

Overcoming resistance to change in business innovation processes

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Abstract— This paper summarizes the experience gained in dealing with resistance to change appeared in the companies when they develop innovative processes related to the adoption of new technologies, tools, equipment, infrastructure and methodologies. Technological innovation is rapidly absorbed by society on a personal level. But at the enterprise level, resistance to innovation can occur at any hierarchical level of the company and may appear with different intensity. Depending on the type of enterprise, the hierarchical level of the employee, the intensity of resistance and other factors, the measures taken are different. In this paper we summarize our experience in the cataloging of the resistance to innovation in terms of impact on workers and showing how technology education and business training can help overcome these resistance forces. This paper describes the experience acquired over 22 projects deployed in the period 2005 to 2011 and that has affected a total of 264 workers of different cultural, technological, business and hierarchical levels.

Keyword- Resistance to innovation, Organizational behavior, Business Innovation Projects, Control of resistance

I. INTRODUCTION

The introduction of technological innovation in society on a personal level is readily absorbed although may be able to change the nature of personal relationships and personality of people [1]. Professionally, the use of technological resources and software applications enables companies to take advantage over competitors [2] and improves both internal activity and information flows and relationships to external entities [3]. These new resources allow, among other things: carry out production processes more quickly and efficiently, have more detailed control of the business, locate and correct deviations from the strategic plans and business objectives, generate and manage business information at real time, and improve control of income and expenses [4]. Although adoption of these technologies is very beneficial and recommended for any business, is not viewed with the same eyes by all participants in the innovation process. This results in resistance to change [5]. Business innovation has to face many challenges such as obtaining funds to carry it out, the adequacy of infrastructure and facilities, training of existing employees, hiring the right people for their development and subsequent maintenance, planning your servicing and maintenance and migration of customers and suppliers to the new communication channels [6]. But resistance to change by employees is one of the factors that most often can cause the failure of innovation [7]. That is why we must be taken into account from the beginning of the innovation process [8] and consider that the resistance to change may occur at all hierarchical levels and by a variety of motivations [9]. Resistance to change is often defined [10] as being the implicit or explicit expression of negative reactions, a defense against the intended change, or restrictive forces that are opposed to the reorganization of conduct and the acquisition of new competence. This paper focuses on technological innovation resistance because this resistance has special characteristics and require take specific actions.

Every technological innovation process is associated with a series of steps for its development ranging from requirements specification to final implementation and evaluation of results. Throughout these phases we can incorporate certain properties into project management that help its adoption by employees of a company, as the strategies proposed in [11]. But despite that projects incorporate facilities in their approach to adapt to change, we often find some people that offer resistance to innovation processes. The particularity of business innovation is that technological innovation at the societal level, in day to day, is very well received by users, such as the expansion of internet at home [12], the use of cellular [13], the use of data connections anywhere [14], essential application in cars [15], etc. However, when the innovation is imposed in the workplace is not welcome because is at first a change in working conditions and therefore produces adverse feelings among workers that if left unchecked can lead to various forms of resistance to innovation [16].

Over the period 2005 to 2011 we participated as a consultant and advisory institution in the analysis, specification, development, implementation and monitoring of software applications and ICT infrastructure in both public and private companies. They have been a total of 22 projects that have been involved over 250

employees in different occupational groups, organizational hierarchies and different cultural and technological level. Participation in these projects was in varying degrees, but with the main tasks in which we have collaborated over these years, we have analyzed the factors that produce and condition the resistance to change concerning technological innovation. To do this, we have characterized the companies involved, employees of such companies and the type of projects developed to catalog the forces that arise during the innovation and the danger of these forces. In our paper we describe the different methods and results to understand the synergies of the employees and the projects developed. It also presents the results of the strategies used to overcome resistance to change and the overall results obtained.

The paper is organized as follows. Section 2 provides a description of the types of projects that have been developed, their characterization and how they affect a company's employees. In Section 3 we characterize the companies involved in projects, these businesses are the target of our study of the resistance to change. In Section 4 we undertake the type of workers involved in innovation processes. In section 5 we establish a classification of the resistance to change observed in the projects. Section 6 addresses the problem of detecting resistance to change, and sets the phases which are suitable for their detection and treatment. In section 7 we discuss the strategies to adopt when we detect a type of resistance to change. In section 8 we make an analysis of the different resistance to change that we obtained during the development of projects. Finally, in section 9, we establish the main conclusions and contributions of this work together with lines of future work. This document is a template. An electronic copy can be downloaded from the conference website. For questions on paper guidelines, please contact the conference publications committee as indicated on the conference website. Information about final paper submission is available from the conference website.

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II. DESCRIPTION OF PROJECTS

One of the fundamental objectives of public universities is the technology transfer to other institutions or private companies, that is, research and knowledge are transmitted to the industrial and social tissue. This transfer occurs not only in the application of technologies but also in advising on and monitoring their development, implementation and use. That is why often the university as a research non-profit, no personal interests and sufficient knowledge about technological innovation becomes an ideal observer for all types of entities. Over seven years we have seen the projects in which we have participated, and we have analyzed the forces of resistance appeared. The companies involved are both public and private. We can classify the projects into three types: projects about software application development for business management such as ERP/CRM, projects about advanced applications for specific tasks and projects about enterprise ICT infrastructure. The realization of innovation projects have a main objective: allow companies face continuous change processes and stay competitive [17], so it is done in all types of businesses.

A. *Software applications for business management ERP/CRM*

Small and medium business must adapt quickly to new environments due to the quickly changing markets, the tendency to develop business in digital environments and a globalized environment. Large enterprises in addition to the need for adaptation have another problem. By becoming more and larger must have systems to ensure its flexibility and capacity to absorb the change in their functional structures. To cover these needs, you need to use applications that automate and manage all enterprise information, use and exchange. So increasingly, companies make use of an Enterprise Resource Planning or ERP [18].

The ERP integrates all the functions of the departments of the company in a simple system that allows sharing all information at once to solve the particular needs. The basic architecture of an ERP system integrates all business functions and uses a database as a shared resource [19]. ERP solutions are designed to solve the fragmentation of information in business and integrate all information flows [20]. Furthermore, currently provide large number of parameters by which they can be adjusted according to the characteristics of the industry [21].

The CRM concept itself does not directly involve use of technology. CRM is a corporate philosophy which seeks to understand and anticipate the needs of existing and potential customers, and currently relies on technologies that facilitate its application, development and utilization [22]. CRM software does little by itself. Proper implementation of the CRM model must have an elaborate process, which integrates the entire corporation involving changes in their strategies, functions and processes [23]. Customer relationship management is a continuous learning process with an intention to increase organization's knowledge and understanding about its customers [24] and is closely linked with the ERP of the company, so in many cases their acronyms are linked in the way ERP / CRM.

In terms of how it affects employees in a company we emphasize that these applications involve the entire staff of the company and require understanding and normalizing each and every one of the tasks and data flows

that occur in business. The ERP / CRM produced the result that the tasks and flows are not owned by the workers but of the company, meaning that a certain task, communication or understanding with customers and suppliers not dependent on an operator but the information system and methodology implanted. It also enables completely objective information about the tasks performed, times, costs, staff involved, compare this information with previous results, obtain predictions of demands, infer customers or detect potential supply problems regardless of the personnel who have attended a task. Furthermore, the information arrives unchanged to managers without having been manipulated since the information is captured or inferred by the system directly and not by personal interests of an employee. Furthermore, the ERP/CRM forces operators and workers to share information, to maintain close social relationships and work with more departments.

B. Advanced applications for specific tasks

Such applications refer to software or hardware that is specifically designed to meet or solve a task that was previously performed with difficulty, by highly qualified employee or just could not perform properly. Such applications involve both hardware and software. Some examples of applications developed are application for recognition of patterns in a 2D image automatic identification using RFID technology or network services self-administered on embedded devices [25].

All these applications have a specific task objective and do not involve major changes to structural or functional level of the company, These applications affect only a few workers and often at the manufacturing plant or administrative level in the processing of data to get some specific information. Specific applications are designed to improve a functionality and this means that staff involved in this functionality should be formed and adapt their jobs to new tools with which he has been endowed. It also means that the company will produce an independent method of the specialist and therefore the quality of the processes do not depend on a human, but depend on a machine.

C. ICT infrastructure

ICT infrastructures provide support for existing applications in the enterprise. In some cases, given the small size of the company, these infrastructures are outsourced and are leased in the form of pay on demand [26]. But when the company has a certain size or require advanced services, it is profitable to build and maintain their own infrastructure for processing and especially information storage. The exponential growth in the amount of information that companies manage means that innovative measures are needed for management, analysis and data accessibility [27] and these specific measures are more feasible when infrastructure is property of the company.

This type of project involve a few workers of the company, usually dedicated to the maintenance staff and management of ICT infrastructure. These projects increase the level of responsibilities of such staff and often even involve the recruitment of new staff to assist in the maintenance of new ICT infrastructure. Furthermore, these projects involve substantial financial investment of the company and a commitment to integrate into its organizational structure the management and maintenance of advanced infrastructure.

TABLE I

Summary of the types of projects we have participated, including: the staff to whom affect these projects, how it affects the workplace and how it affects the worker, the number of projects of each type and number of employees involved by type of projects

	ERP/CRM applications	Advanced applications	ICT infrastructure
Who is involved	All staff of the company	Worker who performs that function	ICT managers
How it affects the workplace	Normalized and systematizes tasks / functions	Simplify, improve or delete tasks	Increased responsibilities and tasks
How it affects the worker	Most tasks are unchanged, picking up new procedures to reflect and automate the collection, management and information flow within the company. Normally only involves using tools in their daily tasks to information management.	The worker's role changed dramatically. The worker now uses a machine that makes your old job. The worker must learn new tools or change jobs if their function disappears	Some tasks change, but new tasks are related to their jobs. Normally this type of staff is sufficiently qualified to manage the new facilities, or the company hires new staff.
Projects	13	6	3
Employees	142 employees	74 employees	48 employees

Table 1 shows a summary of employees who are affected, how it affects the workplace and how it affects the employee, for each of the types of projects described. Also indicate the number of projects of each type and

number of total employees in each type of project that have been involved. The effects on workers will produce resistance to change.

III. CHARACTERIZATION OF THE COMPANIES INVOLVED

The main function of the companies involved in innovation processes characterizing the workers who make up every company. Enterprises engaged in manufacturing processes with a majority of staff dedicated to the production have a technology level below the company engaged in information management. This is why it is necessary to consider the type of staff we face knowing the type of business activity, the activity of each employee and the existing level of technological culture.

A. *Non-automated manufacturing enterprises*

They are typically companies engaged in the manufacture of furniture and products that require a high involvement of human workers. The companies in which we develop our projects are mostly companies that manufactures metal parts for machinery manually. Such companies have about 75% of its workforce dedicated to producing a 20% dedicated to the management and 5% dedicated to the direction. The production staff have specific training for handling machinery such as CNC centers, machine tools and cutting machines, but also includes people without these skills dedicated to manual labor or transport. The staff dedicated to the management is responsible for controlling the flow of purchases, sales and customer balances, and usually use tools to produce, share and maintain information. The direction in these cases are usually people without a high technology training, using tools to manage their agendas and contacts and to receive summary information about the status of company accounts. There are no tools designed for decision support.

B. *Automated manufacturing enterprises*

Unlike companies in the previous section, automated manufacturing enterprises carry out their production processes through a strong automation manufacturing process. These companies make their productive mostly using machinery through which travels the raw material to build consumer goods finally. In our case, are enterprises that builds parts for agricultural machinery or heavy equipment, and in which there are very few workers at the plant level because that production processes are automated. Such companies have about 30% of its workforce dedicated to producing a 65% dedicated to the management and 5% dedicated to the direction. These companies are composed primarily of managers, and these managers receive and manage customer orders and supply vendors. The manufacturing is automated and does not require a large number of operators. In these businesses, the use of technological applications influences, especially, in the standardization of channels and information flows, and the greater transparency of information used in the company.

C. *Management companies*

Such companies include those whose business is to manage information of some kind. In this case involves bar associations. Functions of such companies is to manage the partners involved in the school, its activity, government services, sanctions, merit, fees and participations. In this case there is no production of goods or tangible products but if there is a generation of information to be inferred from data capture. In these companies, 90% of the workforce of the company is dedicated exclusively to the management while about 10% made up the governing body. Management employees makes heavy use of computer tools for the generation, storage, sharing and finding information. They also manage reporting tools and inference of knowledge to establish trends, segregating the best partners to establish action plans and training courses. Finally they use different tools for communication and contact with members of the school, always keeping a log of communications. Generally, the governing body does not need to handle large volumes of information, limited to ensure that the economic levels of the school are correct and in any case establish contingency plans to facilitate the return to normal if there are large deviations.

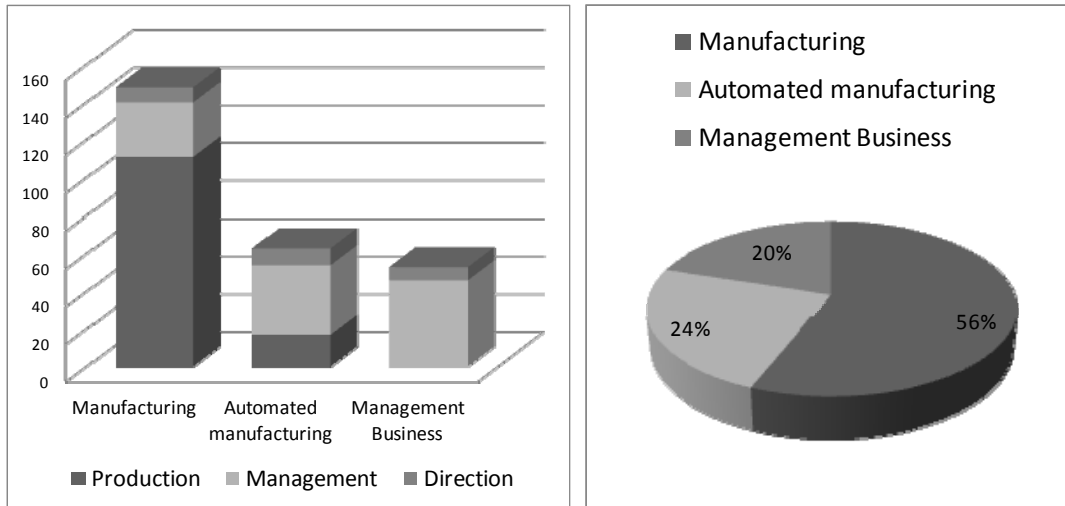


Fig 1. Left: distribution of workers according to types of businesses. Right: total distribution of employees by type of worker.

IV. CHARACTERIZATION OF EMPLOYEES

The type and hierarchy of the employees involved in the innovation process is an important factor to take into account to measure the degree of resistance that will fight innovation. Also determine the actions to be taken.. Through our experience we have divided the people involved in 3 three groups, depending on their hierarchy within the company.

A. Directors

Through our experience we have divided the people involved in 3 three groups, depending on their hierarchy within the company. These staff must possess a vision of the overall operation of the company, know the general flow of communication to customers and suppliers. These employees must produce reports processing data obtained from the company, and decide whether or not it met the objectives set to introduce contingency plans if needed. These employees produce a big problem. When they exert forces of resistance, the resistance is produced at high levels in the hierarchy. This influence can drag to employees of lower ranks that alone did not exert any resistance. A director may think your job is threatened because before the job depended on the ability of the director and now a software application produces this information, report or prediction. This case is strange. Innovation processes are based on the concerns of directors. A angry director is stranger. But sometimes, there are several directors, and not all agree. An innovation process can threaten a high position.

B. Managers

They are workers established in intermediate hierarchical categories in a company as managers, or managers responsible for functional section. Are responsible for transmitting downward and upward. Down: translated and broken down the broad guidelines set by top management objectives, plans and programs for their subordinates, and assign the resources required. Up: coordinate and integrate specialized tasks from lower levels. These employees are located in an intermediate hierarchical position. They maintain direct contact with both top positions as the lower and they can easily convey their contrary feelings to innovation in both directions, which may involve a high risk of failure in innovation. This sector will be particularly care on innovation, we will try to get closer to the position of these workers and show great empathy for their opinions.

C. Workers

Are employees of the lowest hierarchical level and responsible for carrying out productive tasks of the company. Generally, these employees bring little risk because their ability to influence other workers is low. These workers also show resistance to change of low intensity.

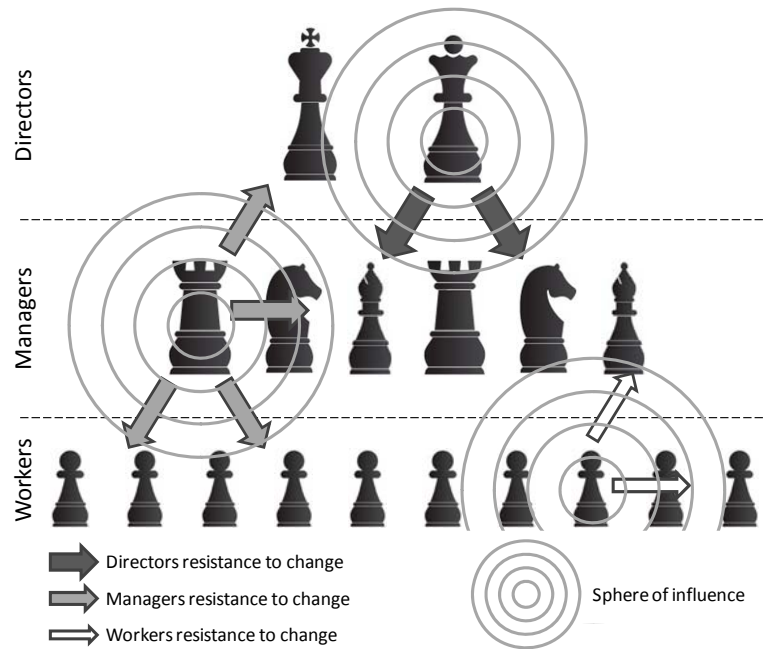


Fig 2. Hierarchy of employees and influence over other employees.

Figure 2 shows the hierarchy of employees and influence ability over other workers. If we think of workers in a company like chess pieces, the directors would be symbolized by the king and queen, managers and department heads would be the special pieces and plant workers would be symbolized by the pawns. As shown in Figure 2, the influence caused on the intermediate levels is greater because these workers maintain relationships with upper and lower hierarchies, and they can influence more people. Moreover, directors do not try to transmit this resistance at their level, they pass the forces on to their subordinates. Generally, directors agreed with innovation and high resistance at this level involves power struggles that may have adverse consequences. The intensity of the influence is linked to the hierarchy of employees. Directors and managers can exert a strong influence towards his subordinates while lower-level workers do not exert great influence but they can discuss your dissatisfaction with others and refer complaints to his superiors.

V. TYPES OF RESISTANCE TO CHANGE

Innovation processes involve multitude of changes that can affect anyone of the company. These changes can be of different types, among others, for example:

- Changes in the way of establishing relationships between the various stakeholders in the company. For example, as information is exchanged between employees of different levels, as this information is stored, or are set and controlled the flow of information between customers and company.
- Changing the tools used to develop the work. For example, information management tools, storage devices or protocols for the use of tools.
- Changes in the nature of the job. For example, the automation of a task can delete a job, and the employee shall be reassigned to another post or another job.
- Changes in the hierarchy of workers. Innovation can change the importance of the tasks. A task was marginal before and now is a primary task. Employees who perform these tasks may change professional category or hierarchy in the company..
- Emergence of new tasks. The introduction of new infrastructure and tools often include the emergence of new figures of employees for management and maintenance.

These changes, because they can be very numerous and in principle unknown to the workers, can produce negative feelings of anxiety, fear, worry, hostility, intrigue, polarization, conflict or impatience on employees. Furthermore, these feelings can have two origins. Origin conscious, if feelings are resulted from employee thinking, and origin unconscious, if feelings are the product of the influence of peers and not self-motivated. These feelings cause side effects: employees try to block change, they try to no change their current situation and their working conditions..

Employees do not always produce resistance to change. In many cases, the benefits of innovation are numerous and obvious and workers show a positive attitude to change. But, in our experience, it is common to find an employee who produces any kind of resistance to innovation.

Finally, we consider resistance to change as every action, voluntary or involuntary, of an employee who tries to prevent the advance or progress of an innovation. These actions may be of different nature. The effects of the

resistance causes damage to the innovative process in function of the intensity of the resistance. After our experience, we have developed the following resistance levels that classify the employee's status based on their empathy with the innovation process:

- No resistance: the employee is in accordance with the proposed innovation and puts all his skills available to the innovation process. This is the ideal state for innovation processes because the employee does not resist. In addition, employees shall endeavor to make the process of change and innovation successfully..
- Distrust: the employee is unwilling to process innovation, not opposed but neither provides resources. In general, this position is maintained in the early stages of the innovation process until it evolves into a position of greater strength or becomes non-resistance.
- No collaboration: the employee does not believe in innovation, is not willing to accept it and not want to participate in the innovation process. Employees in this state hinder the innovation process that affects their jobs. They do not want to adapt to change and believe that if the project does not advance the company managers will believe that change is not possible. So these employees will retain their current state. Are employees who resist change, but their resistance is isolated and focused on their jobs..
- Hostility: the employee does not believe in innovation and also the employee attempts to influence other workers. The employee hostile tries to get other employees to think like him. The employee tries to increase the resistance forces. For this, the employee tries to convince colleagues that develop similar work. Such positions can be dangerous. If all employees in a section meet in the resistance to change can cause the failure of innovation because directors may think that the innovation process is incorrect.
- Enemy: in this group are classified employees showing hostility to the innovation process and also used tricks and gimmicks dishonorable to try to derail the project as a boycott or sabotage. Very few employees are in this state. They are usually isolated individuals unable to attract other colleagues to this position, because this attitude may have legal consequences.

In Figure 3 we show the different states in which you can find an employee. The ideal state is not resistance. That is the state through which we can achieve success in the innovation process. The worst of the states is the enemy because the employee does not cooperate with the process and try to sabotage innovation to produce failure. The resistance control statements consist of decreasing resistance to the state of no resistance. Thus we obtain the cooperation of the employee or at least diminish the intensity of their resistance to change.

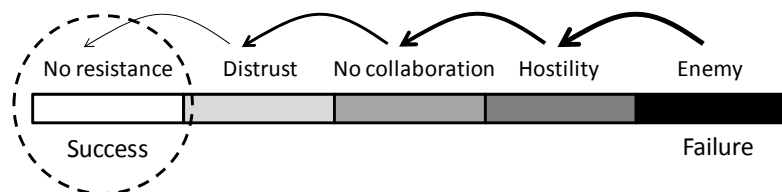


Fig 3. The different states of resistance of an employee where the state of nonresistance is the desired state and the state of enemy is the worst.

If we are unable to detect the resistance forces, they could increase their intensity. That is, if an employee is placed in a state of mistrust and this situation is not treated, the employee will evolve to a state of increased resistance, leading to non-cooperation or even hostility, so it is very important to detect resistance.

VI. DETECTION OF RESISTANCE TO CHANGE

In the development of a project is very important to detect all the requirements from the beginning, because if some aspect is overlooked, you may find that later inclusion is not feasible or that create more costs than are desired. In the treatment of resistance to change occurs the same. From the early stages of a project is necessary to identify and catalog the forces of resistance that we find in the project. We must work from the beginning to isolate, neutralize and transform resistance into productive forces. That is why in our projects we have assigned part of the specification of requirements for detection and initial treatment of the resistance forces. During the innovation process exist several moments for the detection of resistance to change. The first stage for detect the resistance is when employees know the intentions of innovation in the enterprise and the first contact with us is during the requirements specification..

To detect these forces we need create a good working environment among employees of a company and the development team. To do this, we clarify that the development team of innovation is another employee of the company and the innovation process to be developed should not threaten any employee. For the requirements specification often the system of individual surveys of employees is used. The surveys allow us to know the work of employees, workflows and existing problems. In addition, these surveys included questions related to possible resistance forces, trying to capture and catalog if possible the state of resistance presented by each employee. Also, these interviews capture the information known by the employee about the project. We want to know who thinks a worker about the change in their work. This contact allows us to meet the training needs of each employee and needs to adapt to new working conditions. An important aspect in these surveys is that they

constitute the first approach to every employee and we tell them and make clear they are not alone in this process of change, they will receive the necessary support and training and innovation is to improve the quality and employee productivity. Each person is an irreplaceable element in the company.

After years of experience we have determined that an important step before starting the process of gathering requirements is to inform employees about the project. We could confirm that: if the first action is to have a meeting with all employees of the company and inform everyone about the objectives of the innovation process, resistance to change diminishes greatly. A first step in overcoming resistance to change is to dispel the fears and doubts about the intentions of the project. Often, we found that resistance to change is caused by the fear of the unknown, especially technology unknown if employees have little technological culture. Employees unknown what is the purpose of the project, what are the processes that will deploy the project and the collaboration that must take. Often this ignorance produces unfounded fears and hostilities toward the innovation itself. Once you know the background, these feelings are dispelled. From the beginning, it is important to involve employees in the projects, involve them as protagonists of change. Employees should never feel like victims of innovation. If we achieve this goal will be closer to success. In addition, we harness the forces of the employees in our favor rather than fighting them..

Another important moment for the generation of resistance forces is during the early phase of testing and first installation. This moment occurs when: the developers installed the first working version of the software, or data migration starts towards new infrastructure. At that time, any employee can be seen that those elements which are involved are not as expected and this again results in the appearance of fear and hostility. That is why we have included a second round of questions to capture the degree of employee satisfaction with the product version. Knowing the employee satisfaction allows us to detect risky situations such as: the application is not aligned with business objectives, the resistance forces are not controlled, employees will support change, workers are identified with the new proposal enterprise, innovation process management need more management of resistance to change. At this point several scenarios can occur:

Scenario 1. El The post and its functions will be altered. The employee senses these changes and feel discomfort producing resistance. In this case, the alteration of job concerns strategic decisions of managers and therefore we must first refer the employee to his immediate superior. The employee will resolve their disagreement with the manager. For our part, our duty will be to assist and train the worker in his new role and keeping management informed of the possible contingencies that may occur. Thus, the company may be alert and take mitigation measures on negative behaviors of employees.

Scenario 2. The functions of the employee does not change but the employee's tools or methods do change. In this case, we should help as far as possible the employee to perform their jobs through training and advice. First, we must maintain empathy with the workers and show that adaptation to new tools and methodologies is not a traumatic process but an opportunity to grow professionally. Innovation processes must address a specific training plan for each job. No employee is lost along the way to innovation..

Scenario 3. The changes are very light or employee training is sufficient to accept quickly. Sometimes there are hardly any changes in the workplace or the actual training of employees allowed to accept the changes swiftly and with little training needs. This situation is ideal. Innovation processes are carried out transparently, but require adequate existing training to change.

Figure 4 shows the phases of requirements specification and the first implantation. When we detect resistance forces must act quickly. The action should not affect other individuals. Without action on the resistance, resistance affects other phases of the project. In parallel with the project management has to be a management resistance to change, otherwise the project may fail. There are two parallel activities, essential and necessary. The resistance management can be developed by the project manager if the project is not large. If the project is large, the project requires the figure of the resistance manager.

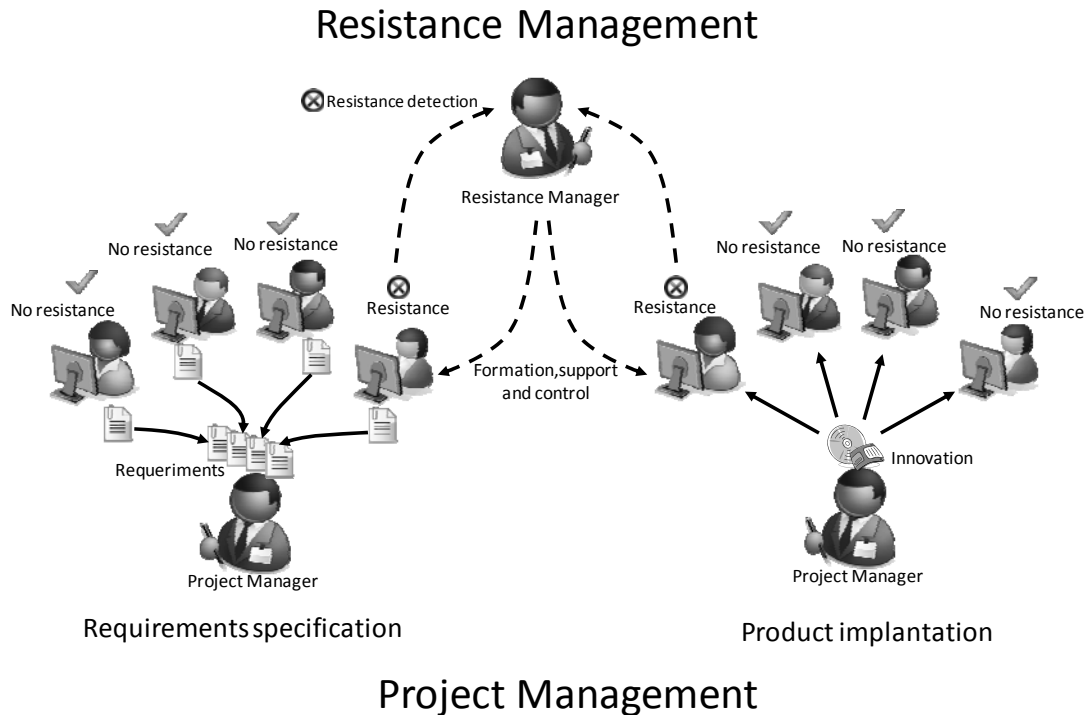


Fig 4. Project management and resistance management. Two parallel activities over the same employees. Are distinct activities that have a common goal: the success of the project.

VII. OVERCOME THE FORCES OF RESISTANCE TO INNOVATION.

As shown in previous sections, there are different levels of resistance to change, showing different intensities, so the employee is dissatisfied with the alteration of the environment or the conditions of his job. Each of these states requires a different action. These actions are aimed at decreasing the level of resistance, isolate or cancel. After many experiences in our projects for each state we have decided to take a concrete measures. These measures allow to move from one state to another. These measures lead to the no resistance. These actions are based on the current state.

A. Enemy estate

When we detect an employee who is in a state of enemy, that is, an employee who is taking action unilaterally to cause the failure of the innovation process, as an immediate measure we decided to inform their line managers. When an employee does not cooperate with us and also perform acts that go against the objectives and policies of the company, the company's mission is to correct that skill using business contingency plans. An enterprise development and deployment of innovative products is not responsible for the management of human resources of the company. In this state, all our efforts (training, counseling, empathy or any other) are a bad expenditure of energy. We have checked as the staff located in this state is usually hiding interest unfavorable to the company and therefore the first mediation is through the directors or managers.

B. Hostile state.

This state is caused by ignorance **WHAT IS THE PURPOSE OF INNOVATION**. This state is usually caused by fear of the effects of innovation: the job can be terminated, changed the division of responsibilities, hierarchy is changed, the company is reorganized. All unfounded fears. The employee feels he must defend. The only thing he can do is try to get other partners with the same feelings, but without doing anything illegal. If the employee gets a group of workers with the same feeling can hinder innovation processes. This situation can be corrected by the general information meetings or even individuals with each employee, transmitting in each case which are the objectives of the company and showing that innovation has some goals that are aligned with the overall objectives. It is necessary to show to worker that innovation can be very deep and affect the resources, tools, methodologies, skills, time or productivity, but that innovation is seeking corporate benefits by improving conditions for workers.

C. State of no collaboration

This state is caused by ignoring **WHO or HOW THE INNOVATION AFFECTS**. This state is usually caused by the worker's belief that the changes will report greater workload and that innovation is an excuse to appeal to

him more work, in short, that will worsen their working conditions. To remedy this situation to be transmitted to the employee, once you know what are the plans of the company: the exact effects of change, show new tools and protocols, compare the new job with the previous, highlight the progress and benefits, quantifying tasks and effort required and, finally, demonstrate the benefits of change.

D. State of distrust

This state is caused by ignorance of TECHNOLOGY OF THE INNOVATION. This state usually arises when the employee does not have a clear vision of how it will perform its functions. This situation is usually caused by lack of appropriate technological knowledge to operate with ease with the new tools and methodologies. The employee believes it will not be able to learn new technologies. This is the simplest situation in which we can find. The solution to this situation is the formation and training of employees in the new technological environment. This attract confidence on innovation and involving them in the change.

E. State of no resistance

Is the ideal state and allows the proper development of innovative process. In this state we have the full cooperation of the staff involved and do not need to take special measures.

Figure 5 shows the various strategies to adopt depending on the degree of resistance to change. It is necessary to reduce the degree of resistance gradually from one state to the above, as this will lead to the employee understands the company's plans, actions taken, as these measures will influence their work and finally the necessary technological knowledge to use the tools and methodologies chosen.

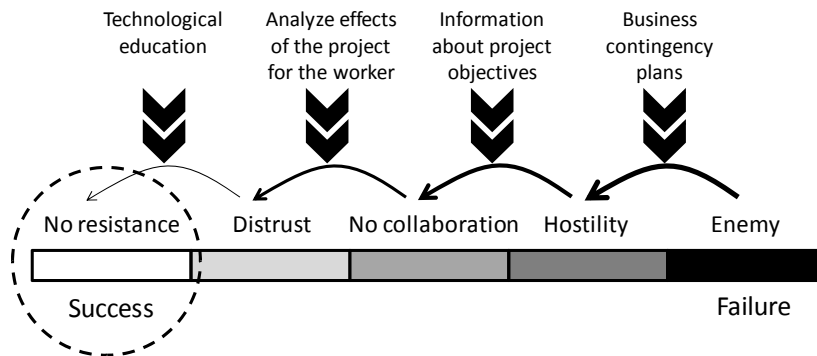


Fig 5. Actions to overcome every kind of resistance to change.

VIII. ANALYSIS OF RESISTANCE OF OUR PROJECTS

During the period 2005-2011 we participated in a total of 22 different projects. In these projects has emerged resistance to innovation. This resistance had different intensity and occurred at different business levels. In Table 2 we summarize the resistances encountered in such projects. Project ID column specifies an identifier each project. Company Type column specifies the type of company where we develop the project: Management (MG), Manufacturing (MA) and Automated Manufacturing (AMA). Project Type column specifies the type of project developed: ERP / CRM, Advanced applications for specific tasks or ICT infrastructure. Employees Total column shows the total existing employees in the company, excluding managers that drive the project and are excluded from the resistance control. Employees Resistance column indicates the number of employees at the plant level that produced resistance, parenthetically we can see the classification of the type of employee resistance using the scale: 1-distrust, 2-no collaboration, 3-hostility y 4-enemy. Managers Resistance column indicates the number of managers that produced resistance and as before, in parentheses shows the classification of the type of resistance. Directors Resistance column indicates the number of directors that produced resistance and also shows the type of resistance using parentheses.

TABLE 2
Summary of the resistance encountered in the projects.

Project ID	Company Type	Project Type	Employees Total	Employees Resistance	Managers Resistance	Directors Resistance
1	MG	ERP/CRM	12	1 (1)	0	0
2	MG	ERP/CRM	18	2 (1, 2)	1 (2)	0
3	MG	ERP/CRM	6	0	0	0
4	MG	ERP/CRM	10	1 (1)	1 (4)	0
5	MG	ERP/CRM	7	0	0	0
6	MA	ERP/CRM	35	4 (1, 1, 1, 2)	1 (2)	1 (3)
7	AMA	ERP/CRM	6	1 (2)	0	0

8	MA	ERP/CRM	3	0	0	0
9	AMA	ERP/CRM	7	0	1 (3)	0
10	AMA	ERP/CRM	12	2 (1, 1)	0	0
11	AMA	ERP/CRM	6	1 (2)	0	0
12	MA	ERP/CRM	8	1 (1)	0	0
13	MA	ERP/CRM	12	1 (1)	0	0
14	AMA	Advanced	7	0	0	0
15	AMA	Advanced	6	0	0	0
16	MA	Advanced	35	3 (1, 1, 2)	0	1 (3)
17	MA	Advanced	8	0	0	0
18	MA	Advanced	12	0	1 (3)	0
19	AMA	Advanced	6	0	0	0
20	MA	ITC	35	2 (2, 2)	0	0
21	AMA	ITC	7	0	0	0
22	MA	ITC	6	0	0	0
			264	19	5	2

If we analyse the data we obtain that 10% of employees in the company produced some resistance to innovation, of which, 73% are employees, 19% are managers, and only 8% are directors.

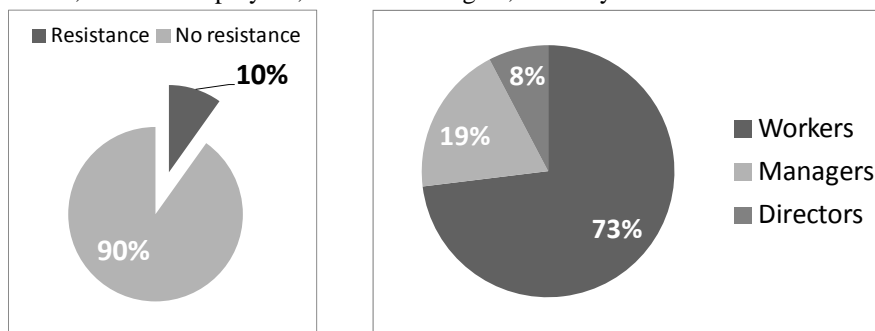


Fig 6. Distribution of resistance to change and the types of workers who produce resistance.

This result was expected: employees lower down the hierarchy do not know in detail the objectives of the company, while the managers or directors know better global business objectives. Those who know the business objectives offer less resistance to innovation.

But if we analyze the type of resistance we can see that the resistance of the intermediate levels is the most intense. Looking at the type of resistance offered by workers at the plant level, the average intensity is low in the majority. Employees mistrust or do not cooperate, but employees do not hinder innovation. Whereas if you look at the intermediate level (managers and middle managers) the resistance they offer is high or very high, trying to influence other workers or even going to sabotage the process of innovation to make it fail. In the directors, although not very common, there are also disagreements and this resistance is also of high intensity but fails to harm the company. The steering committee's main mission is the proper functioning of the company. At senior management level, this type of resistance are given when the innovation initiative comes from a director alone and has no initial support from other directors. Once launched the project, managers see the benefits or harm of innovation, and the resistance disappears, or innovation stops. To achieve a successful project all managers must be agree.

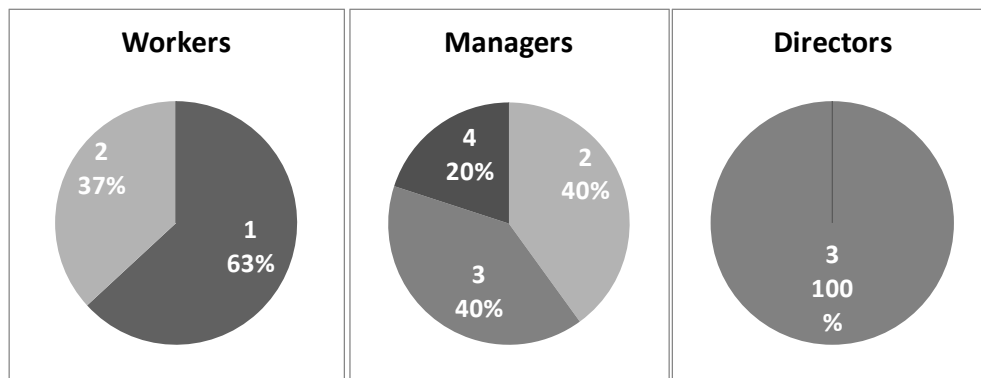


Fig 7. Distribution of the different degrees of resistance depending on the types of workers. Each image shows the resistance type 1-distrust, 2-no collaboration, 3-hostile, 4-enemy, and the percentage of resistance within each group of workers.

As shown in the graphs of distribution of resistance, plant-level resistance that occurs is largely due to the need for technological training of employees or the need to convey that the changes that will suffer workplaces will not be traumatic for workers. However, at managerial level, when there is resistance, it has big intensity. This intensity is due to the fact that these people have other interests in the company, or because they think they are expendable. In some cases, innovation has uncovered fraud of a manager. The resistance produced the suspicion of directors. A high level, resistance to change often coincides with the struggle for the struggle of powers between executives of the same hierarchy. In this case, the development team of innovation must play a mediating role, clearly indicating what the new map of division of powers after the end of the innovation project.

If we analyse the distribution of resistance depending on the type of project (figure 8) we can see how projects such as ERP / CRM produces a higher level of resistance, ie, projects that affect all hierarchical levels of the organization and all staff at these levels. Hopefully, if a large number of people are affected, the number of people disagree is higher.

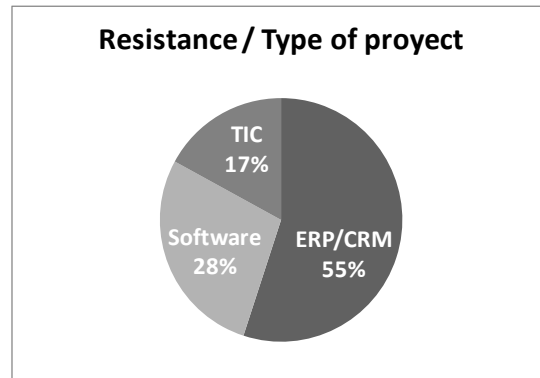


Fig 8. Distribution of resistance based on type of project.

Finally, let's see how it is distributed intensity of resistance based on type of project (figure 9). Innovation projects that affect a greater number of people produce a wider range of intensities of resistance, but mostly low to medium intensity, while the more specialized projects produce a higher intensity resistance.

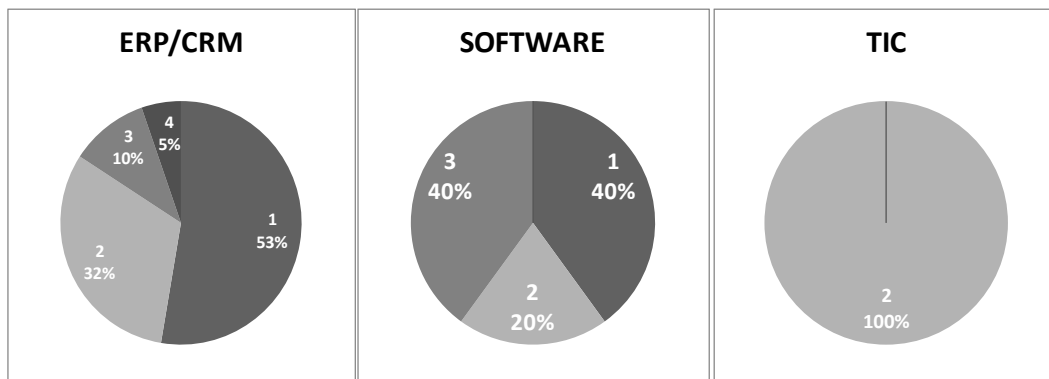


Fig 9. Distribution of resistance in each type of project. The type of resistance is indicated within each type of project: 1-distrust, 2-no collaboration, 3-hostile, 4-enemy.

From these data we conclude that employees who have a lower technological culture tend to offer less resistance to change but in greater number, while, in specific applications or innovations in high level, the forces of resistance to innovation are greater.

IX. CONCLUSIONS

In this paper we analyzed the resistance to innovation. This resistance is a specific type of resistance to change. Innovation is generally well received by users in the private sphere. But innovation produces resistance in the professional area. This resistance to innovation occurs at all hierarchical levels of the organization. At low levels, plant operators, is produced mainly by a lack of technological knowledge that instills insecurity to workers. At middle management level or even higher, this resistance is motivated by the way that will alter the hierarchical position, skills or even personal interests are affected.

The resistance forces are more numerous when projects affect more people in a company, The resistance forces are more numerous when projects affect more people in a company, but are more intense when only affect a few workers and especially if these workers hold positions in middle/high management or specialized tasks.

In our projects we have addressed the resistance forces through training events based on three main blocks of activities designed to overcome each of the types of resistance. Through these actions we have achieved successfully conclude all projects:

- To overcome resistance hostile: convey the benefits of the objectives that arise with innovation projects to the senior and middle levels.
- To overcome the resistance of non-cooperation: transfer the benefits of innovation projects on each workplace.
- To overcome the resistance of distrust: technologically educate each employee in their workplace.

In general, to overcome the forces of resistance to innovation we must educate workers. If we educate the employees, the sense of force is reversed. Workers should be protagonists but not victims of innovation. To do so, employees must know objectives, tasks and technology. Resistance to innovation is the unknown resistance. Resistance to innovation is a specific type of resistance to change. The resistance to innovation that does not stop with education hides other personal interest. If an innovation project is right always has benefits for the company. Will always find resistance forces for innovation. But a good early detection and treatment of resistance allow us to project success.

Finally, this article has made a classification of the forces of resistance and how each affects different employees of the company depending on the project and the type of company that develops on the innovation process. This categorization has been extracted from the experience with more than 250 employees of all types, hierarchy and knowledge. We observed the feelings that cause an innovation project in each employee of a company, we have analyzed and classified and then treated.

Currently, we are working on creating methodologies for exhaustive and formal detecting and monitoring of forces of resistance to innovation. Our conviction is that: all staff as part of the company is a valuable resource and in our experience we have seen that as redirecting these resistance forces can leverage the skills of workers.

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