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INNOVATION CASE

FIAT AUTOMÓVEIS – COMPETENCE MANAGEMENT FOR INNOVATION

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INTRODUCTION

Fiat Brasil launched its Research and Development center to support and adapt its cars to the local market. However, as it employed a skilled team and developed internal competencies, the Brazilian subsidiary earned trust and autonomy vis-à-vis the Fiat Group to develop vehicles in the country. Thus, the Betim-based plant, the largest Fiat Group plant in the world, stopped reproducing the offerings from the company's Torino headquarters and became a car developer with its own characteristics and innovation culture.

To reach this position, Fiat Brasil equipped its Engineering department, which is one of the most advanced ones in the worldwide automobile market, with equipment, laboratories and, mainly, well prepared and skilled people, as highlighted by the Experimental Engineering department manager.

In the Case described below, it was competence management for innovation, focused on individuals and on their knowledge and experiences, which made Fiat Brasil an important development and innovation center for the Group throughout the world.

By basing itself on descriptions offered by the Experimental Engineering Department Manager, this paper presents the process of change and enhancement that took place at the Giovanni Agnelli Development Center.

CONTEXT - FIAT BRASIL AND THE GIOVANNI AGNELLI DEVELOPMENT CENTER

Fiat[1] is one of the founders of the automobile industry in the world and it was set up by investor Giovanni Agnelli in Torino at the end of the 19th century and the beginning of the 20th century. In Brazil, the Fiat Group set up its subsidiary in Betim, MG, in the 1970s, at a time when the State's economy was accelerating due to sectorial diversification and to an increasingly developing industrial structure (DINIZ; SOUZA, 2010).

Since then, from the ethanol-powered Fiat 147, the first car Fiat assembled in Brazil, to its latest 2012 offerings, Fiat Brasil has consolidated itself as a manufacturer that offers consumers increasingly innovative products with new technologies and design solutions. At first, just like the other manufacturers who have set up shop in Brazil, the Brazilian subsidiary was not meant to develop new models for the market. Besides production, Fiat Brasil also adapted existing models to meet the needs of markets in developing countries (CARVALHO, 2005).

When the Brazilian economy opened up in the 1990s, the need arose for car manufacturers operating in Brazil to improve and renew their products constantly so they could raise their productivity and increase their competitive advantages vis-à-vis international standards (CONSONI; CARVALHO, 2002).

[1]FIAT was founded in 1899 and named Società Anonima Fabbrica Italiana Automobili Torino.

Still in the 1990s, FIAT launched the "178 Project" to develop a global car, the Palio. This product's development involved technicians from several subsidiaries, including the Brazilian one. According to Amatucci (2010), about 200 engineers from the Brazilian subsidiary took part in the project and the Brazilian team played an important role in its development, though they were based in Europe. According to the author (p. 79), "the relevant process as regards developing the 178 Project was the involvement of the Brazilian team as a way to build skills for local development". Since then, the Fiat Brasil Engineering department has constantly grown and it currently houses the company's second Development Center, the Giovanni Agnelli Development Center.

The most recent stage in this trajectory happened within this Development Center, which was inaugurated in 2003 to bring together the various research and development areas for Fiat products in Brazil. The Center is seen as Fiat's most complete development center outside Italy, and it is in charge of both the full conception and the development of a new vehicle, from concept to manufacturing prototypes and to running tests to validate technical solutions. About 800 engineers and technicians who dedicate themselves to innovation and to developing new technologies and design concepts work at the Development Center in laboratories that offer the latest resources to carry out simulations and dynamic tests in real scale that enable the company to develop its vehicles with quality and safety.

Together with Italy, the Giovanni Agnelli Development Center in Betim leads product development projects for the Fiat Group and its subsidiaries in China, India and Latin America. The core focus of most of these projects is on developing economy cars, mainly for the Brazilian market (BAHIA; DOMINGUES, 2010). The area was conceived and implemented to be an engineering center whose responses are quick, efficient and appropriate to the Brazilian market.

That is why constant research is one of the fundamental principles of the area. The Center interacts with universities and other educational centers to encourage human capital enhancement and specialization by sharing studies in fields of their common interest.

Research and development work carried out at the Betim plant development center is among the most advanced in the world. It is a competence that represents competitive gains for Fiat and for its supplier network. At the Giovanni Agnelli Development Center, it is possible to carry out tests for different kinds of components for each new project, which also enhances synergies with headquarters in Italy.

STRUCTURE

The Giovanni Agnelli Development Center structure deals with all areas specific to developing a car:

- Style Center - design conception, by creating lines, external surfaces and interiors for the company's cars.
- Project Engineering – Electro-electronics, bodies and chassis.
- Experimental Engineering - it encompasses the areas of Experimentation, Prototypes, and Materials Engineering.

By considering the focus of this study - understanding how individual competence management leverages FIAT product innovation - this paper will focus on the people management structure and process at the Experimental Engineering department. This department involves one of the most complete structures in Brazil. Laboratories and simulation, study and research chambers analyze an ongoing project's every detail. It is at the prototype-building center that the project's physical models are built, firsthand, where the car materializes before it goes into series production, to be tested and checked. Materials Engineering can count on metals and coatings, polymers and chemical laboratories that support new product development.

Some of the laboratories that are part of the Experimental Engineering department:

Figure 1 - Electromagnetic Compatibility Laboratory
Source: Fiat Press (2011)

It is designed to analyze temperatures ranging from 30 degrees below zero to 50 degrees above zero and speeds up to 200 km/h.

Figure 2 - Climate Chamber with Rolling Dynamometer
Source: Fiat Press (2011)

It is designed to analyze temperatures ranging from 30 degrees below zero to 50 degrees above zero and speeds up to 200 km/h.

Figure 3 – NHV (Noise, Vibration and Harshness) Laboratory
Source: Fiat Press (2011)

Four chambers to run assessment tests and to develop vehicles that offer its occupants greater acoustic comfort.

COMPETENCE MANAGEMENT FOR INNOVATION

From a car's conception to its commercial launching, the work carried out by Engineering is based on process, technology and people. The process is a guide that supports all the work. Technology is fundamental for a leading-edge engineering sector. Nevertheless, human talent means more than leading-edge equipment and modern techniques. People are the ones who are going to make a car run: their brains operate machines, their knowledge brings innovation, and relations and exchanges among them will lead to collective intelligence. Management for innovation at Experimental Engineering - which is a fertile environment wherein to develop technologies, processes and professionals - uses an approach based on knowledge, competence and innovation as it centralizes on people all of the area's innovative potential.

There are about 250 collaborators in the Experimental Engineering department, and their levels of schooling range from technical, engineering, Master's and Doctors. Most of them are young professionals: about 60% of them are up to 35 years old and over 60% have less than five years' experience. Nevertheless, management believes that the team's low average age and the little experience they have facilitates learning. Experience is important, but both willingness to learn and openness to what is new are indispensable to an innovative environment, as stated in a testimonial by the area's manager.

The Fiat Experimental Engineering department has been working with the idea that innovation is possible through behavioral change. It seeks to think differently even when dealing with run-of-the-mill activities. Freeing people to use their competencies and knowledge to think and act differently enables them to turn such knowledge into value and so generate innovation and results for the company.

This concept is being applied at the Experimental Engineering department under the name Double Management: running everyday tasks in parallel with extraordinary tasks. This has achieved surprising results, as it has been discovered that people who were performing both kinds of tasks at the same time produced more and better, because their capabilities were expanding together with their new ways of thinking. The methodologies used to develop extraordinary tasks helped to improve the process used for everyday ones.

EXCELLENCE IN EXPERIMENTATION – INNOVATING THE MANAGEMENT MODEL

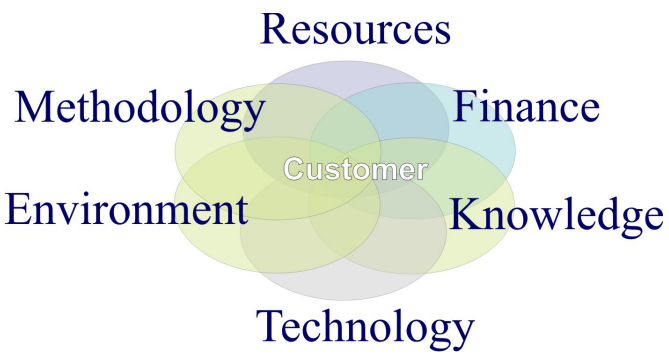
About six years ago, the Experimental Engineering department consisted of several laboratories that worked on their own without communicating among themselves. As the first Fiat engineering department to be set up in Brazil, Experimental was well structured with machines, laboratories, investment and experience. However, its 170 employees were spread out among laboratories and teams with different ways of thinking and management. The department achieved good results, but the company's senior management decided that they had to be excellent ones. Thus, it was necessary to carry out total integration at the Experimental Engineering department by joining teams, processes, technologies and research in the quest for a definite goal: excellence in experimentation.

"Excellent Experimentation is defined as the qualification attributed to a set of resources, that is, physical, financial, knowledge, technologies and methodologies brought together in an environment in which people seek to achieve and maintain high-performance standards as they create a competitive differential within the company.

The continuous and sustained valuing of the people who lead this work, as well as the generation of high-quality new products, processes and services, also make up an Excellent Experimentation".

Source: Working on Innovation - An Acquired Experience, Dec., 2011.

ACTION PLAN



Source: Working on Innovation - An Acquired Experience, Dec., 2011.

Work process and methodologies were important at that moment when a whole area's format was being changed, as they supported what the people were doing, why they were doing it, and where they wanted to arrive at.

Action plan focuses:

- Physical Resources - What was the actual production capacity?
- Financial Resources - What was the actual budget, while understanding that experimentation is always the most expensive engineering activity?
- Knowledge – What is the team's level of knowledge and the need to register such information, and was it being used well?
- Technology – Discovering and using new technologies while adding value to them.
- Methodology – Are the activities being carried out using the correct methodology?
- People – Is it the appropriate team? As regards quantity and quality? Are recognition and valuing also appropriate?

The deadline was the most import and element on the list of actions to be developed to remodel and integrate the department. It was necessary to set a schedule for the work to begin to show results.

	ACTION PLAN	1st QUARTER 2006			2nd QUARTER 2006			3rd QUARTER 2006			4th QUARTER 2006		
		JAN	FEB	MAR	APBR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	Organizational structure fitment.												
2	Defining the attributions and the working boundaries of Experimental Engineering department professionals.												
3	Organizing the work groups.												
4	Defining each work group's competence disciplines.												
5	Defining the specializations that correspond to each competence discipline.												
6	Creating performance indicators.												
7	Positioning Integrated Exp. in PPSP.												
8	Mapping the internal processes.												
9	Defining the Modus Operandi and the flow of activities.												
10	Developing the Training Plan:												
	Defining the competence requirements that correspond to each specialization												
	Mapping the competencies												
	Mapping and classifying the specializations												
	Creating a priorities matrix for training												
	Training plan												
	Mapping the laboratory structure of the physical and virtual tests												
11	A study of the re-dimensioning of hourly-paid workers based on the demand for hours / competence required and existing competencies and job restructuring												

12	Adjusting the groups of hourly-paid workers												
13	Implementing Project Management, Participation Valuing, development histories and resource saturation (Physical, Human) systems;												
14	Implementing the PSI (Experimental Integrated Plan);												
15	Creating and reviewing all test micro Standards;												
16	Implementing CAE (Experimentation Activities Control);												
17	Creating a Unified department to receive and manage test parts;												
18	Reorganizing the Instrumentation Structure;												
19	Defining the flow and management of test vehicles;												
20	Redefining the Integrated Experimentation layout.												
21	Implementing the 5S Methodology clean program;												
22	Implementing the innovation process												
23	Controlling the alignment of objectives with the Company's strategic planning		**daily leadership actions**										
24	Adjusting a professional's condition within the department: profile for the job, cultural alignment with the company, future vision, self-development culture.		**daily leadership actions**										

Source: Working on Innovation - An Acquired Experience, Dec., 2011.

EXPERIENCE ATTRIBUTES

Experimental Engineering integration meant mapping people, teams and attributes. It was necessary to learn where knowledge, experience and information could be found within the department.

Some experience attributes were defined:

- theoretical knowledge;
- knowing the norms;
- the application of theoretical knowledge;
- equipment operation.

Mapping was carried out by the people in charge of the group and compared to a self-assessment carried out by the other professionals. This self-assessment consisted of a form attributing values to each one of the attributes of the professionals to verify installed competencies and check how these collaborators saw themselves. Competence mapping for each area could make the process clearer. Thus, adjustments were carried out to bring speed and productivity to the department, professionals who were under-utilized or overworked were relocated, and teams that did not exchange information and knowledge with the rest of the department had to open themselves up and show their research projects and results.

COMPETENCE MAPPING								
2007 CHASSIS SYSTEM		TECHNICAL AREAS						
		COMFORT			INTERIORS		BODY	
PRODUCT ENGINEERING		Sound Quality	Global Noise	Vibration / Interference	Seats / Seatbelts	Dashboard / Finish	Shell / Chassis / Hatch Gate / Hood	Side Doors
LABORATORY STRUCTURE	Physical proof	↑	→	→	↑	↑	→	→
	Virtual validation	↓	→	→	-	-	-	-
KNOW LEDGE AREAS	Experience	↓	→	→	↓	→	→	↑
	Theoretical knowledge	↓	→	→	↓	→	→	↑
	Knowing the norms	↓	→	→	↓	→	→	↑
	Applying components to the vehicle	↓	↓	→	↓	→	→	→
	Equipament Operation	↓	→	→	→	→	→	↑
	Virtual Validation	↓	↓	↓	↓	↓	→	→

KEY	
↓	LOW
→	AVERAGE
↑	HIGH

ACADEMIC EDUCATION APPLIED TO RESULTS

Academic education and formal knowledge were valued as stepping-stones to growth within the company. However, when the area was mapped it was discovered that a large body of this knowledge was not being applied. If it was not being used then it was not generating results for the company. To be actually valued, study and knowledge had to be directed to a real application. A training map was then set up, based on the mapping, and it was redone every year to ascertain the professional's evolution.

Management then began to question what their employees were studying as regards their academic education, what projects they were developing and what problems they sought to solve. If these were not applicable to the company, then the solution would be to redirect their studies towards other paths. It was not knowledge by itself that was valuable, but turning knowledge into practice and into results.

Little by little, management induced the team to direct their studies and their knowledge not only to bear fruit for their careers but also to bear fruit for the company. This led to work being carried out at universities to mentor Master's and Doctor's degrees. The research carried out began to be applied at the Experimental Engineering department and tested throughout their development with the best laboratory support they could have hoped for. At the end of each study, the research project would have already brought results and would go into production, bringing recognition to its author and innovation into Fiat.

The results obtained were very positive. Three years after the initiative had been launched, 23 employees had already received their Master's degree and six had received their Doctoral degrees, which changed the team's whole profile and the logic of thinking and working together with the university. Furthermore, every time a job was finished there was a problem solved within Engineering, and other topics to be studied and solved would come up during the process, thus bringing continuity to the quest for innovation.

COLLECTIVE INTELLIGENCE

Another action that generated both tangible and intangible results for the area and for the company was that of encouraging problem solving through group work.

At first, three small groups of people who enjoyed thinking about problem resolution were set up: Ideas and productive energy multipliers. They began to work together and results began to appear one year later. Then, three groups turned into 15 groups. After four years there are now 115 groups finding extraordinary solutions in parallel with the excellent discharge of their everyday tasks, thus showing that it is possible to make double management generate more results than what is expected from those who only practice day-to-day tasks.

There was one more paradigm that was challenged through this project, that of lack of time. The results of this work prove that people's productive capacity is bigger than they imagine they are, and that all they need is to be well directed and challenged. Furthermore, a group productive process will bring better and quicker results by defining a collective intelligence that complements and adds to everyone's activities as they share knowledge among themselves. The area's management has never demanded that its employees should know everything or perform the whole workload alone, but they have demanded that what one knows should be multiplied towards collective results.

RESULTS

This paper has highlighted how important it is to align a company's people management process to its innovative strategies. Investments in development and the addition of competencies to the product development team have turned the Brazilian subsidiary into an important R&D asset to the Fiat Group. Queiroz (2005) stresses that Brazilian automobile industry subsidiaries

have accumulated product development capacity through decades and that they have mastered the process.

The initial step taken towards this process lay in the work developed by the local engineering team to adapt products to the local market. Afterwards, participation in the "178 Project" consolidated the team's knowledge and experience in product development, where the Giovanni Agnelli Development Center stood out, mainly the Experimental Engineering department, as one of Fiat Group's most important development centers in the world.

When it began the integration process at the Experimental Engineering department, Fiat expected to improve car validation times, which was the area's weakness. The time taken to carry out the whole process was a long one, but expectations were fully surpassed. The goal was for 84% delivery within a set time. After six years working to restructure the whole area, they have achieved 98% delivery in car validation within the time set.

Practical actions were taken to achieve this result, such as a reassessment of the indicators used and changes to the measurement of the amount of tests to control the components approved. However, before beginning to take practical actions, the most expensive, hard and, certainly, most valid work carried out was that of restructuring the way work was performed. This was the great gain the company achieved: an important area for Fiat business, one that works more efficiently, with greater productivity and better results while valuing people and competencies.

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- and
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