Success and Failure Factors of Value-Added Production Programs at Poudres Métalliques du Québec in Tracy, Quebec[1]

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Over the last two decades, the evolution of the economic environment and the internal dynamics of industrial organizations have prompted many companies to revise their management strategies to adapt to the new requirements of world-wide competition (Appelbaum and Batt 1994; Betcherman et al. 1994; Sharpe 1995). These companies have adopted new work organization models in order to increase productivity, and thus their competitiveness in their respective markets (Appelbaum and Batt 1994; Betcherman et al. 1994; Cohen-Rosenthal and Burton 1993; Goll and Johnson 1997; Osterman 1994). In this way, teamwork has been encouraged by many companies with a view to increasing functional flexibility and worker participation in the production process (Appelbaum and Batt 1994; Cooke 1994; Grant and Lévesque 1997). This article is aimed at identifying the main contributing factors to the success or failure of teamwork within the framework of a value-added production (Impact-VAP) program implemented by a steel company from the Sorel-Tracy region in Quebec.

The material studied highlights the increasing popularity of new work organization models geared to labour-management cooperation and teamwork since the early 1980s (Appelbaum and Batt 1994; Betcherman et al. 1994; Tremblay et al. 1995). While certain authors consider that labour's involvement in management weakens it (Parker and Slaughter 1988; Wells 1993), many studies have underscored the advantages, to both employers and employees, of work organization models and teamwork (Applebaum and Batt 1994; Cohen-Rosenthal and Burton 1993; Levine and Tyson 1990). The literature seems to emphasize two teamwork models, the socio-technical model and the Japanese lean production model. These two models are primarily distinguished by their level of autonomy, their versatility, and the collective responsibility of their work teams (Appelbaum and Batt 1994; Betcherman et al. 1994; Cohen-Rosenthal and Burton 1993; Sharpe 1995). The work reorganization approach favoured by Poudres Métalliques du Québec Ltée (QMP) at its Tracy plant is based on the Japanese lean production model. This model incorporates teamwork into an ongoing production process improvement and cost reduction approach (Applebaum and Batt 1994; Derstepanian 2000). Indeed, the four Impact-VAP programs implemented at this plant were based on the "Kaizen" principles which formed the basis of the Japanese lean production model. (Nakajima 1989; Hiroyuki 1989; Ministère de l'industrie et du commerce du Québec 2001; Rosenthal 1992).

Several studies on the success and failure of teamwork have been based on the sociotechnical experiments (Applebaum and Batt 1994; Bourque 1999; Cohen-Rosenthal and Burton 1993; Lapointe 1995; Rankin 1990). Hence their conclusions may not be extended to all teamwork experiments since work team operations vary according to the organizational model favoured by a given company. In order to better understand the Japanese model, research was conducted in a

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steel sector company with the aim of identifying factors leading to the success of value-added production programs under this model.

Methodology

We have identified, thanks to the relevant scientific literature, five independent variables affecting the success of work reorganization programs, namely, union participation, employee participation, the existence of a negotiated agreement, training, and the existence of a financial incentive program with respect to new work organization models. In order to ascertain the validity of the hypothesis pertaining to the positive influence of these factors, we have adhered to an evidentiary framework based on the comparative analysis of four Impact-VAP programs successively implemented in four of Les Poudres Métalliques du Québec departments over a two-year period, from 2000 to 2002. This facility transforms into industrial-use powders metals processed at a plant next to Québec Fer et Titane of which Les Poudres Métalliques du Québec is a subsidiary in its own right. Among the four value-added production experiments which were part of our study, two Impact-VAP programs included union and employee participation and the existence of negotiated agreements and incentive programs, while the other two were implemented without these components. Only the presence of a training program was a constant of all four Impact-VAP programs studied. The analysis of these four different programs has thus allowed for a study of multiple cases bearing similarities and differences (Yin 1984).

Two types of data have been collected on each case; that is background data and data from semi-structured interviews. The company's organizational development coordinator provided us with all existing material on each Impact-VAP program, namely, meeting minutes, PowerPoint presentations, training programs, Info-Impact-VAP bulletins, cost-reduction program follow-up reports, as well as labour-management agreements, collective agreements, grievances and incentive programs implemented as part of the first Impact-VAP program. Furthermore, ten semi-structured individual interviews were conducted with those responsible for Impact-VAP implementation within the relevant departments as well as with Human Resources managers involved in the implementation and follow-up for these programs. These interviews centered on Impact-VAP program flow, implementation issues, and factors influencing the results of said programs.

Key findings of the research

In 1999, Poudres Métalliques du Québec was able to implement, with the help of outside consultants, an ongoing improvement approach based on value-added production programs in order to face increased competition on the metallic powder market and decrease production costs. A framework based on the Japanese Kaizen model was favoured for the implementation of this approach, and a working committee involving labour representatives identified the departments where pilots of the approach should be a priority. Four Impact-VAP programs were implemented in the company from 2000 to the end of 2002. These had the same objective, namely to reduce operating costs by 20% over those of 1999. The table below shows the results of these four programs, and indicates which success factors were present for each program.

Table – Summary of results

Variables/Projects	Impact-VAP			
	Laboratory	**Iron Atomization**	**Finishing**	**Annealing furnace**
UNION PARTICIPATION				
Indicators: Participation	YES	YES	NO	NO
Level of union participation	High (active involvement in program development)	Low (qualified support)	None	None
EMPLOYEE PARTICIPATION				
Indicators: Participation	YES	YES	NO	NO (indirect involvement of some employees)
Level of participation	High (strong involvement in the implementation of changes)	Mitigated (qualified and fearing job losses)	None	Low, unofficial involvement
EXISTENCE OF NEGOTIATEDS AGREEMENTS				
Indicators:	YES (no layoffs resulting from program)	YES (no layoffs or job losses resulting from program)	NO	NO
EXISTENCE OF TRAINING PROGRAMS				
Indicators: Workers affected:	YES (all unionized employees and managers. Visits to unionized plants)	YES (all unionized employees and managers)	YES (only supervisors and managers)	YES (all unionized employees and managers)
Average number of hours of training per program-affected individual	56 hours	28 hours	32 hours	16 hours

Variables/Projects	Impact-VAP			
	Laboratory	**Iron Atomization**	**Finishing**	**Annealing furnace**
EXISTENCE OF INCENTIVE PROGRAMS				
Indicators:	YES (but granted to all QMP personnel)	YES (but granted to all QMP personnel)	NO	NO
Amount granted under the Impact-VAP program/ Potential gain	$1,680 / $2,500	$1,150 / $2,500	N/A	N/A
SUCCESS OR FAILURE OF IMPACT-VAP PROGRAMS				
Indicators: 20% reduction in costs over 1999	Success	Failure	Success	Failure
Goal attainment rate	133.5 %	42 %	100.5 %	17 %

According to this summary chart, of the four value-added production programs implemented by the company, two were deemed successful (a success rate equal or greater than 100%), and the other two were considered failures (success rates lower than 100%) with respect to program objectives of 20% operating cost reductions per department over 1999. The independent variables of “union participation”, “employee participation”, “existence of negotiated agreements”, and “existence of incentive programs” are present in the first two Impact-VAP programs implemented in the Laboratory and Iron Atomization departments, but not in the last two Impact-VAP programs implemented in Finishing and Annealing Furnace departments. Only the “existence of a training program” was a constant in all four Impact-VAP program cases. However, as we will see further on, the influence of these variables is modulated by their level of intensity within each program. These results indicate that the Impact-VAP program in the Laboratory Department is the one that attained the greatest success with an objective attainment rate of 133.5% while the Annealing Furnace Department program produced the lowest results with a rate of only 17%. The Impact-VAP program in the Finishing Department is deemed a success by its promoters with an objective attainment rate of 100.5%, while the Iron Atomization Department’s program obtained a 42% success rate with respect to the objectives established by the management of the company.

Analysis and Discussion of the Research Results

The independent variables have been analysed, based on our research hypotheses, in order to determine to what extent they have influenced the success or failure of the value-added production programs.

Hypothesis 1
Union's participation has a positive effect on the success of value-added production programs

This research hypothesis presumes a positive relationship between union participation in implementation and the success of a value-added production program. As underscored previously in the presentation of our results, two Impact-VAP programs were successful while two others were failures. However, in the case of the two successful experiments, the union was involved in the Impact-VAP program for the Laboratory Department but refused any involvement in the Finishing Department's program. The same situation occurred in the programs that did not meet their objectives of 20% reductions in operating costs since the union was involved in one of these experiments (Iron Atomization Department), but refused to participate in the other (Annealing Furnace Department). At first glance, the data gathered does not seem to support our hypothesis according to which union participation has a positive influence on the success of value-added production programs. Our analysis must thus be expanded to take into account the dynamics of Impact-VAP program evolution within the company studied.

Some authors assert that union participation in organizational change is necessary in light of its strategic role in ensuring worker involvement in change implementation and the success of the experiments (Appelbaum and Batt 1994; Cohen-Rosenthal and Burton 1993; Verma and Cutcher-Gershenfeld 1993). The union was originally involved in the working committee responsible for the development and follow-up of Impact-VAP programs and, according to management representatives interviewed, its participation in the first program was a major contributing factor to its success. However, job cuts which occurred after the program implementation within the Iron Atomization Department have cast doubt on further union participation. This evolution of the union's stance is in line with numerous documented cases that view these layoffs as breaches of the trust between the parties to labour-management cooperation experiments (Bourque 1999; Goll and Johnson 1997; Verma and Cutcher-Gershenfeld 1993).

It is accordingly important to analyze the effect of union participation on the success of value-added production programs by taking into account the nature and intensity of said participation. Of the four cases studied, union participation was intensive and sustained in the first Impact-VAP program in the Laboratory Department, the union having urged its members to become involved in the organizational changes proposed by management. The cost reductions associated with this first program were, incidentally, the highest of those for all four programs. During the second Impact-VAP program in the Iron Atomization Department, fears expressed by employees with regard to job cuts led the union to demand guarantees against such layoffs as a condition of its participation. However, the union's support was much more mitigated than during the first program since it had to deal with pressure from members to limit its participation to a "qualified support", the underlying idea being to protect jobs. In this case, the Union opted for a "defensive participation" since it had to keep the support of its members while involved in the Implementation and Follow-Up Committee (Bourque 1999; Lapointe 1995; Lévesque et al. 1996; Verma and Mckensie 1987). Failure to attain the goals set by management may be explained, according to those management representatives questioned, by the mitigated union

and employee participation which limited the scope and pace of change implementation and, consequently, the results of the Impact-VAP program in the Iron Atomization Department.

The employer reacted to these results by implementing job cuts within this department claiming the union and departmental employees were responsible for the program's failure. This unilateral decision caused a deterioration of the labour relations climate, the union refusing to participate in the two previously scheduled Impact-VAP programs. In spite of the union's withdrawal, the third Impact-VAP program in the Finishing Department was successful, but not the subsequent one. An analysis of the workings of the last two Impact-VAP programs reveals that union influence may be curtailed by the very nature of the changes being implemented. Indeed, the Finishing Department Impact-VAP program was implemented by management in order to ensure its success in light of the refusal of the union and departemental employees to participate. Cost reduction was attained in this case by improving production management and the technical efficiency of production equipment. Managers questioned believe that union and employee participation would not necessarily have had a significant impact on the results in light of the nature of the changes involved. However, the last Impact-VAP program in the Annealing Furnace Department provided meagre results. Managers questioned blamed this failure on the difficulty of modifying work processes within the Finishing Department and the effect on the operation of the annealing furnace. Employee participation in the Finishing Department's Impact-VAP program would have allowed, according to them, for the improvement of the production process, and consequently, would have contributed to the attainment of production cost reduction objectives for the annealing furnace.

These results confirm, by and large, the main studies which emphasize both the strategic role of union participation in successful organizational change and the influential impact of union opposition on the failure of these experiments (Bourque 1999; Cohen-Rosenthal and Burton 1993; Lapointe 1995). The analysis of our results supports the literature which says that union participation promotes the success of work reorganization programs. It does not, however, allow for the conclusion that the refusal of a union to participate compromises the success of a value-added production program when the proposed changes only affect technical aspects of the organization of work as in the case of the Finishing Department.

Hypothesis 2
Employees' participation has a positive effect on the success of value-added production programs

This hypothesis establishes a relationship between employee participation and the success of value-added production programs by stating that such participation has beneficial effects on the attainment of program objectives set out at the Poudre Métalliques du Québec plant in Tracy. To bolster this hypothesis, we will compare the four Impact-VAP programs with variable levels of employee participation by department. Thus in the two successful cases, employee participation was only a factor in one of the experiments (Laboratory Department), while all participation was withheld in the Finishing Department Impact-VAP program that attained its objectives. The situation is mirrored in both failed experiments because employee participation was mitigated in the Iron Atomization Department's program, and employees obeyed union orders not to participate in the Annealing Furnace Department program.

In light of these results, it is important to note employee participation levels in order to determine whether there exists a link between employee participation and the success of value-added production programs. The Laboratory Department's Impact-VAP program included a strong participation rate for unionized employees since the number of volunteers exceeded Committee expectations, employee participation being constant throughout the program. However, Iron Atomization Department employee participation was very limited, affected employees having pushed their union to abandon the process which, in their view, threatened certain jobs within the department. The union met the affected employees in order to try to convince them to go ahead with the ongoing improvement approach proposed by the employer. This meeting produced a very tight but nonetheless positive vote in favour of union and employee participation, provided the union obtained guarantees from the employer that no job cuts would result from Impact-VAP program implementation. Following the signature of a letter of agreement in this respect, departmental employees adopted a "political" participation prioritizing the protection of process assistants rather than the reduction of departmental operating costs. This Impact-VAP program turned out to be a failure with an objective attainment rate of 42%. Following this experiment, management abolished the process assistant positions through attrition, but without resorting to layoffs, saying this work reorganization was necessary in order to attain the set cost reduction objectives.

The Finishing Department's Impact-VAP program, implemented several months later, was adopted without Department employee participation since the union had decided to withdraw from these programs altogether. Upon learning of the union's withdrawal, management modified its approach for this program, transforming it into a mainly technical exercise that could be implemented without employee participation. The Annealing Furnace Department's program was also developed without employee participation because of the union's refusal to participate. However, contrary to the Finishing Department's Impact-VAP program, a minority of employees agreed to answer questions from management members of the Value-Added Production Committee, keeping their participation informal in order to avoid union pressure. The Annealing Furnace Department's Impact-VAP program did not, however, attain the objectives set for it and managers responsible felt that employee participation in this project would have been beneficial to its success since the Implementation Committee would have been able to further its analysis and involve Finishing Department employees in order to resolve certain operational coordination issues between these two departments.

These contrasting results confirm, on the whole, our second research hypothesis since intense employee participation was a deciding factor in the success of the Laboratory Department Impact-VAP program, and, on the contrary, the mitigated or withheld participation of the employees of the departments concerned limited the results or led to failure in two of three cases studied. In this regard, our analyses support the hypothesis that employee participation is a contributing factor to the success of organizational change since it takes advantage of their knowledge and experience to improve operations (Applebaum and Batt 1994; Eaton and Voos 1992). Consequently, the absence of employee participation is a determining factor in the failure of these experiments as indicated by many case studies. However, our analyses highlight the fact that employee participation is subject to union participation, which pushes us to nuance its status as an independent variable since it is strongly correlated to the latter.

Hypothesis 3
Negotiated agreements have a positive effect on the success of value-added production programs

This research hypothesis seeks to establish a link between the existence of negotiated agreements and the success of a value-added production program. It suggests that negotiated agreements pertaining to the job security of employees involved in organizational change favour success. As previously underlined, letters of agreement guaranteeing job security for unionized departmental employees affected by the changes were negotiated for the first two Impact-VAP programs, while no such letter was signed by the parties to the two other programs because of the withdrawal of union participation. According to the literature, such agreements facilitate work reorganization to the extent that they involve formal labour-management negotiations (Bourque 1999; Lapointe 1995). This dialogue and consultation mechanisms support labour-management cooperation frameworks and, ipso facto, promotes, supports or favours the chances of a successful implementation of new models of work organization (Bourque 1999). Our research supports this literature since, right from the start, management approached the union to encourage it to participate in the process and a letter of agreement was negotiated on the implementation of the first Impact-VAP program in the Laboratory Department. This letter of agreement was concerned with union and employee participation in the process in consideration of protection from possible layoffs resulting from the work reorganization. In the case of the Iron Atomization Department, the letter of agreement also concerned the protection of jobs and favoured attrition to reduce the impact of any eventual downsizing. These agreements ensured individual job security for affected departmental employees, and incorporated into the collective agreement provisions favouring the protection of jobs through guarantees against layoffs.

In the case of the Iron Atomization Department's Impact-VAP program, the union demanded expanded job security by adding to the letter of agreement that no job cuts could result from the implementation of the Impact-VAP program in that department, even if the production cost reduction objectives were not met. In spite of this broadened job security, the program was a failure because of employee mistrust with respect to the feared job cuts, and the negotiated letter of agreement did not alleviate these fears. Mitigated employee participation during the second Impact-VAP program resulted in management cutting the process assistant positions without considering the job protection mentioned in the letter of agreement. This management decision increased tension and led to the union withdrawal from the process, which, in turn, explains the absence of letters of agreement for the two last Impact-VAP programs. This evolution indicates that unilateral management decisions, the non-observance of negotiated agreements, the lack of confidence between parties and the personnel reductions increase tensions by demobilizing the union and employees involved in labour-management cooperation experiments (Bourque 1999; Cooke 1994; Verma and Cutcher-Gershenfeld 1993).

In summary, the data gathered partly confirms the third hypothesis since the presence of a negotiated agreement for the Laboratory Department's Impact-VAP program had a positive impact on the value-added production process, but the letter of agreement concerning the implementation of the Iron Atomization Department's program did not alleviate employees' fears of job cuts, which explains their mitigated participation and the poor results of this

program. These data strengthen the thesis that negotiated agreements contribute to the success of work reorganization by fostering employee involvement in the process, but they also indicate that they are not sufficient for employee participation in the absence of a well-established trusting relationship with management (Bourque 1999; Lévesque and Bourque 2002; Lapointe 1995; Verma and Cutcher-Gershenfeld 1993).

Hypothesis 4
Training linked to organizational changes, and stemming from value-added production programs, has a positive effect on the success of such programs

This hypothesis states that the training of affected staff has a positive influence on work reorganization allowing for the acquisition of technical and managerial skills necessary to its implementation. To further develop this hypothesis, we will compare the results obtained and the training provided during the implementation of Impact-VAP programs.

Contrary to the other independent variables of our research model, training is the only constant element of all Impact-VAP programs implemented at Poudres Métalliques du Québec. At the time of each Impact-VAP program, training needs were assessed in light of the organizational changes being considered and of the new skill set required by the action plan. With the exception of the Finishing Department Impact-VAP program, training was provided to all employees of affected sectors in order to upgrade their relative knowledge of the new work processes and tasks to be accomplished, in light of the flexibility sought in the organization of work. In the Finishing Department, only affected managers were given training on the new work processes because of the refusal, on the part of the union and employees, to participate in the program. In all cases studied, training was aimed at upgrading the technical expertise of those involved in organizational changes in order to boost the likelihood of achieving the cost-reduction objectives set by management. These results thus nuance the literature with respect to the content of the work reorganization training since, according to certain authors, it would involve the acquisition, by affected employees, of new skills and competencies linked to interpersonal relations, communications, leadership, and problem solving (Appelbaum and Batt 1994; Cohen-Rosenthal and Burton 1993; Lapointe 1995). In those cases we examined, the training provided to employees was of a more technical nature and was aimed at one-time improvements to production processes. As for those aspects linked to communications and the acquisition of problem resolution skills, a consultant acted as facilitator and compensated for the absence of training for managers and employees directly involved in the two aspects of organizational change processes.

Moreover, the existence of a training program did not prevent the failure of two of the four Impact-VAP programs studied, which confirms its instrumental role in the success of these experiments. Though it is not a determining variable in the success of the Impact-VAP programs studied, our hypothesis is in part confirmed by managers questioned who felt that the information disseminated to employees during the Laboratory Department Impact-VAP program, as well as to Finishing Department managers, contributed to objective attainment, given the changes implemented. It must also be noted that these two Impact-VAP programs provided the best average number of hours of training given to employees directly involved in the implementation of new work processes. In this respect, our analysis is in line with the literature

stating that new models of work organization require training for multi-skilled employees, training whose benefits are tributary to the scope of the changes being contemplated, and to the level of employer investment in training (Appelbaum and Batt 1994; Betcherman et al. 1994; Levine and Tyson 1990).

Hypothesis 5: Incentive program has a positive effect on value-added production program success

This research hypothesis states that the existence of an incentive program has beneficial effects on the attainment of value-added production program objectives since financial incentives encourage the direct participation of employees. To support this hypothesis, we will go back to the four Impact-VAP programs implemented at Poudres Métalliques du Québec and compare the effects throughout the ongoing improvement process.

Our study reveals that an incentive program was in place during the first two Impact-VAP programs, but that it was abolished by management for the last two, namely in the Finishing and Annealing Furnace departments, following the union decision not to participate in the ongoing improvement process. From the start, management had implemented the Ongoing Improvement Recognition Program in order to encourage all employees to participate in departmental value-added production programs. This financial incentive program was aimed at all plant employees, even though it was only based on results obtained in the departments affected by organizational change. The universal nature of the program was, according to management, intended to favour medium term involvement of all employees in the ongoing improvement process. There is nothing, however, to indicate that the incentive program per se had beneficial effects on the results of the Impact-VAP programs, or on employee participation. Managers questioned felt that employees were dissatisfied with the program because of their perception that the objectives set by management were practically impossible to reach. Moreover, they had trouble understanding the logic of this program which combined the results of the Impact-VAP programs with other factors, such as occupational health and safety improvements. Rather than maximizing motivation to participate in the Impact-VAP programs, the Ongoing Improvement Recognition Program caused frustration since employees from the affected sectors did not feel responsible for the results of the Program, which was aimed at the entire plant's workforce.

Information obtained from managers seems to contradict our hypothesis since the Program had, in their view, a negative influence on Impact-VAP programs because of the dissatisfaction it elicited in employees. These results are contrary to those found in the literature stating that new forms of compensation based on increases in productivity may contribute to the success of work reorganization programs (Cohen-Rosenthal and Burton 1993; Cooke 1994). However, our results confirm several researchers' work to the effect that the impact of incentive programs varies in line with employees' perception that their individual or collective work performance is being considered when calculating bonuses associated with productivity gains (Appelbaum and Batt 1994; Cohen-Rosenthal and Burton 1993; Levine and Tyson 1990).

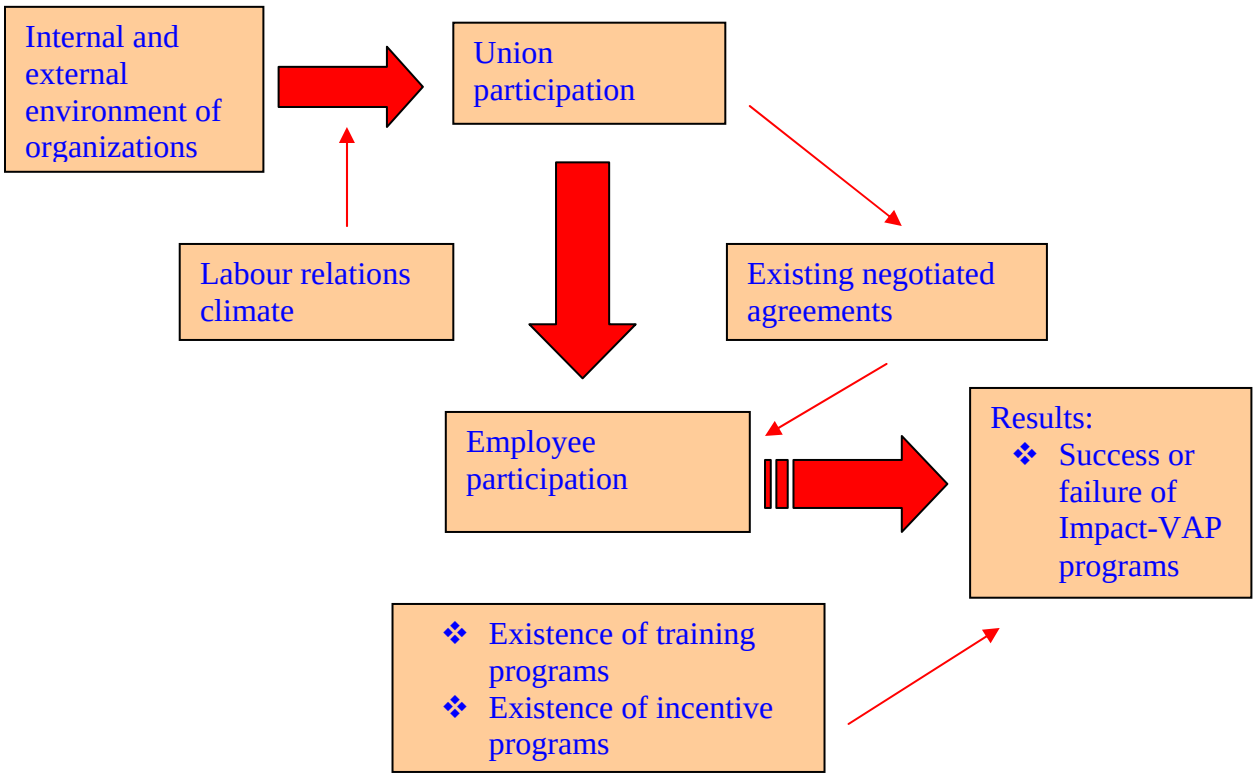
Conclusion

Generally speaking, value-added production programs may be useful for companies having to adapt to a more competitive and continuously evolving marketplace. And so, Poudres Métalliques du Québec not only reached, but surpassed, its production cost reduction objective of 20% compared to 1999 in two cases, but it also failed to do so in two others. In spite of these two failures, the company still managed to reduce its operating costs by about $360,000 from 2000 to 2002, which is no small feat according to managers who were interviewed. According to them, Impact-VAP program implementation also allowed for improved "just-in-time" management, increased product quality, and the elimination of waste, while increasing production levels in certain sectors. We must ask ourselves however if the employer's stated goal was realistic in all cases studied, since the cost reduction objective was the same for all affected departments, without consideration of the nature and complexity of the changes contemplated.

The results of our research indicate that certain factors may influence the success of value-added production programs. Indeed, employee participation turned out to be a determining factor in the success of Impact-VAP programs at the Poudres Métalliques du Québec plant since it allowed the Laboratory Department to exceed the cost-reduction objectives, while a mitigated or withheld employee participation limited the attainment of this objective in the other cases. Furthermore, our results demonstrate that union participation and the existence of negotiated agreements and training programs encourage employee participation. However, our study does not take into account all variables likely to influence the success of organizational change and one may suppose that other variables also played a key role in the process.

Thus many of our research model's independent variables were affected by the evolution of labour-management relations over the course of the different Impact-VAP programs implemented at the Poudres Métalliques du Québec's Tracy plant. The works of Kochan, Katz and Mckersie (1986) indicate that employers' and unions' strategic choices are affected, in particular, by companies' external environment as well as labour relations in general. These choices then influence companies' work organization and performance. The influence of the external environment on employers' strategic choices is made public, according to these authors, by the labour relations climate, which may, as the case may be, facilitate or hinder management work reorganization projects (Bourque 1999; Kochan, Katz and Mckersie 1986). Though the union was involved in the Poudres Métalliques du Québec's Ongoing Improvement Process right from the start, our study has revealed that job security issues fuelled employee reticence to fully participate in the Iron Atomization Department's program. The employer's decision to proceed with job cuts following the program's failure caused the union and employees to withdraw their participation. This withdrawal had a negative effect on the results of the other programs, and ultimately led to the employer abandoning its Ongoing Improvement Program. This cascade of intertwined strategic decisions highlights the complexity of interactions which form the dynamic aspect of labour relations. The following explanatory schema, developed during our research, will complete our initial research model.

Figure 1: Revised explanatory schema



According to this schema, based on Kochan, Katz and Mckersie's (1986) work, the internal and external environment of organizations is the main determining factor in the union's decision to participate in work reorganization experiments; this participation also being influenced by the labour relations climate. The union's position with respect to management's work reorganization project has an important influence on direct employee participation through, among other things, negotiated agreements ensuring job protection. These factors favour direct employee participation, which is a determining variable in the success or failure of production cost reduction programs such as the Impact-VAP programs. Training and incentive programs may also contribute to the success of such programs, though their influence is much less determining and direct than employee participation. This revised schema offers a coherent explanation of the empirical results of factors of success or failure in programs implemented at the Poudres Métalliques du Québec plant in Tracy, and of the complex dynamics of labour relations during work reorganization experiments.

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