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PROJECT MANAGEMENT FOR A PLANT IMPLEMENTATION: SUCCESS OR FAILURE?

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ABSTRACT

Observation: there are many projects launched daily. However, few of these projects achieve the expected results. Various reasons create gaps between the final result and the initial objectives, among others, poor definition of the problem or project and, at times, an incompetent manager. Our first goal is to evaluate the management of a company using a project management theoretical model. The strengths and weaknesses of project management are identified during this comparative analysis. The second goal is to compare these strengths and weaknesses in order to verify the short and medium-term impact on this project. The following weaknesses were identified from the comparative analysis: poor definition of the problem to be solved and the project itself, as well as the lack of audit and project closure. These weaknesses, in the case studied, led to the company's closing after only three years in business. To ensure that the company's other projects do not suffer the same fate, it would be important for the company to further study its project management system and implement a project management process based on a recognized model.

1. Introduction

A multitude of projects are begun every day in both public and private companies. Several factors generate the need to undertake projects on a regular basis, be it rapid technological change, the globalization of markets, competetion and much more. This leads them to continually evolve in order to remain competitive or increase their market share. This evolution often turns into poorly-managed projects and may place the company in a very risky situation. Despite the importance of these projects for the sustainability of the company, often there are few qualified employees leading the projects, thereby reducing the likelihood of achieving the desired results. Managers need to trust their instincts, their past experiences and hope that luck will be on their side during the progress of the project.

Following are three historical projects in Quebec that did not respect the initial specifications or the budgets and time-line: the Olympic Stadium in Montreal, the revitalisation of the Gaspésia and the Laval metro.

Firstly, the cost for the Olympic Stadium in 1972 had been estimated at 178 million dollars and was supposed to have been completed by July 17, 1976, in time for the Olympic Games *(Girard, 2010)*. However, the roof and the mast were not completed in time. The total cost for the stadium was 1.5 billion dollars *(Girard 2010)*, 8.43 times more expensive that the initial forecast. Moreover, it took 12 years to complet, which was three times longer than originally planned for the project *(Phaneuf, 2010)*. The increase in costs can be attributed to the increase in cost for various material: the price of steel, when first estimated, was $200/ton, but when construction began, it was $1 200/ton. As well, a strike by construction workers *(May to October, 1975)* forced project managers to ask employees to work overtime to try to catch up, without success *(Wikipedia)*.

Secondly, the revitalization of the Gaspésia, a pulp and paper mill in the Gaspé, is another example of the failure of project management and exceeding costs. At first, the revitalization project, which included several partners *(SGF, Solidarity Fund FTQ, Tembec and the Quebec and Canadian governments)* predicted a budget of 465 million dollars. This project had not only an economic aspect that was justified, but it also had a political one. Chandler, being in a remote are and not having a strong and diversified economy, governments wanted to make it a political agenda item by restarting the mill. When the project stopped, its cost was 758 million dollars. After it ceased, the Quebec government set up an investigation to find out the causes for the excess costs. Three main reasons were discovered for the excess expenditures: the FTQ union workers hindered and slowed down the site *($90 million)*, unexpected additions at the beginning of the project *($60 million)* and the inability for Tembec to manage such a project *(Girard, 2004)*.

Thirdly, the construction of the Laval metro was announced at an electoral rally by Mr. Lucien Bouchard in 1998. During his speech, a budget of 179 million dollars was mentioned. In 1999, this was changed to 250 million dollars, for a supposed error: there was one kilometre that was omitted on a total distance of five. By June 14, 2000, the budget was not at an estimated 378.8 million. Sixteen months after the first shovel of earth, the budget was now said to be at 547.7 million dollars *(June, 2003)*. The last decree adopted by the National Assembly in 2004, foresaw a budget of $803.6 million dollars. According to Doris Paradis, auditor, the main reason for this cost explosion was the improvisation surrounding the project. In 1998, she mentioned that the government said they would undertake the project at a cost of $179 million dollars, without consulting any document or study. The 18-month delay with regard to the original due date was also questioned *(St-Amour, 2007)*.

These examples show a similarity in the reasons that caused the failure of the original project specifications: the wrong definition of the problem at the beginning of the project, preliminary studies done too fast due to the lack of time or funding and the incompetence of the project manager. All of these reasons lead to modifications in the specifications of the project in progress, delays and extra costs. What are the effects over the short, medium and long term? How do we determine whether a project is a success or a failure? Three categories are identified which measure the success of a project: completed on time, according to budget and specifications *(Shenhar, Dvir, Levy & Maltz, 2001)*. But what about the project that is stopped after three years because it is not profitable? The project met the criteria but the return on investment was not up to par, therefore, it was stopped. Is it still successful? Certain authors respond yes according to the three categories, while others argue no because the project could end up closing down the company; this is a failure according to the latter. Cooke-Davies *(2002)* and Shenhar and Dvir *(2007)* define project efficiency by cost, time and scope goals. They adopt also and define the success of project by meeting wider business and enterprise goals as defined by key stakeholders. Shenhar and Dvir *(2007)* showed through analysis the relationship between project efficiency and project success.

Consequently, the goal of this study is to evaluate a Quebec company's project in a SME using a comparative analysis in order to determine the strengths and weaknesses in its project management. First, the literature review presents three models of project management which stand out with regard to its strengths and weaknesses. Second, the methodology of the research used and the context are explained. Third, a comparison of the model used by the SMEs regarding the theoretical model, allows them to identify their strengths and weaknesses and their effects on the project three years later. Finally, the conclusion identifies the limits and future possibilities as well as recommendations for future projects in this SME in order to ensure future success.

2. Theoretical context

Three project management models are evaluated: Bronzite *(2013)*, Meredith, Mantel and Shafer *(2014)*, as well as Larson andGray *(2014)*. Evaluation of these models brings outs the strengths and weaknesses of each. A comparison of these allows us to identify our reference model.

Our first model is Bronzite's *(2013)*, which applies to the development of the information system. This model was developed following a number of failures in this area. It applies

particularly to companies with more than 500 employees and which have money available and are in a calm period and expansion. Among the models that were analyzed, it is one of the rare ones that proposes a prescribed period of time for each stage of a project. According to the author, six months should be added to the time limit to complete a project, that is, to take all final adjustments into consideration. Only one strength was identified in this model: the tasks that were pre-determined identify when the important stages should be undertaken. This same strength becomes a weakness, since the model does not take into account the complexity or the scope of the amount of work to be done on a project. Consequently, the model is limited to big companies and to projects dealling with information systems.

The second model discussed is Meredith, Mantel and Shafer's *(2014)*. This method of project management is based on the "Project Management Body of Knowledge *(PMBOK Guide)* ". The proposed projects should be selected and prioritized according to the company's objectives. Selection criteria are based on the company's ability to complete a project, its ability to perform and the cost. Indeed, projects should also correspond to the financial reality of the organization and its ability to complete the project without jeopardizing the organization. The most important elements of this model are the choice of project manager and members of his team. This choice of team members is based on employee motivation and the following criteria: technical and political skills, strong problem-solving skills and being able to achieve goals, and good self-esteem. The choice of project manager is made according to the following, specific attributes: have great technical experience, intuition, maturity, availability, a good relationship with senior management, ability to maintain harmony within the project team, the ability to manage conflict, knowledge of the various departments within the organization and their interdependancies, but most important, the ability to carry the project to completion. In addition, the project must be aligned with the organizational structure and the selection of the project team must be made intuitively and according to the situation.

Meredith, Mantel and Shafer *(2014)* identify nine steps to plan and manage a project, including a meeting to officially launch the project with the team and a clear definition of the project's goal. The next step is the development of the project plan with a global vision of the project, its aim and purpose, the general and contractual approach, resources, members of the team, the risk management plan risk and project evaluation method. It should detail the budget estimation principles required to carry out the project and the calculation of the budget from the steps to be performed or done similar projects before. Following these steps, methods to develop and manage project milestones and the allocation of human and monetary resources required are explained. You have to control and monitor the project so that it is on budget and schedule. To do this, they advise the use of project management software. The last step is to perform an audit of the project and finish the project.

Strengths of Meredith, Mantel and Shafer's *(2014)* model include the selection criteria for projects in order to ensure that the company does not undertake projects that do not correspond to the organization's strategy and that it would not be able to complete or be profitable. Their model puts a lot of emphasis on the choice of project manager and his team. It is also important that the team be motivated and that it gets along with one another. The weakness of this model concerns basic principles, that is, the definition and planning of the project. A well-defined and well-planned project will achieve the desired goals and avoid modification during progress of the project.

Our third model is that of Larson amd Gray *(2014)*. They show the need for an effective project management system with selection criteria and projects aligned to organizational strategy. The project management structure must also be adjusted to that of the organization. The important point to consider with this method is project definition in five steps. The first is to define the scope of the project, and establish the final results or the project mission, define delivery dates, deadlines, technical requirements, limitations, and, of course, review it with the customer. The second step is to establish project priorities with regard to content, cost and time. The third step is to create the Work Breakdown Structure *(WBS)* of the project, that is to say, the project breakdown into smaller and smaller elements. The fourth step is the integration of the WBS in the organization by identifying the department who will be responsible for the workload. The fifth step is to code the WBS so it can be integrated into a chosen information system. Larson and Gray *(2014)* emphasize the importance of estimating the duration of project costs as well as future costs which may arise when this step is done too quickly or when non- assessed risks occur.

The development of the project plan with regard to the development of its structure, allows for the planning, scheduling and monitoring of the progress of the project. The project activities are listed along with their logical sequence, their interdependencies and the beginning and end of the activities. These activities are used to determine the total duration of the project and to more easily meet the project contingencies. Also, the steps in risk management must identify any risks that could jeopardize the project, assess such risks, develop response strategies to the risks and to budget accordingly, and control risk response strategies. Regarding the scheduling of resources, the different types of constraints in terms of material, monetary and human resources will be evaluated. Hence, the importance of a good project manager having a good relationship with the team and able to manage the meetings and especially any conflicts. This will measure and evaluate progress and performance. A well-managed project also includes the steps of the audit and project completion.

The forces of Larson and Gray's *(2014)* model are the clearly identified criteria for the selection of projects listed in order, to avoid having the company choose projects which do not correspond to its organizational strategy or that may not lead to term or even be profitable. In addition, they insist on the importance of the definition and planning of the project as well as risk management. If risks are planned before the start of the project, it is easier to give an adequate response and lower cost when they occur. One weakness of the method of Larson and Gray *(2014)* is the lack of details about the basic skills and qualifications to be a project manager as well as the composition of the project team.

In summary, these three models have distinctive strengths and weaknesses. The main strength of Bronzite's model *(2013)* is the predetermined schedule for the project compared to the other two models. However, it does not take into account the complexity and scale of the project and this model only applies to companies with more than 500 employees, unlike the other two models. Moreover, it is only used for the development of information systems projects. Models by Meredith, Mantel and Shafer *(2014)* and Larson and Gray *(2014)* are based on the "A Guide to the Project Management Body of Knowledge *(PMBOK Guide)*" of Project Management Institute. Despite being designed from the same source and having the same project management stages, they present several differences. First, Meredith, Mantel and Shafer's model *(2014)* gives great importance to the choice of the project manager and his team in order to build a strong and motivated team; second, Larson and Gray's model *(2014)* focuses on the planning of the project, the definition and design of the project plan and risk management. The **Table 1** below shows the strengths and weaknesses of these three models.

For these reasons, Larson and Gray *(2014)*'s model was chosen. Its strengths allow it to be better adjusted to the reality and needs of SMEs. The initial project planning allows a better adaptation to changes during the project and the final project cost and risks are reduced. In the reality of SMEs, financial and human resources are often limited. The project staff are the ones available or those capable of performing the work required. SMEs cannot, by their specific characteristics, jeopardize a project.

3. Methodology

It is important to note model Larson and Gray's *(2014)* model in order to highlight the strengths and weaknesses of the method used by the manager and the SME to evaluate the effect of these weaknesses on the project results in the short and medium-term. To do so, the case study is an interesting method because Yin *(2013)* defined it as a survey exploring a contemporary phenomenon in its real context, when the borders are not clearly identified between the phenomenon and its context and from which the evidence of multiple sources are used to understand the case. The case studies are a strategy whose validity is recognized by the scientific community and also widely used in management science. Seeking to understand a phenomenon taking place in a particular context corresponds to an interpretivist approach which does not allow extrapolations or generalizations, but rather is about the plausibility of reasoning and argumentation used to describe the results and submit conclusions *(Walsham, 1993)*. In this sense, the case study fits well with our goal in a social context where the dominant explanation predominates prediction *(Marcon & Compeau, 2003)*. In addition, Yin *(2013)* identifies three criteria for a case study: first, an exploratory approach based on the research questions "how? and why?"; second, little control by the researcher on observed behaviors, and third, a contemporary phenomenon difficult to handle and set in a real context.

The project manager and researcher plays both roles. He is an industrial engineer and worked for this firm for 17 years including 10 years as Director of Operations. He does not have theoretical knowledge in project management and was appointed by the president of the company, under the guidance of the Chief of the division. According to Reason *(2001)*, among the characteristics of action research, it is

Models	Strengths	Weaknesses
Bronzite (2013)	Pre-determined calendar for key stages.	Company with more than 500 employees Design of information systems Calendar does not take into account the size of the project.
Meredith, Mantel and Shafer (2014)	Choice of projects, project manager and equipment Team project motivation	Definition of the problem Preliminary study.
Larson and Gray (2014)	Choice of project Definition of project Planning of project Risk management	Lineup of project team Choice of project manager

TABLE 1. *Strengths and weaknesses of the three models*

important to develop practical knowledge. These, from the researcher's actions during the course of the research, enable the development of organizational knowledge. According to Hugon and Seibel *(1988)*, when the scope of research deliberately transforms reality and this research has a dual purpose, that is to say, to transform reality and produce knowledge among these transformations, an action research is performed. This is what this study shows. We begin with a presentation of the context and company followed by the steps of the project under consideration.

Presentation of the context and company

Founded in 1905, the company is one of the largest manufacturers of metal coating in Canada. It has two divisions, of which one study focuses on construction products. The head office is located in Ontario and its shares have been traded on the Toronto Stock Exchange since 2003. In 2014, the two divisions of the company employed close to 1 200 employees across Canada and the United States. The division that was analyzed with its factory project is the largest of the group. Annually, it manufactures 23 different models of metal sections for a total of 6 million linear meters and more than 660 models of standard moldings for a total of 1.5 million linear meters. It serves the main markets of Eastern Ontario, Quebec and the Maritimes.

Since the siding and metal molding market is an extremely competitive sector, the company saw its market share decline year after year, especially in the lucrative moldings sector. Manufacturing metal molding is a simple manufacturing process that does not require a major investment to get started in business. Thus, with few barriers to entry in the market *(Porter, 1985)*, more and more competitors near major centers offer comparable products with a delay of 24 hours manufacturing time. At the project's launch, the market for metal moldings in the Montreal region was estimated at $10 million dollars annually. The division analyzed only holds 10% of this market because of delivery time; it is geographically too far from the Montreal region. It cannot provide the same customer service as local companies, the delivery being 3.5 days. In 2010, it wanted to regain its lost market share and decided to launch a pilot project, a steel manufacturing moldings plant in the Montreal area. This division is open to the public, building contractors and hardware stores, and offers metal moldings delivery within 24 hours.

In order to stand out from the competition, the new plant will provide customer moldings measuring up to six meters in length while the market standard is three. If the project proves profitable, the division plans to open other factories of the same kind near major Canadian cities. First, the division must make the choice between buying out a competitor *(who already has a market share and has much of the equipment required for this type of plant)*, or build a new plant. The CEO's choice is to build a new plant. He feared that the purchase of this small family plant would not be profitable since it would be engulfed by its heaviest division with an imposing structure, especially with regard to its health and safety policies as well as its complex IT system.

The project was accepted by the company's Board of Directors and must be conducted from January to June 2010. In order to present the project, the general manager of the division and its management team are developing a detailed business plan of the project containing the business description, characteristics of the target market, the main stakeholders *(suppliers, distributors and customers)*, government legislation that may influence the project, the description of the target market, the competition, the ideal place to locate the factory, the dimensions of the plant and the machinery required. The business plan contained an economic study justifying the profitability of the project without any comparison with the alternative.

According to sales managers, 85% of sales should have been moldings of more than three meters since it is a product that was not as available on the market at the time of the launch of the project and it was to become the product of the future. From this information and the business plan, the industrial engineer determined the equipment required for the desired production and the required area of the factory. The plant was to be located on the south shore of Montreal in order to serve the island of Montreal, the South Shore and the Montérégie region and be close to major road arteries for easy access. The project was to be operational in April 2010 to take advantage of the biggest selling season. Therefore, little time was available to draw up a business plan based on extensive market research and an ideal location for the plant. Everything was based on sales managers' judgments or estimates.

4. Comparative analysis of project management

Each step of project management in Quebec companies is compared to Larson and Gray's *(2014)* model by determining the strengths and weaknesses of the organization and its project manager.

Organizational strategy and choice of project

The company launched its strategic plan in 2008, two years before the project. This strategic plan identified goals to open new factories, buy from competitors and develop new markets in order to increase annual sales from 400 to 600 million. The projects are presented in a predetermined order by the company as well as the majority of the information provided by Larson and Gray's method *(2014)*. The established selection criteria are mainly financial criteria or the profitability of the project, calculated on the principle of NPV and IRR. The project selection team is composed of the president of the company, the vice president of operations and chief financial officer. Despite the ambitious goal of increasing turnover by 50% over four years, there are few growing projects in the project portfolio, especially compliance and operational projects.

The business plan was presented to the president of the company by the CEO of the division during a management strategic meeting and investment planning for 2010. The purpose of this new plant concept was to regain their lost market share of the last few years and the Board had to give their final approval since the project was estimated at one million dollars. The criteria for approval were the potential income generated by the project, the new market and the principle that this type of plant could be located near major Canadian and US cities.

Structure of the project management team

For projects of this magnitude, the division created a team called "Steering Committee" and its mandate was to oversee the project team. It was comprised of senior management: the company president, general manager of the division, the National Director of Marketing and Director of Finance. It was headed by the president of the company and met once a month except the first month, which was weekly. Its role is to monitor the progress of the project and ensure that it is on schedule and on budget. Also, it ensures the availability of resources and, if necessary, it allows changes to the definition of the project. The project team consists of members of management of the division; the project manager *(operations director who leads the team)*, sales managers, credit supervisor, the coordinator of Health and security, Human Resources Coordinator, Marketing Coordinator and the CEO. This team meets weekly and its role is to monitor project progress and ensure that the project meets the original objectives: the choice of local production capacity, cost and delays. Daily decisions are made by the team. The Project Manager gives an account of the progress of the project steering committee.

The company chose a functional organization structure. The Project Manager has established the overall plan of the project, has integrated the contribution of different departments, developed the calendar, and monitors the project. Functional managers ensure that assigned tasks are performed according to expectations. In addition, the project manager and his team are supervised by the Executive Committee, which carry the important support when ressources are necessary for the project's progress. However, it may also hinder decision making, as the project manager must approve decisions deemed more important by this committee.

Definition of the projet and plan

The project plan was developed at the first meeting of the Steering Committee and all members of the project team. The project plan included the reasons for the project, objectives, service description, project stakeholders, roles and responsibilities, the Executive Committee, the client *(General Manager of the division)*, the project manager, the team project, the frequency of meetings, documentation, the information systems tool used, budget and risk assessment. The team had a choice between building a factory, buying one already built or renting. To meet the project's closing date and for economic reasons, it was decided to rent. The persons authorized to find the building was the General Manager and the project manager. Finally, the building chosen was in Boucherville, close to Highway 20 and had an area of 15 500 square feet.

Since the market for steel moldings is directly connected to the construction industry, it was crucial to be operational by April *(at the end of winter in Canada)* since this is the beginning of the high construction season. From the work breakdown structure of the project, the team determined the expected life of the project and confirmed the total budget to be $990 000, which was previously approved by the Board of Directors when the project was approved. This budget did not include funds for other eventualities. The duration and cost estimates were made from the team members' experience given that the time available was very limited, they had to be based on the business plan and not on a detailed analysis. Only the cost of the equipment was real, the engineer had received bids with a firm price during the development of the business plan *(he chose the equipment)*. To facilitate his task, and especially facilitate the monitoring, the project manager used a software as well as to determine the project's delivery date: April 12.

To summarize, no studies have been conducted to define the scope and mission of the project. The company is based on the intuition of its two directors of sales instead of a thorough market research study. The milestones and deliverables were never determined during the project definition. In addition, the budget and the estimated duration lacked the precision required to meet the constraints of the project. When determining the budget, only the cost of equipment was obtained from bids from suppliers. Other costs were estimated from the team members' experience. Equipment costs represented a significant percentage of the total budget. The estimated budget for the project team did not include funds for other eventualities, therefore, each unexpected change occurring during the project could create a budget overrun. For example, the epoxy floor paint, the camera system and office area.

5. Risk management

In developing the business plan, risk management was analyzed by the management team and two risks emerged: the possibility of losing customers and a supplier. Indeed, the target market was controlled by its own customers and a provider of their product, ceiling fans. For the potential loss of customers, it decided not to take this into account

because the profit margin on products sold *(10%)* to its customers was not high compared to the profit margin on the sale of moldings *(50%)*. The company should generate more profit with the project even if the opening of the plant would lead to the loss of customers. For the supplier of ceiling fans, there were two backup plans: either buy the necessary equipment and produce the fans in their plant located on Prince Edward Island, or buy them from another provider in Ontario. The latter was chosen.

In this project, there were no planned processes for managing changes. At Management Committee meetings, the president of the company required many changes during the project, despite his awareness of rising costs and delays that these changes would bring. These changes were: first, the purpose of the plant was to be world-class, the factory floor was to be painted with epoxy once the equipment was in place, and this, at a cost of $45 000. The building is rented and the owner's authorization was required to restore the condition of the floor at the end of the lease. In addition, the tire forklifts had to be replaced by white tires to avoid leaving marks on the floor, which cost another $3 000; second, the marketing department asked that the surface area be increased by 85 meters to allow the installation of a mini showroom for products manufactured and distributed, this at a a cost of $10 000. Despite the changes made to the office, the showroom was never implemented; third, once the factory floor was painted, the marks on the walls were even more apparent, so the wall were painted at an additional cost of $3 000; fourth, a system of cameras inside and outside of the factory was installed to allow shareholders to view the factory via the Internet *($12 500)*. The total changes were now at $73 500.

Consequently, project teams and management evaluated and identified risks that did not put the project in jeopardy except for a potential loss of customers and one supplier. A plan was developed in case risks became reality. However, the list of risks could have been more complete if they had used a brainstorming method. Among the risks that had not been identified were the difficulty in obtaining permits from the city, that of finding a building which did not meet all the requirements, and that of finding skilled labor, just to name a few. Having identified few risks, Larson and Gray's *(2014)* four steps of risk management could not be applied. No management changes were made during this project despite a multitude of changes: the majority regarded content and those proposed by the president of the company in order to improve the image that customers had of the factory. These changes have had an impact on the cost, but especially on the project's delivery date.

6. Scheduling of resources

The project team was multidisciplinary and members were mandated to perform tasks relate to the project in excess of their daily tasks. Once the building was found and modifications made to it, the factory supervisor was assigned to the project full-time. His mandate was to ensure that the tasks performed in the building were done correctly and according to expectations. He also had to ensure that the equipment was installed according to the plant layout, whild complying with the various laws and codes and to manage the different sub-contractors on site. In the middle of the project, the marketing coordinator and credit supervisor had been absent for a long time for medical reasons. They were replaced by their immediate superiors at the company's head office. These prolonged absences had a negative effect on the project team as the replacements were not onsite and did not put in the same effort and enthusiasm.

Measurement and evaluation of progress

During the weekly project team meetings, the project manager, who was responible for any actions, was to inform the team on the progress of the actions under their responsibility, through data collected and analyzed using software. The Gantt chart allows the project manager to identify gaps, costs or times and immediate corrective action. The actions required in order to follow the timetable, as well as costs, were agreed upon at these weekly meetings. The progress and results were presented by the project manager to the Steering Committee. However, the manager's reference baseline did not include the cost of the workloads. Thus, it was impossible to follow-up with each one; monitoring was done on the entire project.

Audit and project completion

There was no audit during and after the project no closing at the completion, only the keys to the factory were returned to the supervisor of the Boucherville plant. Throughout the project, a list of lessons learned had been kept by the project manager in order to not repeat the same mistakes in the event that a similar project was to be undertaken by the company. This completed list was never available to other project managers of the company or division, and its potential has not been exploited to its fair value. The only beneficiary of this audit is the project manager. It is the same for assessing the project team's performance and its manager and without a completion plan. When the project began, the president asked the project manager and marketing coordinator to develop a guide on the steps to follow in case other plants of the same type were to be built. This guide was never created since the coordinator of the marketing project left mid-way through the project.

7. Evaluation of project management

The project was completed in June 2010 instead of April 2010. It is possible to analyse the effect of the weaknesses in project management on the plant results over the short and medium terms. Was performance influenced by project management issues and weaknesses found in our comparative analysis?

The numerous and unanticipated changes that occurred during the project showed discrepancies between the initial goals and the final results. The data collected and analyzed during the project included time and cost. Here are the results: first, the factory opened six weeks later than the expected schedule; second, at the request of the President, the factory floor was painted with epoxy once all the equipment was installed and ready to go. This change resulted in a two-week delay. Third, obtaining a permit from the city of Boucherville was more difficult than expected, an additional delay of three weeks was needed and, fourth, the building of the main office was delayed by a week since the marketing coordinator did not give any time constraint for the painting of the office as well as the choice of ceramic floor in the office and cafeteria.

Once the project was completed, the final cost was below the initial budget despite the changes that had occurred during the project. The initial budget included expenditures of $990 000, while the actual, final cost was $932 000 *(a difference of $58 000)*. To stay within budget, the industrial engineer assigned to the project decided to replace non-standard production equipment, the 6-meter shear, with standard 4-meter shears and a riving knife. The reasons for this change were an economy of $77 000, floor savings, ease of resale and delivery. The other important part of the savings was the substantial exchange rate between the Euro and Canadian dollar. The Canadian dollar rose from 0.6335 *(June 2009)* to 0.6919 *(February 2010)*, thus, the time between the submission of bids by suppliers and the payment for equipment coming from Europe. As specified with risk management, ongoing project changes brought about additional expenses not foreseen in the initial budget. These expenses included painting the factory floor with epoxy *($45 000)*, office area *($10 000)*, painting the factory walls *($3 000)*, changing the trolley elevator tires *($3 000)*, and a camera system installed inside and outside of the plant *($12 500)*, in order to be able to view the plant on the Internet. The total, additional cost was $73 500.

The first failure identified was an erroneous definition of the scope of the project, and that, inevitably, leads to changes during the project which incurs delays and cost overruns. This step is neglected even by large companies *(Larson and Gray, 2014)*. To justify the project, the company quantified the loss in market share. It had to take action in order to maintain its leading position in the metal molding market in Quebec. However, it made an important error in its definition of the problem because it did not verify the real reasons causing this loss of market share. Instead of conducting a serious study of the market, it followed two of its sales managers' intuition to find the causes. Thus, all possibilities to deal with the problem were not analyzed. The other possible option was buying out an established competitor or his partner. This option was quickly set aside without having been studied in depth, following a bad experience by the CEO in an earlier draft.

The second negligence for success is the project definition since failure is mainly the result of a mission or an ill-defined content *(Larson and Gray, 2014)*. The project definition was made quickly due to the lack of time and monetary resources. Instead of applying the concept of a new plant model to a market study, it relied on Quebec sales managers' intuition: market needs, the perfect location of the plant and featured products that the factory was to produce. Consequently, there have been a large number of changes. In addition, the person appointed to play the role of the client and who had to officially approve the project definition was the general manager of the division, but, in reality, it was the company president. There was a marked difference between their expectations. The president wanted a model factory for the group, what he called a world-class plant, while the CEO wanted an effective and efficient plant. Placing the wrong person in the role of customer brought many changes during the project such as: painting the floor, the installation of a camera system and the size of the sales office. These changes led to significant delays in the project, even though the priority of the project was time. Regarding costs, the changes have not resulted in exceeding the original budget approved by the Board of Directors for the reasons previously mentioned. However, there was simply no control of the changes. If a change in control procedure had been put into place, the project manager would have had a tool with which he could deny or control special requests of the president in order to meet the priorities of the project, time and cost.

Other major weaknesses or failure which were not among those cited in the problem and that could have a significant impact on future project are review and project completion. There was a list of lessons learned compiled by the project manager, but it was never made available to

the company's other project managers. When there is no retrospective analysis, unfortunately, lessons learned are quickly forgotten and errors are repeated *(Larson and Gray, 2014)*. The company has had other projects since including the merge of three mills in British Columbia. The result was similar at the time, with a slight delay, but cost-wise, catastrophic. The original cost for the project was estimated at $700 000, but at project completion, this had risen to 2.3 million dollars. The reasons that caused the financial meltdown were the proposed changes being required by the company president, while no process in place for a change in management and a poor definition of the project once again.

Bouchervilles's plant ceased operations in May 2013 after only three years since it was not making any profits. The factors that caused the closure are: first, the plant was not strategically located; it was too close to a competitor established in the market for a long time, and secondly, this competitor offered a more complete range of products than our factory; third, the product line to be manufactured and distributed, determined in the project definition, did not fully fulfill the needs of customers, they prefered to buy their products in one place rather than having to travel between the competitor and our factory; fourth, what was to be the star product, moldings with a length ranging from three to six meters, in reality accounted for less than five percent of sales and; fifth, to be competitive, the implanted operation structure was able to deliver their moldings in less than 24 hours and was required by less than two percent of the customers. Finally, the company's strict policies and its computer system has made the process an arduous and difficult operation to run. In short, the reasons for closing the plant after only three years of operation clearly demonstrate the effect of a poor definition of the problem and the factory's project short-term profitability.

8. Conclusion

The primary goal of this study was to evaluate the project management of a Quebec SME. In order to identify the best theoretical model that was appropriate for the SME studied, the strengths and weaknesses of three models were compared *(Bronzite, 2013; Meredith, Mantel and Shafer, 2014 and Larson and Gray, 2014)*; Larson and Gray's *(2014)* model was chosen. The implantation of a factory project took place from January to June 2010. The second objective was to compare the strengths and weaknesses of the method used by the company to the general problem of project management to see if they were similar. The main project management weaknesses made by the company and its manager during the project were wrong problem definition, the definition of incomplete project and the lack of audit and control of the project. The first two elements corresponded directly to the managerial problem. The third objective was to find the effect of the weaknesses of the method used by SMEs to manage its project with regard to results over the short and medium terms. In the comparative analysis between project management and Larson and Gray's *(2014)* model, the strengths and weaknesses of the management of each stage have been listed. Also, the plant that ceased operations after only three years of existence and the causes of its closure were identified and compared with project management weaknesses made by the company and its manager as well as the effect on other projects in the short and medium terms.

This study has its limitations as it concerns a specific project and we cannot, in this case, generalize all projects implemented by the company and even less for all companies. In order to have a complete analysis of their project management process, it is necessary to conduct research on several projects led by the company. The results of project management cannot be regarded as a reflection of the reality of Quebec SMEs. To be representative of the reality of Quebec SMEs, research needs to be done on several SMEs' projects operating in various sectors in the field of manufacturing and services.

To better understand the situation of Quebec SMEs with regard to project management, further research should be pursued, for example: a survey of Quebec SMEs to determine the percentage of success in managing their projects and the causes of their failures; determine their project management knowledge and identify the use of management software in the management of their projects and a competent project manager and experienced within their company. These results may serve as a reference guide for the necessary training of future project managers and the choice of a good project management tool.

For the long-term viability of the company, we recommend they conduct a study on the projects carried out in recent years to verify whether the analyzed project is an isolated case or a reflection of all of its projects. If this project is a reflection of the current project management process, it would be important for the latter to train project managers and implement a methodology of modern project management.

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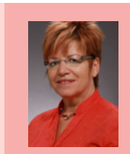

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