

INFORMATION TECHNOLOGY AS COMPETITIVE FACTOR: A STUDY IN THE HARVEST

APL METAL-MECANICH SANTA ROSA/HORISONTINA, RS, BRAZIL

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ABSTRACT

The present article approaches the use of Information Technology (IT) as competitive factor in a Local Productive Arrangement(LPA) Harvest Metal-Mechanic in the state of Rio Grande del Sur, Brazil and has as objective to look for the understanding of how the use of IT contributes to the increase of the competitiveness. In order to reach this objective, a research was carried out in the enterprises that make up the LPA. The results of the research indicated that the enterprises perceive the importance of the use of IT, but that, actually, its use is limited, mainly concerning the planning of IT. Another one of the results that was that the enterprises, although forming part of the LPA, still do not collaborate to among each other, be it through the exchange of information, or through Information Systems. The main recommendations due to these results are that the enterprises try to act actively for the fortification of the LPA. Concerning the use of IT, it becomes necessary to plan and invest in the acquisition of integrated systems for the best management of the information, which will contribute to the increase of competitiveness of the enterprises that belong to the arrangement.

KEY WORDS: Information Technology; Competitiveness; Local Productive Adjustment.

INTRODUCTION

The increasing economic competitiveness, one of the remarkable characteristics of the globalization, the technological development, and the great variety of products along with the shortage of human and natural resources, are causing that the organizations look for, in a continuous way, the survival in the market through development of improvement systems that assure a greater competitiveness. According to Kaplan (1998), one should not remain calm with the present performance, although it is satisfactory.

The knowledge arises in the organizations with base on the information. From that set the economic growth arises. The question of the economic development has its root in world-wide the economic crises that are reflected in the local conjunctures. Thus, there is development when there are changes of structure, without questioning the existing economic models, it is believed that one of the forms to secure the development are the local agglomerates, the so called LPAs calls - Local Productive Adjustments.

The present perception is that it is necessary for actions oriented to the constitution and fortification of LPAs in the country, with a view to the fortification of the cooperation and the learning for the innovation. Under this perspective, the region in the northwest of the state of Rio Grande del Sur, Brazil, would not be far from that possibility, as it has a significant industrial park in the segment of metallurgical industries.

The reason for this research arises by the difficulty faced by the enterprises of small and medium size. The low use of the resources of IT (Information technology) in the internal processes and external relations, appear as the main approach. Also it has the purpose of the visualization of the cooperation and interrelation between the enterprises. In the possibility of spreading to the idea of cooperation and interrelation one looks for the productivity and the competitiveness between the organizations of the sector.

DEVELOPMENT

1. Referential and Conceptual studies

In this article, one tries to present the main referential constructor concepts and theories related to the subject of the Local Productive Adjustments (LPAs) with regard to the Competitiveness with the use of the Information Technology, under the consideration of its main researcher. It is possible to highlight that the theoretical reference presented here is result of a critical selection carried out on the basis of a revision of the literature, that searched to approach the main aspects for the study at issue.

1.1 The origin and Evolution of the New Organizational Formats

The networks of medium and small enterprises play a fundamental role in the economy. These provide new employments and a very flexible diversification in the production of goods and services, which not always happens on the part of the big enterprises.

These networks arose under several forms of addressing them, in several localities of the world: in Italy, in the United States, in France, and Brazil. Among these addresses, Pagani (2006) mentions: Clusters (Porter); Local Production Systems, Local Adjustments and Productive Systems (Cassiolo and Lastres); Cooperation Networks, Small and Medium Enterprise networks Networks Small Enterprises, Consortia of Enterprises. (Casarotto and Platillo); Agglomerations and Productive Systems and Local Innovations.

It became common to associate the origin of the interest by the theory of organization of industrial clusters to the successful policies of industrial development of the Third Italy, as affirmed by Barbosa (1998), specially to the experience of the Emilia-Romagna region, and to the policies of development of industrial clusters located successfully in Baden-Württemberg, in Germany, and to the successful experiences of industrialists clusters of the high tech enterprises - based on the technology of microelectronics, computers and computer science -, organized in agglomerate structures localized in Silicon Valley of, California, in USA. In Brazil, among the experiences of successful industrial clusters, stand out: the one of the shoe complex of the Vale dos Sinos in Rio Grande del Sur, and the one of Santa Rita de Sapucaí, in the south

of the State of Minas Gerais, that concentrates industrial activities of the branches of microelectronics and telecommunications.

Brazil is still in the process of development concerning Local Productive Adjustments. For that reason it is necessary that these formation be identified and diagnosed, so that as much in the public sphere and the private one, there should be initiatives of support to the entrepreneurs, watching the development not only regional, but also national. In this sense it is possible to emphasize the origin of these concepts of the new organizational formats like:

a) Industrial districts

The origin of the concepts on industrial districts goes back to the beginning of XX century. Marshall (1982) in Principles of Economy was the precursor of the concept. According to the author this modality of agglomerate of enterprises would generate a series of externalities, such as: specialized manpower, access to specialized suppliers and services and dissemination of knowledge between enterprises.

b) Clusters

According to the Redesist (2005), throughout the Eighties the concept of clusters was developed, centered in the analysis of the forms of inter-corporate relations, linked to the existence of some regional industrial agglomerates of success in world-wide terms.

c) Local Productive Adjustments (LPAs)

According to the Redesist (2005), the examples in the Italian industrial districts of the so called Third Italy and in Silicon Valley, California (USA), gave rise to term LPA. The Local Productive Adjustments are cases where the participant enterprises are not so strongly linked nor articulated. Concept selected to guide this study.

1.2 The Organizations and the Technology of Information

The use that is done of the IT demands an analysis of the possibilities of the application of the same in the enterprises. As affirmed by Mooney, Gurbaxani and Kraemer (1995), the value obtained by IT is a phenomenon that conjugates technology and organization; thus, a research of that phenomenon as much requires theoretical perspective of the technology as of the organization, and their interaction. Of each one of its different roles in the organization, the

information can be presented in a great variety of types and characteristics, being able to be transmitted (communicated) in different ways and using different technologies.

Information Technology is an expression very much used at the moment. As being a daily expression, several definitions are attributed to a large extent missused, hasty or confusing. In order to understand the scene of IT, it is important to understand two fundamental concepts: The information technology and the information system. Those concepts are often confused, thus the importance of understanding them in their singularity.

Rezende and Abreu (2000) concept IT as technological and computer resources for the generation and use of the information.

IT is not restricted to hardware, software and data communication. There are technologies regarding the computer science planning, for the development of systems, the support of software, the processes of production and operation, and the support of hardware.

The information system as all system possesses entrance, treatment and exit, its objective is to treat the data so that they transform into information and knowledge.

According to Turban (2003), an information system collects, processes, stores, analyzes it and scatters information with a specific intention.

Turban proposes to work the information through use of suitable IT which is more for its purpose.

1.3 Planning of Information and of the Information Technology

For a long time the large enterprises have been investing in Information Technology to considering that the benefits are fundamental for the obtaining of the demanded levels of competitiveness for permanence in the market. When they are compared with the large enterprises, the SMEs (Small and Medium Enterprises) have less financial resources, low competition in management and use of technology of the most recent information.

The necessity that the organizations be intelligent, facing the constant changes of the society of the information, whereupon they also modify and require planning their information helped by the resources of IT. Specifically the planning of IT can become a tool, effective instrategic use for the organization. For Audy (2003), there is no sense in discussing if IT is

strategic or not, as to use IT in an aligned form to the organizational strategy.

As one of the objectives of this research, besides deepening the knowledge in the use of IT, one proposes to research a planning method adapted to the reality of the organizations of the LPA being studied. Four methodologies of Planning of IT were studied that will serve as basis, summing up in:

- Method proposed by Torres (1994), analyzes the computer resources, as much hardware and software, used by the organization, and indicates the prognosis of updating or acquisition of IT for the process of computerized planning in an organization;
- Method proposed by Anita Cassidy (1998), constituted by three architectures: Application, Technique and Service, having as objective to diagnose technologies and applications to take care of the needs of the businesses of the organization;
- Method proposed by Bernard Boar (2002), directed to the diagnosis of present IT, and future tendencies to take care of the strategies and needs of the businesses of the organizations;
- Method proposed by Rezende (2002) uses the instrument of Strategic Planning of the Information Technology (SPIT) as a systemic process in the alignment of the strategies of the business.

1.4 IT as determining factor of the Competitiveness

In order to understand the competitiveness, Ferraz; Kupfer; Haguenaer (1997) conceptualize it as the capacity of the company to formulate and to implement concurrent strategies, that allow him to extend or to conserve, in a lasting form, a sustainable position in the market.

Rezende affirms that: "The competitiveness can be understood as obtaining higher productivity than the competitors, guaranteeing the survival, the perennial existence, the profit, the continuity throughout time and the satisfaction of the internal and external clients." [Rezende, 2002, p. 23]⁽¹⁾.

The concept presented before is what represents better the competitiveness from the enterprise point of view. On the one hand is had the preoccupation of the productivity, in

offering products of quality at smaller cost, which is translated into the internal efficiency of the enterprise and, on the other hand the preoccupation the external atmosphere, that is to say, how the company is placed facing its competitors, facing the market as a whole.

It allows the competitive differentiation and it changes the way to businesses are handled and lead, in relation to the organizational structure as in relation to its own products and services. That is the central point of a great part of argument of strategic information systems, that, according to Laudon and Laudon (2004), they are systems that change goals, operations, products or relations with the with the environments of the organizations, to help them to conquer an advantage over the competitors.

1.5 Networks as Competitiveness Strategy

The grouping of the enterprises in networks, as a way to become more competitive in the market is a recurrent affirmation in all literature on enterprise networks. According to Balestrin and Vargas (2004), an inter-organizational network is the way to reach a competitive advantage through mutual learning, co-specialty, better flow of the information and scale economy. Some benefits generated by the networks that promote a greater competitiveness, are highlighted especially to the small and medium enterprises by the capacity to compete with the large ones, like the flexibility and adaptability, capacity to realize economies, agility and capacity of learning.

For Porter (1999) the LPAs: influence the competition in three ample ways: first, by the increase of the productivity of the enterprises or component sectors; secondly, by the fortification of the innovation capacity and, consequently, by the elevation of the productivity; thirdly, by the stimulus to the formation of new enterprises, that reinforce the innovation and extend the agglomerate.

2. Methodological design

The research used as means a study of cases, realized in enterprises that comprise the LPA Cosecha Metal-Mecanico Santa Rosa/Horizontina of the state of Rio Grande del Sur, Brazil. The LPA Metal-Mecanico whose specialty is harvest (agricultural manufacture of harvesters and tractors) is linked directly to the Brazilian Land Business.

In agreement with Yin (2001), the case study researches a contemporary phenomenon

within its context of the real life, when the limits between the phenomenon and the context are not clearly defined.

The universe of the research is the 52 pertaining enterprises of the LPA. That relation was obtained in the ACISAP (Asociación Commercial, Industrial y Agropecuaria), that after the definition of the harvesting instrument, was sent to all the enterprises to participate in the field research.

The necessary data for the development of this research were collected by means of a questionnaire with closed questions, besides the direct observation of the researcher. The instrument of gathering of data was made taking into consideration three approaches: competitiveness, LPA and information technology. The research instrument approached more generic questions and macro on the subject of the LPAs, with intention to take advantage of to the maximum of the knowledge the consulted experts.

The proposed type of research is qualitative, with exploratory aims with base in the objectives that the study renders. This research has as focus, as affirmed by Gil (2002) to provide major familiarity with the problem, with a view to making it more explicit or to constitute hypothesis, also the improvement of ideas or the discovery of intuitions.

3. Information Analysis

The obtained results were presented, analyzing them in separate way and it was individualized by the variables of the research, in four parts: information of the enterprises and the interviewed person, information regarding the interaction, to the use of IT and the Competitiveness.

3.1 Information of the Enterprises and the Interviewed person

As far as the bearing of the company the SEBRAE (Serviço Brasileiro de Apoio e Micros e Pequenas Empresa) classifies according to the Statute of the Micro and Small Enterprises, of 1999, the adopted criterion to conceptualize micro and small enterprises is the annual gross income, whose values were updated by Decree n ° 5,028/2004, of 31st March 2004.

At the moment, those criteria are adopted in diverse programs of credit of the federal government in support to the MEPs (Micro and Small Company). Besides the criterion adopted

by the SEBRAE also the bearing of company through criterion of the BNDES (National Bank of Economic and Social Development) applicable to the industry, commerce and services, with the classification that is shown in picture N° 1:

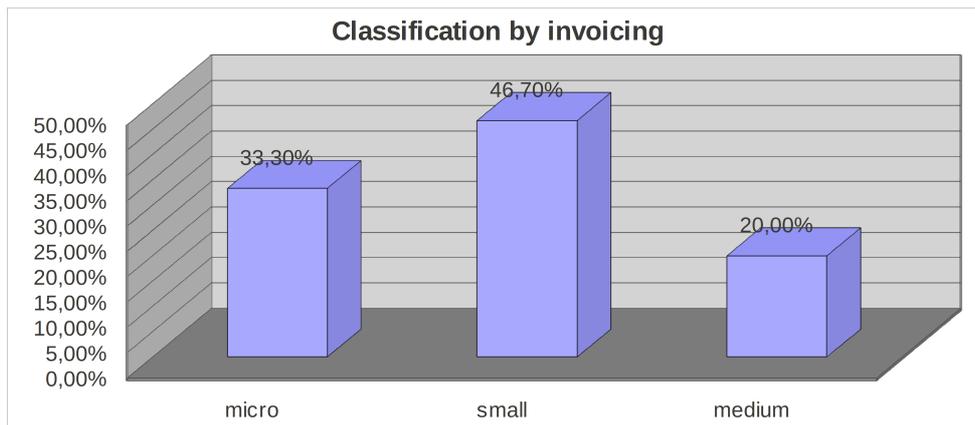
Picture 1: Classification of size of the company according to the BNDES

Classification	Annual gross operational income
Microenterprise	Less or equal to R\$ 1.2 million
Small company	More than smaller or equal R\$ 1.2 million and to R\$10.5 million
Average company	Major that R\$ 10.5 million and minor or equal to R\$60 million
Large Company	More than R\$ 60 million

Source: The National Bank of Economic and Social Development

To the aims of analysis of this research the criterion of classification was used adopted by the BNDES, where it shows that 26.7% of the researched enterprises are in the strip of up to 19 employees, 33.3% in the strip of 20 to 99 employees and 40% of the enterprises in the strip of 100 to 499 employees. The information states that this is not a criterion to fit this study, the information states that to major invoicing of the enterprises greater the number of employees, consequently greater generation of wealth and rent for economic and social development of the region through LPA.

Graph 1: Classification by invoicing



Source: Own elaboration

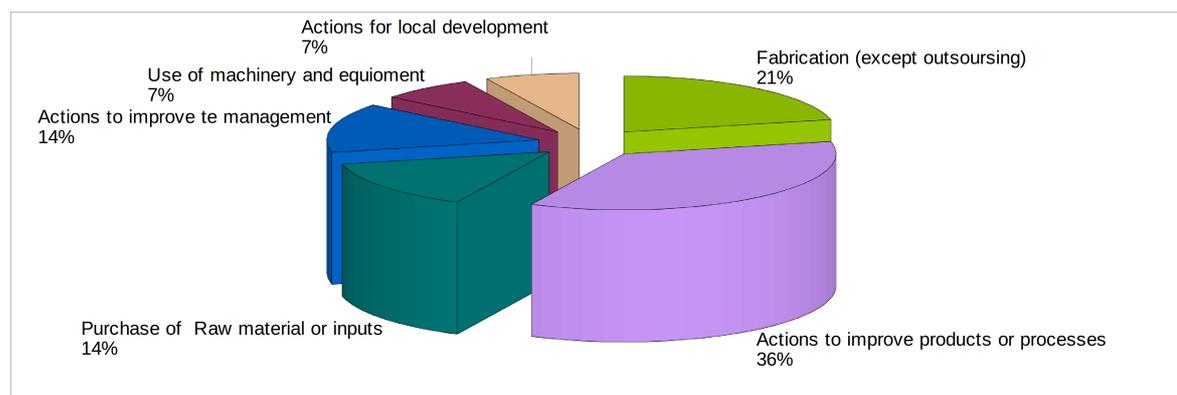
It is verified, by the numbers shown in graph 01, that 33.3% of the researched, classified enterprises as micro-enterprises, have invoicing in the strip of until R\$ 400,000,00 with relative capacity of investment in IT, using simpler resources. Nevertheless 46.7% of the enterprises classified as small with invoicing in the strip of until R\$ 10,000,000,00 and the 20% as medium

with invoicing in the strip of until R\$ 60,000,000,00, theoretically own a possible potential of investment in IT with greater amount of resources and major effectiveness in the management of the businesses.

3.2 Information regarding the Interaction between the LPA Enterprises

With respect to the participation of the enterprises within the LPA Cosecha looked for to identify if these act or already act altogether, what kind of action were realized, and if the enterprises look for to have access to the other enterprises of the LPA. With respect to the action of the LPA, or if these enterprises researched already acted altogether with other enterprises, only 09 affirm that they conducted an action together, which is shown next.

Graph 2: Activities in conjunction with enterprises of the LPA

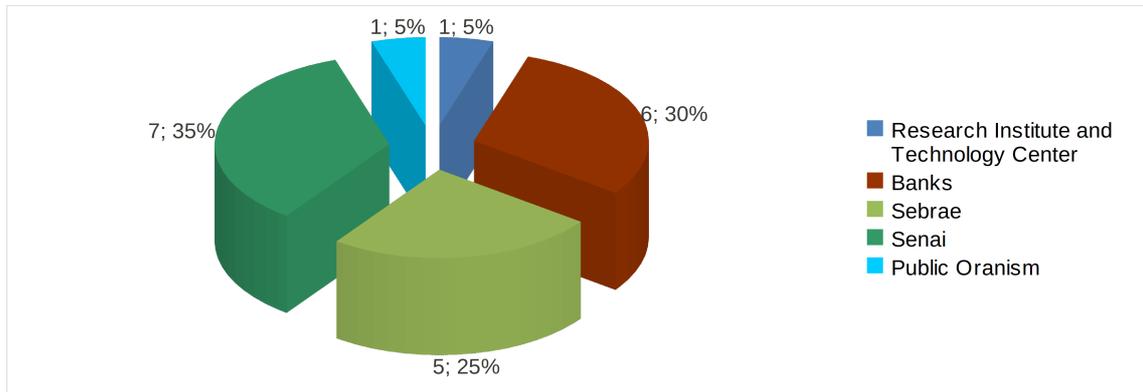


Source: Own elaboration

It was basically in actions in the items of improvements of the product or productive process (35,71%) and manufacture altogether (21,43%) totalized a 57,14%. Other activities carried out are in graph 02 in percentage values of the activities like: purchase of raw material and improvement of management with 14,29% each, use of machines and equipment and actions of local development with 7,14% each, and no company pointed in action of commercialization and joint access at the credit in the financial market.

With respect to the access to the other members of the LPA, like institutes of research, government organisms, credit institutions, some of the researched enterprises only conducted some operation with those members, as an integral part of the LPA, which can reflect a common characteristic of the enterprises of this segment the one of not looking for technical and financial information and subsidies in other financial enterprises and institutes.

Graph 3: Use of the services of some organization



Source: Own elaboration

The graph shows the reality of the use of the services, the banks stand out (06 enterprises), SEBRAE (05 enterprises), and SENAI (National Service of Industrial Apprenticeship), (07 enterprises). To the research institutes only one company had access, this of extreme importance in the support necessary the technological innovation for the survival in a concurred market, considered relevant to stay competitive.

3.3 Information regarding the use of IT

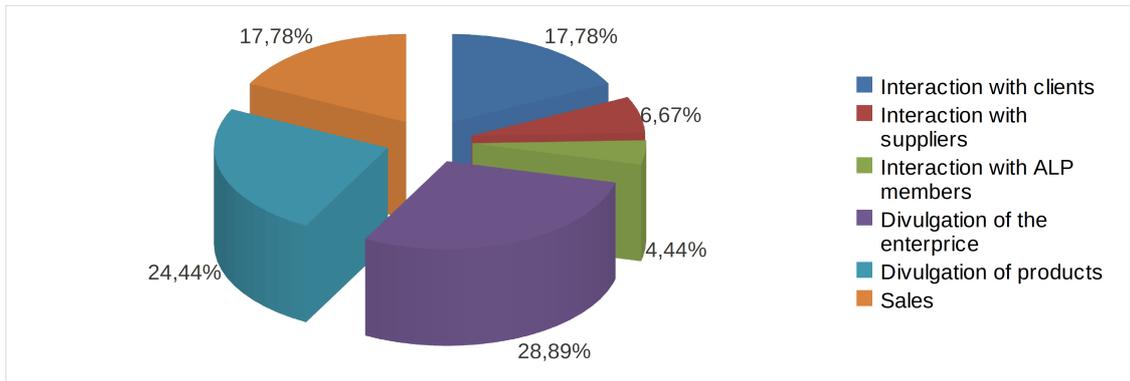
The information technology was analyzed mainly under the concept of the use of information systems and resource of IT by the researched enterprises.

After arriving at the use of IT and information systems, one looked to identify the perception of the enterprises on the use of IT, as competitiveness resource, that is to say, if the technology of the information contributes in some form for the increase of the competitiveness.

Use of Webs in Internet

After obtaining information of the enterprises and the answers, the next analysis is related to the use of the Internet, if these own Webs and what do they use it for. Of 15 researched enterprises only 3 do not own Webs in Internet, being its use canalized, mainly, for spreading data of the company (24%) and its products (29%), it does not take advantage of the excellent channel of more direct interaction with its clients, suppliers, government and community, because only 18% of the enterprise use it for sales and interaction with their clients, this information is seen in graph 4.

Graph 4: Use of Web in Internet on behalf of the enterprises

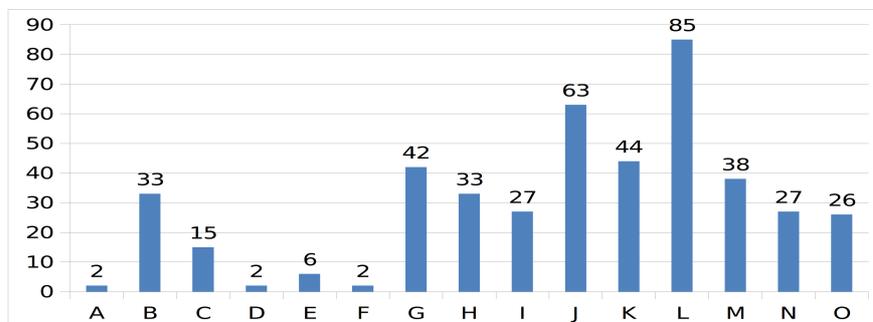


Source: Own elaboration

Computer Equipment

The idea of obtaining information on the amount of equipment of informatics does not object an analysis of the degree of computerization of the researched enterprises. It can be used with different purposes from how the present structure can contribute to the search of the competitiveness.

Graph 5: Total of computer equipment



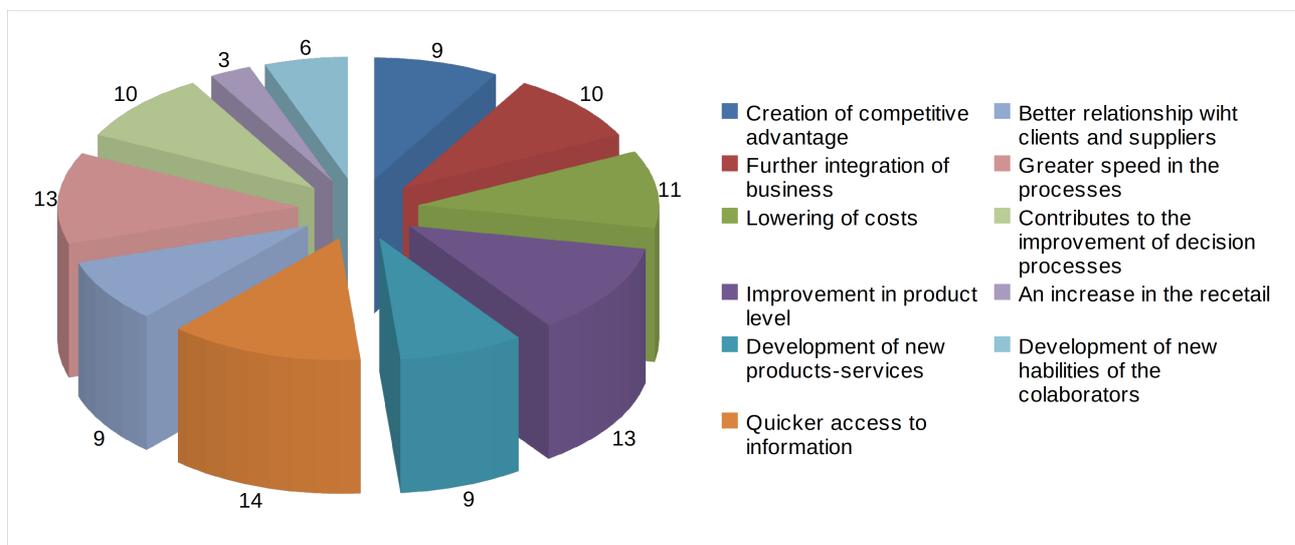
Source: Own elaboration

The amount of equipment of the enterprises researched presented in graph 5, show that enterprises J, K and L stand out with greater amount of resources, reflection of the size of these enterprises and their invoicing.

Contribution of IT in the Competitiveness

Graph 6 portrays the perception of the enterprises of the use of IT, how it contributes strategically to the increase of competitiveness. All answered in a positive way, emphasizing the fastest access of the information greater agility in the processes and improvements in the productivity level.

Graph 6: Strategic contribution of IT in the competitiveness



Source: Own elaboration

With that it is possible to affirm that the opinion of the enterprises is unanimous that IT, is a competitiveness resource, which shows an opening on the part of the enterprises in adopting methodologies of planning of IT and enterprise strategies, fitting to its needs and deficiencies in the atmosphere of their businesses.

The Use of Investments in IT

With respect to the use of IT, three enterprises do not only use IT in their internal processes, (financial controls, production, office staff and sales). The reason of the nonuse was not questioned, but when these micro-enterprises have invoicing in the strip up till an annual R\$ 200,000,00, the justification is reflected by the high cost of implantation the technology.

With respect to the investments in some technological resource in the last months, twelve responded that yes, emphasizing to the acquisition of servers, software and hardware.

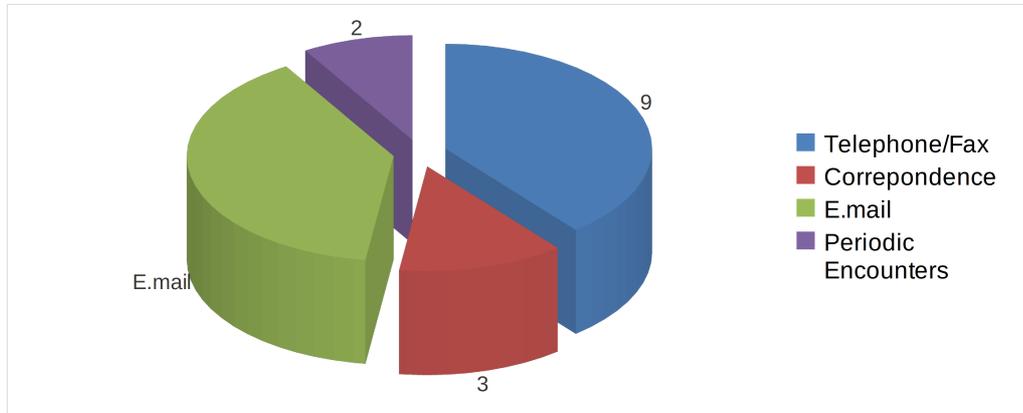
Another outstanding factor in this research is with respect to the use of integrated systems of management only six enterprises affirmed that they use ERP (Enterprise Resource Planning). This fact can also reflect the importance given to the use of IT as a factor of competitiveness by these enterprises.

Integration and External Relation

On integration and relation with other enterprises as part of the LPA, only two enterprises affirmed to a relationship with clients and suppliers. This reflected low level of cooperation

within the LPA and other links of the productive chain, which jeopardizes its operation and, mainly, with the competitive factor of a LPA.

Graph 7: Process of Information Exchange

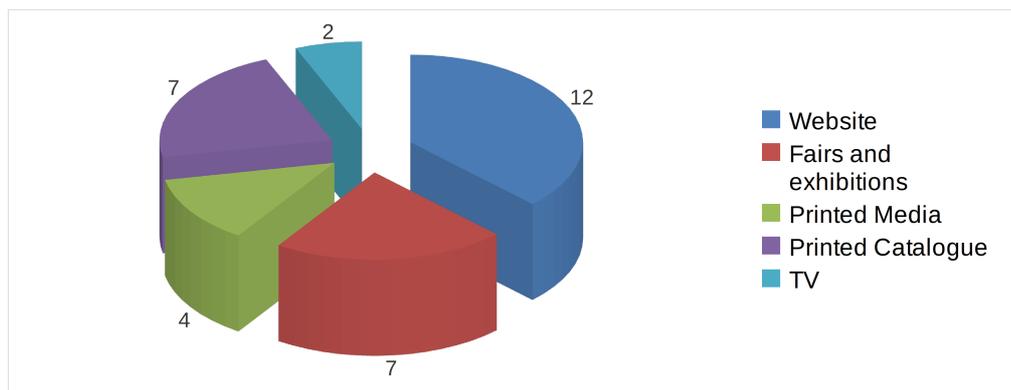


Source: Own elaboration

Since there is no communication via SI between the researched enterprises, it is interesting to know how they communicate, that is to say, how do they interact and exchange information. All affirmed that mainly they communicated by means of telephone and electronic mail, with few periodic encounters.

In continuity to the doubts related to the use of IT, one looked to identify the disclosure resources that the researched enterprises use.

Graph 8: Disclosure Resources



Source: Own elaboration

Basically all the enterprises affirm that they own and use as a resource of disclosure more the Web, except two enterprises that do not have a website in Internet. With respect to the other resources, seven enterprises use fairs and exhibitions, four printed media, seven printed catalogs and two by television.

Returning to the enterprises, that do not use resources of IT for spreading and which they either do not own a website, considering that the LPA is made up of enterprises of small bearing, major difficulty can be found in the consolidation of the LPA and the use of information technology.

IT Planning

They were also asked if the enterprises used some method of IT planning, only one affirmed that it uses a method called Mind Manager, or mental map, which is the name of a kind of diagram, returning to the management of information, of knowledge and intellectual capital, for the understanding and solution of problems.

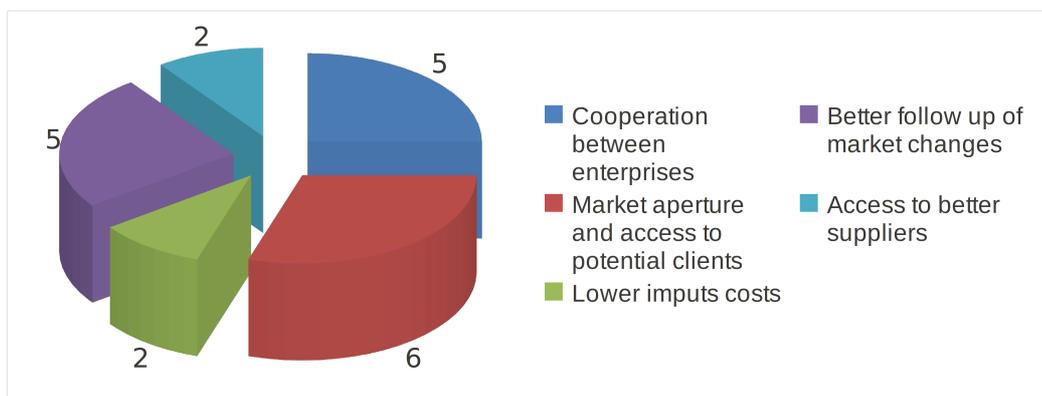
The industrial enterprises live together with changes in their environments, above all that they adapt to the market in which they are inserted. That is why it is important that the organization have an adequate Strategic Plan, of Information Technology, so that they maintain themselves active and competitive in the area of their businesses.

3.4 Information regarding Competitiveness

When analyzing the matter of competitiveness, the organization of the enterprises in LPA can be perceived as a factor that increases competitiveness on the part of eight enterprises, and whereas seven enterprises do not consider that a LPA makes possible major competitiveness.

The second researched aspect treated on the determining factors of the competitiveness of the enterprises based on how it is perceived, according to the options presented in graph 9.

Graph 9: Perception of the LPA as a competitiveness element



Source: Own elaboration

Of the exposed matter it is perceived that 30% of the enterprises indicated that the competitiveness is perceived based on the opening of market with access to potential clients as determining factors, 50% aim for the cooperation between the enterprises and better support of the changes of the market, the remaining 20%, that it affirms in lowering of costs of consumptions and access to better suppliers, would facilitate a better positioning of the enterprises.

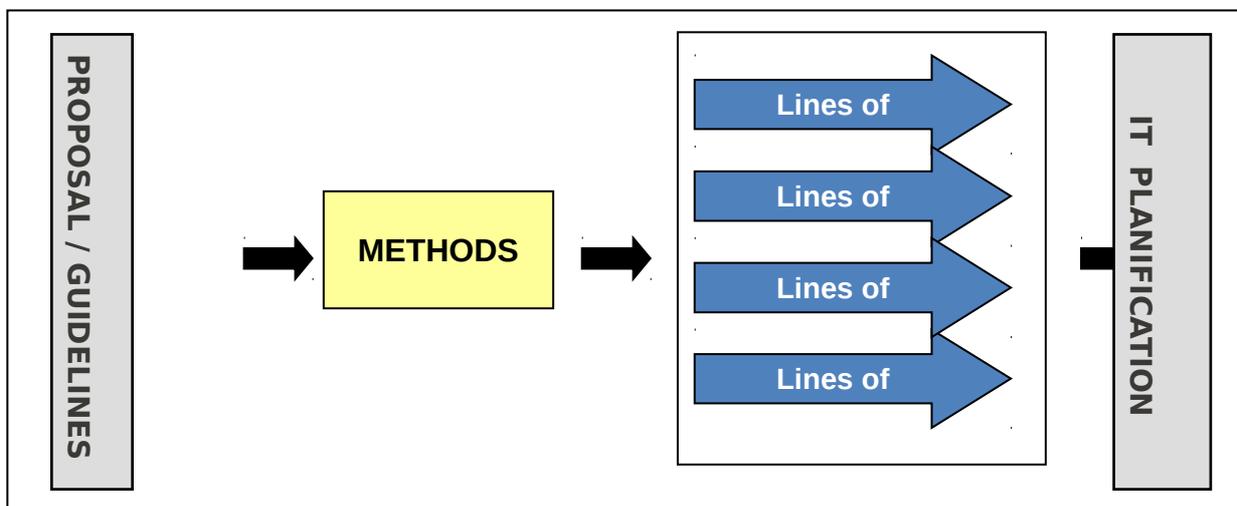
The point to emphasize is that although seven enterprises have not affirmed that the LPA favors the competitiveness, the same still do not perceive the cooperation as a key factor for the growth of their company. This result was confirmed in the survey to the enterprises which have strategic planning. The result was that only 20% of the researched enterprises are formalizing the strategic planning for the next five years.

4. Implementation Proposal

In order to end up this research there was elaborated a proposal-guideline of implementation, with thematic and the approach in synergy with the problem and objectives of this study, as a form to verify the previous researches on the LPA.

The proposal of suggested guideline had as its bases the information of the researched enterprises, originating the outline presented in figure 1, that represents a model of the proposed cycle.

Figure 1: Proposed model/ Implementation Guideline



Source: Own elaboration

The proposal becomes an impelling fact, that, by means of careful strategic planning, for the enterprises of the LPA, will give rise to the projects and to its attachment lines, originated from projects, that constitute instruments through which it is possible the implementation of the proposal. The projects do not have to exist in an isolated form, that is to say, they only have sense if they are done altogether. The structure of the proposal is specified in picture 2.

Picture 2: Structure of the Implementation Proposal

PROPOSAL/ GUIDELINE	METHODS	ACTION LINE
To implemet the culture of the Competitiveness and Cooperation using resources of IT	- Make the industrials aware about the importance of the knowledge on the resources of IT, of which they can add to their business; - The importance of the cooperation.	- Society with SEBRAE to reunite the entrepreneurs through Workshops;
Strategic Planning	- To formalize a Strategic Planning in all the enterprises;	- To contract a company of consultants;
Strategic Planning of the Technology of the Information	- To formalize a Strategic Planning of IT with Base in the strategic Planning.	-To use suggested methodology (to see chart 13);
To facilitate the acquisition of resources	-To unite means to facilitate the acquisition of resources of IT by the enterprises.	- To look for public policies of fiscal incentives; - Through financial institutions.

Source: Own elaboration

With respect to the researched enterprises, it is recommended that they participate actively in the LPA as forms to lever its commercial transactions, especially the small ones that seems to be placed on the margin of the other studied enterprises.

On the use of IT, it is recommended that the enterprises be structured initially internally, with the use of software, ERPs, Internet and Electronic Commerce. The LPA must also look for their integration via system through an IF. The use of a management system of the chain of aid is recommended.

CONCLUSION

This research had as main objective to understand how the enterprises that comprise the LPA Cosecha MetalMecánico Santa Rosa/Horizontina use the resources of the information technology for their competitiveness, where it was possible to find evidences of the importance of the use of IT, as a factor of competitiveness for the enterprises that compose the LPA.

Evidences were found, mainly of the perception of IT as competitive resources and also in the use of IT by the enterprises. What was not really identified was the use of IT shared within the LPA, or by their members.

With respect to the use of IT and its contribution, only six of the fifteen enterprises use integrated systems of management, none of the six uses the electronic commerce, although, a part already uses the Internet as a channel, for marketing, that is to say, they only use as it forms to disclose their company. What was demonstrated is that the enterprises use IT still in an inadequate form, or they use it partially, like a tool of support to their routine activities, but they have not perceived the importance of these resources for the development of the LPA.

With the competitiveness it also it happened in the same way. The enterprises researched still perceive the competitiveness, in the internal and external ambient, of eight enterprises, the other seven do not consider this possibility. A fact that was confirmed, in the establishment of which only 20% are formalizing the strategic planning.

Few were the evidences of cooperation between the member enterprises, with some actions done together. It is pure reflection, in what is said with respect to the practice of evolution of the LPA, one perceives that the relations still are beginning to consolidate, what actually fits the LPA in development degree, but to arrive at the phase of cluster structured, where a high degree of cooperation between the enterprises is had, there becomes necessary a change of position and behavior.

There are, then, the following future questions: will it be really necessary for the local enterprises to make use of these technological resources and management? Or still: will it be that the enterprise class and the local enterprises are being out of phase comparing themselves to other States of Brazil? In order to close: if this study were realized in LPAs of the Southeast or the Northeast would it have the same result?

In truth, these doubts are results of the main limitations found throughout the development of this research. Other limitations found were: the nonexistence of studies with this same aim, the difficulty to collect data next to the enterprises and the phase-shift of the local enterprises in terms of use of information technology.

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