests that geographic proximity is essential for the development and maintenance of strategic alliances, particularly in the SME arena.

Table 3 presents a profile of the respondents that had adopted e-commerce. In relation to *business age*, Table 3 shows that SMEs in operation for more than three years are more likely to adopt e-commerce than those that are relatively 'young'. The table shows that the number of adopters increased with the age of the business. Indeed, almost 40% of the SMEs that had been in operation for more than 20 years had adopted e-commerce, while only 4.4% of those SMEs which have been in operation for less than 2 years were e-commerce adopters. In relation to *business size*, 66.7% of the adopters had less than 20 employees, suggesting that the flexibility afforded by a smaller number of employees may facilitate e-commerce implementation. In relation to *market focus*, studies by Blackburn and Athayde [6] suggest that e-commerce adoption is positively associated with an international market focus. An examination of Table 3 does not support this finding. Indeed, the number of e-commerce adopters with an international focus amongst the respondents is less than 13%. Finally, in relation to the *business sector*, a number of studies [6, 36] suggest an association between the business sector and the level of e-commerce adoption, with Riquelme [55] finding a high adoption rate in the service sector in particular.

The current study supports this finding to an extent, with 35.5% of the respondents who were adopters classifying themselves as being in the service sector.

A recent study by Tetteh and Burn [59] concluded that e-commerce adoption is best carried out in a strategic alliance environment. The data shown in Table 4 does not appear to support this view. While 62.8% of non-member respondents had adopted e-commerce, those in an SME strategic alliance arrangement are, at best, equivocal. This would appear to suggest that belonging to a strategic alliance does not facilitate e-commerce adoption.

Before examining the data in Table 5 in detail, it is interesting to note that the mean for almost all the e-commerce criteria were below the median value of 3. This implies that the adoption criteria found by other researchers (listed in Table 2) are not as apparent in the current study. Of those criteria with a mean above 3, the most important are "Improvements to internal efficiency", "Improvements to customer service" and "Improved competitiveness". These findings are in contrast to the 'media hype' suggesting e-commerce is adopted to develop new markets, increase sales and strengthen relations with business partners, little evidence of their importance is shown in the findings.

Table 5 also shows that only two criteria showed significant difference between the two groups of respondents. These were "External technical support" and "Improved control". While still below the median point, both were rated higher by the non-member group than by their strategic alliance member counterparts. One possible explanation for this is that sufficient technical support and business know-how existed within the SME strategic alliance arrangement to satisfy its members. This expertise may not have been available to the individual non-member businesses. This would tend to support the views of [27, 42] who suggest that many SMEs seek out a strategic alliance to acquire these skills that are absent in their own organisation.

Perhaps of greatest interest is the lack of any significant differences between the two respondent groups. This may be explained by the low means on the criteria tested. An alternative explanation may be that the decision to enter into a strategic alliance may not be prompted by the desire to adopt e-commerce or move towards some form of global marketing. This would tend to bring into question the views of authors such as Dennis [14] who suggests that a prime motivation for SMEs to form alliances is the desire to extend their market coverage through e-commerce adoption.

Finally the data was subdivided separately by business age, business size, market focus and business sector and a series of two-tailed t-tests were applied to determine whether, within each group, the means of ratings were significantly different. Table 6 provided the results of these tests. It shows with the exception of the "Single owner" and the "10 to 19 employees" groups, there was no significant differences in the rating of applicability of criteria for any of the sub-groupings between respondents that were part of a strategic alliance and respondents that were not. It is also interesting to note that the criterion "Improved competitiveness" was ranked highly by SMEs with 10 to 19 employees, in both the member and non-member groups. Since this is the first time this type of research has been undertaken, it is not possible to support these results with evidence from previous studies. However, the current study indicates that business size may appear to have an effect on e-commerce adoption criteria. These findings provide a direction for further in-depth research which is required to examine the relationship between organisational factors, SME strategic alliance membership and e-commerce adoption criteria.

10. Limitations

It should be noted that the study presented here has several limitations. Firstly, the membership/non-membership of some type of SME strategic alliance may be biased either by the lack of geographic proximity to other SMEs needed to form and maintain some type of viable alliance. It may also be biased by the perception of the respondent as to what constitutes an SME strategic alliance. Secondly, the choice of variables selected for the study is somewhat problematic because of the complex nature of e-commerce criteria which change over time. Furthermore, according to Sohal and Ng [57], the views expressed in the surveys are of a single individual from the responding organisation, and only those interested in the study are likely to complete and return the survey. However previous empirical studies [53] have demonstrated this methodology to be valid. Finally, this is a quantitative study, and further qualitative research is required to gain a better understanding of the key issues.

11. Conclusion

Unlike previous studies that have focussed on SMEs that are part of a strategic alliance, the data presented in this paper has attempted to compare and contrast those SMEs that are part of a strategic alliance with those that are not in relation to the reasons they have adopted e-commerce. The study showed that only two adoption criteria showed any significant differences between the two groups. The study also compared the ratings of criteria for specific subgroups of the population based on business age, size, sector and market focus. Only two subgroups of the respondent population showed any significant differences between respondents that are part of an SME strategic alliance and respondents that are not. These were SMEs with a single owner and SMEs which had 10 to 19 employees. The findings of the study suggest that, while there appear to be differences in the uptake of e-commerce between SMEs that are part of a strategic alliance and those that are not, there is little difference in the ratings of criteria used in the decision making process. Clearly, more research needs to be done to determine which criteria are important in the decision making process surrounding the adoption of e-commerce by SMEs and how these criteria impinge on the decisions made.

The results of this study are significant for several reasons. This has been the first attempt at understanding the relationship between strategic alliance membership and e-commerce adoption criteria. The research presented here indicates that this relationship is worthy of further examination because by formally explicating it, researchers and government organisations engaged in promoting e-commerce adoption will have more comprehensive knowledge about the organisational factors that have an effect on the relationship and will be able to provide better advice to regional SMEs on e-commerce adoption.

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