

The Strategic Role of IT: An Empirical Study of its Impact on IT Performance in Manufacturing SMEs

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Abstract — The business value of Internet and Web applications for small- and medium-sized enterprises (SMEs) is dependent upon how such applications “fit” with the strategic orientation of these firms. Based on the strategic alignment of information technology (IT), this study uses a systemic approach to test the contribution of three predictors of IT performance in an organization: the strategic role of IT as well as the sophistication of the management and the use of IT. A multivariate mediation perspective is used to conceptualize alignment. The results of an empirical investigation of 44 manufacturing SMEs establish an important mediator effect of IT management and IT usage sophistication between the strategic role of IT and IT performance.

Keywords - *IT sophistication; IT performance; SME; strategic alignment; strategic role; e-business applications*

I. INTRODUCTION

The current economic context is marked by a considerable expansion of electronic markets. The need for information technology (IT) comes with the ever increasing demand for digital information. The impact on business is tremendous, especially for small- and medium-sized enterprises (SMEs) who need to invest in systems with the ability to store, process, and generate data stemming from its dealings with various business partners. For many small companies, the need for IT is necessary to ensure their survival and competitiveness [25], and to enable their innovation capabilities [15]. While it is evident, IT systems have substantially improved the manufacturing process and productivity, they have also allowed for more organizational flexibility by transforming workers time and space, and reinventing the internal and external mode of business organization [14].

With the pervasive arrival of IT and the opening of the global marketplace, SMEs have been subject to rapid change and extreme instability. The SME is obliged to integrate IT to ensure its competitiveness and survival. IT can play an important role in a company's performance and its ability to respond effectively to the changing needs of the market, therefore special attention and research is needed [33].

And given the inherent fragile nature of the SME, IT plays an increasingly strategic role in creating new challenges [11]. New online competitors easily enter new or existing markets, customers are more informed and more demanding because they can compare features and prices of products through the Web; also, the changing needs and wants of the market often render recent IT investments obsolete [36]. As a result of substantial investments by many SMEs into IT, it is essential to foresee the threats and opportunities that are inherent in the technology, to discover the mechanisms that manage and drive these technologies, and to analyze the impact in terms of cost-effectiveness and profitability for these enterprises [22].

The increased strategic nature of the role of IT in the organization may give rise to management problems and IT use, not only at a technical level, but also at strategic and organizational levels [5]. It is therefore important for SMEs to better understand how their investments in IT, coupled with an increased understanding of their management practices and how they use the technology, provides the most benefits [16]. This research thus aims at better understanding the impact of the strategic role of IT, IT management sophistication, and IT usage sophistication upon IT performance in manufacturing SMEs, by answering the following research question: *To what extent and in what manner do the strategic role of IT, the sophistication of IT management, and the sophistication of IT usage contribute to the performance of IT in manufacturing SMEs?*

We first present the theoretical background of the research, followed by the research model, and the method by which 44 French manufacturing SMEs were empirically studied in order to answer the research question. Next, the results are presented and discussed. We further identify the study's implications and limitations, and conclude with future research.

II. THEORETICAL BACKGROUND

The study's theoretical background is founded on the concept of *strategic alignment* at the core of the

strategic paradigm in information systems research. It was first defined in terms of its impact on organizational performance rather than on the performance of IT. However, there is no doubt the concept is still one of the most important fundamental bases of our understanding of the strategic role of IT and IT performance in organizations. According to Henderson and Venkatraman [18], strategic alignment is based on the assumption of a dynamic and coherent IT (strategy and infrastructure), the company's business strategy and process development, would have an impact on performance and thus its competitiveness. An enterprise should synchronize its business and its technology sectors, as well as at the strategic and operations levels. As presented in Fig. 1, Henderson and Venkatraman's [18] model is based on a systemic approach, emphasizing the importance of aligning internal and external business activities in order to improve organizational performance and predetermined strategic objectives.

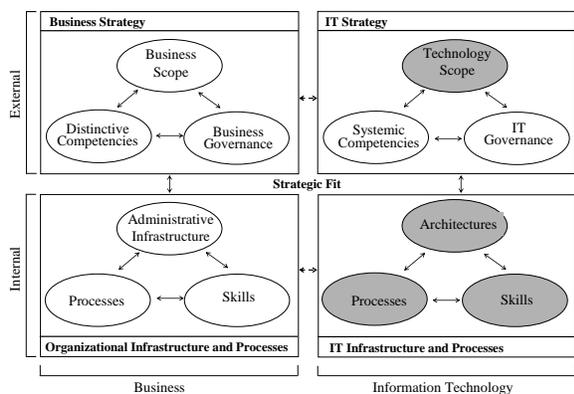


Figure 1. Adaptation of Henderson and Venkatraman's [18] IT alignment framework

This model of IT strategic alignment has been tested in various ways over the past two decades, often by exploring in more detail some aspects of each dimension described above. However, few studies have taken into account other factors such as organizational context (business strategy, organizational structure), the environmental context (industry, firm size), and the technological context (technology solutions, IT management) [39]. It has been highlighted that a close link between business strategy and IT strategy contributes to both IT performance and organizational performance [8, 12]. Despite previous empirical studies that have allowed us to better understand the contexts in which the alignment of IT contributes or not to organizational performance, many aspects remain unexplored, including alignment at the technological level [2].

This study proposes a research model for ascertaining in what manner IT “works” in SMEs, specifically the strategic role of IT, and the sophistication of IT management and IT usage. IT performance is seen here as a result of direct or “proximal” strategic alignment of IT [8], while organizational performance would be considered rather as an indirect consequence or “distal” of this alignment. Returning to Fig. 1, the shaded sections of Henderson and Venkatraman's [18] model are the basis of the research model used for the current study.

A. Strategic Role of IT

According to Powell and Dent-Micallef [32], IT human resources and the organizational structure of the business must complement one other in a way that creates intrinsic benefits that results in a significant and distinctive performance compared to other sectors in the company. Thus, more and more emphasis is needed to optimize the use and management of IT based on the internal characteristics of the company as well as its strategic profile, size, in-house expertise, as well as its managerial, technological, and functional capacity.

Certain researchers have explored the idea of the evolution of IT usage, namely Ward, Taylor and Bond [43] who observed that the strategic role of IT is developed over three major periods in order to support the business while throughout its growth: (1) The period of developing data processing standards and automating repetitive tasks, thereby improving operational efficiency, (2) The period of managing information systems, designed to improve management efficiency by producing concrete information that will be used to better manage and control the firm, (3) The period of strategic information systems enabling the company to better position itself in its market segment.

As per the model proposed by Philip and Booth [31], each organization has its own expectations with regards to IT that is dependent upon its skills and capabilities to align the technology with its strategic objectives. According to this model, information systems can play five potential roles in the enterprise: (1) Survival is the most important role played by IT in an organization. The goal of IT is to achieve greater control over management and can be used to understand day-to-day administrative and production tasks in order to achieve operational performance and cost reduction. (2) Resources: this model compares the company to a waterway, receiving a stream of resources such as materials and services of other companies, and issuing products and services that can be used by other third parties. (3) Competitive advantage: IT moves from the simple role as facilitator of obtaining resources to one of fully exploiting potential of resources to gain a competitive advantage. Creativity and innovation are

essential ingredients to this approach. (4) Value analysis service: rethinking business processes by reengineering them to improve the company's competitiveness and flexibility, taking into account the rapid changes in the environment. (5) Cyberspace: It is in cyberspace that virtual organizations build relationships with suppliers, consumers, and other organizations. This type of structure is very flexible, innovative, and provides very personalized service.

B. IT Sophistication

The evolution of the strategic role of IT is closely linked to IT sophistication because it reflects the way IT is managed and used by the company. IT sophistication is explained by the way IT falls into line with the firm's strategic objectives [34]. The concept of IT sophistication and its measurement were first defined and validated by Raymond, Paré and Bergeron [35], to be subsequently used by other researchers [10, 19, 29]. IT sophistication refers to the nature, complexity, and interdependence of IT use and how it is managed within the organization. IT sophistication management includes managerial and functional sophistication on the one hand, while the use of IT sophistication includes informational and technological sophistication on the other hand.

Managerial sophistication takes into account the mechanisms used to plan, monitor, and assess current and future applications. Within the context of the SME, the sophistication of planning is demonstrated by the degree of formalism of the company's processes and the level of alignment with the organizational goals. The availability of written documents, standards, and measures for purposes of security and confidentiality clearly reveal a managerial sophistication. This dimension may also contain aspects related to the accomplishment of business objectives relating to the adoption of IT, the degree of formalization of the adoption process as well as managerial involvement in this process. Also related to managerial sophistication are the presence of external consultants, the initial investment, and the annual budget allocated to develop and operate IT applications.

Functional sophistication refers to the location and functional autonomy of IT within the organization. The number of internal specialists within IT function is an indicator insofar as it refers to the number and nature of the tasks to be completed by the IT function or by the amount of persons responsible for IT within the organization. Based on the hierarchical level of the organization (operational, administrative, strategic), sophistication can be characterized by the proportion of IT applications at each of these decision-making levels.

Informational sophistication refers to the nature, both transactional and managerial, of the applications

portfolio [4]. Another aspect of informational sophistication is the degree in which applications are integrated in the SME; this element can be characterized by the presence of a central database shared by the implantation of a LAN, by a fluid circulation of information and sharing of resources, and by the implementation of an integrated management software package (ERP). The importance of the ERP system at this level would allow businesses to share information with its partners in real-time [7].

Technological sophistication reflects the number or variety of IT used by the SME in several areas such as CAD/CAM, internal networking, and external networking [23]. In each of these areas, the number of hardware and software integrated into the system is counted based on the degree of complexity and type of technology used by the organization. The technological dimension considers the nature of the hardware and development tools used by the SME. The number of workstations is a first indicator of IT sophistication in addition to decentralized hardware within the organization. A second indicator is the diversity of programming languages and development tools used. The sophistication of the man-machine interface can also be considered as a criterion. Finally, dominant treatment modes as well as the types of operation preferred by the SME are added to the mass of indicators of technological sophistication. The adoption of an ERP system can be considered as a perfect example of technological sophistication within the SME, who are attempting to prevent the consequences of technological obsolescence by more sophisticated integrated applications such as FMS [40].

C. IT Performance

Assessing the performance of the IT function in an organization is not a simple task [26]. In a process evaluation of IT costs, Keen [21] proposed taking into account various elements such as the technical obsolescence of software, the declining cost of work units and operating software, development flows, and operating costs. IT takes the form of other assets and is also subject to devaluation or replacement. These items could be used to quantitatively assess the standard IT budget including machines, applications, and services. However none of them consider organizational transition costs related to learning, reticence, stress, fault, change internal reporting, information loss, and additional migration costs.

Benefits gained from IT remain very complex to identify specifically in relation to profitability studies. In addition, quantifying benefits from organizational change, improved customer follow-up, or even an improvement of internal and external communication, are a challenge for a number of enterprises. In fact,

there is the dilemma of quantifying qualitative and intangible inputs with indicators for legacy assets. Some companies choose to go beyond this notion of IT profitability, by categorizing them as machinery and equipment for production, such as furniture, office or as general operating costs resulting in a shortsighted view on IT investment. Others use indicators to measure operational performance (quality indicators, satisfaction surveys), technical (referencing, application availability, application evolution), or users (number of users of a system, effective consultations frequency). DeLone and McLean [13] developed a model that IT success can be measured via six dimensions; quality of the system, quality of the information, usage, user satisfaction, individual impact, and organizational impact. User satisfaction remains however one of the most important measures of success and most recognized in IT [37]. It has been demonstrated that the quality of the system, the quality of the information and the usefulness of applications point to, in large part, the satisfaction of users.

III. RESEARCH MODEL

As presented in Fig. 2, the research model is based upon a conceptualization of the strategic alignment of IT proposed by Henderson and Venkatraman [18], more specifically the alignment between the IT strategy and the IT infrastructure and processes that is deemed to have a positive impact upon the performance of IT in manufacturing SMEs. The IT strategy is as the strategic role attributed to IT by the SME’s leader, whereas the IT infrastructure and processes are as the firm’s sophistication in both managing and using IT. Testing this model should help us answer the following research question: *To what extent and in what manner do the strategic role of IT, the sophistication of IT management, and the sophistication of IT usage contribute to the performance of IT in manufacturing SMEs?*

As shown in the research model, the strategic role of IT is an independent construct directly related to the dependent construct, i.e. IT performance. The impact of the strategic role of IT will also be felt by the sophistication of IT management and IT usage. This research model aims to explain IT performance in a novel way by focusing on the strategic role of IT while taking into account the sophistication level of IT deployed in manufacturing SMEs. It is for this reason that the IT sophistication concept [35] is mobilized here, that is, IT management sophistication on one hand, and IT usage sophistication on the other hand. The first hypothesis is in line with the main proposition found in previous conceptualizations of the strategic alignment of IT on the basis of the evolution of information technology’s role in organizations [31, 42].

Its distinction and contribution however lie in the choice of IT performance (or organizational IS effectiveness) rather than organizational performance as the outcome of such alignment.

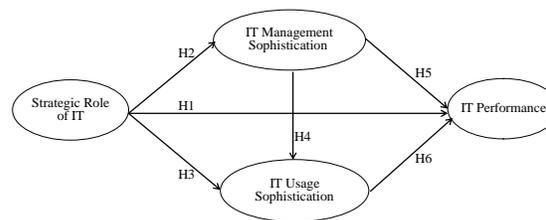


Figure 2. Research model

It had been previously noted that the strategic role played by IT in organizations could only be ascertained if one took into account their IT management and usage characteristics. Now the notion of IT sophistication effectively reflects how IT are managed and used within organizations [43]. Hence the second hypothesis assumes the more strategic the role played by information technology in the organization, the greater the presence of its IT function. Following Henderson and Venkatraman [18], it is presumed that in manufacturing SMEs, the strategic importance of IT will be reflected in the IT resources and capabilities developed by the IT function. The third hypothesis reflects the premise that users will be more satisfied with the applications implemented and with the quality of information output if the SME’s leadership views IT as a strategic necessity or as a source of competitive advantage. Here, the notion of “top-management support” as a determinant of IS success would take on added importance in small business [37].

The fourth hypothesis assumes a certain hierarchy in the evolution of IT, as previously indicated, i.e. this technology must be effectively managed and deployed in the SME if it is to be appropriated and effectively used by employees. This is basically in line with DeLone and McLean’s [13] updated IS success model in which system usage and user satisfaction are dependent upon the quality of the system, the information output, and the service provided by the IT function [30]. The fifth hypothesis proposes that the performance of IT improves when the sophistication of the management of IT increases [27]. As noted by Philip and Booth [31], “sustainable advantage depends on the ability to manage the IS resources effectively on an ongoing basis”. The last hypothesis similarly

proposes that IT performance improves with more sophisticated usage of IT [35], this being in line again with DeLone and Mclean’s [13] IS success model.

In summary, the following hypotheses are tested:

- H1: The more strategic the role played by IT, the higher the performance of IT.
- H2: The more strategic the role played by IT, the greater the IT management sophistication.
- H3: The more strategic the role played by IT, the greater the IT usage sophistication.
- H4: The greater the IT management sophistication, the greater the IT usage sophistication.
- H5: The greater the IT management sophistication, the higher the performance of IT.
- H6: The greater the IT usage sophistication, the higher the performance of IT.

IV. METHOD

Secondary data was provided by a database created by a university research center for benchmarking purposes and containing information of 44 French manufacturing SMEs. For the study’s purpose, a SME is defined as having between 10 and 299 employees, the median size of the sampled firms being 38 employees. The industrial sectors represented include metals (27%), food and beverage (16%), wood (9%), plastics (9%), textile (7%), minerals (5%), electronics (2%) and others (25%).

A. Data Collection

This database was created in collaboration with business owners that belong to chambers of commerce in Midi-Pyrénées region, by asking the management team and IT manager to answer a questionnaire on the firm’s strategic orientation, practices, and performance with regard to information technology and e-business, broken down by the main business functions of the SME, namely operations and production, sales and marketing, and accounting, finance and HRM. In exchange for this information, the firm was provided with an overall diagnostic of its situation relative to the management and performance of its information technology.

B. Measures

In view of Henderson and Venkatraman’s [18] framework on which this research is based, fit or alignment between the strategic role of IT and the sophistication of IT management and usage in the firm is ascertained here from a “fit as mediation” perspective [41]. First, the extent to which IT plays a strategic role in the SME was measured through a self-typing approach based on Venkatraman’s [42] and Philip and Booth’s [31] stage models, by asking the chief executive to answer the following question (statements

were coded from 1 to 4 in order of increasing strategic importance):

Indicate among the following statements the one that best defines your understanding of the strategic role that is assigned to information technology-based applications (ITApps) in your firm (choose one statement)?

1. ITApps should allow us to improve our managerial control and our production monitoring.	<input type="checkbox"/>
2. ITApps should insure greater operational flexibility and better response to our customers’ needs.	<input type="checkbox"/>
3. ITApps should facilitate and accelerate the development of new products, and allow us to increase our market share.	<input type="checkbox"/>
4. ITApps should allow us to integrate our business and production processes, and to improve exchanges with our business partners.	<input type="checkbox"/>

The measures of IT management sophistication, in terms of managerial and functional sophistication, and of IT usage sophistication, in terms of informational and technological sophistication, emanate from constructs developed, validated, and used in previous research [29, 35]. IT performance is measured by the level of attainment of the benefits associated with four types of IT-based applications (accounting-finance-HRM, logistics-production-distribution, marketing-sales-customer service, e-business-Internet-Web), thus following a process-based approach wherein the respondents evaluate the “business value” of IT for their firm [38, 40]. A list of expected benefits specific to each type of application (e.g. “increase flexibility”, “improve customer service”, “facilitate the recruitment of personnel”) is presented to the manager (CEO or CFO, operations manager, sales and marketing manager, and IT manager) who must indicate on a 5-point scale the extent to which the applications implemented contribute to the attainment of these benefits.

V. RESULTS

Structural equation modeling was used to validate the research model. To this effect, the PLS technique was chosen for its robustness, more precisely its capacity to handle small samples and formative measurement models in comparison to covariance structure analysis techniques such as Lisrel, EQS and Amos [17].

A. Measurement Model

Given their composite and multidimensional nature, the research constructs are modeled as being “formative” rather than “reflective” [9]. Such a construct is composed of many indicators that each

captures a different aspect; hence changes in these indicators bring or “cause” change in their underlying construct [24]. IT management sophistication is thus modeled as a second-order formative construct from two sub-constructs, namely managerial sophistication and functional sophistication. As presented in Table 1, each of these sub-constructs is in turn composed of six and two formative measures respectively, a functional sophistication and managerial sophistication score being obtained from the factor scores determined by a principal components analysis. Given that this analysis produced two components for managerial sophistication, a single score was obtained by averaging the two factor scores.

The reliability of a formative construct, as opposed to a reflective one, is confirmed by the absence of multicollinearity between its measures or indicators [28]. Formative indicator validity is confirmed by a weight that is significant and not less than 0.1 [20], as confirmed in Fig. 3. Discriminant validity of a formative construct is confirmed by it sharing less than 50% variance with any other construct, whereas nomological validity is confirmed when the construct’s hypothesized links with other constructs are significantly greater than zero and in the expected direction [1].

TABLE 1. PRINCIPAL COMPONENTS ANALYSIS OF IT MANAGEMENT SOPHISTICATION

indicator	factor	Funct. Soph.	Man. Soph. ^a	Man. Soph. ^b
Functional Sophistication	designated manager for IT	.91	-	-
	org. level of the IT function	.91	-	-
Managerial Sophistication	IT development	-	.79	-
	IT evaluation	-	.68	-
	user participation	-	.75	-
	external consultants	-	.58	-
	IT resources&competencies	-	-	.93
	IT support & appropriation	-	-	.95

^aIT management practices

^bIT management capabilities

In similar fashion, IT usage sophistication is modeled and measured from two sub-constructs, namely informational sophistication and technological sophistication. As presented in Table 2, each sub-construct is in turn composed of six and three indicators respectively. The reliability and validity of the IT usage sophistication construct was similarly confirmed. As to the IT performance construct, it is composed of four measures, that is, the average benefits obtained from each type of IT-based application. One may note again that there is no multicollinearity among these last

formative measures, the highest correlation among them being equal to 0.19 (p > 0.1), with all four regression weights being greater than 0.1 (Fig. 3), thus showing adequate reliability and validity.

TABLE 2. PRINCIPAL COMPONENTS ANALYSIS OF IT USAGE SOPHISTICATION

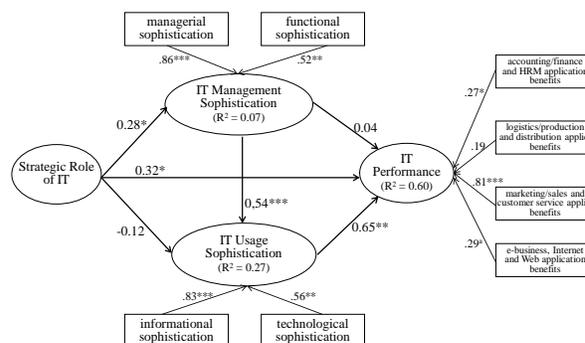
indicator	factor	Tech. Soph.	Inf. Soph. ^a	Inf. Soph. ^b
Technological Sophistication	uses of IT	.90	-	-
	uses of e-bus/Internet/Web	.81	-	-
	quality of IT security	.50	-	-
Informational Sophistication	accounting/fin./HRM apps	-	.78	-
	logistics/prod./distrib. apps	-	.60	-
	mark./sales/cust. serv. apps	-	.74	-
	ERP system modules	-	.69	-
	information output quality	-	-	.93
	user-system interaction qual.	-	-	.95

^aextensiveness of IT usage

^bquality of IT usage

B. Test of the Research Model

The research hypotheses were tested by evaluation the direction, value, and level of significance of the path coefficients estimated by PLS, as presented in Fig. 3.



Nota. Significance levels were obtained by bootstrapping. *p < 0.1 **p < 0.05 ***p < 0.01

Figure 3. Results of testing the research model

A positive and significant path coefficient ($\gamma_1 = 0.32$; $p < 0.05$) confirms the first research hypothesis, that is, the more strategic the role played by IT in the manufacturing SME, the greater its IT performance. Moreover, if one removes the effect of IT management and IT usage sophistication upon IT performance, the strategic role of IT still explains 25% of the variance in this same performance. The benefits obtained from marketing, customer service, and e-business applications thus flow directly from a vision of IT as a

mean for the SME to develop its products and markets, to integrate its production processes, and to improve exchanges with its business partners.

A positive and significant path coefficient ($\gamma_2 = 0.28$; $p < 0.05$) confirms the second hypothesis, that is, the more strategic the role played by IT, the greater the IT management sophistication of the SME. When IT constitutes a strategic necessity or a competitive weapon, when IT is of critical importance for “core” business processes of small manufacturers, these organizations act in a coherent manner by adopting managerial practices that allow them to better manage the development and use of these technologies. These are practices such as planning, designing and evaluating IT-based applications, sustaining and favoring user participation and user appropriation of IT, preserving and developing IT resources and competencies, and seeking outside consultants to overcome internal lacks in this regard. These firms show similar coherence when they place the IT function at a high hierarchical level in the organization and render IT autonomous (with a designated manager), that is, not subordinated to the financial or accounting function as is still often the case in small business.

Due to a negative and non significant path coefficient ($\gamma_3 = -0.12$), the third hypothesis could not be confirmed. It stated that the more strategic the role played by IT, the greater the IT usage sophistication of the SME. Thus it seems that the strategic role of IT would be only indirect here, that is, through its effect on IT management sophistication. For instance, seeking internal and external integration of business processes through IT would lead the firm to better plan its use of IT and to dispose of better IT resources and competencies; only then could a more advanced technological infrastructure and applications such as ERP and e-business be implemented.

The fourth research hypothesis is confirmed by a positive and significant path coefficient ($\gamma_4 = 0.54$; $p < 0.001$), relating the firm’s IT management sophistication to its IT usage sophistication. This result increases the relevance of a strategic perspective based on IT resources and competencies, namely a resource-based view [3] to explain the level of adoption and assimilation of IT in manufacturing SMEs. Now, firms that have sufficiently developed their IT function and managerial competence and that have access to external resources are those that have adopted and assimilated the greatest number of advanced manufacturing applications, and where system quality and security are best.

Due to a non significant path coefficient ($\gamma_5 = 0.04$), the fifth hypothesis could not be confirmed. It stated that the greater the IT management sophistication, the greater the IT performance of the SME. In the absence

of a direct effect, better management of IT has nonetheless an indirect effect upon IT performance, that is, through its positive effect on the use of TI (which in turn has a direct effect on performance, as we shall see). This last result is obtained with an estimation of this indirect effect by the product of the two path coefficients ($\gamma_4 * \gamma_6 = 0.54 * 0.65 = 0.35$; $p < 0.05$).

A strong path coefficient ($\gamma_6 = 0.65$; $p < 0.001$) confirms the sixth research hypothesis, that is, the greater the small manufacturer’s IT usage sophistication, the greater the performance of its information technology. Advanced applications such as an ERP system, a transactional Web site, videoconferencing, and mobile computing, to the extent that they are effectively assimilated by SMEs, are those that are the most strategic, that is, bring the greatest “value” to these firms in the form of increased competitiveness and competitive advantage. One may recall moreover that this increased assimilation of IT is the result of better management of these technologies. In turn, this better management is the result of a more strategic vision of the role played by IT in the organization.

In total, these three factors combined explain 60% of the variance in the performance of IT. One may note here that the applications that are most affected in terms of performance are the marketing and sales applications, followed by the accounting, finance and HRM applications, and the e-business, Internet and Web applications. This last result tends to underline the more operational rather than strategic nature of the logistics, production, and distribution applications as presently implemented in the sampled manufacturing SMEs.

VI. DISCUSSION AND IMPLICATIONS

The results obtained from 44 SMEs show that IT performance is influenced in two ways. First, IT performance is directly affected by the strategic role of IT. Second, IT performance is also influenced by the indirect effect the strategic role of IT that passes first through a greater IT management sophistication, which in turn influences the IT usage sophistication, which finally contributes to IT performance.

This dual contribution of the strategic role of IT on IT performance suggests that the functional sophistication of IT alone is not sufficient to increase IT performance; it is also necessary that IT be well used by the employees. Thus, to ensure that IT fully meets its strategic role, it has to be well managed. Its development and evaluation should take into account the needs of users, involving them when conducting process analysis to make the most effective use of resources, all this being done within a structured IT

function which reflects the reality of the organization while using external resources when necessary.

The strategic role of IT has no direct influence on IT usage sophistication, however it does via IT management sophistication. It recalls that once IT is deployed and well managed, it is possible for users to enhance their strategic role. These results are in line with Westerman's [44] work on the evolution of IT. It recalls the importance of ensuring that IT should adequately support business operations, making certain that information systems work as and when they are supposed to, that their access is secure, that information is accurate, complete and correct, and that all this is done in time and within budget. Then users are able to learn and adopt the various functional applications available within the company, and to assess the quality of information they find and the links that they may develop to make better decisions.

The descriptive results indicate that for all SMEs, the benefits of IT mainly come from accounting / finance / HRM, and logistics / production / distribution applications. Then come benefits accruing from marketing / sales/ customer service applications, and to a lesser extent e-business, Internet and Web applications. This descending order of the benefits of application is consistent with the increasing complexity of IT strategic role. All companies do not cover the use of IT for electronic integration of internal and external functions, which is the most strategic role. The IT applications that are easiest to implement are often the first established, and therefore are the first to generate profits. In this study, where the benefits are cumulative by type of applications used, companies that have established several types of applications are the ones showing the highest performance from their IT. They are also those who have the most comprehensive strategic role, the more complex and more demanding.

In the context of this study, firms that gain the most benefits from their IT are those that devote the more strategic role to these technologies, manage them in a sophisticated way, and use them extensively and intensively.

VII. LIMITATIONS AND CONCLUSION

As in any empirical research, this study has some limitations that should be mentioned. Given the nature of the sample, its representativeness in relation to all SMEs limits the scope of the results. The sample firms have indeed participated in a broad diagnostic performance survey, which may reveal distinctions with the general population in terms of IT [6]. The use of perceptual measures for assessing the strategic role and performance of IT may also have induced some respondent cognitive biases, although earlier studies have also resorted to such measures [38].

Notwithstanding its limitations, this study revealed that a strategic vision of the role of IT is critical to the managerial and technological skills developed by the SME and the organizational impacts of the exploitation of these capabilities. Based on a strategic alignment perspective, however, future studies could extend the research model by examining whether the role assigned to IT depends on its fit with the SME's business strategy, structure, and environment. A formative model for measuring a most complete performance of IT such as that proposed by Gable, Sedera and Chan [16] may also be used to include, in addition to the organizational impact, individual impact, quality of IT-based systems, and quality of information produced by these systems.

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