

# STRATEGIC ALIGNMENT OF E-BUSINESS DEVELOPMENT

## *Performance Outcomes for Manufacturing SMEs*

Louis Raymond

*Institut de recherche sur les PME, Université du Québec à Trois-Rivières, P.O. Box 500, Trois-Rivières, Canada G9A 5H7*

François Bergeron

*Faculté des sciences de l'administration, Université Laval, Québec, Canada G1K 7P4*

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Abstract: Facing pressures from an increasingly competitive business environment, manufacturing SMEs are called upon to implement strategies that are enabled and supported by information technologies and e-business applications. Based on the Internet and Web technologies, these include applications such as e-communication, e-commerce, e-business intelligence and e-collaboration. From a contingency theory perspective, and using survey data obtained from 107 Canadian manufacturing SMEs, this study examines the alignment of e-business development with business strategy, based on Miles and Snow's strategic typology. The performance outcomes of this alignment in terms of growth, productivity and financial performance are also examined. Results indicate that the ideal e-business development profiles vary in the relation to the firms' strategic orientation, whether it is of the Defender, Analyzer or Prospector type.

## 1 INTRODUCTION

A number of business activities such as communicating, transacting, environmental scanning and collaborating with other organisations are now done through the Internet and the World-Wide-Web. The complexity of technological choices, implementation difficulties personnel training costs and the continuous updating of systems demand that organisations target their e-business activities upon their business strategy. This issue of information technology (IT) *alignment*, and consequently of the alignment of e-business activities with the firm's business strategy constitutes one of the five main problems faced by IT managers in large enterprises (Luftman, Kempaiah and Nash, 2006).

But what about small and medium-sized enterprises (SMEs), and especially in the manufacturing sector? Is the strategic alignment of their e-business activities as critical? Does this alignment allow manufacturing SMEs to perform better in terms of growth, productivity, and profitability? The main objective of this research is

to answer this last question, through an empirical study of 107 Canadian manufacturing SMEs.

## 2 THEORETICAL AND EMPIRICAL CONTEXT

The study's theoretical and empirical context is constituted by the IT alignment research founded upon contingency theory. The notion of strategic alignment emanates from strategic management and organisation theory research whose fundamental proposition is that organisational performance is a consequence of the coherence or "fit" between two or more factors such as strategy, structure, and technology (Burns and Stalker, 1961). In this perspective, coherence is a dynamic search that seeks to align the organisation with its environment and to organise resources internally in support of this alignment (Miles and Snow, 1984, p. 11). Given that strategy is the mediating force between the firm and its environment, it constitutes in concrete fashion the basic alignment mechanism, and the organisational technology, Internet and Web-based

technology here, must be compatible with this strategy if one aims to create a significant competitive advantage.

## 2.1 Business Strategy

While many definitions of business strategy can be found in the literature, Porter's (1980) perspective will be adopted here, wherein strategy is constituted by offensive and defensive actions undertaken to counter competitive forces and thus provide the firm with an increased return on its investment. With regard to the business strategy, Miles and Snow (1978) typology has been the most recognised and widespread classification scheme for the last twenty-five years (DeSarbo, Di Benedetto, Song and Sinha, 2005). A firm is thus classified as a *Prospector* to the extent that it is innovative in introducing new technologies and seeking new markets, as a *Defender* if it is engineering-oriented and aims to maintain its position in a relatively stable market, or as an *Analyzer* if it adopts a "second but better" orientation based on a trade-off between the minimisation of risk and the maximisation of business opportunities. Being applicable independently of the industrial sector (Hambrick, 1983), this typology has been validated and used in numerous empirical studies, including a number done in the context of SMEs (Aragón-Sánchez and Sánchez-Marín, 2005; O'Regan and Ghobadian, 2005).

## 2.2 Strategic E-Business Development

The development of e-business in the organisation can come in different forms. The most frequent is in the form of "e-communication", referring to the promotion of the firm, its products and services, brochureware, online catalogs, and other types of Internet uses (including intranets and extranets) and Web sites designed to communicate with customers and employees (Raymond, Talbot and Vézina, 2002). The second form is "e-business intelligence" wherein the nature and breadth of information now available on the Internet allow the firm to scan its technological, commercial and competitive environment in search of ways and means to improve its operations and decision-making, and seek new product-market opportunities (Hill and Scott, 2004). The third form of e-business development, namely "e-commerce", is of a transactional nature, and is still rather difficult to implement successfully, for SMEs in particular. It concerns the buying and selling of goods and

services through the Internet and Web-based technologies (Laudon, Laudon, Bergeron and Gingras, 2006). Another manner in which e-business can be applied is "e-collaboration". It consists in integrating and sharing, through the Internet or extranets, information on the extended value chain linking the firm with its upstream and downstream business partners. This allows stakeholders within the same industry or network organisation that share the same objectives to collaborate in the design, development, production and management of products and services at different stages of their life-cycle (Cassivi, Lefebvre, Lefebvre and Léger, 2004).

## 2.3 Research Model

The research model underlying the present study is presented in Figure 1. There is reason to believe that different forms of e-business development would be appropriate for each type of business strategy, that is, for Defenders, for Analyzers, and for Prospectors. As defined by Miles and Snow (1978), many aspects of their typology can be affected by the firm's e-business strategy, including the Defenders' emphasis on operational efficiency in terms of production and sales costs, the Prospectors' need for innovation in terms of product and market development, and the Analyzers' need for flexibility to balance both operational efficiency and innovation.

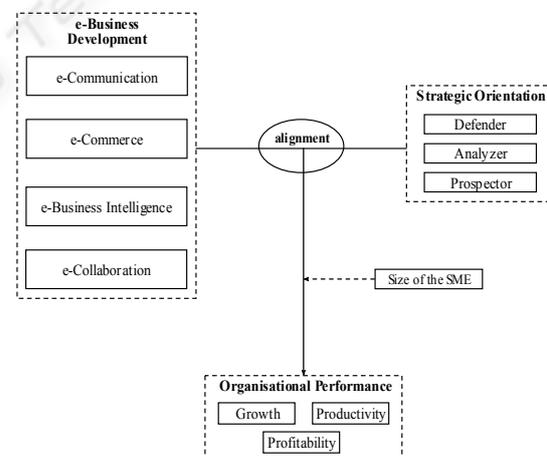


Figure 1: Research model on the strategic alignment of e-business development in manufacturing SMEs.

Manufacturing SMEs whose business and e-business strategies are aligned should be less vulnerable to changes in their business environment and to internal inefficiencies. They should also perform better as Internet and Web-based technologies provide the systems and support the processes

required to successfully implement their business strategy, focused on the development of networks, products and markets.

In line with previous research results on the strategic alignment of IT (Croteau and Bergeron, 2001; Sabherwal and Chan, 2001; Bergeron, Raymond and Rivard, 2004), one can surmise that a high level of alignment between the manufacturing SME's e-business development and its business strategy demonstrates that the use of Internet and Web-based technologies and applications is targeted on its competitive needs and its strategic priorities, and thus allows it to increase its performance. Thus the following research proposition:

*P: Greater alignment of e-business development with business strategy is associated to greater performance.*

Note that with regard to organisational performance, the research model includes two proximal indicators, that is, growth and productivity, directly related to the e-business development objectives, and one distal indicator, that is, profitability. And whereas organisational size can play a potentially determining role in the e-business development and the performance of manufacturing SMEs (Sadowski, Maitland and Van Dongen, 2002; Yang, Yang and Wu, 2005), this factor will be included as a control variable in the research model, the underlying hypothesis being that size will have a moderating effect on the relationship between e-business alignment and performance.

Inferred from the attributes of Miles and Snow's typology and the implications of this typology for the development of e-business in manufacturing SMEs, the ideal e-business alignment profiles for Defenders, Analyzers and Prospectors are presented in Table 1.

Table 1: Ideal e-business development profile for each type of business strategy.

Bus. Strategy e-Business Dev.	Defender	Analyzer	Prospector
e-Communic.	yes	yes	yes
e-Commerce	yes	yes	yes
e-Bus. intellig.	no	yes	yes
e-Collaboration	no	no	yes

### 3 RESEARCH METHOD

The data used in the study were obtained from a database created by a university research centre that contains information on more than 350

manufacturing SMEs located in the province of Quebec, Canada. With the collaboration of a 800-member industry association to which most of these firms belong, the database was created by having the SMEs' chief executive and functional executives such as the controller, human resources manager, and production manager fill out a questionnaire to provide data on the practices and results of their firm. In exchange for these data, the firms are provided with a complete comparative diagnostic of their overall situation in terms of performance and vulnerability. Anonymity of the questionnaire data and resulting diagnostic is preserved by the industry association, which assigns an identification code to each firm. Out of these firms, 107 came back for a second diagnostic a year later and were then questioned about their use of the Internet and the Web. Questionnaire data, including sales and export data, were also updated to reflect changes in the last year. Annual sales of the sampled organizations range from 1.4 M\$ (Can.) to 55 M\$, with a median of 7.6 M. Approximately 40 % are small (SEs: 19-49 employees), whereas the rest are medium-sized (MEs: 50 - 336 employees), the median number of employees being 60. Over fifteen industrial sectors are present, including metal products, wood, plastics and rubber, electrical products, food and beverages, and machinery.

A previously validated self-classification approach (James and Hatten, 1995; O'Regan and Ghobadian, 2005) was used to identify the firm as either, a Prospector, a Defender or an Analyzer. The measure of e-business development was based upon a list of business activities for which the Internet (including intranets and extranets) and the Web are used by the SME. The classification of these activities refers to the various levels of e-business development observed in previous studies (Raymond and Bergeron, 1996; Kula and Tatoglu, 2003; Levy and Powell, 2003; Xu, Zhu and Gibbs, 2004), as adapted for the manufacturing SME sector. Organisational performance is assessed from growth, productivity and profitability indicators commonly employed in strategic management research.

Alignment is hence conceptualised and measured from a "profile deviation" perspective (Venkatraman, 1989), that is, the less Defenders, Analyzers and Prospectors deviate from their ideal e-business development profile (Table 1), better will be their performance. Following the method used by Sabherwal and Chan (2001), values of 1 and 0 are assigned as ideal values (yes and no), the measure of alignment being calculated from the euclidean

distance between the firm’s actual strategic profile and its ideal profile, for each type of business strategy.

#### 4 RESULTS

All of the sampled manufacturing SMEs use Internet-based technologies to develop e-communication internally and/or with their present and potential customers. A good proportion of firms (77 %) have also developed e-business intelligence activities, using the Web to scan the commercial environment and/or prospect for new markets. However, much less SMEs (35 %) have developed e-business applications to sell their products. Even less practice e-collaboration (30 %) by using the Internet to interact in R&D with their business partners in order to develop new products. As to their business strategy, 51 firms were classified as Prospectors (47.7 %), 35 as Analyzers (32.7 %) and 21 as Defenders (19.6). Analysis of variance results presented in Table 2 also indicate that these three groups do not differ with respect to their development of e-business, that is, in terms of their developing e-communication, e-business intelligence, e-commerce and e-collaboration. Moreover, conforming to Miles et Snow’s (1978) initial assertion, none of the three types of business strategy is associated better performances.

Table 2: Breakdown of e-business development, size and performance by type of business strategy (n=107).

Strategy Type	Defend. (n=21)	Analyz. (n=35)	Prosp. (n=51)	F <sup>a</sup>
e-Bus. Dev. <sup>b</sup>				
e-Communic.	1.00	1.00	1.00	0.0
e-Commerce	.33	.31	.37	0.2
e-Bus. intellig.	.90	.74	.73	1.4
e-Collaboration	.33	.31	.27	0.1
Org. Size <sup>c</sup>	85	71	82	0.5
Performance				
Growth <sup>d</sup>	.148	.103	.193	1.5
Productivity <sup>e</sup>	.008	.010	.012	0.7
Profitability <sup>f</sup>	.036	.024	.052	1.8

<sup>a</sup>all F-values (one-way ANOVA) are non significant (p > 0.5)

<sup>b</sup>attainment of this development level (1:yes, 0: no)

<sup>c</sup>number of employees

<sup>d</sup>average growth rate for the last 3 years

<sup>e</sup>gross margin / number of production employees

<sup>f</sup>margin = net profit / sales

There is thus no direct link between a firm’s strategic orientation and its level of e-business development, in conformity with the contingency

argument that underlies the research model. This argument implies that is neither the business strategy nor the development of e-business as such that affects performance but rather their alignment, there being thus no “one best way” in matters of e-business.

Results pertaining to the research proposition are presented in Table 3, that is, product-moment (Pearson) coefficients of correlation between strategic alignment, measured for each SME by the gap between its actual and ideal e-business development profiles, and the three dimensions of organisational performance, namely growth, productivity and profitability. Partial correlations are presented, i.e. controlling for the potential effect of size as proposed in the research model, for the sample as a whole (P) as well as for each type of business strategy.

These results confirm the basic proposition of this research to the effect that a greater strategic alignment of e-business is associated to a better performance of manufacturing SMEs, whatever their strategic orientation, to the extent that this is true for these firms’ productivity (r = 0.18, p < 0.05) and profitability (r = 0.13, p < 0.1), but not for their growth (r = 0.04). One can also ascertain if the proposition holds within each type of business strategy. Returning to Table 3, one sees that for Defenders, e-business alignment is highly associated to growth (r = 0.52, p < 0.01) and to profitability (r = 0.35, p < 0.05) but not to productivity (r = 0.03). Moreover, e-business alignment is associated only to profitability for Analyzers (r = 0.27, p < 0.1) whereas it is only associated to productivity for Prospectors (r = 0.33, p < 0.05).

Table 3: Correlation of strategic alignment with performance.

(zero-order correlation) partial <sup>b</sup> correlation	Alignm. All (n=107)	Alignm. Defend. (n=21)	Alignm. Analyz. (n=35)	Alignm. Prosp. (n=51)
Growth	(.06)	(.37*)	(.16)	(-.01)
Productivity	.04	.52**	.15	-.02
Profitability	(.13 <sup>a</sup> )	(.08)	(.04)	(.19 <sup>a</sup> )
	.18*	.03	.06	.33*
	(.13 <sup>a</sup> )	(.27 <sup>a</sup> )	(.27 <sup>a</sup> )	(.11)
	.13 <sup>a</sup>	.35*	.27 <sup>a</sup>	.12

<sup>a</sup>p < 0.1    \*: p < 0.05    \*\*: p < 0.01

<sup>b</sup>controlling for Organisational Size

From a “resource-based view” (Barney, 1991), it is worth noting that e-business alignment seems to “compensate” for the potential weaknesses of manufacturing SMEs with regard to their strategic

orientation. This alignment is in fact associated to growth for Defenders, whereas these firms rather aim for productivity and profitability, to productivity for Prospectors that rather aim for growth, and to profitability for Analyzers that rather aim for a dynamic equilibrium between growth and productivity.

## 5 IMPLICATIONS

A number of contributions and implications of this research can be found. Firstly, this is one of the first studies to have rigorously conceptualised and measured e-business alignment in order to confirm the theoretical validity and practical utility of this notion and of the strategic contingency approach in the study of e-business, contrary to the universalistic approach founded on "best practices" notion.

Without the alignment notion, no direct link can be demonstrated between the business strategy and the type of e-business application. Here, it is the combination of the different forms of e-business that makes the difference. This combination, i.e. the manufacturing SME's e-business development "profile", is critical to its organisational performance. A Defender should thus develop e-communication and e-commerce. An Analyzer should develop e-communication, e-commerce, and e-business intelligence. And a Prospector should develop e-communication, e-commerce, e-business intelligence, and e-collaboration. One must note that for the Defenders studied here, this ideal profile does not conform to the e-business applications actually implemented, as these firms favour e-business intelligence (90 %) more than Analyzers (74 %) and Prospectors (73 %), whereas it is e-commerce that is rather meant to allow Defenders to improve their performance. In other words, these SMEs wrongly invest in e-business intelligence and would be better to implement e-commerce applications.

This study cast some doubt on notions of "tried-and-true" in matters of e-business, often linked to the experience of practitioners. A purely descriptive approach would have in effect demonstrated that the most frequent types of e-business in manufacturing SMEs are, in order: e-communication, e-business intelligence, e-commerce and lastly e-collaboration. Consequently, one could have prescribed that these firms implement e-business applications in this order to "follow the trend", which would have been a first error. Such an approach would have also demonstrated that apart from e-communication, e-business intelligence is the form of e-business that is

the most important for Defenders. Thus prescribing to the latter that they give priority to e-business intelligence would have been a second error. Now one can realise that the strategic alignment perspective clarifies the relationship between the various forms of e-business and organisational performance and, as the same time, uncovers results that contradict initial descriptive findings.

These results also allow us to emphasize the nature rather than the value of the SMEs' technological investment, given that certain forms of e-business would be more appropriate than others for certain firms in relation to their strategic orientation. For example, Defenders would have the most to gain by implementing a transactional Web site (e-commerce), given the positive impact this would have on their financial performance, whereas Prospectors would benefit more from Web-based environmental scanning (e-business intelligence) in terms of their productivity. From an institutional point of view, technological imitation would only be valid to the extent that the firm shares the same strategic orientation with the competitor it is trying to imitate.

Having examined the complex relationship between strategic alignment and performance, we have confirmed the existence of many associations, a number of which depend upon the firm's strategic orientation or business strategy. For example, a positive association was found between alignment and productivity for Prospectors but not for Defenders and Analyzers. Similarly, a positive association between alignment and growth was found only for Defenders. This implies that strategic alignment can not in turn be prescribed in an universalistic fashion. In particular, the size of the firm must be taken into account, as e-business alignment was found to be rather more important for small enterprises than for medium-sized ones.

The level of e-business assimilation is also relevant. For owner-managers of manufacturing SMEs wanting or needing to increase their organisation's flexibility, to lower costs, to increase systems integration, to improve product quality and to strengthen innovation capabilities, the results of this study may lead to an examination of their firm's level of e-business assimilation, this being done in conjunction with their strategic intent. Identifying the extent to which various forms of e-business have been developed and assimilated is essential to determine if these are aligned with the strategic objectives and competitive environment of the manufacturing SME. For example, this would help in answering a question that is now posed to a

number of manufacturing SMEs under pressure from competition that is now global and from large prime contractors in particular, that is, if they must participate in e-markets and in what form.

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