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# **Forestry Entrepreneurs — Research on High Performance Business Model**

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<http://dx.doi.org/10.5772/60951>

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## **Abstract**

Over the last 30 years, the forest industry in Eastern Canada has undergone a radical transformation, from a model where larger forestry businesses operated their own production equipment to a model where harvesting, transport, and forest road construction are awarded to contractors. This change in strategy on part of the large corporations has created new start-up opportunities for many forest entrepreneurs. Their dependency on a single large client (wood buyer), however, could hinder entrepreneurial behavior. This study aims to examine the forest Small and Medium-sized Enterprises (SMEs) population, identify the factors that stimulate their performance despite a business environment that may be deemed unfavorable, and draw an overall picture of the existing situation. An analysis of 535 questionnaires filled by forest machine owners suggests that SMEs with four employees or more show better performance results than those with three or fewer employees, considered very small enterprises (VSEs), essentially because these businesses are typically able to work more weeks in a year. Their managers use a significantly higher number of tools to measure performance and attribute greater importance to management duties. The results have enabled us to identify certain performance factors, but suggest that further research is needed to better understand the underlying causes of contract assignment and the relationships that develop between SME managers and large forest product companies.

**Keywords:** Loggers, SMEs, performance, business model

## 1. Introduction

The emergence of new actors in the globalized economy has led to increased competition in certain economic sectors, including the forest industry. In Canada, similar to what can be observed in other countries with an important forest sector, logging is mainly the purview of large corporations, which award harvesting, transport, and forest road construction contracts to many Small and Medium-sized Enterprises (SMEs). In eastern Canada, the forest industry has experienced difficult times in recent years, facing challenges that are both structural and the result of unfavorable economic conditions. The increasing cost of fiber, exchange rates unfavorable to exports to the United States (US), a tariff imposed by the US government, increased energy costs, lower prices for softwood and certain types of paper, and increased scarcity of resources have made the industry face many serious problems. Competitive pressure in this industry pushes the large corporations to demand more from their subcontractors, which in turn must improve their performance in order to survive.

The purpose of this paper is to identify factors that could be associated with better performance in a highly competitive business environment. We already know that some forestry SMEs exhibit more diversified activities and a greater number of employees than others (1), which leads us to think that a new business model may be settling up within subcontractors. However, we still do not know if this new way of organizing forestry operations is linked with better performance for the SME. To answer our research questions, we performed statistical analyses on a large sample of forest entrepreneurs active in the province of Quebec, Canada. In this paper, we begin by presenting the business environment in which the forest industry operates, after which we identify a number of specific factors that can affect performance in this sector, and investigate their effects on the population under study.

### 1.1. Québec's forest industry in context

In Québec, logging is still predominantly controlled by large corporations (2). Forest entrepreneurs essentially provide these companies with logging, forest road construction, or log transport services. As a result, they find themselves in a contractor/subcontractor business relationship, as indicated by Legendre (2005). After studying the evolution of subcontracting in the forest industry, the author notes that risks and responsibilities have been thrust onto the shoulders of small logging businesses, which are "[...] completely dependent economically and financially on the [large corporations] and have almost completely lost all of their organizational independence" [translation] (3). This fact becomes all the more evident when we consider statements by Canadian economic analysts, who view small logging companies as dependent on large organizations, with the main goal of providing these organizations with the flexibility they need to restructure in a post-Fordist economy (4)<sup>1</sup>.

Since the emergence of forest entrepreneurs is at least partly the result of a strategic choice on the part of the large forest product companies to focus on their core competencies, it is not

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<sup>1</sup> This paragraph has been previously published in St-Jean, É. & L. LeBel (2012), "The Influence of Decisional Autonomy on Performance and Strategic Choices – The Case of Sub-Contracting SMEs in Logging Operations". In Okia, C. A. (Ed.), *Global Perspectives on Sustainable Forest Management*, In Tech, Rijeka (Croatia), pp. 59-74.

unreasonable to suggest that not all owner-managers of logging companies exhibit entrepreneurial behaviors, such as innovation, or the quest for growth, profits, and opportunities (5-8). Literature on the subject of commercial domination in fact suggests that SME dependency on one or a few clients ultimately attenuates the entrepreneurial behaviours of managers, who may be tempted to settle for a contractor/subcontractor business relationship (9). Furthermore, in the forest industry, primary contractors set various conditions with regard to how forest entrepreneurs carry out their work, for example, by setting restrictions on log length, the amount of wood to cut, or even on work methods or which equipment/machinery to use. Under these conditions, it becomes increasingly difficult for entrepreneurs to innovate, which is often considered a fundamental marker of entrepreneurial action (10). In many cases, as suggested by Holmlund and Kock (11), subcontractors are left with little choice but to comply with the orders of a primary contractor, even if this occasionally results in unprofitable production. However, results from a study by Drolet and LeBel (12) clearly indicates that the owners of logging SMEs have the potential to influence their business' performance. In this context, we still do not know if forestry entrepreneurs took all the leverage they have to manage their business toward a better performance.

Lastly, due to the very nature of their work in this sector, forest entrepreneurs operate in a world of permanent uncertainty, which further amplifies the unstable aspect of production, and in turn, their performance. Factors that contribute to this uncertainty include working outdoors (severe cold temperatures, stifling heat, rain, snow), variable and unpredictable land conditions (slopes, terrain, standing volume, etc.) variable needs for raw material on the part of primary contractors (economic crises, wood substitute products, etc.), workforce scarcity and skills, major mechanical failures, forest fires, and so on. With little or no control over these factors, forest entrepreneurs are faced with more complex budgetary and operational planning and monitoring processes because they can neither reliably predict the number of work weeks for the coming year nor can they anticipate production, earnings, or expenses. With time, however, entrepreneurs learn to operate in a context of uncertainty and not all entrepreneurs are affected equally by uncertainty related to the number of weeks they work. Some proactive entrepreneurs actually take advantage of unplanned work stoppages to engage in preventative maintenance or training, which can have a positive impact on the long-term performance of their business.

Vaillancourt (13) reports that the number of weeks worked is one of their main performance factors for forest entrepreneurs, particularly those operating in forests in the public domain. Forest product companies or primary contractors usually estimate the number of weeks required for an operation on the basis of the amount of wood to be harvested, so they can then distribute production among all of the subcontractors. In the author's sample, 13% of respondents went so far as to identify the number of weeks worked as the main indicator of profitability.

## 1.2. Factors affecting forest SME performance

SME performance is affected by many factors, particularly due to the multidimensional character of performance, which adds an additional level of complexity to its analysis (14).

SME performance can be measured, monitored, and managed using a variety of methods, tools, and systems. Proper understanding, use and mastery of these tools can also affect performance. Inasmuch as simple performance measurement systems can help owner-managers of logging company-sized SMEs reach their goals, more sophisticated systems, which require resources and expertise that entrepreneurs who are concerned with production rather than management behavior do not always possess, can become a major irritant, only to be abandoned shortly after they are implemented.

Forest entrepreneurs primarily measure their performance in terms of production and cost reduction (15). Other dimensions of forest SME performance, such as human resources or client satisfaction, are not considered in performance evaluation (12). Incidentally, forest entrepreneurs do not use measurement systems or, to an even lesser degree, performance management systems. Few forest entrepreneurs use any tools that are part of a structured performance measurement or management system such as a balanced score card (16). It should be noted that the difference between management and measurement systems is a known source of confusion for many users (17). For entrepreneurs specialized in harvesting, for example, performance is generally measured in terms of stem count, equipment utilization rate, and the amount of fuel consumed. These data, which are compiled in a very informal manner, are used by entrepreneurs for payroll purposes in connection with production and the primary contractor's statements and for overall operational management, rather than for strategic purposes or to improve performance. In addition to their limitations, these indicators constitute "a collection of unrelated data that are scattered about [...]" [translation] (18).

Moreover, several determining factors with a definite impact on harvesting SMEs remain to be explored. These factors could eventually improve the content of balanced management scorecards adapted to the scope of forest SME activities and help owner-managers make better decisions. For example, to what extent does a preventative maintenance program affect financial performance? How do work schedules affect operator productivity? How should these decisions be reflected in the balanced management scorecard? One of the obstacles to the implementation of a balanced management scorecard is the source of the data, from acquisition to compilation, and its connection with the performance management system. Information can come from the accounting system, the forest company or primary contractor, measurements taken by the entrepreneur, or even informal discussions. As was mentioned above, forest entrepreneurs have neither the human resource capabilities nor the expertise of large corporations to develop sophisticated and integrated systems. Research must therefore be used to describe forest SME performance in terms of determining factors and indicators that are simple and tangible. In addition, the energy invested in collecting, processing, updating, and analyzing the information must not exceed the benefits to be generated by the management tool. Under these conditions, the development of a decision-making aid such as a balanced management scorecard, at least with regard to its content, is of limited use by failing to consider dimensions that could have a significant impact on forest SME performance.

Overall, a balanced management scorecard should provide information on several aspects of business activity, and it must especially make it possible to explain a current situation and to detect trends if nothing changes. It must provide entrepreneurs with the ability to anticipate



the future of their business in terms of their objectives, which cannot easily be done from a simple reading of the balance sheets. But this kind of management system may be more suitable for businesses with more complex operations and greater number of employees (i.e. business size).

On a different note, the relationship between business size and performance remains unclear. Business size can have an effect on economy of scale, on the effect of scope, the effect of experience, and the effect of learning (19). Empirical analyses, however, do not appear to confirm a relationship between economy of scale and performance (20). It is reported that smaller size, which involves less organizational complexity, positively affects productivity, which is usually associated with performance (21). With more resources, however, larger businesses can more easily incorporate new technologies that stimulate performance (22). It is also noted that smaller businesses show more limited growth because their lack of resources prevents them from developing in a variety of business environments (23). All in all, where business size carries certain advantages and inconveniences with regard to performance, context appears to play a significant role.

It is from this angle that a closer look at forest SMEs becomes interesting. Our preliminary results suggest that smaller forest SMEs are less likely to use performance measurement tools and rely on year-end balance sheets to determine profitability. We attempted to investigate this situation on the basis of the tools that are generally used by entrepreneurs, as opposed to the balanced scorecards suggested in the literature. Moreover, smaller logging businesses also appear to be more severely affected by the crisis that has shaken the Canadian forest industry. We were, therefore, interested in discovering their strategic intentions for the following five years, in order to see to what extent their small size, which necessarily means fewer resources, could affect their survival.

## 2. Methodology

### 2.1. Population and sample

Data for this research were collected as part of the *Programme de Recherche sur les Entrepreneurs Forestiers de Récolte et de Transport* (PREFoRT) [Research Program on Forest Harvesting and Transport Entrepreneurs]. In October 2006, a little over 2,500 forest entrepreneurs were invited by mail to participate in a survey, which represents practically the entire forest entrepreneur population of Québec. One month later, a reminder card was sent out to those who had not responded to the first mailing. In December, the questionnaire was sent once again to the non-respondents. In total, 717 entrepreneurs completed the postal survey, for a total response rate of 28%. The questionnaire included more than 80 mostly closed questions, which enabled us to draw a fairly complete picture of the respondents and their businesses. According to Armstrong and Overton (24), it is acceptable to associate the late-respondents with the non-respondents. A partial analysis of the answers provided by the respondents who replied before the reminder card was mailed out revealed that they were not significantly different from those who responded after that date, which suggests the absence of a non-respondent bias.

## 2.2. Method

Rather than rely on markers normally used to identify business size, we separated the businesses according to size on the basis of the median number of employees, i.e. three (3) employees or fewer and four (4) employees or more. This decision is obviously debatable, but it is supported by an iterative consideration of some of the results obtained. First, not counting the entrepreneur, three employees are usually required to operate a pair of logging machines (processor and forwarder) in the eastern Canadian environment. Second, cross-referencing the number of methods used to measure performance with size (number of employees) reveals that SMEs with four employees or more use at least one (1) method to measure performance, and the maximum number increases radically. Thus, there appears to be a threshold with regard to the use of methods to measure performance. Since this cut-off point also matches the median, it seemed appropriate to continue our investigation on the basis of this number.

## 2.3. Measures

For *performance*, a relative subjective measure rather than an absolute measure was used. Performance measures can be objective or subjective (25). The use of subjective variation measures is considered satisfactory by some researchers (26). We were concerned about making respondents uncomfortable by asking them to reveal profit numbers, for example. They were instead asked to indicate the extent to which the profit margin had increased, remained stable, or decreased over the previous five years, and if the profits for the last fiscal year were above, comparable to, or below the average for previous years. These two measures were combined to create a *performance improvement index* (Cronbach's alpha of 0.586). Given the fact that forest entrepreneurs are in the midst of a sectorial economic crisis, it appeared to us that a relative measure would enable us to target those who were able to do well under such challenging conditions.

We used performance measures, which reflected the real-life conditions of forest entrepreneurs on the basis of, in particular, an analysis of responses collected from discussion groups. In addition to specific measures such as numbers of trees cut or the primary contractor's statements, we also incorporated financial statements or balance sheets.

To find out about their strategic intentions, managers were asked to identify the strategies that most closely matched their plan for the following five years. Options included "increase the size of your logging business", which reflects a growth strategy in the forestry sector, "diversify your business to conduct activities outside the forestry sector", which reflects a strategy of diversification, as well as other strategies that include either selling, closing, or reducing the size of the business, which indicate a strategy of withdrawal from forest operations.

## 3. Results

The results reveal significant differences between very small enterprises (VSEs) with three or fewer employees and SMEs with four or more employees. First, SMEs show more improved

financial performance than VSEs (bilateral t-test, *sig.* = 0.001). Next, as illustrated in Table 1, out of the seven (7) sector-specific performance measurement tools, six (6) are more significantly used by SMEs. They also use more methods to measure performance (Table 2). The relationship between the number of methods used and performance improvement, however, is not significant (correlation = -0.25, *sig.* = 0.567). We also investigated the relationship between the number of weeks worked and improved financial performance. The relationship is significant and positive (correlation = 0.172, *sig.* = 0.000). This means that the more weeks a logging business works in a year, the more it improves its performance. There is no significant distinction between VSEs and SMEs with regard to the number of weeks worked (bilateral t-test, *sig.* = 0.068), which suggests that both business groups have the same amount of work. Business size, however, correlates significantly and positively with the number of weeks worked (correlation of 0.107, *sig.* = 0.02). In this case, distinguishing between two groups (VSEs vs. SMEs) is somewhat arbitrary and obscures the relationship between business size and the number of weeks worked.

Performance Measure Used		VSE (≤3)	SME (≥4)	Total	χ <sup>2</sup> Test
Balance sheets or financial statements	Yes	69.1%	76.6%	73.1%	<i>p</i> = 0.100
	No	30.9%	23.4%	26.9%	
Number of trips completed	Yes	25.8%	42.6%	34.7%	<i>p</i> = 0.001
	No	74.2%	57.4%	65.3%	
Equipment utilisation rate	Yes	25.3%	42.6%	34.4%	<i>p</i> = 0.000
	No	74.7%	57.4%	65.6%	
Number of trees cut	Yes	32.0%	44.2%	38.4%	<i>p</i> = 0.016
	No	68.0%	55.8%	61.6%	
Primary contractor's statements/log	Yes	19.1%	27.9%	23.7%	<i>p</i> = 0.045
	No	80.9%	72.1%	76.3%	
Use of an onboard computer (black box)	Yes	8.4%	29.4%	19.5%	<i>p</i> = 0.000
	No	91.6%	70.6%	80.5%	
All activity entered in computers	Yes	6.2%	12.2%	9.3%	<i>p</i> = 0.046
	No	93.8%	87.8%	90.7%	

Source: Original

**Table 1.** Differences in Use of Performance Measurement Tools According to Size

	VSE (≤3)	SME (≥4)	<i>t</i> -Test
Number of methods used to measure performance	M = 2.30	M = 3.28	<i>p</i> = 0.000

Source: Original

**Table 2.** Number of Methods Used According to Size



In addition, as illustrated in Table 3, SME managers give greater importance to administrative duties and planning field operations than VSE managers, who focus primarily on personally operating the equipment.

Management Tasks	VSE ( $\leq 3$ )	SME ( $\geq 4$ )	<i>t</i> -Test
Management and administration	2.54	2.92	0.000***
Planning logging operations	3.34	3.88	0.000***
Operating logging equipment	4.65	3.65	0.000***
Mechanics and equipment maintenance	3.77	3.88	0.250

\* =  $p \leq 0.05$  \*\* =  $p \leq 0.01$  \*\*\* =  $p \leq 0.001$

Source: Original

**Table 3.** Importance Given to Certain Tasks According to Size

Furthermore, not only do SMEs outperform VSEs in the current business environment, some of their strategic choices are different as well. The data reveal that inasmuch as VSEs and SMEs equally wish for their businesses to grow within the forest industry, diversify into other sectors, or train a new candidate to take over the business, VSEs are more likely to wish to close the business and sell off their assets than SMEs (see Table 4). Obviously, fewer VSEs than SMEs wish to reduce the size of their business, since in their case this would be tantamount to closing the business.

Strategic Intention		VSE ( $\leq 3$ )	SME ( $\geq 4$ )	Total	$\chi^2$ Test
Grow within the forestry sector	Yes	12.0%	16.0%	12.8%	$p = 0.194$
	No	88.0%	84.0%	87.2%	
Diversify outside the forest	Yes	23.1%	30.9%	24.6%	$p = 0.077$
	No	76.9%	69.1%	75.4%	
Close down the business and sell off assets	Yes	26.8%	12.8%	24.2%	$p = 0.002$
	No	73.2%	87.2%	75.8%	
Reduce the size of the business	Yes	10.8%	24.5%	13.4%	$p = 0.001$
	No	89.2%	75.5%	86.6%	
Train a candidate to take over the business	Yes	19.2%	24.5%	20.2%	$p = 0.248$
	No	80.8%	75.5%	79.8%	

Source: Original

**Table 4.** Differences in Strategic Intentions According to Size

Beyond the effects of business size, which could have an influence on strategic choices, better performance influences future choices. Thus, the better a business performs, the more it will strive toward growth and anticipate training a candidate to take over the business, whereas those with poorer performance will seek to reduce their logging operations, or even close down the business (see Table 5).

Strategic Intention		Performance Improvement Index						TauTest
		2	3	4	5	6	Total	
Grow within the forestry sector	Yes	6.4%	9.2%	13.0%	32.5%	36.8%	12.4%	0.000
	No	93.6%	90.8%	87.0%	67.5%	63.2%	87.6%	
Diversify outside the forest	Yes	27.1%	23.7%	24.2%	20.0%	26.3%	25.0%	0.890
	No	72.9%	76.3%	75.8%	80.0%	73.7%	75.0%	
Close down the business and sell off assets	Yes	38.8%	19.7%	14.9%	5.0%	5.3%	23.8%	0.000
	No	61.2%	80.3%	85.1%	95.0%	94.7%	76.2%	
Reduce the size of the business	Yes	18.6%	10.5%	10.6%	5.0%	5.3%	13.0%	0.045
	No	81.4%	89.5%	89.4%	95.0%	94.7%	87.0%	
Train a candidate to take over the business	Yes	12.2%	23.7%	23.6%	25.0%	52.6%	20.5%	0.000
	No	87.8%	76.3%	76.4%	75.0%	47.4%	79.5%	

Source: Original

**Table 5.** Relationship Between Performance and Strategic Intentions

## 4. Discussion

As we have seen, businesses in the forest services sector appear to differ on the basis of their size. Once they are beyond the 4-employee threshold, they use a significantly higher number of performance measurement tools and show better performance. Our research does not enable us to conclude, however, that greater use leads to higher performance; rather, our results suggest there is no such connection. It would appear that some formalization becomes necessary as size increases (27, 28), but this formalization is not necessarily a source of economic performance. This situation results in the manager focusing primarily on managing the business rather than operating the equipment.

One of the keys to understanding forest SME performance factors is the number of weeks worked. This variable is significantly related to performance and size. This means that larger businesses receive more contracts from forest products companies, which leads to better performance since they get a better return on their investments. This opens the door to a host of other unanswered questions. Do primary contractors choose to give more contracts to larger

businesses because of their size, estimating, for example, that they need more work, or do other reasons underlie these choices? In other words, does the size of SMEs influence forest products companies as to whether or not to award them contracts? Are larger SMEs more proactive in their search for clients and contracts? We have noted that SME managers give more importance to managing and planning field operations than VSE managers. Does this situation, which is a result of larger business size, help improve the quality of services, and as a result, influence companies into giving them more contracts? Despite our observations to the effect that the number of weeks worked is crucial in explaining performance, we have no knowledge about the factors that influence forest product companies into awarding more contracts to certain SMEs. This suggests that further research is required on the relationship between these forest SMEs and the industry's forest companies, which could explain the performance differences among SMEs operating in this sector.

It is also possible that operations become more efficient once a certain size has been attained, maximizing the return on investments in equipment, beyond the number of weeks worked. It is also likely that managers who can free themselves from operational duties can focus more on their management duties and, as a result, provide better oversight for employees and business practices and thus increase productivity or profitability. These issues should also be explored in the future.

We have also observed that performance shapes future strategic choices. Higher performance logging businesses seek growth and expect to train candidates to take over the business, whereas businesses with poorer performance are more likely to close down the business and sell off its assets, or reduce the size of the company. Our observations to the effect that SMEs with four or more employees show the best performance, even though the specific factors at the root of this performance remain unknown, suggest that additional research be conducted on performance factors at play within this industry, and to investigate whether an optimal size may exist in terms of maximizing operational profitability.

Given that the largest forest SMEs show better performance, and that this is evidently due to a higher number of weeks worked, solutions to improve VSE performance can thus be suggested. Managers of these businesses should foresee growth by adopting a more pronounced entrepreneurial stance rather than a small business orientation (29). As a result, they could transform their management style and become more proactive in seeking work from contractors to increase their number of work weeks.

## 5. Limitations

Despite having obtained interesting results, several limiting factors must be underlined. First, a subjective (i.e. based on the owner's estimate) and relative (i.e. current compared to past) performance measure was used. While such a measure has its advantages by permitting to more easily collect hidden information, as well as emphasizing performance changes during a period characterized by a profound economic crisis, an objective and absolute measure would have brought a different perspective. In the SME's context, since it is often very difficult to

obtain objective information with regard to profits and considering that these measures are strongly correlated to subjective measures, it is often the best compromise (25). It must also be noted that we essentially compared VSEs ( $\leq 3$  employees) to MSEs ( $\geq 4$  employees). Although we had good reasons to proceed this way, most notably because of the work organization schemes most common in forest operations, this categorization is debatable. Nonetheless, it has allowed for the identification of size thresholds, something a linear measure (i.e. correlation) would not allow. On the other hand, these thresholds do not allow considering the relationship between size and performance. We, therefore, had to complement our analyses with statistical regressions. Considering that identifying factors that contribute to performance is complex, additional analyses are certainly required to understand all possible nuances. Finally, a longitudinal experiment would be beneficial since it could allow understanding the effect of applying certain management practices such as performance measures, in an attempt to improve financial results. Our findings, based on transversal analyses are promising but limited in this regard.

## 6. Conclusion

This study has led to a better understanding of the effects of certain forest SME characteristics on performance and suggests areas for future research. A better understanding of the factors that improve performance is critical in order to enable them to achieve world-class levels in an industry that is increasingly competitive. These SMEs will also have to transcend the “more work = better performance” paradigm. In a context where logging rates are declining and several entrepreneurs are facing financial difficulties, it is tempting to design procurement policies that would favor certain businesses to the expense of other. The demographic of logging entrepreneurs, with a sample’s average age of 51 years, should incite decision makers to develop procurement policies that favor improvement of business practices. Our study indicates that larger harvesting businesses may yield better overall performance. At the same time, they require a different type of involvement from their owners, one that place more emphasis on global business management. Favoring larger businesses without insuring that entrepreneurs are properly trained and experienced may negatively affect performance.

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