

## Business Intelligence Practices for Exporting SMEs

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### Abstract

The aim of this paper is to study business intelligence practices of exporting SME and their relationship to the level of international commitment. The results show that managers' sensitivity, influenced by the level of international commitment, plays a central role in the organization of their intelligence practices. The research focused on Quebec SME exporters and used the PLS method to verify research assumptions.

**Keywords:** international commitment, business intelligence, PLS, exporters SME

### 1. Introduction

In an economy characterized by globalized markets and increasing competition, numerous small and medium businesses (SME) choose to internationalize their activity in order to maintain or increase their growth (Ortiz & Lombardo, 2009).

However, if internationalization can be presented as a means of development, the process is risky and complex. Among research (Neupert et al., 2006; Wright et al., 2007; Brouthers et al., 2009) that study difficulties encountered in the internationalization process, Leonidou and Theodosiou (2004) and Toften and Rustad (2005) showed that the management of environmental information is one of the most prominent barriers that international SME have to face.

Therefore, the adoption of an active business intelligence practice is an important challenge for these enterprises. Toften (2005), Julien and Ramangalahy (2003) emphasize the positive impact of business intelligence activities on international performance. These activities are indeed likely to allow leaders to obtain information on recent developments of foreign markets, on legal constraints for each specific country, etc. (Williams, 2006).

However, in an actionable knowledge perspective, few works discuss the relationship between the international involvement level and the organization of business intelligence practices, or more precisely, the definition, the intensity of information seeking and diffusion inside the SMEs. Thus, although the role of the leader is often considered as central in this type of small structures, his influence on the orientation of these activities is rarely grasped.

The objective of this article is to characterize the relationship between the international involvement of the SME and the influence of the leader concerning the structuring of business intelligence practices inside the organization. Results from a survey conducted in Canada reveal that the level of international involvement develops the leader's sensibility towards information, and that this sensibility plays in favor of a greater diffusion of the business intelligence practices inside the exporting SMEs.

The first part of this article specifies the theoretical foundations that allow designing the conceptual research model presented in the second part. Methodology is covered the third part. The fourth part is dedicated to analysis and discussion of the results.

### 2. International SMEs and Business Intelligence Practices

#### 2.1 *International Involvement of SMEs*

The many existing definitions of internationalization (Ruzzier et al., 2006) converge towards the following conceptualization: internationalization of an enterprise is synonymous with the geographical extension of its

economic activity beyond national borders. Internationalization can take different forms (Rasheed, 2005; Aspelund et al., 2007), such as foreign direct investment (FDI), joint-venture, import and export. Export is the way most favored by international SMEs (Wolff & Pett, 2006).

Once they enter the international market, SMEs can leverage several strategic options (Julien & Ramangalahy, 2003): product launch or renewal, strengthening of the penetration rate in the client countries, or export to new countries (Monnoyer, 1990).

The level of international involvement of SME relates to the implication of the enterprise on foreign markets. It is related to the resources controlled by the enterprise, to its strategy but also to the conditions of the environment. It can be measured by the intensity of exportation generally defined as the share of export sales in the total sales, and the level of proactivity of their development strategy. Julien et al. (1998) propose three profiles of international SMEs:

- Opportunists that don't pursue a clear strategic orientation towards their international development and leverage few resources to this effect. Their main concern is to capitalize on first business opportunities that arise (generally in the form of unsolicited orders, or other occasions ready to be exploited).
- SMEs in transition phase that take concrete steps towards international involvement: establishment of an international marketing or competitive intelligence practices, definition of strategic orientations that display the will to enter foreign markets. Significant resources are mobilized, but can, however, be proven insufficient to allow enterprises to make a home stretch to the international.
- At last, professional SMEs that pursue a clearly defined strategic orientation towards international involvement. Their leaders display explicitly their engagement to develop internationally and mobilize a significant amount of resources. As their international experience grow, these SMEs become progressively autonomous.

Whatever their strategy may be, an involvement to the international seems to call upon an original know-how, the design of new products or services (Wolff & Pett, 2006). In this perspective, businesses must continuously seek to acquire information and update their knowledge (Julien & Ramanalahy, 2003; Leonidou & Theodosiou, 2004).

## 2.2 SMEs and the Organization of a Business Intelligence Practice

From the seminal works of Aguilar (1967) to the most recent research (Lönnqvist & Pirttimäki, 2006; Waston et al., 2006; Sahay & Ranjan, 2008; Calof & Smith, 2010) a consensus has been established around the benefits of implementing business intelligence systems in enterprises. The performance level of these enterprises appears to be linked to the development and maintenance of business intelligence activities.

Business intelligence is a generic expression that encompasses various forms of intelligence: competitive, technology, commercial, legal, societal, *etc.* (Lesca, 2003). It concerns in particular strategic issues such as development priorities of the business or the search for new industries. It can be regarded as a dynamic process which aim is "the acquisition and use of information about events, trends, and relationships in an organization's external environment, the knowledge of which would assist management in planning the organization's future course of action." (Choo, 2001). Seen as a practice of organizational information management, business intelligence helps actors, in general, and managers, in particular, to make decisions in contexts perceived as complex (Ranjan, 2008). The project is to increase the responsiveness of firms so that they can adapt more freely to an uncertain environment (Johannesson & Palona, 2010; Johns & Van Doren, 2010).

Different business intelligence models are suggested in the literature on decision support systems. Mostly, they are based on the widely accepted "intelligence cycle" approach (Alquier & Salles, 1997; Calof & Dishman, 2008). It includes mainly the following steps: expression of needs, research and selection of information, exploitation or use of information (checking, processing, analyzing, synthesizing) and, finally, its diffusion to stakeholders in the company.

However, the previous phases do not constitute a set of mechanical and more or less automated operations (Guechtouli, 2010). They are considered as an entanglement of complex processes to be achieved in an amount of information perceived as fragmented, disparate, and even contradictory (Caron-Fasan & Lesca, 2008). Many research specify that the development of business intelligence activities does not lead systematically to value creation (Hargadon, 2002). Lindenberg (2003) points out that, in fact, it is according to his preferences, his personal project of his own knowledge, availability, strategic directions of the company, *etc.*, that an actor searches, selects, uses and disseminates information. In this regard, the development of different stages of business intelligence seems deeply related to the sensitivity and commitment of the actors in the companies at stake (Caron-Fasan et al., 2012), including leaders (Guechtouli, 2010). Caron-Fasan and Lesca (2008) specify

that the leaders often find it difficult to get away from daily duties in order to start and participate in the business intelligence process.

The above considerations seem to be even more important when one considers the context of our research. On one hand, the management of resources (financial, but also attention and availability of the leader, etc.) seems even more problematic for SMEs than for large organizations (Barkham et al., 1998). Moreover, small structures that are on foreign markets have to allocate resources to the internationalization while continuing to support activities on domestic markets (Fillis, 2007; Grimes et al., 2007; Weerawardena & O’Cass, 2009). On the other hand, the questioning around the management of organizational information leads us to consider the grounded “character” of the selection, dissemination and use of information processes (Guechtouli, 2010). These processes seem to require an appropriate organization to be able to develop on the long term within the firm (Calof & Dishman, 2008). Given this conflicting set of constraints, it seems relevant to ask, firstly, to what extent the level of international involvement of SMEs affects the level of sensitivity to information of their leaders and, also, if this sensitivity influences positively the structuring and dissemination of business intelligence activities within these companies.

### 3. Conceptual Model

Regarding the activities of business intelligence, three dimensions emerge repeatedly in different studies (Wood & Robertson, 2000; McGee & Sawyerr, 2003): sources of information, the areas explored and the frequency of information research. These dimensions concern mainly the search for information. However, we stated that the different stages of development of a business intelligence activity could be summed up to that stage alone. In this perspective, the leaders’ sensitivity to information and its influence on the activities of business intelligence make it possible to apprehend other factors associated with them.

Thus, in the context of this research, in order to characterize the organization of business intelligence in exporting SMEs, we selected the following dimensions: the leader’s sensitivity to information, the intensity of information seeking, the number of information sources and the internal dissemination of information. Therefore, it becomes possible to verify whether leaders with some sensitivity to the information actually influence the orientation, structuration and dissemination of these practices within their company and whether this sensitivity is related to the importance of international involvement of these SMEs.

Two hypotheses are thus tested. The first hypothesis (H1) posits that there is a positive correlation between the exporting SME leader’s sensitivity to information and the extent of international involvement of the company. This hypothesis is subdivided into two sub-hypotheses.

H1.1: the leader of an exporting SME is all the more sensitive to information as his enterprise is proactive towards exporting.

H1.2: the leader of an exporting SME is all the more sensitive to information as his enterprise exports a significant share of its sales.

The second hypothesis (H2) addresses the issues of organization and implementation of business intelligence practices in exporting SMEs. It is formulated as follows: the degree of formalization and structuration of business intelligence practices within a SME is positively influenced by the sensitivity of its leader to information. Three sub-hypotheses are tested.

H2.1: the exporting SME searches for more information as its leader is sensitive to information.

H2.2: the exporting SME use more sources of information as its leader is sensitive to information.

H2.3: the exporting SME diffuses more information among its members as its leader is sensitive to information.

The research model is shown in Figure 1.

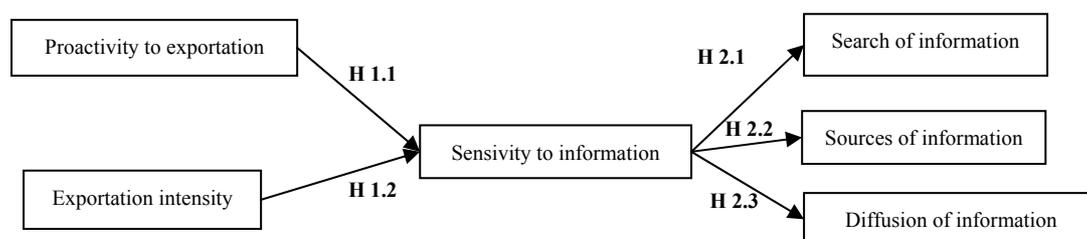


Figure 1. Research model

#### 4. Methodology

The data used in this research come from the CEO Database (St-Pierre & Delisle, 2005). It contains information on more than 400 SMEs located in the province of Québec, Canada and exclusively from the manufacturing sector. It presents various profiles related to the companies studied. Thus, it includes exporting, subcontracting, performing, distressed, growing and declining firms. Due to the orientation of our research question, we only used data on the sub-sample of exporting SMEs. In addition, among the latter, we selected only firms with a workforce of 10 or more employees. This restriction prevents a comparison of SMEs with very small enterprises (VSEs), which may represent significantly differentiated strategic trajectories and organizational forms (Marchesnay, 2003, p. 111). Ultimately, we obtain a sample of 180 exporting manufacturing SMEs whose workforces vary between 10 to 250 employees.

In addition, information is collected from SME managers who receive, in return, a complete comparative diagnostic of their situation in terms of performance and vulnerability.

The dimensions of international involvement, considered here as explanatory variables, help to explain the impact of the level of international involvement on the sensitivity of leaders to information. There are two dimensions to measure the intensity of export and proactive export respectively. The first is measured by the export ratio (the amount of exports on the total turnover). The second is appreciated by the choice between the three profiles proposed by Julian *et al.* (1998): opportunistic, in transition, or professionals exporters.

The dimensions of business intelligence are considered here as dependent variables. We selected the following dimensions:

- The search for information, measured by its frequency.
- The internal dissemination of information, measured by its level, that is to say the number of hierarchical levels irrigated by information.
- Sources of information, measured by their number.

For the first two dimensions, three indicators characterizing the nature of information are identified: information on competitors, information about customers and, finally, information about the market. To do this, five-point ordinal scales are used to allow respondents to rate their level of research or internal dissemination of information for all three indicators. The scale ranges from low (1) to significant (5).

Thirteen information sources are retained: managers, production staff, sales staff, the Board of Directors or Advisory Committee, customers / suppliers, contractors, sub-contractors, consultants, bankers, industry associations or business community, fairs and exhibitions, newspapers (business magazines and journals) and finally universities and research centers.

Sensitivity to information acts as a mediating variable between international involvement and the other variables of business intelligence. Indeed, in our model, we postulate that the level of sensitivity to information is, upstream, influenced by the level of international involvement and, downstream, influence the organization and the structure of the other dimensions of business intelligence. The sensitivity to information variable is measured by the level of perceived importance of this information. Like the two variables information retrieval and dissemination of internal information, three indicators related to the nature of information are identified: on competitors, customers and on the market. Ordinal scales to five points are used to allow respondents to gauge the level of importance for each of the three categories of information.

To verify the research hypotheses, we use the method of structural equation and especially the PLS (Partial Least Squares method).

This method was developed to examine the causal relationships between a set of multiple independent and dependent variables. The contribution of this method is to allow the treatment of simultaneous estimates of several dependency relationships interrelated and, secondly, the incorporation of measurement error (Chin, 1998). Therefore, we can obtain more precise estimates of regression coefficients compared to traditional methods of regression. Moreover, the application of this method has many advantages over other methods of structural equations (EQS, LISREL): robustness (Chin, 1998), simplicity of its algorithm, the non- nor need a large sample size or a large number of measurement scales and distributions of residuals (Fornell & Larcker, 1981). Its application proves also relevant in the initial phase of development and testing of theories and especially in confirmatory research or hypothetico-deductive (Fornell & Bookstein, 1982).

#### 5. Discussion and Results

First, we review the general characteristics of our sample. Then, we present and discuss the results of our

confirmatory analysis.

### 5.1 Sample Characteristics

We describe the characteristics of SMEs of our sample in terms of international involvement and business intelligence practices.

#### 5.1.1 International Involvement

The results show that the SMEs observed export on average 30% of their turnover. About their proactivity to export, the three profiles are represented with a majority of professionals (58%). SMEs in transition and opportunists ones represent respectively 22% and 20% of all SMEs observed. Moreover, the interaction between these two indicators (intensity and proactivity) shows that for each profile which is proactive there is a trend of average export rate: 11% for opportunists, 19.5% for those in transition and 40% for professionals. This leads us to believe that the export rate may be an indicator of the proactive export profile. However, it is important to note that the export rate, alone, remains insufficient to inform us about the exact profile of the exporter as it can be an exceptional value recorded during the year study. Indeed, one can find that some exporters have a very high export rate, but still show an opportunistic attitude. Meanwhile, it is also possible to find exporters with export rates very low, but that organize their export activity on a regular basis and act like real professionals anticipating the future development of these markets. Therefore, the dimension of a proactive profile to exportation better reflect the international involvement than the only intensity one measured by the export rate especially if this measure is ad hoc.

#### 5.1.2 Sensitivity to Information

The absolute level of sensitivity to information varies with the nature of the information sought. Leaders of exporting SMEs surveyed point information on the market, as being the most important (4.1) followed by information on competitors (3.5) and information on clients (3.1). These results are consistent with those found by Wood and Robertson (2000) whose study shows that information on the market are considered by exporters surveyed as the most important. Julien and Ramangalahy (2003) reached the same conclusion. They found that the information on prices, on the potential and suitability of the actual and on new products are considered among the most important for exporters interviewed.

#### 5.1.3 Business Intelligence Practices

The overall level of frequency in information search is intermediate (2.5). However, information on markets seem to be the most frequently looked for (3,5), followed by information about competitors (3) and, finally, those relating to customers (2,4).

Results are similar to those found on the sensitivity of the information. Leaders of exporting SMEs surveyed are respectively more sensitive to information on the market, on competitors and finally on customers. Therefore, there seems to be a relationship between the sensitivity of leaders to information and the frequency with which they seek this information.

As for information sources, results indicate that exporting SMEs observed are using an average of seven or eight of the thirteen selected information sources.

Table 1. Use of information sources

Information source	Managers	Production staff	Sales staff	Board of directors	Customers / Suppliers	Sponsors	Sucontractors	Consultants	Bankers	Associations	Fairs	Press	University
Frequency (%)	77,2	54,3	82,6	59,8	84,8	31	28,8	49,5	78,8	52,7	85,2	77,7	34,2

Fairs and customers / suppliers are the main sources of information used by the respondents. They recorded respectively 85.2% and 84.8%. followed by sales staff (82.6%), banks (78.8%), newspapers (77.7%) and managers (77.2%). The least used information sources are subcontractors (28.8%), sponsors (31%) and universities and research centers (34.2%).

These results show that firms of the sample use both internal and external information sources. The last one seems to be slightly more used than the previous. Furthermore, it seems that exporting SMEs prefer personal information sources which are built around a contact (sales staff, bankers, customers / suppliers, etc.). These results corroborate findings of Katsikeas and Leonidou (1997), Chaudhrey and Crick (1998) and Hart and

Tzokas (1999).

Regarding the level of internal dissemination of information, it is substantially higher than average: (3.3) for information on competitors, (3.5) for those on the market and on customers.

### 5.2 Confirmatory Verification

Two models (Figures 2 and 3) are tested to verify our research hypotheses. Each one is based on a single dimension of commitment to export. The first model aims to verify the relationship between proactivity export, sensitivity to information and the three dimensions of business intelligence.

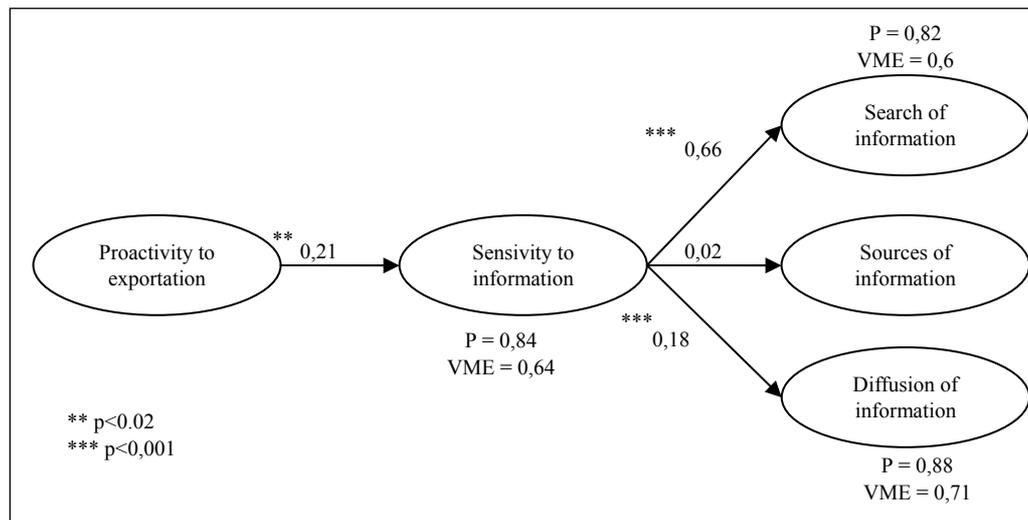


Figure 2. Simplified research model n°1

The second model seeks to test the same relationship but with the size of the intensity of the exportation dimension.

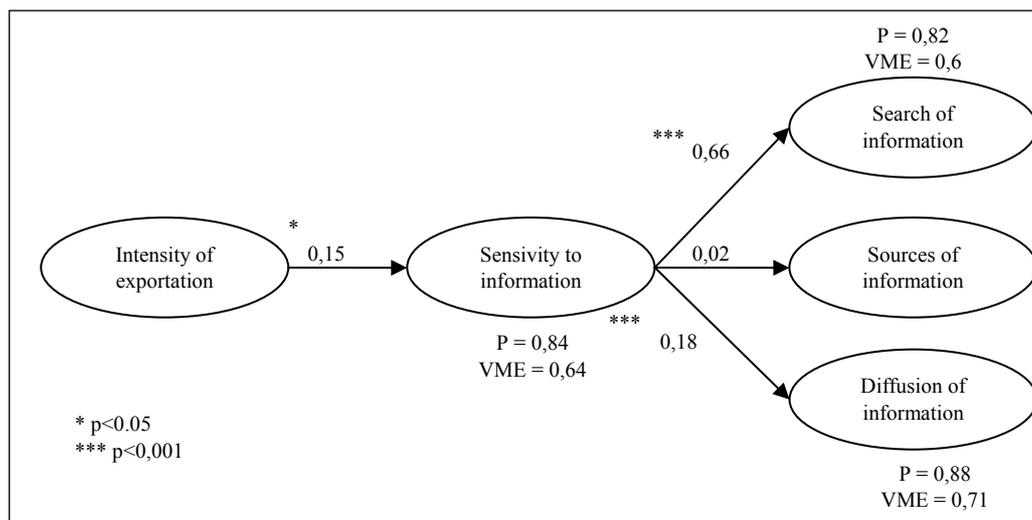


Figure 3. Simplified research model n°2

We analyzed data in two stages. The first step aims to verify the empirical properties of the conceptual model to ensure that each dimension can be considered as a single value when testing the research model (Raymond et al., 2001; Ramangalahy & Julien, 2003; Rivard et al., 2006). The second step seeks to test the relationship between the constructs of the model.

Properties to check are the internal consistency of the measures (their one-dimension status and their reliability) and the validity (convergent and discriminant) of the constructs.

- The one-dimension status implies that any indicator measuring a construct must be considered as a single value. It is appreciated by the strength values of the coefficients ( $y_i$ ) indicators associated with the constructs (loadings). It is considered as satisfactory when the value of loading is greater than 0.5 (Rivard & Huff, 1988). This implies that the measures share sufficient variance with the construct or the latent variable they are supposed to measure.
- Reliability implies that a measuring instrument must allow different observers to make consistent measures of the same subject with the same instrument or allow an observer to establish similar measures of the same subject at different times. It is verified by considering the coefficient rho ( $\rho$ ) associated with the construct. The Cronbach alpha coefficient, rho is acceptable when greater than 0.7. A rho ( $\rho$ ) equal to 0.7 indicates that the construct variance explains 70% of the variance of the items used to build it (Fornell & Larcker, 1981). For the calculation of the rho ( $\rho$ ), we divide the variance of the construct by the sum of the variances of the construct and errors.
- Convergent validity measures the degree to which multiple attempts to measure the same concept with different methods are consistent. It is assessed by looking at the average variance extracted (VME). Its formula is:  $VME = \text{Sum of loading}^2/n$ . For an acceptable VME, its value must be greater than 0.5 (Fornell & Larcker, 1981).
- The discriminant validity of the model constructs. It shows that the constructs of the model are different from one another. In this perspective, indicators supposed to measure different phenomena should be weakly correlated with each other to allow discriminating the phenomena. To satisfy discriminant validity, the square root of VME must be greater than the correlation coefficients between the model constructs (Fornell & Larcker, 1981).

The two models (Figures 2 and 3) show the same results on empirical properties tests (loadings, the rho and VME) for the constructs: sensitivity to information, information retrieval and information dissemination. Only correlation coefficients values and square roots of VME (Table 2) change. This result is explained by the fact that we retain the same characteristics of the sample, only the international involvement dimension has changed.

Table 2. Square roots of the VME (diagonal) and correlation coefficients

	Proactivity	Intensity	Sensitivity	Inf. res.	Inf. diff	Inf. sourc.
Proactivity	<b>1,00</b>	<b>1,00</b>				
Sensitivity	0.21	0.15	<b>0,8</b>			
Inf. research	0.23	0.12	0.66	<b>0,77</b>		
Inf. diffusion	0.11	0.07	0.18	0.15	<b>0,84</b>	
Inf. sources	-0.003	0.03	0.02	0.06	0.11	<b>1,00</b>

We note that square roots values of VME corresponding to constructs are also higher than the correlation coefficients between constructs.

With the values of the loadings, the rho and VME found earlier, we can argue that both models satisfy the conditions of one-dimension status reliability and validity (convergent and discriminant) and are ready to be tested (Figures 1 and 2).

As for the relationships among constructs, it is noteworthy that in both models, values binding sensitivity to information for both constructs (research and information dissemination) are positive and significant. This allows us to validate our two research hypotheses (H 2.1) and (H 2.3): the more leaders of exporting SEMs are sensitive to information, the more they frequently seek and disseminate information within their companies. It should be noted that the path coefficient between sensitivity to information and information research is very strong compared to the one found with the dissemination of information.

The hypothesis concerning the impact of sensitivity to information on the number of information sources (H 2.2) is not verified. The path coefficient is close to zero (0.02). There are two possible explanations for this result. The first one is conceptual: the question concerning the use of information sources has been asked so that respondents indicate yes or no, using each of the thirteen types of information sources retained for three application areas: product development / markets, technological development and the field of economic and financial environment. However, the importance of information concerning customers, competitors and the market brings us closer to the first application domain rather than the second one. The mismatch between the information sought and some of the sources used to obtain this information may be the cause of this result. In this perspective, we join the main

developments of the theory of media richness (Daft & Lengel, 1984), in particular, those which suggest that any support must be consistent with the desired information.

The second explanation is that, information-wise as in many others, small businesses take up choices given by an economy of means (Barkham et al., 1998). They focus on few but carefully chosen information sources. In that way, exporting SMEs make a more important effort to gain more information from a given type of source. For instance, information is required from many clients, different bankers, or from an even more important number of suppliers but may not be collected from other people.

As regards proactivity dimension to exportation, it is positively and significantly linked to managers' information sensibility ( $p < 0.02$ ). That result allows us to validate our H.1.1 working hypothesis. It shows that the more proactive the profile to exportation, the higher the level of sensibility to information. In other words, the professional type of exporting companies would give more importance to the information on clients, suppliers, or on the market than the transitional or opportunist types.

The exporting intensity variable is positively and significantly linked to sensibility to information as well ( $p < 0.05$ ). That result confirms our H.1.2 hypothesis. That means that the higher the export turnover, the more important managers perceive information on clients, suppliers and on the market.

After testing our two models, we can conclude that the first model gives more interesting results regarding relationships between international commitment and managers' information sensibility.

In fact, the proactive profile to exportation seems to be a better indicator of exporting commitment than the export rate. The latter has the advantage of being a quantitative measure. However, it remains occasional and fluctuating, as shown in our descriptive results. That situation brings up the problem of transferring the export rate into a qualitative measure: Is there a difference between two exporting companies that sell 60 % and 80 % abroad and two others that sell 10 % and 30 %?

Although the proactive profile to exportation is less instructive (with only three values) than the export rate, it gives a better measure of exporting commitment and allows to better bear out our general hypothesis.

Therefore, we can infer that the two sub-hypothesis, successively relating to the impact of the proactive profile and the intensity of exportation on managers' information sensibility (H.1.1 and H.1.2) are confirmed. On that point, our results represent an extension of the current empirical knowledge on strategic foresight processes within SMEs. If it is possible that concerned managers face classical difficulties of managers to free themselves from daily and common activities of their company, our study shows that the more important international commitment, the higher information sensibility. As suggested in many studies, (Caron-Fasan & Lesca, 2008), a consequent international commitment may be taken as one of the factors that impact positively the start, or more precisely, the initialisation of business intelligence activities within SMEs.

Furthermore, two of three sub-hypothesis referring to the impact of sensibility to information of managers on business intelligence practices are confirmed (impact of sensibility to information of managers on information research and on its internal spreading). As a follow-up, these results show that managers' sensibility plays an essential role in the determination and diffusion of business intelligence process within exporting SMEs organization. They are in line with the standpoints mentioned in other researches (Kappelman et al., 2006). Using his competences, his knowledge and in particular, his sensibility to information, the manager influences widely the starting point of business intelligence activities and their spreading within the organizational structure of his company. Therefore, by knowing and taking into account that factor are to be taken as key factors to succeed international development projects. In concrete terms, that means that managers of exporting SMEs, or about to be, may be trained so that they develop their sensibility to information and strengthen their knowledge about business intelligence activities. These actions could be conducted before the internationalisation project.

## 6. Conclusion

The question brought up in this study concerns the relationship between international commitment of the SME and the influence of its manager on the guidance of business intelligence activities of and within its organization. Our results specify the determining role of the manager. More precisely, they put into perspective the manager's influence on his activities orientation, on the definition of the scanned information sources and, on their level of internal diffusion.

Moreover, our study reveals that being on foreign markets may be taken as one of the conditioning factors to begin business intelligence activities within SMEs.

On another point, our results must be understood relatively to the limits of the research. From a theoretical point

of view, these limits raise a few questions, in particular about not taking into account other dimensions of international commitment: organizational structure, the number of country/market supplied overseas, the international experience, and so forth. With regard to business intelligence activities, others variables could be added: information treatment, organisational abilities (formalization of the function, centralization/decentralization of the function, technical abilities, human resources, and so on.).

With regard to the results, the limits of this study lie with the sample studied and put under question the generalisation of the these results to all the exporting SMEs. In fact, the particular context of the sample (from Quebec) makes uncertain a generalization of these results to another context (European or African, for example). For this reason, we must recall that few companies of the sample export a significative part of their turnover outside North America.

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