KNOWLEDGE MANAGEMENT: USING INFORMATION TECHNOLOGY TO OBTAIN KNOWLEDGE IN A COMPETITIVE ENVIRONMENT

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Abstract

The purpose of this article is to emphasize the importance of corporate governance, information systems and their theoretical and practical knowledge in the upcoming years. It does not only offer an analysis of the use of information and knowledge in universities, but also explains its main significance. Another objective is to join some specific fields such as artificial intelligence, information systems, marketing, marketing research and knowledge management so that sharing, distribution and creation can be transmitted to the undergraduate student of business administration as well. In order to write this paper, the available bibliography was reviewed and a quantitative exploratory research was conducted in some universities in São Paulo, Brazil. The study showed that students of the undergraduate courses in Business Administration had low level of knowledge in Information System and Marketing Research while they are in the school and this fact permit analytical vision of risks in the treatment of governance.

Keywords: Knowledge, Education, Intellectual Capital; Corporate Governance; Risks

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1. INTRODUCTION

The evolution of Information Technology has impacted differently in all sectors, including Education. The amount of information generated and the multiplicity of channels allow for interactivity and introduce new behavior in the way information is absorbed. Also in Education, students' behavior has been changing along recent years. This has exerted influence on the way learning has taken place, depending fundamentally on the stimulus existing in the relation teacher-student and on the resources made available by the educational institution to provide innovative and stimulating learning.

The teaching-learning traditional system, based only on the reproduction of knowledge does not cater anymore for the characteristics and behaviors of the new students. Not only is the adoption of information technology necessary, but also its use in an environment where teachers and students interact and complement each other in the teaching-learning process.

Bearing this context in mind, this research aims at identifying the level of knowledge of undergraduate students in undergraduate courses of business administration about the application of new technologies in Information Systems and Marketing Research.

The key advantage of this approach is that we can substitute the need to know absolute probabilities with the easier task of estimating relative probabilities. The is a useful option in many risk management situations where we need to allocate resources to mitigate various risks. The possibility of the risk not materializing provides the necessary zero outcome state of nature and frequently it is much easier to estimate the relative rather than absolute probabilities of these risks. For example, in allocating resources to ensure computer security it is much easier to estimate the relative likelihood of internal versus external security breach as opposed to estimating the absolute probabilities of such events. Peter C. Youg, professor from Minneapolis has stated : " The company's highest responsible for risk is not a specialist, bust the managing director. Risk is an integrated part of life and business life and due to that an important part of any managers responsibility". Business risk is not something you take an insurance against. Everyone in a company has to accept risks and to be willing to carry risks in fulfilling a job. Risk management is not to avoid risks but to understand that business always is subject to some degree of risk. A no risk-game is a game with no profit, unless there is imperfect access to knowledge. Risk management can be executed more or less intelligent or skilled, but it can never be execute ed such as to avoid risks. Risk and how to handle risk is legitimate and inevitable. Basically risk management is like deciding how many spare wheels to carry, or how many maps to carry in your trip . How many for normal driving and how many for crossing the Sahara ? Undoubtedly, most efforts have been directed to measuring poverty. After a great number of

attempts(of which the World Bank has been one of the most involved protagonists) have been made over the past decades we can assert that presently we have at our disposal rather sophisticated and reliable tools enable an adequate monitoring of poverty.

As for the impoverishment processes, we must notice that, after all, it is only recently that attention has been concentrating on the issue of social exclusion and that, therefore, the methods adopted are still not a hundred percent reliable. The study of social agency processes, on the other hand, is lagging behind. Many attempts have been made to measure development in its various instances (economic development, social development, and human development, educational development).

The intent local public administration in the municipal power has past, in elapsing of the years, for innumerable moments of changes to the long one of the history of the country. Initially, it had the time where the local public administration was come back, deliberately, for the defense of specific interests of the detainees of the power, without any type of focus or vision come back toward the favored classes, passing, later, for a long period of social assistencialism as form to guarantee the continuity of the politics of aiding of the detainees of the power. Arriving at the current moment, where the exclusive aiding to the ruling classes and the social assistencialism more do not represent the base of the local public governance that, although to continue under strong influence of these factors, it is presented at a moment of changes of this paradigm, the ambient question, associated to the aspects of the exercise of the citizenship and of the partnerships between the public power and the civil society, a factor becomes more each time evident fort and in the context of the public administration place, leading to the necessity of a complex reflection of all the society to construct and to consolidate a new paradigm of the public administration place that it takes care of the news and actuals necessities of the current society in change and of the partnership between the public and the private one.

This reflection, today, if concentrates in the necessity of if having a great understanding of the society in its diverse component dimensions, since the geographic questions, strategical politics and, until problematic of the construction of knowing the collective place and its consequences in the consolidation of the local power to the municipal level and its results, under the educational and ambient point of view. It is in these dimensions that the interventions of the local power occur in more intense and direct way, through action aiming at the results and/or to the waited development .

A new paradigm of the public administration is built, whose main objectives start to be the creation of generating conditions of the supported development, of the popular participation, the partnership enter the diverse levels of being able them public, private and of the organized civil society. In this new context, the

ambient question starts to have basic paper, as well as the management of flows of value in the interior of Shared Nets that, to the long one of this work, we will define as Dendritics Nets in the presented case of sharing of analysis and solutions for the urban garbage and the treatment of hydric basins in public corporate governance in the State of São Paulo, using knowledge and information system . So, as a research question, we can formulate a hypothesis: is the form of competition important? Competition does not merely take the relatively innocuous form of reducing prices and profits, if instead of having a raider take control of the assets of a company with a weak management, we must replace the management by understanding society and solutions for problems involve people and organizations?

2. INFORMATION SYSTEM AND MARKETING RESEARCH

The changes imposed by the modern world, and mainly the introduction of new information technologies, modified the behavior of organizations and their leaders. In a competitive environment, it is fundamental to include the use of supportive decision tools based on managerial information and on the competitive intelligence system. Administrators and managers spend most of their time identifying and analyzing information to make decisions and manage their companies and businesses. Besides, the market dynamics and the growing need for competition demand not only faster, but more creative decision-making.

In this sense, companies had to level their structures to gain efficiency and adopt more aggressive marketing strategies, both to attract more clients and to keep them. According to Davenport (1998) decisions taken from inadequate information may cost billions of dollars for an organization.

Thus, the Managerial Information System and the Competitive Intelligence System supported by information technology are considered as facilitating elements in decision-taking and in the definition of strategies, as they enable the work with integrated information, able to chain corporates transactions and give support to several business processes (STAIR & REYNOLDS, 2002:237).

A good managerial Information System offers customized information for each level of decision to be taken. It is essential for the company to make available and use information technology as a useful tool in the identification and analysis of information and viable alternatives for the company.

The adoption of these new technologies contributes for the company's monitoring the information generated and the use of the intelligence system as a strategic resource in decision-making. In marketing, the companies can utilize information technology resources to identify their potential customers, perfect marketing campaigns in order to

obtain better economic results, identify those most probable customers who might purchase a new product of service, set up systems of client assistance, etc.

3. BUSINESS INTELLIGENCE TECHNOLOGIES AS SUPPORT TO DECISION

Information technology has contributed significantly for the achievement of operational efficiency by organizations, mainly concerning the growth in the processing capacity, structure and information flow. Day after day the companies need information about customers, suppliers, competitors, market data, which, without the support of information technology, would be impossible to be collected and transformed quickly into added value elements in the decision-making process.

It is in this sense that business intelligence tools have been changing into a factor of interest by managers who have to deal with a great amount of data and information about the company's businesses. Authors like Walton 1994, Davenport 1994, Nonaka & Takeuchi 1997 argue that business intelligence in the context of organizations has been fundamental for the establishment of competitive advantage and understanding of the more and more demanding customers' expectations.

Therefore, it seems evident that a business intelligence system is essential to help in the development of strategic actions and guarantee the company's survival and success.

According to Gibbons & Prescott (1993), Business Intelligence presents several levels of sophistication and complexity, and that depends on the degree of development of each country. We will look at the main concepts and purposes of each of these technologies.

4. MAIN CONCEPTS AND PURPOSES

At this point is very important do understand some concepts that will be used during the research and to verify the knowledge of the students. In Stair's (1998:4-5) conception, an information system consists of Data, Information and knowledge.

Data are facts and elements in their primary form and Information is a set of organized facts and elements that allow for decision-making. Knowledge, in its turn, is a set of rules, guidelines and procedures used to select, organize and handle data, making them useful for decision-making.

According to Daft (2002), *"Even though knowledge uses data and information, it is not a synonym for either of them. Data is made of simple absolute facts and figures that, by themselves, can be of little value. Information is data that has been connected to other data and transformed in a useful context for a specific use. Knowledge is a step ahead; it is a conclusion drawn from the information after it*

has been connected to other information and compared to something that is already known."

Due to its utmost importance in a company's decision-making process, it is possible to see information as knowledge. According to Alvim and Heidi Toffler (1999), knowledge is a kind of know-how, or the understanding acquired with experience. They categorically state that *"from all the necessary resources to produce wealth, none is more flexible than knowledge"*. Knowledge—unlike information and data—always involves a human factor. It focuses on previous information, direct experience, intuition and understanding. Therefore, it is possible to consider the existence of two types of knowledge:

- *Explicit Knowledge* – formal and systematic knowledge that can be correctly codified, written and transmitted to others through documents or general instructions.
- *Tacit or Implicit Knowledge* – knowledge based on personal experience, common sense, intuition and judgment.

In Daft´s words, *"Explicit knowledge can be defined as 'to know about' whereas tacit knowledge is 'to know how'."*

That means that the evolution of information technology has produced added value as long as data, only quantitative in the past, now turn into intelligence, assigning qualitative character to the data obtained by the organizations.

4.1. What is the meaning of Business Intelligence?

Business intelligence is understood as a mechanism of assigning to business characteristics inherent to human intelligence by means of technology. As Gilad & GIlad (1988) say, business intelligence is understood as the activity of monitoring the external environment of the organization, searching for relevant information for the decision-making process. In fact, it is a mechanism for collection, analysis and systematic dissemination of information about the environment surrounding an organization.

In Tyson's (1988:9) view, business intelligence refers to an analytical process that turns gross data into relevant, useful and accurate data for strategic decision-making. This author points out that the adoption of this process does not require knowledge or use of sophisticated techniques, and that it can be used by organizations of any size or branch of activity.

4.2. Artificial Intelligence and its real meaning in a competitive environment

With the progress of technology, the organizations are increasingly dependent on its use. In order to use business intelligence it is also necessary to use the resources of Artificial Intelligence. According to Stair (1998,256), artificial intelligence systems aim at helping in the decision-making process from the

reapplication of human decision in structured situation, such as medical diagnosis, exploration of natural resources, identification of problems in mechanical devices, without completely substituting the human being in this process, though.

Stair (1998) emphasizes that artificial intelligence also encompasses other subsystems, for example specialized systems, robotics, viewing systems, natural language processing, learning systems and neural nets.

4.3. New Technologies Of Support To Decision

Recently new technologies have been developed to contribute for the improvement of business intelligence systems. Among them we should point out Data Warehousing, Data Mining, and KDD (Knowledge Discovery in Databases).

According to Porter (1998), the competitiveness is the reached performance, for a long period of time, above of the average of the competitors and, being thus, this can occur individually between the companies or regions, in one determined been or country. Thus, the analysis of the ambient nets, in the context of the local public administration, must be associated to the theory and complexity of the formation of the nets and its possible conceptions in the process of formation and development of cities and in the processes of globalization of the economy. In principle, such processes if find linked to a large extent, but this interrelation alone can be chore, analyzed, and exactly reverted, from the ambient nets. The called phenomenon of metropolization and consequence dissolution of the metropolises in way to the poverty, violence and marginality, fruit of economies or extreme externality in great urban agglomerations. The process of globalization and urbanization, disconnected to the ambient question, has generated problems that, according to (Deleuze & Guattari 1999), could only be decided from the moment where these problems will be faced in a des-territorialized way.

"the city-world. of the new figure of the integrated world-wide capitalism it is, then deeply, des-territorialized, its diverse components are dispersed on one rizoma multipolar urban, understanding all the surface of planet".

The approach of the nets, in the local context public administration, is related to the conceptualization of the nets as component elements of ampler a strategical vision, involving all the social sectors (economically active, or not), come back to guarantee the generation of instruments of mobilization of social, economic and ambient resources capable to generate the wealth necessary to guarantee the quality of life of the society, without, however, to harm the right to the minimum access of the future generations to this same quality.

For in such a way, the premise is considered of that this quality of life is determined by the relation of the partner-cultural and economic factors of determined society allies to a development philosophy, focused in the social sustainability that, in turn, will be guaranteed by the rational use of the natural resources of production. The studies of urban nets are inserted in the context of quantitative geography and are based on the functionalists theories and the theories of the systems. This boarding has brought significant contributions for the identification of configurations of urban nets and the busy position for data urban center .

According to Marteleto (2001), the social nets appear as a new instrument face to the institutional determinism. "What is new in the work in nets of connections it is its promise as a global form of organization with base in the individual participation. One form that recognizes independence, while strengths the interdependence ". This author still detaches that the study of the nets as evidence of a social aspect contemporary who still is being little explored: the perception of that "the individuals, endowed with resources and pro positive capacities organize its action in the proper spaces politicians in function of socialization and mobilization excited for the proper development of the nets".

The approaches are several and/or meanings that the concept of nets can present, but, amongst them, those displayed by Marteleto (2001), for presenting a strong social character, are fit well in the proposal presented in this work. For this author, the concept of nets can be express through "a system of nodes and links", or "a not geographic community", or a "physical system that if seem a tree or a net".

The nets mention a type to it of "relations/nets" that exist since that the man consolidated its social character and that, especially now, in the globalized society and of the information, they assume an excellent character that deserves a special attention of social sciences. In this society intensely complex contemporary, globalized and informatized, three dimensions deserve prominence when it is aimed at to study the perspective of inherent nets to the dynamics of the social movements: of the sociability, of the spaciality and the temporality.

The adequacy of these concepts in the context of other studies also is detached by Marteleto (2001) e, more of the one than this, these concepts for it presented reveal strong related to the concept of enterprise nets presented by Ribault et al. (1995), that it affirms to be, the nets of companies, a form of destined grouping to favor the activity of each one of them without, however, to demand that these have financial bows between itself forcibly. As well as in the social context (human), the nets of companies represent a form of association for affinity, with an ample informal character and that it makes with that each company is the responsible one for its proper development and all for the success of the system.

For Marteleto (2001), although to originate in an informal sphere of social relations, the effect of the nets can outside be perceived of its space, either in the

interactive relations with the State, distinct sectors of the society, formal or informal economic organizations or other representative institutions, in new conception of spaciality.

Powell (1990) detaches that many authors have converged its opinions to the fact of that, in middle of the decade of 1980, a new form of economic organization was initiated that is if consolidating, the point of other authors (not cited for it) to consider that such fact is resulting in a new form of social organization, and weather. Economic relations are based in a social context that if develops in mutual function of linkings, interests and reputation that, still according to this author, weakly are determined by a formal structure of authority. Thus, the addition of the relations in a net does not represent its potential greater for constructions of positive interactions between the parts; these, still, also are very dependents of the form as the net is structuralized, of the historical and local time.

Valley to stand out that, since the classic studies of social nets until most recent, it is agreed that does not exist a "theory of social nets" and that this concept can be used with diverse social theories, needing complementary empirical data, beyond the identification the links and relations between individuals (Marteleto, 2001). Beyond the job in diverse social theories, many works have shown the possibility of association of this concept to other areas of the human knowledge, especially those related to the economic and educational and ambient aspects.

Amongst the motivations most significant for the development of the nets those are that relate to the levels of social-global organization, national, regional, state, local, communitarian (Marteleto, 2001) to which must, also, be associates the motivations of ambient character, all related they to the subjects detached for the author, which insists on the importance of the inclusion of the citizen.

The nets, not necessarily, need a hierarchic center and a vertical organization, differently of that it occurs in the organizations, a time that is defined by the quantitative and qualitative multiplicity of the links between its different components, guided for a logic and an associative principle. This suggests creation of tipologies of nets.

In the study, authors Amato Neto (2000) use as grouping parameters the degrees of formalization of the consisting nets, the centralization and the mechanisms of cooperation that these can present. Thus, the authors present the following tipologic groupings: Social Nets, Symmetrical Social Nets; Anti-symmetrical Social nets, Bureaucratic Nets, Symmetrical Bureaucratic Nets, Anti-symmetrical Bureaucratic Nets, Nets Proprietors, Nets Symmetrical Proprietors and Nets Anti-symmetrical Proprietors.

In this context, the philosophy of the sustainable development comes to act, in the scope of the ambient question, as an agglutinate actor between these concepts, being allowed that in each one of them the

basic principle of this philosophy that if bases on the preservation of the natural resources for the future generations, that can be searched, for example, through an enterprise reception system structuralized in nodes is inlaid and links, or fellow creatures to a tree. Or either, for the agglutination of the concepts of social nets, enterprise nets and governmental links.

Symmetrical social nets are characterized for the in existence of being able centered, and all its participants share the same capacity of influence, already, in Anti-symmetrical Social Nets it has the presence of a central agent for the coordination of the projects. Already, Bureaucratic Nets are legal, contractual and formal, being able, also to be symmetrical or anti-symmetrical, nets anti-symmetrical proprietors are the capital venture and nets symmetrical proprietors joint-ventures. But, in new paradigm it matters to explore the consequence of a hierarchic relation between cities determined for the logic of the extraction tax and for the established necessities of the mercantile circulation of permanent form in the territory.

4.4. Data Warehousing

Considered as a big storage of data, integrated in an organized way, its purpose is to help in the decision-making process in an organization, seeking to transform high amounts of information into intelligence.

Inmon (1997) claims that this system 's able to store and organize data stemming from several sources of the organization, integrating them in a unique database, turning them into information for all the levels of the organization.

Data Warehousing can generate knowledge and information about the customers'behavior, introduction of products in the market, sales teams' performance, results or losses in the organization, constitution of production costs, etc.

The most important fact in this process is not the generation of information, but its effective use. According to Kimball (1998), it is useless to make the most modern equipment, interconnected with a Data Warehousing, available for all the company, if the managers cannot profit from all the potential and richness of information that can be generated.

4.5. Data Mining

Considered as another important instrument in the decision-making process, it defines the automated process of capture and analysis of a set of specific data to improve the view of the ones in charge about the business. The function of this process is exactly to make the interface and analysis of the data originated by the Data Warehousing. Data Mining allow for the forecast of future trends and behaviors, enabling the administrators to make decisions based on facts, not only on suppositions. Through this tool it is possible to

make analysis of huge amount of stored data, allowing the companies to know their customers better and direct products and services to them.

In accordance with Kimball (1988), data mining originated in classical statistical routines, like correlation and regression. It developed with the addition of other techniques based on neural nets, decision trees and artificial intelligence, and only in the 1990's it was possible to apply artificial intelligence techniques to help in the management and solution of business problems. The term "data mining" is also known as "data prospecting", as it is a tool that processes the existing data in the company's database, making them accessible for strategic use by the companies.

In Business Administration, data mining allows better knowledge of the customers' habits and characteristics, making it easier for the companies to offer products and services that are more attractive and suitable to the customers' expectations and needs.

4.6. Knowledge Discovery in Databases (KDD)

KDD (Knowledge Discovery in Databases) is a searching system of automated knowledge in databases. It is a data-polishing process, because it involves the automation of the identification and recognition of patterns in a database. A KDD process depends essentially on the Data Mining and Data Warehouse techniques, as the data is already arranged and consistent. According to Sulaiman & Souza (1997 and 1998), KDD (prospecting of knowledge in databases) is a tool that is more known and used by artificial intelligence researchers. From these concepts it is possible to understand better the purposes, applications and results that these tools present for the decision–making process.

5. INFORMATION SYSTEMS AND KNOWLEDGE MANAGEMENT

The uses of information systems have been developed in order to assist organizations in creating, capturing, manipulating and distributing knowledge and information in a necessarily profitable way. As regards knowledge, information systems must perform a vital role optimizing the company's information flow. Every information system available makes the information flow easier and has intrinsic organizational knowledge.

Information technology systems have been designed to meet a series of demands regarding information and the use of information technology as a strategic tool is definitely the highest level of its application.

Among the great variety of information systems, groupwares and intranets help the creation and sharing of knowledge among people working in groups. Word processors, electronic publishing, image generation and web publishing, electronic calendars and database are examples of office automation systems. Therefore, they spread knowledge in a broad spectrum that

involves Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), Computer Integrated Manufacturing (CIM), Computer Based Learning and Training (CBLT), Artificial Intelligence Systems (AIS), Expert Systems (ES), Neural Networks (NN), Fuzzy Logic (FL), Genetic Algorithms (GA) and Intelligent Agents (IA), Avatars (Av).

Finally, according to Daft (2002), it is important to bear in mind that: "*information technology is the motive force behind the recent tendency towards knowledge management. Data storage and its exploration, along with the mapping of knowledge and electronic libraries are useful tools for the administration of the explicit knowledge. In order to succeed in the administration of tacit knowledge, organizations must use dialogue, stories of learning and past cases and practice communities. Intranets are important to maintain the sharing of both explicit and tacit knowledge. Boosting knowledge involves changes in the organizational culture that encourage people to share their knowledge instead of accumulate it.*"

If we look into it, people devoted to the study social phenomenona (and as a consequence, also those who make decisions in the matter) find themselves faced by one social condition and two processes. The social condition we refer to is that of poverty, that is to say a state of deprivation that tends to be relatively stable. The point is being armed with the tools necessary to identify the poorest sectors of population. As far as decision -making is concerned, it is necessary to take emergency measures in order to alleviate or reduce the most serious situations.

The first of the two processes is that of social exclusion, which takes on the shape of a process of impoverishment. In fact, by accumulating and interacting, social risks tend to drive to a condition of poverty the actors exposed to them. For the decision-maker this means having to find ways and instruments to fight such risks before it is too late, that is, before a new process of social exclusion that would produce new situations of poverty settles in.

The second process is that of social agency, i.e. The process that makes it possible for those who have run into a situation of poverty to come out of it by eliminating the social risk factors that have engendered it. Consistently with the two points above we could talk about processes of enrichment and social re qualification so as to point out the relationship between social development on the one side and social exclusion and poverty on the other. In this respect, as far as the decision-maker is concerned, the emerging problem does not concern building up defenses against impoverishment processes or alleviating conditions of life for the poor. It is rather a question of identifying and giving support to social actors who show the capacity of enhancing life standards for the collectivity (e. g. the middle classes, both profitable and non-profit enterprises, qualified human resources, civil society and so on).

It is hard to say whether such tripartite model (Social Exclusion, Social Agency, Measuring Poverty), may actually work.By distinguishing among three levels of reality, in fact, it enables researchers to gather a more analytical and clear-cut vision of the ongoing processes .It also avoids the risk of reducing these processes to just one dimension (be it that of poverty, of social exclusion or of social agency). It also gives decison-makers the chance of articulating in a more consistent and strategic way their intervention in terms of social and economic policies.

In actual fact, public policies can be valued, also and especially, on the basis of their contribution to:

● alleviating poverty (by reducing its most devastating effects according to an ' emergency " approach);

● fighting social exclusion (removing, by way of " prophylaxis", one or more factors of social exclusion, but using a " symptomatic" approach);

● supporting social agency (by " strategically " promoting the strengthening of civil society, through a significant involvement of urban middle classes)

These problems are related to issues like the size of the project, the complexity, the long time-span, the uncertainty, the governance and the management of hydric basins. Some other issues are:

● Lack of strategic framework or conflicts over strategy.

● Lack of organizational adaptation to technological change and poor management of change.

● Lack of organizational skills to support implementation.

6. METHODOLOGICAL PROCEEDINGS

In this paper, we chose a quantitative exploratory research, interviewing 363 students of many universities. Qualitative variables were transformed into quantitative ones in a 1-7 scale, where 1 represented that the student did not have any information about that subject, while 7 represented that this student was an expert in that field. It was a Likert scale. To process the data collected, we used Factor Analysis.

In accordance with Hair et al (1998), the Factor Analysis is multivariate statistical technique that can be utilized to examine the underlying patterns or relationships for a large number of variables and determine whether the information cam be condensed or summarized in a smaller set of factors or components. We decided do use Factor Analysis, basically because we had 40 variables (V1, V2,…V40).

Besides, we put all data in an Excel Spreadsheet and use the SPSS 12.0 in order to obtain descriptive statistics related to mean and standard deviation. Furthermore, a Scree Plot graphic was generated and two important matrixes: Total Variance Explained also and Rotated Component Matrix.

Finally, we had to consider only 317 observations in a total of 363 due to some problems of misinterpretation of questions C32 (Models of Optimizing Type – 0) and C40 (other specify). The first one was not well understood owing to the fact that there were numbers from 1 to 7 in the squares that caused a misunderstanding. On the other hand, the second question, C40, simply did not make any sense because we had already asked / inquired all questions. To sum up, we had a utilization rate of 87.33%.

Table 1. Variables analyzed

1.	Data Mining
1.	Data Warehousing
1.	Data Mart
1.	Database Marketing
1.	Computer - Aided Design (CAD)
1.	Computer - Aided Engineering (CAE)
1.	Computer - Aided Information Technology (CAIT)
1.	Computer - Aided Instruction (CAI)
1.	Computer - Aided Manufacturing (CAM)
1.	Computer - Aided Process Planning (CAPP)
1.	Computer - Aided Technology (CAT)
1.	Computer - Aided Testing (CAT)
1.	Computer - Integrated Manufacturing (CIM)
1.	Connectivity Among Systems (CAS)
1.	Expert System
1.	Artificial Intelligence
1.	Techniques of Modeling and Simulation of Markets
1.	Strategy of Processes Integrated in Marketing
1.	Strategy of Informational Processes Integrated
1.	Strategy of the Integrated Information Technology

1.	Taguchi functions applied to Marketing
1.	Genetic algorithm
1.	Avatars
1.	Security of Information Systems
1.	Security of Marketing Systems
1.	Knowledge Networking
1.	Reverse strategic planning in Marketing
1.	Traditional strategic planning in Marketing
1.	R engineering
1.	Models type Reasoning
1.	Expert systems Integrated into the Artificial intelligence
32.Models type Optimizing	
33. Models type analogy	
1.	Theory of the Artificial intelligence
1.	Models type Creativity
1.	Theory of the Neural Network
1.	Theory of the Restrictions
1.	Theory of the Chaos
1.	Theory of the Complex Systems
40. Other. Specify	

7. ANALYSIS

First of all, we plotted all data in an Excel Spreadsheet only for variables related to the level of knowledge of undergraduate students of the last year of Business Administration in 5 (five) important and representative Universities in the State of São Paulo.

Using the Factorial Analysis SPSS 12.0 program, 6 (six) important components were identified, according to the table 2:

Table 2. Main components identified by factorial analysis –Extraction method: Principal component analysis. Rotational method: Varimax with Kaiser Normalization. Rotation converged in 10 interactions.

Component	Name	Total	% of total Variance explained by the component
F1	SKIS	18,402	48,426
F2	GKIS	2,865	7,540
F3	AGK	1,782	4,669
F4	AKAI	1,380	3,631
F5	GTKM	1,330	3,500
F6	SKMIS	1,233	3,246
% of cumulative variance explained 48,426 55,965 60,655 64,286 67,786 71,032			

7.1. The description of each one of the factors

F1 –SKIS –Specific Knowledge of Industrial Systems (Practical Approach 1). It is a component that involves specific package software related to industrial and integrated manufacturing process in enterprises. It is the most concrete component and it was proved that, the Brazilian University neglect the practical approach. In other words, we have only this five practically only theoretical institutions and that cause problems not only to the students, but also to the enterprises.F2 – GKIS –General Knowledge of Information systems (Theoretical Approach 2). It is a general idea that requires a high level of abstraction of the students. It deals with the idea of a general integration, which is difficult for the understanding of Brazilian student used to deal with a very low level of abstraction. This is a complex situation that involves professors, teachers, institutions, students, the society and the government as well.

F3 –AGK –Abstract General Knowledge (Theoretical Approach 3). It includes important and new variables such as avatars, Taguchi's functions, reasoning, analogy and creativity models as well. Again, we observed Brazilian students are not able to identify abstract concepts, the result of an ancient learning method.

F4 – AKAI –Abstract Knowledge of Artificial Intelligence and others (Theoretical Approach 4). This is the most difficult component for the understanding of the students. Normally, in Brazil and in South American Countries in general the emphasis is on memorization, instead of learning, understanding, connections. In other words, they can not perceive what we call horizontal and vertical analysis as a whole.FS – GTKM –General Theories of Knowledge Management (Theoretical Approach 1). This is the lowest level of theoretical approach and comprehends: he Theory Of Chaos, the Theory of Complex Systems, Re-engineering and Traditional Strategic Planning. Probably the question of being related to these subjects owning to the fact that they have not been mentioned as *The Theories of Modernity*.

F6 – SKMIS –Specific Knowledge of Marketing Information System. All variables related to marketing and many teachers do not know their real meaning. How can they teach to their students?

Besides, we noticed in the Scree Plot the inflexion point where the curve changes its direction. The other variables are not significant for this analysis. Furthermore, we built some tables that can clarify our point of view. Table 3 shows the Component #1: SKIS with his variables. This component explains 48,43% of all data collected.

Table 3. Component #1: SKIS

Variables	Rotate Component 1	Mean	Standard Deviation	Coefficient of Variation (CofV)
C9	0.826	1.85	1.47	0.795
C8	0.803	1.62	1.22	0.753
C12	0.781	1.52	1.17	0.770
C7	0.766	1.76	1.41	0.801
C6	0.763	1.82	1.47	0.808
C13	0.758	1.62	1.23	0.759
C10	0.757	1.56	1.2.	0.776
C11	0.756	1.57	1.27	0.809
C5	0.697	2.30	1.70	0.739
C14	0.486	1.69	1.35	0.799
Mean	0.739	1.731	1.350	0.781
SD	0.095	0.229	0.165	0.025
CofV	12.870%	13.239%	12.212%	3.183%
R	0.340	0.740	0.740	0.070
		Special Column		
Grade Mean	24.729	1.731		
SDGrade	21.457-28.000	1.502-1.960		
2SDGrade	18.186-31.271	1.273-2.189		
3SDGrade	14.914-35.543	1.044-2.418		

Table 4 shows the Component #2: GKIS with his variables. This component explains 7,54% of all data collected.

Variables	Rotate Component 2	Mean	Std. D.	Cof V
C19	0.810	2.09	1.51	0.722
C18	0.752	2.15	1.57	0.730
C20	0.748	2.28	1.62	0.711
C17	0.678	2.57	1.66	0.646
C25	0.630	2.30	1.68	0.730
C24	0.555	2.90	1.78	0.614
C27	0.511	2.05	1.52	0.741
C26	0.430	2.32	2.02	0.871
Mean	0,639	2.333	1.670	0.721
SD	0,132	0.281	0.167	0.076
CofV	20.704%	12.065%	10.005%	10.521%
R	0.380	0.850	0.510	0.257
Grade Mean	33.329			
SDGrade	29.314-37.343	2.052-2.614		
2SDGrade	25.300-41.357	1.771-2.895		
3SDGrade	21.286-45.371	1.490-3.176		

Table 5 shows the Component #3: AGK with his variables. This component explains 4,69% of all data collected.

Variables	Rotate Component 3	Mean	Std. D.	Cof V
C23	0.646	1.49	1.15	0.772
C33	0.578	1.54	1.15	0.747
C35	0.573	1.58	1.23	0.778
C30	0.546	1.58	1.20	0.759
C21	0.438	1.76	1.29	0.733
Mean	0.556	1.590	1.204	0.758
SD	0.076	0.102	0.059	0.018
CofV	13.603%	6.414%	4.900%	2.438%
R	0.208	0.270	0.014	0.045
Grade Mean	22.714			
SDGrade	21.257-24.171	1.488-1.692		
2SDGrade	19.800-25.629	1.386-1.794		
3SDGrade	18.343-27.086	1.284-1.896		

Table 6 shows the Component #4: AKAI with his variables. This component explains 3,63% of all data collected.

Variables	Rotate Component 4	Mean	Std. D.	Cof V
C16	0.667	3.05	1.70	0.557
C15	0.654	2.48	1.73	0.698
C36	0.652	2.08	1.50	0.721
C31	0.637	2.06	1.58	0.767
C34	0.606	2.10	1.44	0.686
C22	0.505	1.67	1.27	0.760
Mean	0.620	2.240	1.537	0.698
SD	0.060	0.472	0.172	0.076
CofV	9.701%	21.093%	65.076%	10.931%
R	0.162	1.380	0.430	0.210
Grade Mean	32.000			
SDGrade	25.257-32.000	1.768-2.240		
2SDGrade	11.771-38.743	0.824-2.712		
3SDGrade	5.029-45.486	0.352-3.184		

Table 7 shows the Component #5: GTKM with his variables. This component explains 3,50% of all data collected.

Variables	Rotate Component 5	Mean	Std. D.	Cof V
C38	0.775	2.35	1.67	0.711
C29	0.668	3.27	1.78	0.544
C37	0.600	2.33	1.65	0.708
C39	0.565	1.75	1.33	0.760
C28	0.557	2.52	1.81	0.718
Mean	0.633	2.444	1.648	0.688
SD	0.091	0.546	0.191	0.083
CofV	14.323%	22.332%	11.564%	12.081%
R	0.218	1.52	0.480	0.216
Grade Mean	34.914			
SDGrade	27.114-42.714	1.898-2.990		
2SDGrade	19.314-50.514	1.352-3.536		
3SDGrade	11.514-5.831	0.806-4.082		

Table 8 shows the Component #6: SKMIS with his variables. This component explains 3,25% of all data collected.

Variables	Rotate Component 6	Mean	Std. D.	Cof V
C1	0.812	2.10	1.60	0.762
C2	0.787	2.27	1.68	0.740
C4	0.701	2.76	1.93	0.699
C3	0.640	1.76	1.42	0.807
Mean	0.735	2.223	1.658	0.752
SD	0.079	0.416	0.212	0.045
CofV	10.774%	18.734%	12.773%	5.959%
R	0.172	1.000	0.026	0.108
Grade Mean	31.757			
SDGrade	25.814-37.700	1.807-2.639		
2SDGrade	19.871-43.643	1.391-3.055		
3SDGrade	13.929-49.586	0.975-3.471		

8. IDENTIFY RISKS

Table 9. Level of risk affecting timing and costs

	Technical risk factors	Human risk factors	Economic risk factors
External	Technical development	Political influences	Macro economic indicators
Project related	Development Construction	Communication Motivation	Budgets Cash flow
Internal	Technical level	Strategy	Companies involved

Working with new technology always involves a far greater level of risk affecting timing and costs. In this paper, we address the question of how flesh and blood decision makers manage the combinatorial explosion in scenario development for decision making under uncertainty. The first assumption is that the decision makers try to undertake 'robust' actions. For the decision maker a robust action is an action that has sufficiently good results whatever the events are. We examine the psychological as well as the theoretical problems raised by the notion of robustness. Finally, we address the false feeling of decision makers who talk of 'risk control'. We argue that 'risk control' results from the thinking that one can postpone action after nature moves. This 'action postponement' amounts to changing look-ahead reasoning into diagnosis. (Pomerol, 2004).

9. CONCLUSIONS

As we can infer in this article, the low level of the students' of these Brazilian education institutions abstraction is evidenced. In other words, due to the training lack and development in disciplines of the knowledge, it carts this a lack of conditions of pertinent vocabulary, what implicates in the low reading capacity, which contributes to minimization of the abstraction level of these for his/her time. On the other hand, we also noticed the low practical level of the courses offered by the Brazilian education institutions, mainly with respect to those disciplines aggregate of value, what is fundamental for the development of an industrial infrastructure of the country.

There is also to increase the lack of the own teachers' preparation completely in their students, drug addicts that are in a structure not brought up to date, archaic and without proposal, doing with that besides the business administration students lose the focus of his / her course as professionalization objective and application.

He / she fits to still detach the complete dissociation among State, company and education institutions, above all when there are political alterations, usually after the elections.

Finally, it fits to increase that the teaching methods in Brazil are very late in relation to the central countries, once they are only centered in the memorization, in the creativity lack, in the pure theory with little practical applications and, in some cases without the minimum sense.

This kind of situation corroborates view that in which circumstances there is no clear definition of objectives and goals in the corporates nets ; any strategy that comes to be delineated will end up in failure, as it brings in itself these embedded standards that, in the case of corporate governance since the firms were not structured, had their reflection in the results found. In the scenario characterized in this study, it is clear that the managing board of the nets, eventually treated the strategy issue in the wrong way, as being one more of the entrepreneurial tools presented as an alternative to improve its organizational performance by educational development.

Still concerning the elaboration and implementation of the diversification strategy adopted by the cooperative nets, according to Porter's (1987) concepts here approached, it is possible to observe that

there was no attempt concerning the elaboration of their own strategies by the business units established, although they present, in thesis, management autonomy before the general management of the cooperative nets; in this study, there is no evidence of any attitude on the part of the units towards this issue. Another factor that may have contributed for this situation was the very fact that the autonomous management power of the business units has not been characterized in practice and this, as was clearly characterized in this study, very much contributes to the poor performance of the units and lack of corporate governance. Still within the parameters presented by Porter (1987), neither was any initiative by the corporation highest management observed that treated the elaboration of the corporation strategies approaching the management aspects of the business units established. The answer for the questions proposed during the introduction as hypotheses, in a dynamic market, one with constantly changing products, process, and prices, it may not be possible to say with precision at any point at time which management is best suited to succeed in the future. The company with strongest management will develop the best products, produce the highest earnings and growth and drive companies with weaker management out of business or, at least, leave them with a much smaller share of the market. In the absence of good information about the preferred management strategy, the second-best optimum may be to let various managements compete and see which one succeeds. Evolutionary arguments have been used in the past to suggest that competition among firms will select a population of firms that maximize value.

REFERENCES

1. AMATO NETO,J. *Redes de cooperação produtiva e clusters regionais: oportunidades para as pequenas e médias empresas*. São Paulo, Atlas, 2000.
2. DAFT, RICHARD L. *Organizações: teorias e projetos*.São Paulo: Pioneira/Thomson Learning, 2002.
3. DAVENPORT, T.H. *Reengenharia de Processos.* 4ª.ed. Rio de Janeiro: Campus, 1994
4. DELEUZE, GILLES & GUATTARI, FÉLIX. *Mil Platôs: capitalismo e esquizofrenia*. VOL. 3. RJ: 34, 1999, pp. 9-29.
5. DM Brasil.*Data Mining*. Disponibilidade em http://www.dwbrasil.com.br. Acesso em: 10 Out. 2007.
6. HAIR, J. J. F., ANDERSON, R. E., TATHAM, R. L., BLACK, W. C. *Multivariate data analysis*. 5a. Ed. Prentice-Hall, 1998.
7. INMON, WILLIAN H. *Como construir o Data Warehouse*. Rio de Janeiro: Editora Campus, 1997.
8. INFORMATION DISCOVERY. *The Data Mine Suíte.* Disponibilidade em: http://www.datamining.com/dmsuite.htm; Acesso em 30 Jun 2007.
9. KIMBALL, RALPH. *Técnicas para construção de Data Warehouses dimensionai*s. São Paulo: Editora Makron Books, 1998.
10. KOTLER, PHILIP. *Marketing Management – Analysis, Planning, Implementation and Control*. 9th ed. Prentice-Hall International, Englewood Cliffs, NJ, 1997
11. MARTELETO, R. M. . *Análise de redes sociais: aplicação nos estudos de transferência da informação*. Ciência da Informação, Brasília, v. 30, n. 1, p. 71-81, 2001.
12. POMEROL. J. C. *Scenario development and pratical decision making under uncertainty*. Decision Support Systems, 31, 2001, p. 197-204..
13. _____.*Scenario Development and Practical Decision Making under Uncertainty: Application to Requirements Engineering* . Requirements Engineering , Publisher Springer, London, 2004.p. 174-181.
14. PORTER, M.E. *From competitive advantage to corporate strategy*. Harvard Business Review, p., May-June, 1987.
15. PORTER, MICHAEL E. (Orgs.). *Estratégia: a busca da vantagem competitiva*. Rio de Janeiro : Campus, 1998. p. 469-480.
16. POWELL, W. W. *Neither Market nor Hierarchy: Network forms of organization*. Research in Organizational Behavior, 12, 1990, p. 295-336.
17. PRESCOTT, J.E.; GIBBONS, P.T. *Global Perspectives on competitive intelligence*. USA: Bonus Books; Society of Competitive Intelligence Professionals, 1993.
18. RIBAULT, M.; MARTINET, B. & LEBIDOIS, D.: *A gestão das tecnologias*. Coleção gestão & inovação. Lisboa, Publicações Dom Quixote, 1995.
19. STAIR, R.M. *Princípios de sistemas de informação: uma abordagem gerencial*. 2ª.ed. Rio de Janeiro: LTC, 1998.
20. TOFFLER, A., TOFFLER, H. *Criando uma nova organização*: a política da terceira onda. São Paulo: Record, 1999.
21. VIVES, X. (ED) *Corporate Governance Theorethical & Empirical Perspectives* N. Y. Cambridge, University Press, 2000.