

CERTIFYING MANAGEMENT PROJECTS AND SYSTEMS OF INNOVATION FOR BRAZILIAN COMPANIES: A VIABILITY STUDY

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Abstract — *Under a new paradigm of production new processes appear and are driven towards a better adequacy and efficacy to the country's social-economic, political and cultural dimensions. Therefore, the issue certification of technological innovation has become urgent as it is intrinsically and extrinsically linked to the current industrial philosophies. The level of technological innovation has become an indicator of economical growth, levels of welfare and international competitiveness. So, it is very important to analyse the local situation in relation to the topic in focus, aiming to bring to light substantial information to certification of projects and systems of innovation in a Brazilian region. For that, this initial research has been carried out to discover the reality of the State of Paraná, its necessities, as to obtain a conclusion on the viability of certifying projects and systems of innovation.*

Index Terms — *Certification, technological innovation, management of projects & systems*

INTRODUCTION

The idea behind certifying management projects and systems of Research, Development and Innovation – R, D & I has been successful in Spain where the Spanish Association of Standardization and Certification (AENOR) acts significantly. R, D & I are essential factors for an economic development of a country, apart from being the indicators of welfare levels, and international competitiveness. Therefore, a better efficacy and efficiency is acquired on the productive processes of goods and services, which are more and more demanded by the market globalization. The strategic importance of these three factors has induced the Spanish public administration to take decisions on the legal side, creating special laws that will give incentives, through tax rebates, every company that fulfill some R, D & I criteria. These companies can claim a technical report to the Science and Technology Ministry that works in conjunction with the Exchequer Ministry having submitted their projects beforehand. AENOR has created some regulations that

aim to promote and organize activities of R, D & I in the Spanish scenario. As a result of this standardization two types of certificate have appeared being one for projects of innovation on R, D & I and another one for management systems on R, D & I. These certificates contribute greatly to the companies goodwill in the market, increasing effectively its level of competitiveness in the sector. Moreover, they help managers to take decisions more accurately and to carry out projects that could face various sorts of barriers otherwise, such as uncertainty with regards to its contents, some related to investment amongst others. In Brazil TECPAR (Institute of Technology of the State of Paraná) was appointed to serve as the foundation of this research, as it is the institution responsible for the application of AENOR's model in the State of Paraná. An agreement has already been signed between both institutions.

OBJECTIVE

To analyse and present the opinion of Brazilian specialists in the area of projects and management systems of R, D & I on the viability to applying AENOR's model, as well as to understand the reality of this certification institution and Brazilian companies, searching for similarities and applicability of the existing Spanish model.

THE BENEFITS OF CERTIFYING

The benefits of certifying projects of R, D & I are the main reasons behind this research. Amongst these benefits are [1]:

- Companies of any size can show clearly their objectives in terms of R, D & I to the government bodies.
- Helping managers to take decisions about the level of investment related to each project.
- Sistematizing projects of R, D & I improving its managerial attitudes, establishing objectives and aims that help to control its related resources and the success of each of them.

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- Avoiding dispersion of work that could create technology, patents and trading marks from which additional benefits could be achieved through technology transfer and tax rebate.
- Identifying risks associated to activities of R, D & I better defining the mechanisms of control that help to reduce them or eliminate them.
- Analysing the results of R, D & I activities making decision taking easier for people in charge.

The benefits of certifying management systems of R, D & I are [1]:

- Sistematizing R, D & I activities in order to make the most of companies internal know-how.
- Establishing objectives and aims that help to control related resources for these activities.
- Planification, organization and control of R, D & I units that means saving resources and leads to an improvement in motivation and commitment of all employees.
- Adding value in terms of reliability on the activities of R, D & I through its managerial system, making technology transfer easier.
- Improving the image of the company in the sector and increasing its competitiveness with other companies both at national and international level.
- Technological vigilance can be done through the identification of market changes and opportunities of improvement.
- Integrating managerial work of R, D & I with the other departments.
- Offering satisfaction to shareholders through demonstrations of added value that are related to R, D & I activities.

METHODOLOGY

The development of this work was made in three distinct parts being: public delimitation – specialists to be questioned; questionnaire creation; questionnaire application. Due to time constraints only specialists actually working in the State of Parana were chosen. As certification of projects was, and still is, a new matter to be studied, a group of specialists in the area was utilized in order to decrease the level of difficulty when presenting the questions. Two specialists were from Tecpar, one from the Federal University of Parana and the remaining seventeen were professionals of various companies. Therefore, the sample added up to twenty specialists from three different fields, that is, Research Institute, University and Industry. Questionnaires aimed to collect information related to: applicability of certification, the Spanish experience and its documentation, motivation of entrepreneurs, and rules and regulations for certifying.

QUESTIONNAIRES

Finally, five questions were made which are as follows:

1. Is it technically viable to certify projects of R, D & I?
2. Which motives would make a company certify its projects? Could it be solely a company's option or would it be done only by market demand?
3. How to convince companies to certify its projects and management systems of R, D & I?
4. Do you think that a norm for structuring and helping to define projects of R, D & I could be useful?
5. So, would be viable to certify projects and management systems of R, D & I, taking the reality of companies in Parana into consideration?

Table 1 below brings up the criteria used for the tabulation of data. There were five questions and three options for each question.

Q.	Yes = 1	No = -1	Depends = 0,1
1	Yes = 1	No = -1	Depends = 0,1
2	Option/Company = 1	Market/Demand = -1	None = 0,1
3	Yes/(Easy) = 1	No/(Difficult) = -1	Neutral = 0,1
4	Yes = 1	No = -1	Neutral = 0,1
5	Yes = 1	No = -1	Neutral = 0,1

It should be noticed that in table 1 three words were chosen in order to establish a semantic differential that is linked to some qualitative aspects of the questions/answers.

DISCUSSION ON LITERATURE

When Brazilian reality is in focus one has to be careful in analyzing the real reasons that show all its efforts with Research and Development as very little or not considerable when taking into account “the particular nature of this activities and its wider meaning for the process of technological change” [2].

The restrict and differentiated character of R & D activities form the basic criteria to distinguish them from other routinely activities. They are neither the only way to create knowledge, nor are dissociated from other essential activities and its decisions of methodological and strategic character [3]. Therefore, all decisions that are related to R & D are also oriented to future profiting through improvement of its competitiveness, increase of profitability and market share. The knowledge generated by R & D become part of the resources used in the technological innovation process of goods and services, not finishing on itself [2].

Technological innovation “is the first utilization - including the commercialization when it applies - of

products, processes, systems or services, new or improved” [4]. Also in accordance to [4], Manual Frascati considers innovation as the transformation of an idea onto a new or improved product that is introduced into the market, or in new production systems and its diffusion, commercialization and utilization. Technological innovation is also understood as substantial improvement of existing products or processes.

The low return on investments in innovation is explained by [5] who demonstrates that this is a problem peculiar to science and engineering based firms, giving examples of various companies that had their products copied and disappeared from the market after this, opening space to the market of copiers. He also alerts for the fact that not even the patent service is useful to protect innovative companies as its inventions can be copied with few little changes from the original. Therefore, if government is one of the main responsible for the creation of policies of innovation, it will also have the task to protect the referred projects and systems of innovation, preventing from copiers and other problems, particularly the disappearance of the innovative potential within the country.

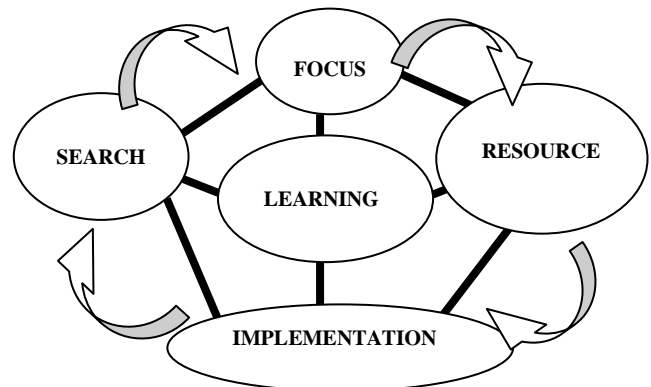
This potential is clearly shown by the data taken from [2] as follows: the innovation rate of Brazilian industries is 31,5%. From the 72.005 selected companies, only 22.698 implemented new or improved products or processes for the market within the chosen period. A comparison with Spanish companies becomes very important as this research deals with the certification of projects and systems of innovation. AENOR is used as a reference. Spanish levels are very similar to the Brazilian ones, as at the same period of time Brazil had a rate of 34,8% [2]. In table 2 adapted from[2], the demonstrated results were obtained taking size and collaboration levels into consideration, determining the actual relevance of this factors for the innovation process. It can be seen that the weight of these relations is greater in foreign companies, but are quite relevant for Brazilian companies which employ over 500 people. The levels presented by both foreign an national companies are very close indeed.

TABLE 2
FIGURES AND PERCENTAGES OF
INNOVATIVE COMPANIES

Origin of capital and Size	Innovative Companies (A)	With collaborative relations (B)	B / A
Total Brazil	22401	2432	10,9
National	21052	1982	9.4
From 10 to 29	11647	808	6.9
From 30 to 49	2999	238	8.0
From 50 to 99	2947	273	9.3
From 100 to 249	1940	276	14.2
From 250 to 499	825	143	17.4
With 500 plus	694	242	34.9
Foreign	1348	451	33.4
From 10 to 29	150	37	24.9

From 30 to 49	108	25	22.9
From 50 to 99	245	79	32.5
From 10 to 249	318	101	31.6
From 250 to 499	202	66	32.9
With 500 plus	325	142	43.6

It can be observed that efforts towards research and development in Brazil are very limited, being a considerably better on a reduced number of large sized companies in certain sectors. According to the companies which do invest in innovation, this decision begins as a strategic issue that cannot be stopped. It is also recognized that governmental incentives are very important as they can reduce significantly the costs of R, D & I “particularly those which demand long time for development and maturation, as well as high levels of risk and investments [2]. So, strategy becomes the main focus of the innovation process amongst other key-elements. [5] gives special emphasis to this saying that a company should seek for challenges and pressures instead of avoiding them. Part of the strategy consists of taking advantage of the country’s environment as to create impetus for innovation. (...) Establish internal norms that would overcome regulatory barriers or demands for higher quality products; select the most advanced suppliers; treat employees as permanent workers, stimulating improvement of skills and productivity.



As [6] states, these key-elements are five, and are shown in graphic 1.

GRAPHIC 1.
KEY ELEMENTS OF TECHNOLOGICAL INNOVATION.

In relation to the item “resource” shown at graphic 1, Brazilian entrepreneurs can build up some expectations as some forms of direct support are given by national agencies: Tax rebates for employee’s technological training in the industry were implemented in 1993 by the Law numbered 8.661. Its concession is possible through programs of technological development both for industries and agriculture (PDTI and PDTA), presented by companies whose approval is the responsibility of the Science and Technology Ministry. In spite of these incentives, it is known that laws are changed in time which is not a good practice in terms of stabilizing practices of innovation in the sector. Nevertheless, the market demonstrates that a special attention should be given to quality matters, as other certifying agencies have been working non-stop for several years due to market demands. When the majority

of products or services are in accordance to certain conformities in a restricted area, is because shareholders are respecting these international demands for standardization. So, suppliers, government, customers and everyone involved in the process will agree with this new code. This are useful to classify manufacturing material, product supply, tests and analysis in general. That is a new codified language that can be use amongst suppliers and customers for the benefit of technology transfer and international negotiations.

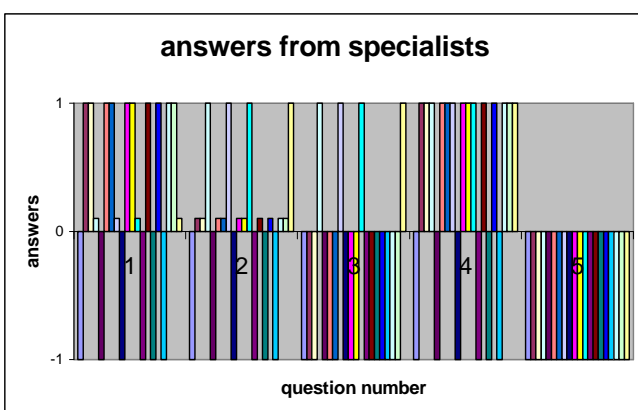
RESULTS

In table 3 the numerical tabulation is shown as the results obtained by the 20 questionnaires. The figure 0,1 was used instead of 0 (zero) as it would appear more expressively in the graphic 2. Otherwise it would be lost along the neutral (zero) line. Apart from that, 1 was chosen for positiveness, -1 negativeness.

TABLE 3
NUMERICAL TABULATION

Q.	1	2	3	4	5	6	7	8	9	10
1	-1	1	1	0,1	-1	1	1	0,1	-1	1
2	-1	0,1	0,1	1	-1	0,1	0,1	1	-1	0,1
3	-1	-1	-1	1	-1	-1	-1	1	-1	-1
4	-1	1	1	1	-1	1	1	1	-1	1
5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Q.	11	12	13	14	15	16	17	18	19	20
1	1	0,1	-1	1	-1	1	-1	1	1	0,1
2	0,1	1	-1	0,1	-1	0,1	-1	0,1	0,1	1
3	-1	1	-1	-1	-1	-1	-1	-1	-1	1
4	1	1	-1	1	-1	1	-1	1	1	1
5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

Table 3 is followed by graphic 2 below that shows the differences more clearly through colours and graphs.



GRAPHIC 2. RESULTS – SEPTEMBER 2003

CONCLUSION

The obtained results show that the answers were predominantly negative with regards to the studied topic, that is, the viability of implementing and certifying projects and systems of innovation. Question 1 showed a shared vision in relation to the technical viability on creating a certification process. This result is at quite misleading as all respondents were specialists in the field. This divergences should therefore be investigated with a more in depth research that could be held with the use of semi-structured questions for interviews. Question 2 propitiated a predominant answer that indicate that implementing certification processes can only work if demanded by the market. Some comments were made in relation to ISO certification, comparing the actual necessity of this as a negative aspect of the market, even if its benefits are considered. In question 3, where the sensibility of entrepreneurs is the main issue, a almost unanimous negative answer was obtained, that means that there was a consensus amongst respondents in relation to the difficulty (even the impossibility) of bringing the interest of shareholders and entrepreneurs in general to the issue. The probable causes of this, according to the comments that were made during the each answering process could be linked to the long distance between certification process and profitability of such projects and systems, apart from a certainty of an increase in operational costs along with these changes. In question 4 that deals with normalization of projects and systems with certification “a posteriori”, respondents thought (the large majority) that would be interesting having a norm that could be used as guideline for the certification process. According to them, the technical aspect here is important to help the existing systems. In spite of that, the question does not deal with economical aspects, with are fundamentally important when dealing with viability. Question 5 brings a real unanimous answer that demonstrates that it is not viable to implement the certification process into the actual conjuncture. It should be mentioned that the respondents in general emphasized the term “actual” which appears in the question, making comments about possible benefits that could come from the government (not actually, but latter on) that could make this idea viable then. No comments were added that could lead to a conclusive idea relating size and viability of certification. It can be inferred, however, that small and medium sized companies tend to accept certification processes slower than large ones, as the economical factor affects the previous more seriously. Despite the fact that a great importance has been given to the “focus” (strategy) as it is demonstrated in the text, the major factor of this research was actually “resource” (graphic 2) as the issue of tax rebate and benefits were mentioned repeatedly for the certification of projects and systems.

In this way, it can be concluded that this non viability is only temporary as it is caused by a lack of investment from the government, differently to what happened in the Spanish case.

A very positive attitude can be noticed with relation to technicalities involved in the process of certification, demonstrating the capability of companies for future implementation. However, thanks to high levels of taxation by the Brazilian government, specialists show high levels of skepticism with regards to the viability of this process of certification of projects and systems of innovation.

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<http://www.innovation.ca> Canada Foundation for Innovation

<http://www.proinnovator.com/certificate.html> Parthenon Innovation Group

<http://www.cti-wales.com/eng/aboutus.php> Commitment to Innovation website

<http://www.fitt-iitd.org/fittdisplay.html> Foundation for Innovation and Technology Transfer

<http://www.ocri.ca> Ottawa Centre for Research and Innovation