Working Paper 95-50
Business Economics Series 08
November 1995

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# LEARNING FROM FORGETTING: AN EXPERIENTIAL STUDY OF TWO EUROPEAN CAR MANUFACTURERS

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Abstract

Decision making power can be decentralized to foster organizational learning at the lower levels in the chain of command. However, abilities to capitalize on organizational learning may be impeded by a concomitant process of organizational forgetting. This paper provides empirical evidence on this process gathered at the subsidiaries in Spain and Sweden of two large automobile manufacturing corporations. This evidence shows how organizational forgetting occurs after a long period of learning and success and the antecedents of organizational forgetting. It is argued that organizational structure and national culture play a significant role in the relative success or failure of innovative projects aiming at implementing organizational learning at the operational level.

Key Words and Phrases
Organizational Learning, Organizational Forgetting, Budgeting, Cross-National Cultures.

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Companies operating in turbulent environments must face up to the uncertainty coming rapidly from both changing technologies and global competition. Advanced technolgies such as flexible manufacturing systems or CNC machines are not mass produced goods but custom-made and highly unique products. Full utilization of these technologies can only be obtained through day-to-day organizational learning at the operational level. Operational learning is the term used to describe organizational learning at lower levels in the chain of command. Learning organizations are able to sustain innovative managerial practices at this operational level (Mills and Friesen, 1992).

The importance of operational learning is illustrated in the design of innovative automobile plants which are explicitly designed to foster it (Adler and Cole, 1993, 1994; Berggren, 1994). Unfortunately, most of this literature takes an operations management perspective (Schein, 1993). The influence on organizational learning of specific elements of the organizational structure such as the information system has deserved a much less attention .

The internal structure of the firm stores its organizational memory since the former is the result of organizational struggles and compromises with respect to responsibilities (Hall, 1991; Walsh and Ungson, 1991). Particularly, the information system (e.g.; the budgeting system) keeps the memory of the formal organization. The increasing evidence on the changing role of information systems in general and management accounting systems (MAS) in particular mainly focuses on the technical aspects of the systems such as the misguiding effects of MAS on investment appraisal, pricing or make-or-buy decisions (Johnson and Kaplan, 1987; Kaplan and Norton, 1992). Yet, there is limited evidence on the explicit role of MAS in the sustainability of operational learning. This lack of evidence is particularly relevant when addressing issues such as the potential effects of MAS on the failure of innovative learning projects or when analyzing the functioning of these projects in different countries.

Current managerial practices assume that once a given level of organizational learning is reached, that level is to be maintained in the future. Hence, learning is understood as a cumulative and forward process with no steps back. Managers barely accept that a learning process could be disrupted by a process of forgetting. In this regard, it is considered that forgetting takes place when some successful managerial practices are no longer implemented nor replaced by others with the intent of achieving a higher level of learning. In the well known case of a cost learning curve, discontinued use of these successful practices and its related forgetfulness would result in the return to previous cost levels of production. The persistence of operational learning is not a simple task; it requires the simultaneous implementation of many

successful improvements. The non-implementation of one of these successful practices has disturbing effects on manufacturing performance; organizational forgetting exists even when managers are unaware of it.

Organizational forgetting has received much attention in the managerial literature. Forgetting has come forward as the supporting evidence of laboratory simulations to estimate cost increases (Bailey, 1989), or aiming at the development of a procedure for estimating the amount of learning depreciation that occurs (Argote, Beckman and Epple, 1990). In both studies, authors gave emphasis to calculation and estimation of forgetting rather than to the analysis of the *process* itself.

The purpose of this paper is to study the *process* of organizational learning and how it can deteriorate in a reversed process of organizational forgetting. We utilize an structural perspective because some elements of the organizational structure such as the budgeting system play a central role in the storage and retrieval of organizational memory. Therefore, it is questioned whether the organizational structure could be also relevant in fostering a process of organizational forgetting.

To examine the potential impact of national characterictics on the learning and forgetting processes, empirical evidence has been gathered in two different European countries: Spain and Sweden. The study sites consists of the subsidiaries of two large multinational car corporations; General Motors and Volvo. Two long term projects were carried out at the Volvo Components plants located in the cities of Floby, Köping and Lindesberg (Sweden) and the Delco Chassis division plant located in Puerto Real (Spain) during three and two and a half years, respectively. Both of these projects intended to foster operational learning through teamwork, aimed to achieve improvements in productivity, quality and working conditions. Both projects were independent of each other and started in the same year.

Evidence collected from the Spanish setting has come from the minutes of team meetings as well as from interviews with the participants in the project. A workshop was also held with the participation of the middle managers that worked on the project and present managers. Additionally, two general rounds of interviews were undertaken. In the first round, all participants were questioned about the underlying reasons for setting up the teams, their goals and the causes which explain their continuation and dissappearance. A final round of interviews was undertaken to discuss some preliminary conclusions. Interviews were not taped, but written notes were taken. Data collection took place once the project was over; the author was a passive

observer of team developments. With respect to the Swedish side of the cases, an author joined the activity of the teams as an external consultant. He had free access to the teams and could also advise them in designing the indexes of performance. He was, therefore, a participating observer.

A more detailed description of the settings is given next. The results of both experiments are described in due course. The paper concludes by providing an analysis of the evidence and by posing some questions for further analyses.

## THE SETTINGS.

Both subsidiaries have in common that they produce for the car European assembly market. Therefore, they operate in a highly competitive market and use advanced technology. In the same year, the headquarters of Volvo Components and the plant management of the Delco Chassis plant decided to implement a process of decentralized decision making down to the operational level to speed up organizational learning. A key element of this process was to provide the teams with suitable information. Apart from this, the two settings were remarkably different.

The Delco Chassis plant manufactures suspension systems. The factory was intended to sell components to European assembly plants of General Motors as well as to companies outside the multinational group. The factory is located in an underdeveloped area by European economic standards which has a high unemployment rate. Consequently, Delco did not have problems to recruit qualified personnel. During the setup process of the plant no efforts were made to produce for outside customers. Once the setup process was completed, the management team realized that the factory had surplus capacity and was inflexible; it was not possible to make parts slightly different from a narrow set of product specifications. The plant was unprofitable and there were no possibilities of long-term survival unless it was able to sell its products to outside customers. The plant had to take advantage of the installed capacity by making the manufacturing operations more flexible. This manufacturing inflexibility was matched by a bureaucratic organizational structure. A strict and highly formalised budgeting process was the main example of this bureaucracy. The decision-making power was very centralized and proved to be unable to cope with the uncertainties created by the manufacturing technology.

After a capacity study, four areas were considered to be the bottlenecks of the factory. The plant´s directors considered that it would be helpful to form working teams in order to increase

capacity and production compliance, quality and improved working conditions. The four bottleneck areas of the organization would be involved in a teamwork project. These areas represented a small part of the whole shop floor and the project was restricted to these areas only. The teams operated for periods ranging between 1,5 and 2,5 years.

Teams were formed by middle managers (industrial engineer, maintenance engineer, manufacturing engineer, maintenance foreman and front line supervisor) and all the operators working in the respective area. The teams operated in an informal way. The bureaucratic structure of Delco Chassis never allowed them to be formally recognized in the organizational chart. Meetings took place after the first production shift and used to last two hours. Operators working during the first shift received two hours of overtime payment. Operators who had to work during the second shift did not receive any extra payment but they did not have to run the production during that time.

Delco had already put into force an improvement suggestions program. As a result of this program, operators were rewarded with a bonus of 10% of the savings obtained during two years of a succesfully implemented suggestion. Operators agreed to share any reward that was a result of suggestions made by any of them. There were no other tangible benefits for team members.

The teams themselves created an information system which provided them with *ad hoc* information about the problems under consideration. Nevertheless, some items were regularly gathered and discussed at the meetings; quality, production schedule compliance and consumption of maintenance services. This information collected by the teams was fully independent from that provided by the central (budgeting) system. Although the budgeting system was the reporting venue in Delco, teams did not receive external information about their activities. Reporting of team activities was provided by the distribution of the minutes of the weekly meetings among any interested individuals in the organization.

This paper reports the development of one of the teams, Team A, which portraits the teamwork project. Supporting evidence of the other areas as well as of a control group is also provided.

Volvo Components is a subsidiary of the Volvo group with 6,000 employees. It has a strategic role within the corporation since it has to deliver sub-assembly parts to the different assembly sites at Volvo. At the time of the reported project Volvo Components was profitable. Except some minor sales to SAAB, the Volvo Group was the only customer of Volvo Components. The

parent company could choose a component producer (and competitor) other than the subsidiary. To make their choice on any particular bid, the parent company considered the following variables (quoted in decreasing order of importance): quality, delivery time, flexibility and productivity.

Regarding the organizational chart of Volvo Components, the high degree of vertical integration within the group brought about that some functions, such as product design or marketing, were not under command of the subsidiary, but were directly carried out by the parent company. At this time the subsidiary put into practice an organizational reshuffle, moving from a functional to a divisional structure. Therefore, departments like Production, Materials Management, etc., were removed and four business units were settled: cars, trucks, marines and civil machinery.

The redesign of the information system on the operational level was also under consideration. Consequently, a pilot project was designed and implemented. The project involved three teams in three different plants: Floby, Köping and Lindesberg. The Floby plant made hubs, brake drums and drive shafts for rear axles. Cog wheels and shafts for heavy gear boxes were made in the Köping setting. Finally, cog wheels for rear axles were produced in Lindesberg.

Teams consisted of a supervisor, a foreman and a number of operators ranging from nine to twelve people. Teams were recognized in the organizational structure as such, and the supervisor is a key individual in Volvo´s operations management. The Volvo project used the existing teamwork structure to take a step forward in the decentralization process through the implementation of an information support system at this local level.

The controller´s office and an external consultant provided some help to the teams in the design of the MAS to be used at the operational level. The so-called local information systems released information on quality, set-up machine time and indirect materials consumption. As in the Spanish case, financial information was not regularly used by the teams.

This paper will study the case of the team working at the Floby plant because it exemplifies the developments which took place.

## GETTING RESULTS

Team A exemplifies the Delco teamwork project. This team made an initial list of 70 problems. Those problems were narrowed down to comprise the 10 most important ones. Although there was an initial agreement not to deal with problems outside of the team´s control, the list of problems showed that to accomplish certain actions, coordination with other departments was required, (e.g. to improve the flow of materials or the quality of raw materials).

Actions were mainly taken on controllable problems. Interdepartmental coordination in teamwork was a direct consequence of group dynamics. To improve throughput, operators agreed to rotate during the coffee breaks and changes of shifts. With this action, it was possible to lengthen production time one more hour per day. All these actions brought about an increase of 58% in the number of pieces produced per shift after four months of teamwork. Team A increased production by 96.9% after sixteen months of teamwork.

As time passed, problems arose which were beyond the team´s control and required coordination with other departments, such as Quality Control, Production Control, Purchasing, Security and a special task force on scrap reduction. As finding a solution required a substantial amount of time, the minutes contain an identical list of problems for weeks. Twenty months after the beginning of the project, the team decided that they will meet fortnightly. In addition to irresolvable problems of coordination, the minutes begin to mention some others which were previously resolved but had reappeared. Most significantly, the operators refused to rotate during their coffee breaks and changes of shifts. Four months after the last periodical meeting, team production was 5,023 pieces per shift (Table 1).

TABLE 1 TO APPEAR HERE.

Team B was also involved in the teamwork project. There was a sustained increase over the 22 months that lasted the teamwork period. The subsequent output decrease went below the results achieved before the beginning of the project.

In order to allow comparisons, data on pieces produced per shift were also gathered from the daily work-sheets of Team C. This team was not involved in any teamwork project. For the purposes of this paper, Team C can be considered a control group. Table 1 shows that the area run by Team C achieved a stabilized improvement in number of pieces produced per shift during the teamwork period.

Production decreases in the Delco setting were not due to reductions in consumer demand. On the contrary, the European car market experienced a steady expansion during the period under consideration.

No concrete data are available about direct labor consumption by the teams. Nevertheless, there is an unanimous consensus amongst present and past middle managers that the amount of direct labor did not experience significant changes during the teamwork period. There were no changes in the number of operators per machine and the number of daily shifts remained stable during that period.

The Floby team runs three production lines. Two lines are basically formed by CNC machines. This machinery is coupled to the third production line. The latter was formed by a controlling computer and several robots to handle materials. Team meetings were informal and took place whenever a problem required the consideration of the team. The team followed the strategy of considering the problems one at a time. Rather than focusing on the most important problems, they dealt with those ones which were easily resolvable. For instance, the budgeting system reported about negative variances in cutting tools consumption. The foreman wanted to follow up the use of cutting tools in two lathes on the drive shaft line. Five different cutting tools can be attached to the rotating heads of these lathes. Each tool has a number of cutting edges and when an edge is worn out, quality declines and tools have to be replaced. Team members decided to purchase a different set of cutting tools after discussing the problem with the supplier. These new tools had similar prices. Four weeks after using the new cutting tools a three days manual follow up was put into force. Operators just counted how many drive shafts had been processed by every cutting tool. As a result 574 drive shafts were processed. This outcome required the consumption of 52 cutting tools. The standard consumption was 74.3 cutting tools (Table 2). It brought about a positive monetary variance of 28% in cutting tools consumption.

TABLE 2 TO APPEAR HERE.

Volvo operators received extra-wages linked to positive variances between actual and standard production. One year after the beginning of the project, team members decided to take responsibilities for production planning. In short, it meant that the team itself could decide what production rate target they intended to keep during the following six month period. The production-rate was the result of dividing actual by standard production. The outcome would set the basis for the discussion about the next six month period.

Two main sources of improvement were under consideration; rejects and downtime. Rejects were classified as M-faults (Materials) or P-faults (Production). Team members managed to reduce M-faults substantially by setting up a communication hot line with a supervisor at the supplying foundry. P-faults remained stable and below the budget throughout the period. Regarding downtime, the team considered that it could be reduced by the rationalization of production methods as well as by increasing flexibility. Team members considered the latter as a problem under their scope of control. Due to the high technology environment, operators were specialized in their machine group. It brought about that the team was vulnerable to absenteeism. Therefore, team members decided to set up a program to enable all operators to run all machine groups. Breakdowns and machine setups were used to teach other operators abour the features of different machines. Table 3 shows targets and outcomes for the first six month period after the implementation of these specific actions.

TABLE 3 TO APPEAR HERE.

As a result of these and other follow-ups the Floby team achieved a continuous increase of the pieces produced per year. As shown in Table 3, this improvement was also matched by a sustained decrease in the required amount of direct labor hours to make that output. These results were highly praised by the management of Volvo Components. The project was expanded through the Components division and the supervisor of the Floby team became a popular person within the Volvo group. He enjoyed a part-time job as a consultant to train other teams in similar experiments.

TABLE 4 TO APPEAR HERE.

## LEARNING vs FORGETTING

The Volvo Components case shows a long period of organizational learning based upon a great deal of small improvements. On the other hand, the Delco Chassis evidence brings to light a long period of organizational learning followed by a period of organizational forgetting. These processes of organizational learning and forgetting can be explained through a twofold analysis dealing with the inner and outer environments of the organizations. With respect to the inner environment, aspects related to the organizational structure, the budgeting and the incentive systems will be analyzed. Regarding the outer environment, the national culture of each particular setting might be considered an influential factor in the development of the projects.

**The shield**

The organizational structure plays a significant role in the development of the learning and forgetting processes. It can act as a shield against learning, as in the Delco Chassis case. Three elements concerning the organizational structure will be analyzed; the (non)recognition of the teams in the organizational chart, the narrow focus of the budgeting system and the incentives system.

The (non)recognition of the teams in the organizational chart. Since the organizational structure is the result of compromises and negotiations, it stores the organizational memory. The comparison between Delco and Volvo brings forward their different organizational histories. Volvo is a company with a long tradition in job enrichment through job design. Semi-autonomous teams were established by Volvo in the early seventies as a tool to handle high rates of absenteeism and personnel turnover. The challenge for Swedish companies was to recruit and maintain the best operators. Teamwork as well as a decentralized team structure were an integral part of Volvo´s organizational structure (Berg, 1985). The communication between a given team and the rest of the organization had a formal recognition in the organizational chart.

On the other hand, Delco was still a young company and as in many other aspects, had no previous tradition of teamwork. When teamwork started up, teams were not recognized in the organizational chart. Teams were supported by the management board but their activities were much more on the side of the informal organization. Delco teams decided to deal with controllable problems. Due to the coordination among team members, it was possible to achieve dramatic improvements.

When most of the controllable problems were solved, teams had to start dealing with problems beyond their boundaries (Llewellyn, 1994). At this moment, teams had to face lack of recognition by the rest of the organization. There was no formal structure to nurture those specific communications. Delco was a bureaucratic organization and it was difficult to get resources outside the formal procedures. For the rest of the organization, the claims of team members were perceived as made by particular individuals. Initial dialogue and commitment amongst team members was grounded on the positive attitudes of the participants in the project. After some time, it was necessary to transform attitudes into structures. This did not occur and the result was the development of a process of organizational forgetting. Routines which had been learnt as a result of an internal commitment amongst team members (e.g., to reduce setup machine time) were given up. As long as Volvo Components organizational structure recognized

teamwork, it provided a better venue for the development of a sustained organizational learning.

To sum up, pilot projects aiming at organizational learning need to be supported by the organizational structure. This support can prevent the development of a forgetting process as long as formal recognition nurtures the communication between teams and the rest of the organization. Since most of the organizational problems are not clearly within the boundaries of any particular team, this formal recognition of responsibilities would back the process of give and take which is usual among different organizational subunits.

The (narrow) focus of the budgeting system. Regarding operational units, the logic of central information systems is non-relevant for decision-making purposes (Grönlund, 1990). Central information systems such as the budgeting system are correct for control purposes. The budgeting system comprises goals to be attained, not activities to be accomplished. Therefore, there is a built in contradiction between systems designed to control performance (budgeting system) and systems designed and used on the operational level for decision-making purposes (MAS used by team members). The latter was helpful for operators and middle managers in handling their activities, the former imposed a hectic pressure on team developments.

The budgeting system entails that incremental learning is to take place. It is assumed that once a level of performance is achieved, it is to be maintained (or even improved) in the future. However, reality shows that learning is not a continuous and incremental process. On the contrary, it has to be constructed every day. The production system of companies which operate in world-wide markets is designed to develop its full capacity. This capacity is only achieved through the simultaneous implementation of a great deal of costly practices (e.g., coffee-break rotations). Operational level MAS used by teams at both settings reported non-financial information, containing soft-data which could shed light about potential sources of learning (e.g., downtime and absenteeism in the Volvo case). On the other hand, the budgeting system just reports financial figures which summarize a great deal of specific and costly practices. Those demanding financial figures are agressive towards team members and barely sympathetic with the effort carried out by them. Hence, teams not only perceive budgets as a useless tool in their decision-making process, but also as a set of documents which are ready to consider as *normal* and standarized all the extraordinary improvements achieved during the past period.

The budgeting system of Delco and its related concept of hierarchy and discipline provides a too narrow window for improvement, change and learning. When resources for teamwork purposes are demanded within the budgeting period, the likely answer is: "It might be a good idea, but

not now. Why do not you make that proposal when preparing the next budget? That is when all demands are made at the same time and that is when they all can be coordinated into an effective plan".

In the Delco case, the budgeting system played a negative role with respect to team development. Improvements achieved by the teams were not matched by a parallel allocation of resources. As noted above, teams were never recognized in the organizational structure. Consequently, teams did not manage any specific budget. While teams were asked to improve their practices, they did not receive any additional resources. Although Volvo teams also had strict budgets there were two outstanding differences; on the one hand teams themselves were recognized by the budgets, on the other hand budgeting control focused on strategic control rather than on the financial control exercised at the Delco setting.

In summary, the incremental logic of the budgeting system by itself appears to be a main obstacle for the development of organizational learning. Teams did not have specific resources to support their actions. The false recognition of the teams was eased by the demanding requirements stated in the operational standards which informed the budgeting system matched as well as by the shortage of financial resources .

The reward system. The development of teamwork could imply an intrinsic incentive for those involved in it because team members perceived that their jobs were important, they had autonomy and feedback on results (Vroom, 1966). However, these motivating factors need regular reinforcement. As time went by, team members had to deal with problems which were beyond their scope of control; they had no autonomy. There was also negative feedback on results; the operational level MAS informed that they were unable to attain the list of problems. Finally, the Spanish labor unions do not allow wage increases tied to performance improvements in particular areas of a given company. The Delco case shows that teams had initial intrinsic motivation. When it dissappeared, organizational learning became organizational forgetting.

Volvo teams also enjoyed intrinsic motivational factors. Additionally, team members could enjoy wage increases as a result of productivity improvements. In the Volvo case, the joint effect of intrinsic and extrinsic motivational factors nurtured a sustained organizational learning.

**The cross-cultural perspective.**

Cross-cultural differences are helpful to explain occupational values (Goffee and Jones, 1995; Gray, 1995). In this regard, it is noteworthy to point out that Sweden and Spain are countries with a remarkable difference in their cultures. A five dimensions scale has been used to represent a national culture (Hofstede, 1980; 1991). These dimensions of the national culture influence the particular behavior of the individuals in the organizations. For the purposes of this analysis, there are two Hofstede´s dimensions of relevant interest for the purposes of this paper: power distance and uncertainty avoidance. Power distance refers to the dependence relationships amongst people in a country. In small power distance countries there is limited dependence of subordinates on bosses, and a preference for consultation, that is, interdependence between boss and subordinates. The emotional distance between them is relatively small: subordinates will quite readily approach and contradict their bosses. In large power distance countries there is considerable dependence of subordinates on bosses. Subordinates respond by either preferring such dependence (in the form of an autocratic and paternalistic boss) or rejecting it entirely, which in psychology is known as counterdependence: that is dependence, but with a negative sign. Large power distance countries thus show a polarization between dependence and counterdependence. In these cases, the emotional distance between subordinates and their bosses is large: subordinates are unlikely to approach and contradict their bosses.

Spain is a country with a large power distance. It is ranked in position 31 amongst 53 countries or regions. On the contrary, Sweden is a country with a very small power distance; it is ranked in position 47/48 amongst the referred 53 countries or regions.

Uncertainty avoidance is defined as the extent to which the members of a culture feel threatened by uncertain or unknown situations. This feeling is, among other things, expressed through nervous stress in a need for predictability: a need for written and unwritten rules. Sweden is a country with a weak uncertainty avoidance; it is ranked in position 45/50 amongst 53 countries or regions. On the other hand, Spain has a strong uncertainty avoidance; it is ranked in position 10/15 on this particular scale.

The joint effect of power distance and uncertainty avoidance can be used to link national cultures with suitable organizational structures. Sweden is featured by its small power distance and weak uncertainty avoidance. Its social structure is flat. On the other hand, Spain is a country with large power distance and strong uncertainty avoidance. Its social structure can be compared to a pyramid of people.

These arguments provide a complementary perspective to the analysis of the organizational structure on the different results of the teamwork project in Delco and Volvo. Volvo operates in a country with a flat societal structure. The Volvo group has been quite successful in adapting itself to this societal structure. Teamwork projects, since the early Kalmar plant experiments, are efforts to adapt the organizational structure of the company to the usual rules of society. On the other hand, Spain has a large power distance and strong uncertainty avoidance. It means that subordinates are dependent on bosses. Subordinates will barely approach their bosses and contradict them. In Delco, when there was not a good relationship between teams and the rest of the organization, middle managers had that cultural unability to raise the issue to their bosses. Moreover, since there was not any written organizational procedure legitimating the teamwork project, middle managers felt even more unable to argue for the value of teamwork.

Pilot projects are regarded as prerequisite for the development of sucessful learning experiments (Beckhard and Harris, 1989). Nevertheless, in countries with large power distance and high uncertainty avoidance it is also needed to extend the project across the organization as soon as successful results are achieved. In countries with these particular cultural features, this decision is to be made the top management since middle managers find it difficult to raise project validity claims. Middle managers who run the Delco project acknowledged the false recognition of their team by the rest of the organization as well as the necessary extension of the project to other organizational areas to assure project success. However, they thought that such a particular decision was to be made by the top management because it was far beyond their scope of responsibilities.

The Delco case proved that teamwork was able to achieve early success and high levels of sustained learning. At that point, the extension of the project to the rest of the organization would have the organizational learning to the organization as a whole. In some cultural environments, top managers should not expect claims coming from the middle managers about the extension of these projects.

These arguments do not imply any sort of determinism or straight cause-effect relationship about the success or failure of decentralization projects. On the contrary, it is argued that some cultural aspects should taken into consideration when implementing projects which were successful in a different national setting.

## CONCLUDING REMARKS

More and more organizations are decentralizing their decision-making process to lower levels in the chain of command. The aim of this process is to gain competitive capabilities by absorbing uncertainty coming from the shop floor. Uncertainty absorption is so important that some auto plants are explicitly designed to foster this process from the very start. The managerial literature is full of (successful) examples of companies which are able to match the implementation of this process with the usage of a given technique (e.g., value analysis, quality circles, etc). Nevertheless, there is very little empirical evidence on long-term experiments and on what happened after a first period of learning and success. This lack of evidence also refers to cross-cultural comparisons. In a global business environment, the latter weakness is particularly important since cultural characterictics are helpful in explaining the reasons for successful implementation of innovative projects. There is a need for cross-national studies on the sustainability of learning achievements.

This paper is based on empirical evidence gathered in two European subsidiaries of Volvo and General Motors. Amongst the wide range of possibilities used by managers to foster organizational learning, these companies choose problem-solving in current operations and support of innovation and experimentation to build for the future (Leonard-Barton, 1992).

Teamwork projects in Delco and Volvo concluded with the processes of organizational forgetting and organizational learning, respectively. The micro and macro-organizational levels of analysis provide an explanation of these developments.

It is suggested that organizational structure plays a relevant role at the micro-organizational level. In particular, there are three complementary reasons. First, teams were not formally recognized in the organizational chart. Thus, team claims were no longer perceived as such, but as demands outlined by individual members of the organization. This false recognition of teams by the rest of the organization was particularly important when teams had to solve problems not fully controllable by them.

Second, the rigidity of the budget system as well as its incremental learning logic was perceived as too agressive by team members. Improvements achieved by the teams were readily incorporated into budget standards, these aggregated figures were not helpful in the decision-making process nor were fair to many of simultaneous and costly practices which had to be put into force to obtain a persistence learning. Furthermore, budget demands were accompanied by

budget constraints. Team members could only use resources coming from their respective functional area.

Third, the reward system did not make provisions for rewarding productivity increases of the teams beyond the suggestion schedule. In short, individuals clearly perceived the pressure of the hierarchy because their activities within the team were not recognized as such. It seems to be clear that subordinates suffering the imposing hierarchy are not good learners (Zuboff, 1989).

Organizational learning and forgetting can also be explained from a macro level of analysis. Spain is a country with a large power distance and strong uncertainty avoidance. Therefore, it is assumed that Spanish middle managers find it difficult to approach their bosses. In particular, Spanish middle managers were aware of the convenience of extending the project to other organizational areas but they also considered that the decision had to be made at the top management level. Since the extension decision was far beyond their scope of control, middle managers considered that their claims would interfere top management´s understanding of the situation. They kept silent.

The success of the Volvo case can also be explained from this twofold micro and macro levels of analysis. In this sense, Volvo implemented a loose-tight control (Peters and Waterman, 1982). These authors argue that excellent organizations are characterized by the simultaneous implementation of centralization and decentralization process. Although excellent organizations are decentralized, they also develop a strong centralization around a set of basic principles. This is the Volvo case. Volvo gave a step forward in its decentralization process through a teamwork project dealing with innovative information systems on the lowest organizational level. This kind of loose control through decentralization is supported by the Swedish cultural characteristics. However, Volvo also developed a tight control of the teams through the budget process. Teams had to settle their targets for the following period and these targets were the evaluation criteria of teams performance.

To sum up, evidence shown in this paper could be of some help for managers aiming to design and implement learning projects, particularly when these projects are expected to be succesful in different cultural projects. In this regard, more comparative studies on long-term learning projects is needed.

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TABLE 1
Delco Chassis
(Pieces produced per shift. Monthly average)

| Teamwork | Before starting teamwork | After four months of teamwork | After sixteen months of teamwork | Right after the end of the teamwork project | Five months after the end of the project |
|---|---|---|---|---|---|
| Team A | 3,637 | 4,642.5 | 7,162 | 6,016,5 | 5,023 |
| Team B | 11,125 | 11,180 | 12,020 | 10,980 | 11,040 |
| Team C (control group) | 2,834 | 2,910 | 2,955 | 3,084 | N.A. |

TABLE 2
Volvo Components. Floby plant
(Cutting tool consumption)

| Cutting tool number | 1 | 2 | 3 | 4 | 5 | TOTAL |
|---|---|---|---|---|---|---|
| Standard consumption | 22.9 | 17.2 | 11.4 | 11.4 | 11.4 | 74.3 |
| Actual consumption | 19 | 14 | 9 | 6 | 4 | 52 |

TABLE 3
Volvo Components. Floby plant
(Production targets and outcomes)

| Production line | Production target | Actual production |
|---|---|---|
| Hubs | 123% | 123% |
| Shafts | 121% | 123% |
| Drums | 123% | 126% |

TABLE 4
Volvo Components at the Floby plant
(Pieces produced per year vs yearly consumption of direct labor hours)

| Teamwork | Before the beginning of the project | First year | Second year | Third year |
|---|---|---|---|---|
| Pieces produced per year | 102,060 | 103,320 | 110,220 | 125,580 |
| Yearly consumption of direct labor hours | 20,200 | 19,780 | 17,960 | 18,570 |