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RELATIONSHIP BETWEEN IMPORTANCE AND PERFORMANCE OF E-BUSINESS MOTIVATIONS AMONG SMES

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Abstract

E-business adoption among Small and Medium sized Enterprises (SMEs) has been limited because of resource constraints and a failure to understand the strategic value of e-business. To facilitate decision making concerning e-business applications and their implementation, simple, low cost tools are needed to assist in analyzing and developing effective e-business strategies. Importance-performance (IP) analysis has been effectively used in a variety of settings to evaluate strategy and make resource allocation recommendations for improvement. While most IP studies have assumed that importance and performance are independent, three recent studies have argued otherwise, identifying– positive, negative and v-shaped relationships. Our exploratory study investigates the application of IP analysis based on data collected from over 400 SMEs, finding a fourth, N-shaped relationship between importance and performance. This is an extension of the v-shaped relationship and appears when the full range of performance scale values is displayed. As implied in the IP literature, the relationship suggests a path of travel that can help show the e-business adoption states and the possible undulations in e-business strategies along the path. Further implications for guiding e-business strategies for these firms are also discussed.

Keywords: SMEs, importance-performance analysis, e-business.

INTRODUCTION

The commercialization of the Internet in the mid-1990s led to predictions that this new technology would be of immense value to Small and Medium-sized Enterprises (SMEs) and help them 'level the playing field' against their larger counterparts. However, e-business adoption by SMEs has been limited (Grandon and Pearson 2004, Thong 1999, Zank and Vokurka 2003). Reasons offered include a lack of financial and human resources and a failure to understand the value of e-business (Barnes, et al. 2003, Vlosky and Smith 2003). At the same time, firms are under pressure to 'do something' with e-business lest they be left behind. These pressures can come from internal or external (e.g., trading partners) sources (Grossman 2004, Soliman and Janz 2004), and have been identified as important reasons for e-business investment (Barnes, et al. 2003). Thus, firms are often forced to implement e-business applications without adequate resources and without fully understanding the strategic role of e-business in their organizations. The potential for mismatch between e-business/goals and deployment of applications calls for the development of simple, low cost tools to help SMEs develop more effective e-business strategies.

Importance-performance (IP) analysis, first introduced by Martilla and James (1977) is a simple, graphical technique widely used to evaluate strategy and make resource allocation recommendations for improvement (e.g., O'Neill, et al. 2001, Skok, et al. 2001). Within the information systems literature, Skok et.al (2001) used IPA to analyze the success of investments in information systems in the health club industry and O'Neill et al. (2001) applied IPA to evaluate service quality perceptions of online library services. The simplicity of IP analysis, and its validation in numerous studies over twenty-five years, has tremendous appeal to SMEs as a tool for evaluating e-business strategy.

Traditionally, importance and performance have been thought to be independent. However, three recent studies (Matzler, et al. 2004, Roskowski 2003, Sampson and Showalter 1999) have argued that importance is a causal function of performance. Depending on the nature of the IP relationship, priorities might radically change as performance improvements cause variables to become more important or less important. Therefore, for IP maps to be useful, the nature of the relationship between importance and performance must first be understood. The purpose of this paper is to determine the nature of the relationship between importance and performance of motivating characteristics of e-business among SMEs as a necessary first step in developing a tool to guide e-business strategy. Additionally the findings are expected to make a modest contribution to the IP literature.

LITERATURE REVIEW

Importance-performance analysis

IP analysis was first introduced by Martilla and James (1977) as a simple framework whereby a product (or service) is evaluated on selected attributes in terms of each attribute's importance to the customer and perceived performance (i.e., satisfaction). In the original, grid model, importance and performance of the attributes are plotted on a grid, called an IP map, which is divided into four quadrants (Figure 1): labelled 'concentrate here', 'keep up the good work', 'low priority' and 'possible overkill,' respectively. It is recommended that resources be redirected from attributes in the 'overkill' quadrant towards attributes in the 'concentrate here' so as to move towards the 'keep up the good work' quadrant (Martilla and James 1977, Skok, et al. 2001). Slack (1994) developed a gradient-based IP map that identifies four zones (Figure 2) labelled 'urgent action', 'improve', 'appropriate,' and 'excess,' respectively. He suggests a 'lower bound of performance acceptability,' above which lies the region for improvement. It is recommended that organizations move from the 'urgent action' or 'excess' zone to the 'appropriate' zone through redistribution of resources.
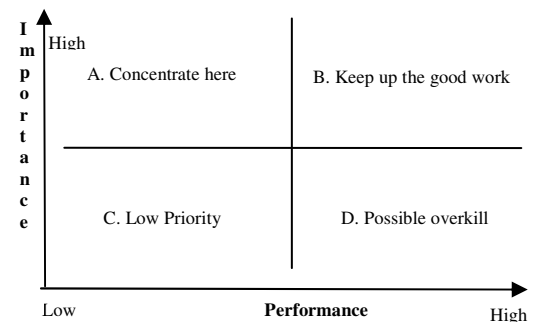

Figure 1: Importance-performance map (Martilla and James 1977)

For prescriptive purposes a 45 degree upwards sloping line 'iso-rating' line (see Figure 2) is inserted in the IP map, representing a perfect balance between importance and performance and zero performance gap (Bacon 2003, Hawes and Rao 1985). Anything above or below indicates a need for change in strategy. It is different from the 'lower bound' of the gradient model. The lower bound of performance line is defined by the firm and may vary from firm to firm, whereas along the iso-rating line, performance equals importance. It is recommended that organizations allocate resources to move attributes to the iso-rating line.
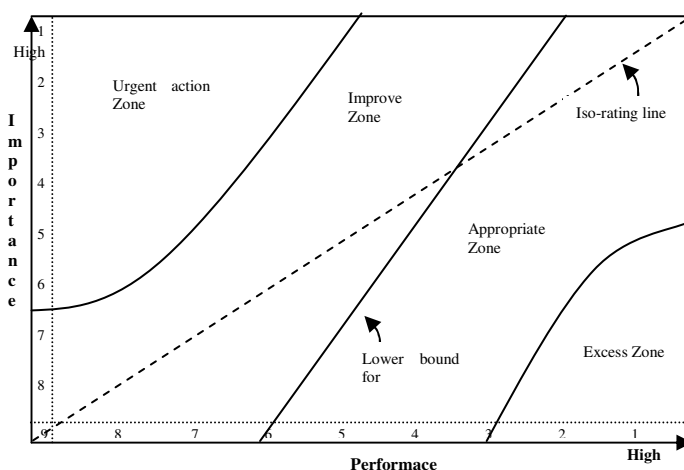

Figure 2: Modified IP map (Slack 1994, Hawes and Rao 1985, with alterations)

The aforementioned models recommend movement to some optimal point or space on the graph but none specify the path. Further, these models have assumed that attribute importance and attribute performance are independent and do not influence each other

(Sampson and Showalter 1999). If this is true, then the number of paths from the current position to the optimum point is infinite. Slack (1994) initially suggested a possible relationship between importance and performance, that could influence priority (Figure 2). The existence of a relationship was confirmed and explicated by three studies (Matzler, et al. 2004, Roskowski 2003, Sampson and Showalter 1999). Specifically, these studies suggest that importance and performance may have a positive, negative, or mixed (v-shaped) relationship.

Sampson and Showalter (1999) hypothesized and found support for a negative relationship between importance and performance. That is, as performance increases, importance decreases. They refer to Maslow's hierarchy of needs theory to argue that, as performance increases meet/satisfy some need, it consequently becomes less

Figure 3: Roskowski 2003, 4-year Public and 4-year Private colleges.

important. They further found that, for some attributes, there is a small region on the high end of the performance scale where importance begins to increase or remains unchanged (flat). Roskowski (2003) found strong evidence that importance and performance are related. He argues that for data with a wide range of performance values, the v-shape is visible (Figure 3a); else only the right side of the v-shape is visible, indicating a positive relationship (Figure 3b). Matzler et al. (2004) argue that the nature of the relationship depends on the type of attribute – 'Basic factors,' 'Excitement factors,' and 'Performance factors' – and suggest a negative, positive and no relationship, respectively.
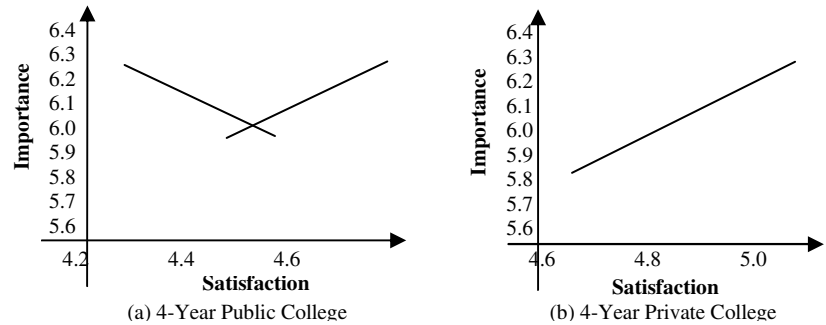
These studies reveal four potential relationships between importance and performance - no-relationship, positive, negative, or a v-shape relationship (Figure 4). However, these studies have a few limitations. For example, Sampson and Showalter's study focuses on dining facilities in middle schools – a monopolistic environment, which may not be representative of organizations at large. Roskowski's study, set in the education industry, showed the v-shaped relationship being tentatively valid in only one of four data sets.

Figure 4: IP relationships from the literature.

Matzler et al.'s study focused only on the low and high values of performance and did not consider intermediate values, and, consequently, the presence or absence of a v-shape cannot be determined. Thus, while these studies indicate a relationship between importance and performance, their results are inconclusive.
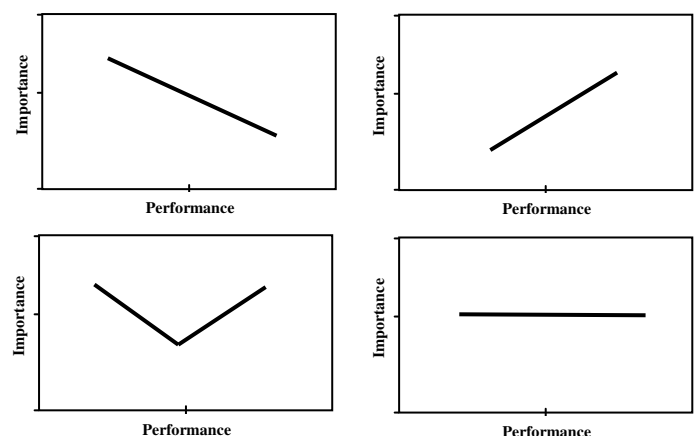
Consequently, it is necessary to investigate the nature of the relationship in the context of e-business and SMEs before IP analysis can be applied as a tool for guiding e-business strategy.

Research Method

Traditional IP analysis consists of (1) identifying the variables of interest through literature review and/or use of managerial judgment, (2) gathering data on the importance and performance dimensions of these variables via an appropriate survey instrument, (3) plotting the data (average importance and average performance of each variable) to generate IP maps, and (4) an analysis leading to strategy recommendations (Martilla and James 1977, Skok, et al. 2001). We followed the first two steps to collect the data on the variables of interest in this study, namely, e-business motivations among SMEs. Then we followed Sampson and Showalter's (1999) methodology to evaluate the relationship between importance and performance: (1) correlation analysis to identify the existence of a relationship between importance and performance, and (2) plotting the data to investigate the nature of this relationship.

E-business motivations were identified from various streams of research and validated during the pilot testing of the instrument used to gather data. Nineteen motivations and four higher level factors so identified are reported elsewhere (Levenburg and Magal 2005) and reproduced in Figure 2. Importance and performance data on these were collected using a survey, with two-five point Likert-type scales. The questionnaire was mailed to 9,365 CEOs (or owners) of family owned businesses located across the US, with employees less than 500, a commonly used and recommended criterion to identify SMEs (Grandon and Pearson 2004, Pflughoeft, et al. 2003, SBA 2004). Within the U.S., family owned firms account for 80 to 95 percent of all incorporated businesses (Gersick, et al. 1997, Poza 2004, SBA 2004), making family owned businesses the most common form of business organization in the U.S. (Daily and Dollinger 1991). Four hundred and thirty nine responses were received for a response rate of 4.7%. The low response rate was of concern and a sampling (1,262) of the non-respondents was contacted to determine reasons for not participating. Of these, 191 (15.5%) were determined to be no longer in existence. Excluding the surveys sent to defunct businesses results in a response rate of 5.5%, which seems to be common in studies conducted among this population (e.g., Grandon and Pearson 2004, Pflughoeft, et al. 2003, Thong 1999).

Comparing responses from early and late respondents is a recommended method of detecting non-response bias (Armstrong and Overton 1977, Lambert and Harrington 1990) and is widely used (Grandon and Pearson 2004, Pavlou 2003, Thong 1999). Contacting the 1,262 non-respondents resulted in an additional 62 responses. Our analysis using t-tests found no significant difference in the responses between the two groups, suggesting a low likelihood of non-response bias.

Of the respondents, 82% had revenues of greater than $1 million and 18% had revenues ranging from under $100,000 to $1 million. Arguably, extremely small businesses are less likely to engage in e-business activities, simply because their size may not justify the cost associated with even setting up for electronic mail or access

to the Internet. These small family owned businesses are likely to be one-person or 'mom and pop' operations, who are unable to engage in e-business activities, and are not likely to respond. Thus, there is a bias towards firms that do engage in e-business activities.

Results

The first step in the analysis was to determine if importance and performance are related. Following Roskowski (2003) and Sampson and Showlater (1999), we used correlation analysis to assess the presence of a relationship. Table 1 shows these correlations. All correlations are significant at α = .001. This is consistent with the findings of Roskowski and Sampson and Showalter.

The second step was to determine the nature of the relationship between I and P. We followed Sampson and Showalter's method wherein average importance scores are computed for each level of satisfaction and then plotted. The results for the four factors are shown in Figure 5. All of the plots in our study indicate the 'V' characteristic when considering data on the performance scale between scale points '2' and '5.' When data on the performance scale is expanded to include the lowest level ('1'), the 'N' shape emerges. This 'N' shape is clearly visible for 17 of the 19 individual variables, the four factors and the overall average.

Figure 6 shows the I-P plot for the average of all the variables, superimposed on the three models. Given that plots for almost all the individual variables and the four factors are extremely similar, this plot of the average is considered sufficiently representative.
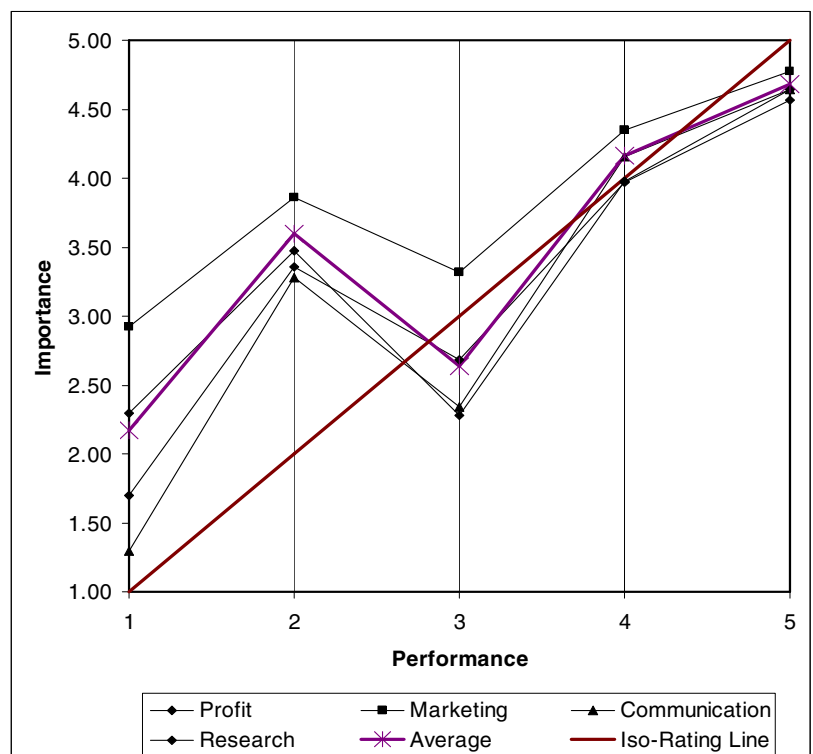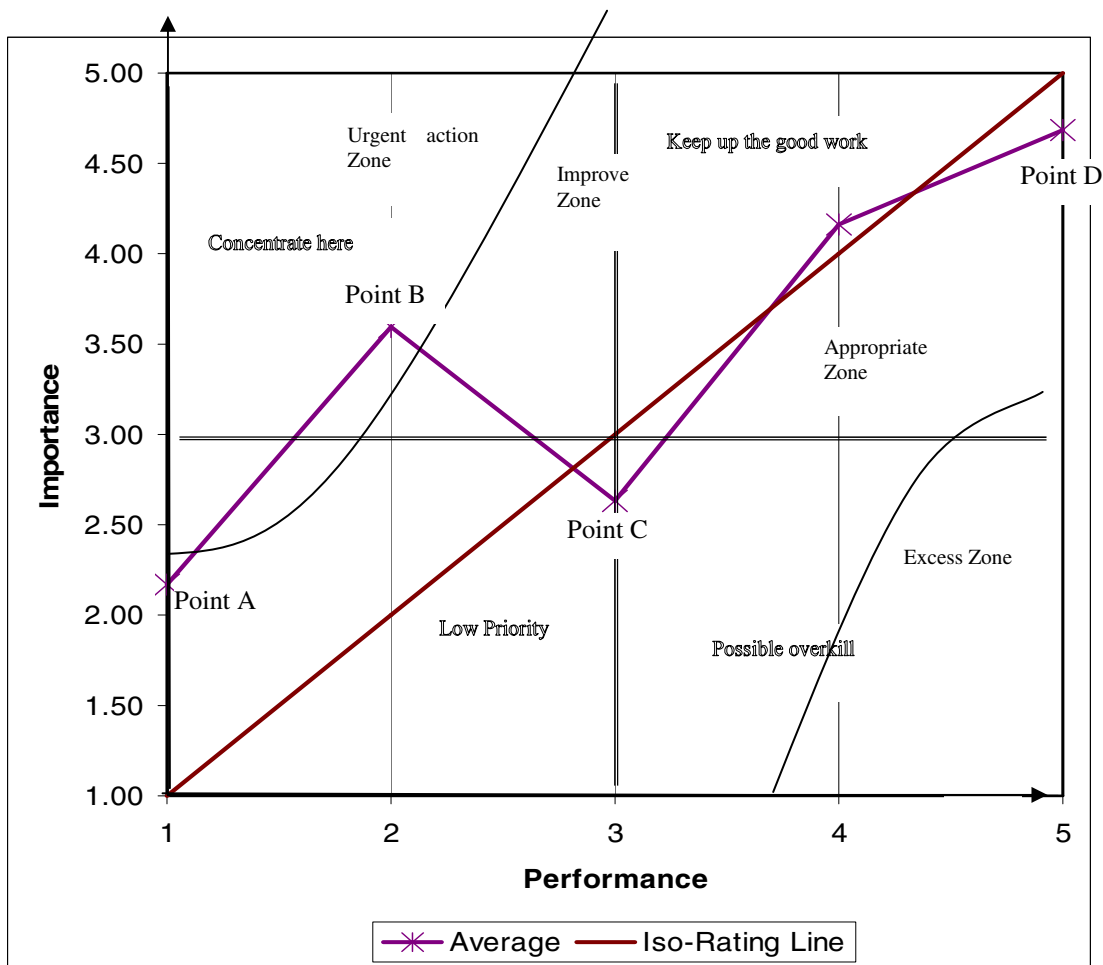

Figure 5: Results

Figure 6: Results superimposed on IP models.

Looking at Figure 6, we can see that initially both importance and performance are low (point A). Additionally, point A is in the 'Low Priority' quadrant of the quadrant model, in either the urgent or improve zone of the gradient model, and above the iso-rating line of the gap model, indicating a performance gap. As performance increases, movement is towards point B which is in the 'concentrate here' zone, the urgent zone. Additionally, the performance gap increases. Thus, an initial increase in performance leads to a movement towards the most undesirable position on the map, as indicated in all three models. Further increases in performance results in a downward movement towards the iso-rating line, possibly moving past the iso-rating line (point C) into the 'possible overkill' and 'improve' zones. Point C is the local minimum point on the path. According to Sampson and Showalter, this minima corresponds to a point where performance meets expectations. Additional performance improvements result in a movement towards point D, roughly following the iso-rating line and into the 'keep up the good work' and 'appropriate' zone.

	E-business Attribute	Mean Imp.	Mean Sat.	Rho, r	Pr > |r|
1	Enhance company image/brand	3.96	3.57	0.49812	<.0001
2	Distribute product/company information	3.95	3.53	0.45979	<.0001
3	Identify new markets or customers	3.53	3.16	0.31734	<.0001
4	Generate sales leads	3.75	3.07	0.26597	<.0001
5	Gain an edge over competition	3.58	3.30	0.42280	<.0001
6	Improve communications with customers	3.96	3.71	0.57251	<.0001
7	Improve communications with channel partners	2.68	3.22	0.57498	<.0001
8	Improve communications with employees	2.49	3.16	0.58994	<.0001
9	Comply with requirements of a large customer or supplier	2.66	3.26	0.62464	<.0001
10	Sell products online	2.62	2.90	0.20461	0.0007
11	Improve marketing intelligence	3.08	3.18	0.44445	<.0001
12	Find information about new sources of supply	3.18	3.48	0.65706	<.0001
13	Find information on industry or other economic data	3.21	3.50	0.58243	<.0001
14	Reduce administrative costs	2.71	3.08	0.47928	<.0001
15	Reduce direct costs of creating product or service	2.38	3.06	0.44984	<.0001
16	Reduce shipping costs	1.98	2.93	0.34872	<.0001
17	Reduce advertising expenses for traditional media	2.73	3.10	0.46178	<.0001
18	Increase net profit	3.36	3.03	0.19493	.001
19	Provide or improve customer support	3.78	3.53	0.50737	<.0001
	Factors: Marketing	3.75	3.35	0.43	<.0001
	Communication	3.17	3.27	0.53	<.0001
	e-Profits	2.60	2.99	0.36	<.0001
	Research	3.14	3.35	0.57	<.0001
	Overall	3.13	3.19	0.43	<.0001

Rho, r = Spearman Correlation Coefficient.

Table 1: Correlation between Importance and Performance.

DISCUSSION

The purpose of this paper is to explore the relationship between importance and performance, to see if the relationships suggested in the literature hold for our population of family businesses engaging in e-business. We find that there does indeed appear to be a specific path that these firms follow as they move across the IP map. Our findings indicate the presence of an 'N' shaped relationship that is an extension of the 'v' shape identified by Roskoswsi (2003). It is not surprising that we find some firms at Point A in our map, given the indications in the literature about the lack of resources and understanding of e-business among many such firms. Smaller family firms may simply feel that doing something is better than doing nothing to respond to internal and external pressures. As a result, these firms may use Internet connectivity to adopt relatively simple applications (e.g., e-mail, setting up Web sites, or conducting business-related research) in order to demonstrate to others that they are indeed 'with it' and by having an Internet presence, have entered the

'Internet age.'

From Point A, performance improvements that follow may result from organizational learning or external influences. The movement from Point A to Point B, in fact, suggests that as e-business performance increases within family firms, they begin to realize that e-business may hold the potential to make a substantial contribution to the organization's goals. The increased awareness results in an increasing importance placed on e-business activities.

This may be accompanied by an increase in resources allocated to e-business activities and an increase in the number and type of applications implemented, moving the firm to Point C, a natural tendency towards the optimum (iso-rating line), due to external influences, or a conscious decision on the part of the firm. As performance increases further, satisfaction increases and the urgency (importance) placed on e-business activities becomes sated, causing a movement towards the equilibrium Point C. Similar arguments have been offered by Sampson and Showalter (1999), who argue that satiated needs lead to reduced importance. Once an optimum is attained, firms appear to remain at an optimal level (along the iso-rating line) in spite of changes in performance.

We find that the importance of the four motivations that drive family firms online change as they move along the N-path. Initially (at Performance level 1) firms are largely driven by the Marketing aspects of e-business and their efforts are focused on a desire to use the web for promoting the firm and its products and services (see Figure 5 and the high scores for this factor in Table 1). This is possibly because the applications used to support these goals are among the most well-known, the easiest to use and possibly the least expensive to implement (e.g., e-mail). On the other hand, they may fail to recognize the value of other uses of e-business applications to achieve gains in Communication and Profitability goals (e.g., selling products online), which may entail greater human and financial resources than the firm is able to commit. However, as performance gains are achieved in e-business, the importance levels of all factors increase, but the importance of the non-Marketing factors increase the most. Eventually (at Performance levels 4 and 5), all factors appear to converge towards equal levels of importance.

CONCLUSIONS, LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

The purpose of this paper was to explore the relationship between importance and performance of the motivating characteristics of e-business among SMEs. We found that importance and performance are indeed related. The specific nature of the relationship was somewhat different from that suggested in the literature. The results provide additional validation for the use of IP maps as low cost tools for SMES to shape e-business strategy. Firms can first identify their location on the IP map relative to the N-shaped path and then identify the path to the optimum location on the map. For example, the map will identify the extent of change in performance necessary to reach the optimum. This can be used to influence resource allocations decisions.

A key point is that changes in performance will influence importance. Strategy and resource allocation decisions can produce changes in performance, as demonstrated by the left to right horizontal movements along the performance axis. Performance change, in turn, leads to change in importance and the movement to a new point on the IP map. This continuous interplay between importance and performance means that both must be periodically measured and evaluated as inputs into strategic e-business planning if scarce resources are to be managed most effectively. Indeed, this is no different from basic models of strategic business management wherein the firm follows an ongoing process of strategy formulation, strategy implementation, and evaluation and control.

Several interesting questions emerge. Does the maturity of the phenomenon being investigated (e-business, in our case) influence the path across the IP map? For instance, Sampson and Showalter (1999) found a downward sloping path when assessing the quality of food service, which could be considered a rather mature and 'stable' phenomenon (i.e., one would doubt that the criteria for measuring the quality of food service [e.g., cleanliness] would substantially change over time). Does the path of a 'stable' phenomenon differ from the path of one that is more 'evolutionary,' such as e-business? If so, do theories of learning or those related to stages of growth offer insight on this phenomenon?

Another question that emerges is the impact of key variables (e.g., the amount of financial and other resources allocated, the number and type of applications implemented, or the technological infrastructure used) on the path identified? Since the identification of the path is an important first step in developing a tool for small firms to define their e-business strategies, make resource allocation decisions, and assess the impact of these decisions, knowing what variables impact IP analysis will help to fine-tune strategy formulation.

Finally, given the rather limited e-business research on SMEs, we recognize that this study represents an early, exploratory work. Consequently, we focused explicitly on e-business motivations without any dependent variables. Further research employing longitudinal studies would help confirm the direction of travel along the N-shaped relationship.

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