

## THE RELATIONSHIP BETWEEN KNOWLEDGE AND THE QUALITY OF THE DECISIONS

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### **Abstract:**

In a competitive world, where the situations are highly uncertain, the existing information isn't trustable, the possible correct alternatives are wide and the time for the company's survival is limited, the ability to make decisions is very important for the companies success. The objective of this study is to evaluate using practical cases of decision making if the individuals with a higher level of knowledge make better decisions.

The methodology adopted the resolution of management practical cases that was applied in an intentional sample of 109 professionals in the management studying an MBA in FIA-USP, Brazil. The data was processed using the multi-variant statistic analysis, correlation analysis and cluster analysis techniques. The interpretation of the result was made through a modification of the model (YIN, 2001). The results showed that the individuals graduated in state universities/faculties, classified as high quality by the Ministry of Education and Culture – MEC in 2002, and with a higher level of professional experience made the best decisions.

**Keywords:** Knowledge, Experience, Quality of Decision

## **THE RELATIONSHIP BETWEEN KNOWLEDGE AND THE QUALITY OF THE DECISIONS**

### **1. Introduction**

The organizations are fighting against an extremely competitive environment; they are in a society deeply affected by the new paradigms introduced by the called knowledge society. The new reality provokes an intense reorganization of the society producing changes in the organizations in all the levels. Considering that conditions the critical factor for entrepreneurial success is now the capability of the companies to dominate a limited group of skills. In that sense knowledge become to be relevant, reason why organizations should try to find as many guarantees in order to use it with success. Now, the challenge is not only to produce more, better and cheaper, but it also consists in using such sources of knowledge in order to optimize the formulation of strategies and in this way make a better decision. Thus, the success of business will depend on the decisions made, the way they will be implemented and the experience obtained for the next times. Knowledge will start to be evaluated using the decisions and the actions that this decision will generate.

Until now an existing problem is that there have been few studies interested in discovering what drives an individual to make good decisions in environments similar the ones described above. Thus, the objective of the study was to verify the influence knowledge have in the quality of the decision made. It was studied more in deep if individuals with more knowledge made better decisions in situations where exists high uncertainty or there are no past precedents, the existing information is not trustable, the knowledge of facts does not clarifies the understanding of the situation, or there are too many correct possible alternative in a short limited time.

In order to give a better explanation, the study was divided in three parts. The first one explains the theoretical framework, analyzed the literature that define the knowledge definition, the types and qualities of knowledge and the studies related to its measurement. Next the concepts involving the process of making decisions and the quality of the decision will be presented. Finally, some of the studies that highlight the importance of knowledge in solving problems and decision making will be presented. In synthesis the literature review shows that even though many attempts have been done to establish a definition for knowledge, until now there is no agreement in this matter. This attempts shows very clearly that knowledge is not pure or simple, but is a mixture of different elements, is continuous and

has a formal structure, is intuitive, which make it difficult to put it in words or understand it totally in logic terms making it more difficult to measure.

The educational and psychological literatures made many attempts to measure individual's knowledge and examine its role in the process of problem solving in specific areas. Their objective, besides understanding of how the individuals make decisions, is to optimize the teaching and learning process. Also in this sense, the literature in the area of the science of decision stated very clearly the undeniable interference between the paradigms and the psychological point of view in the way of reasoning of the decision maker. His or her beliefs, values and customs works as a window from which the decision maker examines the problem, raises alternatives and selects the one that according his or her knowledge seem to be the most interesting and advantageous. This knowledge in its long life, indeed, is based in a sequence of mental structures that grows and modifies through absorption of new theories and methods, or through personal experiences of the decision maker. The decision maker intrinsic sequence associated to his or her commitments, his or her expectations, and the emotions and feelings of every human being let design a unique picture of "that" decision making process. A decision on the same problem and same environment could be different when the decision is made by different people. Undoubtedly, those are the reasons of the contradictions presented in the results of the studies done in those areas.

In the management area there are many authors that presented and discussed the importance of knowledge, specially the tacit knowledge, in the decision making process. For instance, BROCKMANN & SIMMONDS (1997) in their article, "Strategic Decision Making: The influence of CEO Experience and Use of Tacit Knowledge", concluded that the tacit knowledge is a key ingredient in the decision making process and that the two variables determining this kind of knowledge are the experience and intuition of the decision maker.

In the second part a field study was made with 109 professionals coming from the management area and studying a Master in Business Administration – MBA in the Economy and Administration faculty-FEA of the University of Sao Paulo, Brazil. The objective was to evaluate throughout solving cases if the individuals with a higher level of knowledge make better decisions than their counterparts that have a lower level of knowledge. The quality of the decision of the people interviewed was tried to be evaluated using as the base the answers of the practical cases of the decision making in Marketing, Finance, and General Management areas. Those cases were extracted from basic books of the areas in study, the Online case library posted in the internet by the Administration Faculty of the USP (2002) and the Management Cases Library provided by Harvard University (2002). The questions and

answers of the cases were done by a group of specialized professors in the areas of Marketing, Finance, and General Management of the Economy, Management and Accounting faculty FEA in USP. The questions were formulated following the concept of the decision theory, in which is presented a problem with several alternatives and enough information to make a decision. Every case presented more than one good answer. In the case of general Management were assigned weights to each of the alternatives and objectives presented in the questions, with this it was possible to give a grade according which answers was closer to the best answer. The same was done in the case of Marketing and Finance.

The third part takes care of the analysis and interpretation of the results. The data was processed using strong statistic multi-variant analysis techniques as the correlation analysis and cluster analysis. The interpretation of the results was made using logical and theoretical chaining. The results of the research showed that individuals with medium experience graduated in faculties of state universities (classified as high quality by the Ministry of Education and Culture – MEC, 2002) made the best decisions.

With this study it is expected to contribute considerably with the actions developed by organizations and extendedly by teaching institutions in order for them to lead a better performance of their executives with positive consequences in the development of the companies and nations.

## **2. Bibliographic Review**

Nowadays, is not new for the science of management that knowledge is the most important economic resource for companies and in a larger context for countries to compete. Particularly, in the service sector the importance of knowledge to manage the physical assets is intrinsic and easily identified (LEONARD & SENSIPER, 1998). In the manufacturing sector this fact could be verified, but in a smaller scale in the following activities: research and development (R&D), process design, product design, logistics, marketing, or systems management. This activity defines the competitive differential of the company (TERRA, 1999). According to this theoretical line the critical success factor for companies is now the capacity they have to dominate a group of skills that are important for their clients.

In the scenario with a predominant new economy based in more intangible values will be necessary to have different companies that the most important requirement to their employees will be the decision making and problem solving expertise. Due to the fact that the success of a business depends on the decisions, the way they are implemented and the accumulated

experience for future decisions, managers and academics are interested in identifying which are the factors for having better decisions and solutions to complex problems.

This study understands the decision making as a process that uses knowledge to solve problems. To prove this the literary review was searched using terms as knowledge, decision process and problem solving. The literature review shows a poor existence of scientific studies focused on the influence of knowledge in the decisions quality. Despite the importance of knowledge to develop businesses for the science of management, it seems that the concern of the scientists tend to be oriented more in the management than in identifying the relationship between knowledge and decisions. In the annual conference of Berkley University in 1998, Petrash, Director of the intellectual patrimony management at Dow Chemical, explained the importance of measuring knowledge using the following principle “If you can visualize it, you can measure it, and if you can measure it, you can manage it for continuous improvement”. The question that rises in this point is: How cans something could be managed if it could not be measured? To relate knowledge with any other variable is mandatory to give a measurement and to give a measurement implies an agreement in its characterization and definition.

### **2.1.The Knowledge**

A definition of knowledge is not easy to translate, transfer, conferred, evaluate and apply with the management theory and practice. Having this context we tried to analyze the concepts found in the literature of different areas with the intention of define and try to measure it. The literature review showed how the treatment of the knowledge in the philosophical, economical, psychological and educational context differs according to the type of focused knowledge and the way to acquire and use it. For instance, in the philosophy the rationalism alleges that knowledge could be obtained by deduction appealing to mental constructions as concepts, laws and theories. The empiricism argues that the knowledge is obtained by induction through specific sensorial experiences. For Kant the experience is the base of knowledge, but he didn't accept the empirical argument which states that this is the only source of knowledge. He affirmed that the knowledge appears when the logic thinking of the rationalism and the sensorial experience work together. This is the reason why he tried to make a synthesis between the rationalism and the empiricism to emphasize the relationship between knowledge and action.

The emphasis in the relationship between the knowledge and the action could also be finding in the classification presented by POLANYI (1996). He stated that the knowledge is classified in explicit and tacit. The explicit knowledge refers to the one transferable, formal and

systematic. In the other hand, the tacit knowledge have a personal quality, is closely linked to the action, the commitment and the involvement in a specific context. This classification was the base of the discussions of the importance of knowledge in organizational, economical and decision making matters.

The educational and psychological literature extended their typology interested in the formulation and design of the educational theories. Maybe it could be possible state that the main merit of the educational theory was to try to measure the individual knowledge and evaluate the problem solving process. In this way, they enrich the interpretations of why some individuals make better decisions, solve problems faster and with more precisely then others. This was a question that the theoretical and practical people of organizations didn't do. The approach the educational literature uses implies that knowledge is characterized by the function it fulfils in performing tasks; this is the use of knowledge. This is why it was presented in two dimensions to describe knowledge in use: the type and quality of knowledge. The first one refers to specific characteristics to a type of knowledge (conceptual, situational, procedural, strategic knowledge). The second one refers to the characteristics, properties, of knowledge (deep knowledge versus superficial, knowledge structure (automated versus non automated and general versus specific) that can be relevant for several types of knowledge (TON DE JONG, 1996).

### ***2.1.1. Measurement and/Or Evaluation of Knowledge***

Between the studies made of knowledge measurement (but not exactly with a measurement in strict terms) were found those made in psychology (WAGNER & STAMBERG, 1987) and science of decision (BROCKMANN & SIMMONDS, 1997 and GIUNIPERO *et. al.* 1999). In those studies the individual knowledge evaluated experience, academic background, and use of intuition in problem solving and decision making. For instance, Wagner & Stamberg used the repository of knowledge concept to picture the tacit level of knowledge of two individuals. It is understood as repository a group of experiences lived by the individuals. The results of the study showed that the repository of tacit knowledge changes according to the experiences and the level of tacit knowledge depend on the professional level. Reinforcing Wagner & Stamberg thoughts, Ansoff in 1998 (cited by BROCKMANN & SIMMONDS, 1997) stated that the tacit knowledge could be gained through experience. Therefore, the experience of an individual increases when he or she is exposed to different problems and solutions. Through this exposure a big repertory of experiences, problems and solutions are hierarchically organized in the memory. In the same way BROCKMANN & SIMMONDS (1997) and GIUNIPERO *et. al.* (1999) tried to enhance

the application of tacit knowledge as part of the decision making process. They said that the experience of an individual increases the usage of tacit knowledge in the decision making and the moderated intuition increases the relationship between the experience and the usage of that knowledge.

GLAZER (1998), one of the first organizational theorists who tried to determine the value of individual knowledge did a comparison between the “utility” of a typical good to a service and the “utility” of knowledge. The value theory of knowledge should begin with the perception that it is an object of difficult measurement using the traditional standard tools. The typical “utility” of the economy show properties as divisibility, adaptability, scarcity and decreasing returns according to depreciation. These are the properties in which usage value differs to exchange value. For example, the fact that the water is cheap gives it a low exchange value, but it has a high use value. While a diamond is expensive so it has a high exchange value, but a low use value. In contrast the knowledge as an object differs of its typical utility that isn’t easily divisible, adaptable, scarce (but frequently perishable), and could not have decreasing returns for its usage. It frequently increase its value when is more used. These are the characteristics that measures knowledge using the most difficult traditional tools. The traditional distinction between use value and exchange value should be abandoned supporting the concept that knowledge has a economic value (exchange value) only when is used. In this sense we can find concordance between the educational theory and the Glazer’s predictions. When admitting the usability as a base to measure the interaction between the subject and the object, in this case between the “connoisseur” (the subject that knows) and “what is known” (the object that is known), calls the attention. If the knowledge does not have value (if it could not be measured) unless it is used and if the “connoisseur” that is the one that uses knowledge, then to measure knowledge means to measure the connoisseur who is really who uses knowledge. To measure the connoisseur implies to incorporate concepts as “context” and “subjective interpretation”. This presupposition suggests the introduction of subjective and tacit factors in the methods and models of traditional measurement, since they are the factors that will give a particular meaning to the connoisseur. That is why is necessary to identify them as attributes of the connoisseur. The understanding of why these factors give a subjective meaning is a matter of the measuring knowledge problem.

The knowledge problem is that it can not be treated as a variable (that could be studied) or as a resource (that could be manage). It could not have a realistic and robust measure and before any attempt to measure or evaluate it is essential to get to an agreement about the units

of the analysis. Is it individual? Is it a group? Is it the document or the object of knowledge? In other words, the relative problem of measuring knowledge is basically the problem of what to measure. The studies which objective is to determine the value of knowledge are in front of this problem: Determine the unit of analysis.

## **2.2.The Decision Making Process**

The decision making process could be seen as a sequence of sensations, perceptions and desires that should pass through one or more decisions and continue with the observation of the results of the actions taken, in a continuous link with the next decision making process, training period in which our intuition will be enriched with the experienced lived in the previous decision making process. Some decisions require reflections and detailed analysis while others not. Some personal decisions require few or no analysis, while others also personal could require of more analysis. For example, buy a new house or change company. This complex variety could also be present in the managerial decisions. If the decision is so important and complex then it is worth to formally analyze. The rational decision making becomes particularly important in the administrative context, in which exists a complex situations, a formal analysis of high quality could be very valuable. The resolution of the problem is an activity associated to take an action or choice to solve an identified problem. This activity involves the articulation of the values and beliefs, the identification of the appropriate alternatives, its evaluation and the choice that gives the best solution. However, to make a good decision does not means necessarily to understand the decision making process. Our interest in this point is to identify the factors that could influence the process of problem solving and decision making. For this we will describe what a good quality decision is and how to evaluate it.

### **2.2.1. *What Is A Good Quality Decision And How Could It Be Evaluated?***

Making decisions could involve uncertainties, high risks and serious consequences, implies many and complex considerations, and almost always others judgment. In this context, how could a good quality decision be obtained? It is important to clarify the difference between decision making quality and results quality. A good decision is a logic one, based on alternatives, uncertainties. A good result is, in a large extent, a desirable result. There is no way to guarantee good results (unless there is no uncertainty). Although, making good decisions increases the probability to obtain a good result. This difference is particularly relevant to measure past decisions, which result is observable and in which the quality of the decision and the quality of the results can be compared.

How can you evaluate the quality of those decisions that do not have previous results, in which the uncertainty and the risks are high or the time for feedback is long? KLEINDORFER *et. al.* (1993), MATHENSON & MATHENSON (1998), and HAMMOND *et. al.* (1999) expose which decisions with those characteristics should be judged and evaluated using quality of its decision making process, and not using the consequences of its results. For that evaluation, these authors present different elements and/or dimensions as the intention to obtain a method that take to the best decisions. These elements, which directly or indirectly interact with learning and the feedback, give a structure that could seriously redirect the decision making process, enriching the possibilities and increasing the choices of making a good decision. Then good decisions result from an efficient decision making process which fills criteria that help to observe in a more clear way all the tangible and intangible aspects of the situation translating all the facts, feelings, opinions, beliefs and pertinent orientation to pick a better choice.

In that sense it get to an agreement when stating that the only way to increase the possibilities to make a good decision is using a good decision making method, which drive to the best choice using a the minimum time, energy and money.

### ***2.2.2. Factors That Influence the Quality of a Decision***

The efficient development of a decision making process results in quality decisions that could have good or bad results. However, the decision making process does not necessarily guarantee quality decisions because exists diverse factors that could sabotage the decisions more carefully considered. For example, the cognitive science combines the psychology and the neurology in order to obtain a better understanding of the reasoning process; this pretend to understand how the human mind works. The way people define, analyze and solve their problems reflex their basic preferences of the perception and judgment, in other words defines the cognitive style. The laboratory research and the day to day reveal that we create unconscious mechanisms to deal with the inherent life complexity. Those unconscious mechanisms called heuristics work well in a numerous situations. For example, when judging distance our mind trusts in a heuristic method that relates clearness with proximity. The more clear a object seem to be the closer it must be. The more undefined the further it must be. This simple mental shortcut helps us create a continuous sequence of judgments of the distance that asked to be in this world. As most of the heuristic mechanisms they are not trustable. For instance, in a day cloudier than in a normal day our eyes tend to delude our mind making it think that the objects are further than they really are. Researchers identified a large series of this kind of mistakes in the way we think. Some of the heuristic routines as the one of

clearness and when having tendentious judgments are detours for the sensorial perception. Other reveals themselves as irrational thinking anomalies. What makes all this anomalies so dangerous is their invisibility. The fact that the majority is solidly rooted in our reasoning process we do not recognize them (HAMMOND *et. al.* 1999).

In decision making process this is not different. For example, when reflecting on a decision the mind gives too much importance to the first information it receives. Impressions, ideas, estimations, or initial data work as an “anchor” for the following reflection. The anchors could be disguised in different ways. They could seem to be simple and innocuous as a commentary or a public statistic. They could be inlaid in the words of the definition of the problem to be solved. One of the most common types of anchors is a past fact or a tendency. Mainly in situations characterized by sudden changes the historical anchor could drive to unsatisfactory previsions and choices wrongly oriented. Whatever the origin is the anchors frequently harms our reasoning impeding us make correct decisions.

Besides this kind of errors that the physiologists call “physiological traps”, the intuition is also a factor that influences the quality of the decision. The interest for the intuition in the decision and managerial science was increasing because of the frequent and special references made by some of our best business leaders. Undoubtedly there are a lot of skeptics in the power of intuition. The main reason for this skepticism could turn around the opinion that the occurrences of the nature should be explained rationally and in scientific terms. Although the skepticism is understandable, the existence of a potential intuitive skill is for itself an empiric matter. Unfortunately there was little research made about the role of intuition in the decision making and those researches showed contradictions.

### **2.3.The Role of Knowledge in the Decision Making and In Solving Problems**

One of the reasons to consider the knowledge as valuable specifically in management is to be closer than the data and information from the action. The knowledge could and should be evaluated by the decisions or the actions it takes. For example, the best knowledge could take you to an efficient measure of the development of products in your production. They could also be used to solve complex problems or to make more precise decisions in related to strategy, competitors, clients, distribution channels and product or service life cycle. (GRANT, 1996; MATHENSON & MATHENSON, 1998; GIUNPERO, 1999; TERRA, 1999).

As explained above, the knowledge develops along time through experience related to what we see in courses, books, mentors, and also practice. One of the main benefits of experience is that it gives a historical perspective from which it could be seen and understood

new situations and events. Experience transforms the ideas of what should happen in knowledge from what really happened. The importance of the experience for knowledge is that it points out the capacity of knowledge to manage complexity. Knowledge is not a rigid strategy that excludes what does not fit; it could manage the complexity in a complex way. That is one of the essential sources of its value. Although it is tempting to look for simple answers for complex problems and manage uncertainties dissimulating that they does not exist, generally the decision is better knowing more than knowing less, although “less” could seem to be more clear and more defined (DAVENPORT & PRUSAK, 1998).

Knowledge offers speed, let those who has it to quickly manage the situations even the complex ones that will confuse the beginners. Those interiorized answer, also called frames, are efficient guides for complex situations. Frames are patterns of interiorized experiences; they are paths in the maze of alternatives that saves the work of analyzing and choosing in each step along the path. The frames could be interpreted so fast that we could have no conscious of them, as when an answer comes intuitively without knowing how it came. That does not means that the steps does not exist – intuition is not something mystic. (DEBBIE & LAN-FOX 1996). This means that the steps to be taken were fully learned that they happened automatically without a conscious thinking, reason why it happened in a high speed. Those interiorized experiences are what Polanyi called as tacit knowledge and the frames of that experiences will be what Wagner & Stamberg called a repository of tacit knowledge.

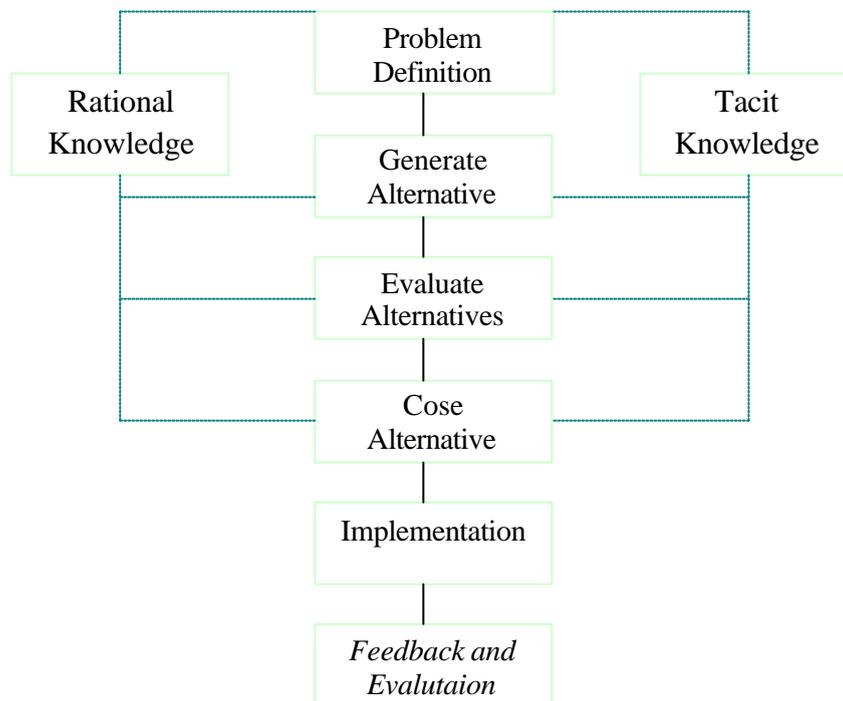
Even though the importance of knowledge in the problem solving and decision making, few studies were done interested in establishing that relationship. It has been tried to identify and follow is who knows or what and when in order to determine the way knowledge reflect in specific decisions. For DAVENPORT & PRUSAK (1998) to correlate knowledge and decision making is a thorny task because is difficult to link an specific knowledge or specific information to specific resulting consequences of the decisions. If it is complicated to identify the knowledge used in the decisions or in the problem solving, it is more complicated to try to correlate it with the consequences of their results.

The rational vision of knowledge and the decisions assumes that the decision makers need really good information. And it is clear that those circumstances are hardly present in the real life.

In the organizational environment, BROCKMANN & SIMMONDS (1997), GIUNIPERO *et. al.* (1999), has examined the influence of experience and the intuition of the CEOs in the use of tacit knowledge in their strategic decisions. Both studies consider the experience as a main source of knowledge. Evaluating it basically by the number of years the executives are in a

position or function in organizations of the same industry. The results showed that the more experienced could be more efficient and adept processing and organizing information to make a decision than the less experienced. For this vision the rational model of the decision making will be modified by incorporating knowledge in the decision making process period. That is why the decision maker will use his or her knowledge, his common sense and his intuition in his or her decisions. (Figure 1)

**Figure 1 – Rational Model in the decision making**



Source: Adapted from GIUNIPERO *et. al.* (1999)

### 3. Methodology

The methodology used in this study is co relational-causal to try to understand the relation cause and effect between the studied variables, Due to these multi-variant techniques are used for the analysis. For GUPTA (1999) these are, in the extended sense, techniques that refer to all the statistic methods which simultaneously analyze multiple measures of each individual or the object involved in the research. In order to be considered multi-variant all the variables must be random and interrelated in the way that its different effects could not be interpreted separately in any sense. For KINNEAR & TAYLOR (1996) the purpose of the multi-variant analysis is to measure, explain and predict the degree of the relation of the “variate”

(equilibrate combination of the variables), therefore the multi-variant character is found in the multiple “variate” (multiple combinations of the variables) and are not the number of variables and observations. The analysis of the data involves measuring the variation of the group of the variables. This could be between them, between an independent variable itself and between one or more independent variables. This allows choose between a large numbers of alternatives that have statistic significance.

For PERRIEN (2004), the multi-variant analysis could not be applied without an adequate conceptual development, because the organization of multiple variables and their interrelation is complex, which makes more difficult the interpretation of the results. IN the analysis it is important not only to analyze the statistical analysis, but the practical significance of the results. In other words, the results should have a visible effect that justifies the actions. Besides, the development of the conceptual model must be done very carefully before applying this technique. Critical variables could be omitted or be excessively used, because the use of the technique will filter them. The use of irrelevant variables could apparently improve the meaning of the results, but they turn them not to adequate for the sample population.

### **3.1. Conceptual Model**

Methodologically this study valued strategically the quality of the conceptual model. This model establishes that the formal knowledge obtained at the university and by training is the tacit knowledge, obtained through experience, which affects the quality of the decisions. “Quality Decisions” were expected to be made by people owners of knowledge coming from their experiences and from a high level of academic studies. With this in mind, a field study was made with the objective of evaluating, through the decision making by solving practical cases, if individuals with a higher level of knowledge make better decisions than the ones with lower level of knowledge.

To get these results, the following variables were analyzed.

Variables	Tacit Knowledge	Explicit Knowledge
	Number of years working. (Professional Experience)	Academic Studies (Management, Engineering, Psychology)
	Number of years in the industry or sector (Sector experience)	Level of Studies (Post-graduate, PHD, MBA, specialization)
	Number of years in the area of expertise. (Expertise experience)	
	Number of years in the current position. (Position experience)	
	Number of companies where the interviewee worked.	
	To evaluate the quality of experience: <ul style="list-style-type: none"> <li>• Information of the current company. (size, origin of capital, Ranked as one of the 500 best companies)</li> <li>• Current position and level.</li> <li>• Professional abroad experience.</li> <li>• Auto-Evaluation of the level of knowledge in the expertise area.</li> </ul>	To evaluate the quality of the studies: <ul style="list-style-type: none"> <li>• Quality of the institution where the studies were made.</li> <li>• The development of the interview during his or her studies</li> </ul>

### 3.2. The Sample

The sample was determined as non probabilistic, intentional and coded. Since the access to the sample was available the sample was determined as accurate as possible to the population. The idea was to select professional in the administrative department with a determined level of experience and with management positions in which making decisions is a day to day task. It was used for the sample the Master in Business administration – MBA of the Institute of Administration Foundation of the University of Sao Paulo. The research was made with collaboration from post degree program professors of the Administration Faculty of the Sao Paulo University – FEA-USP in the implementation and solution of decision making evaluation cases in Marketing, Finance and General Management areas.

To gather the data the structured material was applied in three different blocks; (1) Ask for help and instructions for its use; (2) Apply the questionnaire to get information about the interviewee profile; (3) Cases to evaluate the decision quality.

The participation of students of the Management Trainee program of the Institute of Administration foundation of Sao Paulo University was requested to pre test the tool to gather data and the material to evaluate the quality of the decision.

The data gathering was made with the students of four different programs of the Institute of Administration Foundation (FIA) of the Sao Paulo University. That allowed getting a fairly uniform group of participants, because all of them were at third grade and in management or executive positions in their companies. We worked with 109 executives coming from management and chief levels, with a minimum of 5 years of experience, studying an MBA in

Retailing, Executive program, Business Finance and International executive. The information was collected through: (1) Application of a questionnaire to measure the level of knowledge of the participants. (2) Solution of three decision making practical cases in General Management, Marketing and Finance to verify if the individuals with a higher level of knowledge make better decisions than their counterparts with a lower level of knowledge.

**Three practical cases.** Tried to evaluate the decision quality of the interviewee based on the answers of the decision making practical cases in Marketing, Finance and General Management. Those cases were extracted from base books of each area of study that are available online posted by the Faculty of Administration of USP (2002) and in the Library of Management cases of Harvard University (2002). The questions and answers of the cases were done by specialized professors from Marketing, Finance and General Management of the faculties of Economy, Administration, Accounting in the FEA-USP. The questions were elaborated following the concept of the decision theory, which is presented a problem with several alternatives and enough information to make a decision. Each of the cases presented more than one best answer. Weights were assigned to each of the alternatives and objectives asked in the questions in order to give a score according to how close the answers were from the best solution.

### **3.3.Data processing**

Once the data was tabulated it was processed and analyzed. Before using the multi-variant techniques, the basic characteristics of the data source and its underlying relations were analyzed. For that the following was necessary: I- Analysis of the origin of the variables (analysis of the way of distribution) II- Analysis of the relation of the variable (Using two dispersion graphs) III- Analysis of the differences among groups (determine the unusual cases and missing data). Many researchers wrongly focus only in the **statistic significance** of the results, without understanding its correct interpretation or what is called **practical significance** (significance of accessing the multi-variant analysis results based on substantial discoveries and not in the statistical significance). While the statistical significance determines if the result could be attributed to probability, the practical significance shows if the result is useful (important enough to guarantee the action). By processing the information could be seen not only the significance of the results, but its practical significance. Since in the academic context the research must not only be focus in the statistical significance of the results, but in its theoretical and substantive implication, many times they are derived from its practical signification. The data analysis was made of: Outliers cases, Missing data, normality, linearity of the existing relations among the variables, etc.

The following techniques were used:

- Cluster Analysis. Technique to develop significant subgroups of individuals or objects. Its objective is to classify a sample of people or objects in a small groups mutually excludable based in similarities among them.
- Correspondence Analysis. Interdependence technique that lets the bidimensional reduction of a classification of objects using a group of attributes and the percentage map of the objects relative to those attributes. This analysis gives a multi-variant representation of interdependence of the non measurable data.

#### **4. Analysis and Interpretation of the Results**

In this section will be presented the results obtained by using the statistic tool in an intentional sample of 109 interviewees. Besides the statistical tools used to define the profile of the, a correlation analysis was made to verify the existence of the relations among the variables studied and also a grouping analysis was to verify the existence or non existence of similar characteristics among the interviewees. Next, the main result will be described.

##### **4.1. Sample Profile**

The average age is 34, what shows that the sample represents a medium young population. The main background is in Engineering (39%) and Administration (31%). The 62% of the sample were graduated at private universities and 249% at state universities. The evaluation of the teaching institutions quality where the interviewee studied showed that 68% of the students come from faculties with the best performance. Regarding the professional experience, was observed that 86% had 6 years of professional experience with a mean of 13 years. In the dominant action area, which is not necessarily equal to the area of academic background, was observed that the greater part of the interviewee came from finance area (24 students), followed by sales (15) and Administration (12). Besides, the interviewee's background compared to the dominant action area of the interviewee was analyzed, observing that they do not coincide.

To verify the quality for the teaching institution (university, faculty, school, etc) the data of the last 6 years from "National exam of courses" was analysed. The criteria followed by MEC methodology were to avoid the idea of presenting the measures of the courses evaluated. This way will not stimulate individual comparisons, but will evidence the difference among groups of institutions. The option to attribute concepts seemed to be the most adequate, separating the courses in homogeneous group according to their performance. The concepts were distributed in five levels (A= Excellent, B=Good, C=Regular,

D=Insufficient, E=Bad) and calculated from the relative position of the mean of the course (arithmetic mean of the grades in the exams of the graduates), but take in consideration the general mean and the standard deviation that measures the dispersion of the grades with the mean. Thus, was observed that 68,8% of the MBA students comes from qualified faculties with the best performance have the grade of “A” and “B”.

#### **4.2.Descriptive results of the decision making quality**

A preliminary analysis of the answers to the cases related to the sample reveals that:

- ✓ The case with the higher grade was General Administration with a mean of 24,43 and median and mode of 23. This could be because the cases present a decision making situation which need more common sense than knowledge of a specific area of expertise. The average age of the interviewees is 34 years old with a professional experience mean of 13 years. The last data could explain why the high scores in this case show the experience as a factor that influence the decision making.
- ✓ The Case presented that the lowest grade was Marketing with a mean of 19,55 points. From our point of view we can speculate that this result reflects a low level of knowledge of the interviewees in this area of expertise. This was supported with the fact that in the sample there are few professionals with experience or studies in this area. Besides, the questions were prepared to evaluate the explicit knowledge where knowing the concepts was very important.
- ✓ The Case that evaluates the decisions in the area of finance also did not have a good grade. We observed a mean of 22 points. Nevertheless, in this case there was interviewee with the highest scores: 50 point. And they were the interviewees with the grades higher than 30 points. While analyzing this groups of interviewees we can notice that their ages are between 35 to 43 years old with 13,4 years of professional experience, the predominant career is engineering and 66% come from teaching institutions that have the highest score.

It is interesting that most of the interviewees in the three cases with the highest scores comes from teaching institutions qualified with the highest scores by MEC of Brazil on 2002. In the next point we will refine this interpretation through more sophisticated statistical techniques as the correlation and grouping analysis.

#### **4.3.Correlation Analysis**

In this study, “Pearson Correlation” was used since it is the most adequate considering the origin of the studied variables. For GUPTA (1999) the interpretation have a high degree of correlation if it is greater than 0,50, medium level if it is between 0,5 and 0,2, low level if it is

between 0 and 0,2. if the coefficient is greater than zero(+) means that the variables changes in the same direction, the correlation coefficient in the bi-variant correlation matrix are between -1 and 1 indicated by 1(\*) or 2 (\*\*) asterisk the level of significance of the outputs.

In the following paragraphs we will analyze the correlation of the most interesting variables.

1. The variable “Number of courses”, courses besides the career, presents a high correlation with the variables: “Range of professional experience” ( $r=0,366$   $p<0,01$ ), “Number of areas where he or she worked” ( $r=0,248$   $p<0,01$ ), “Years of experience in the sector”, “Number of positions” ( $r=0,536$   $p<0,01$ ) and “Case 1 General Administration” ( $r=0,288$   $p<0,01$ ). The data showed that the professionals with a good level of studies are those with more years of experience in a professional level and in the area of expertise. Probably that is why they have worked in different areas and in different positions. We could notice that a positive correlation exists ( $r=0,189$   $p<0,01$ ) with the variable “Average evaluation of the cases development” this could be because the individuals with a higher level of studies and as a consequence with more knowledge have a better performance than with a lower level of studies. These results showed congruence with the results obtained by STERNBERG (1995) where a high level of education was highly correlated with the tacit knowledge of the interviewees of that research.
2. The variable ‘Professional experience’ not reveals any correlation with the variables that try to measure the performance showed in the three cases. This leads us to think that not only time of experience is enough to make a good decision, but it is necessary to have experience with good quality. To proof this we asked the interviewees to auto evaluate their own quality of knowledge and experience, comparing this to the quality of decision variables. It could be verified that there is no relation between this variables or the other studied in the research. However, we can not state that the experience quality is not related with the decision quality because the auto-evaluation question (Likert type) is considerably subjective and the interviewee could have overestimated their answers. It would be interesting in future researches on this matter to ask the interviewee’s boss to evaluate the interviewee’s performance and knowledge in their area of expertise and match them with additional criteria as salary, company position in the market, company turnover, etc.
3. The variables ‘Experience in the position’ shows an inverse relation with the “Mean of the cases” ( $r=-0,224$   $p<0,05$ ). This means that the interviewees with several years of experience in the position presents a low level of performance when solving problems or making decisions. In other words, probably it is not only a matter of experience, but also

the quality of that experience. This results does not coincide with the ones found by BROCKMAN & SIMMONDS (1997) in their study, which showed that the experience in the sector was significantly low related to the use of tacit knowledge, but it does coincide with what STENBERG (1995) found when he states that the years of experience in the current position have a negative correlation with the tacit knowledge ( $r=-0,29$   $p<0,01$ ). This is a reason for the low performance of the interviewees.

4. The variable “Number of positions” shows positive relations with the performance of the case “General Administration” ( $r=0,216$   $p<0,05$ ) and with the performance in general ( $r=0,197$   $p<0,05$ ), and shows no relation with the cases of Marketing and Finance. This data could mean that people that have more extended knowledge and experiences with different positions and people could make better decisions related to General Administration area than in areas that require more technical knowledge as Marketing and Finance.
5. The variable “Evaluation of the faculties by MEC” shows positive correlation only to the general performance of the decision quality ( $r=0,257$   $p<0,05$ ). This indicates that the interviewees graduated in good quality institutions qualified by MEC had the best performance while solving the cases and making decisions. These results are similar with the ones found by STERNBERG (1995), because in his study the quality of the university and the quality of performance were positively correlated to the tacit knowledge.

#### **4.4.Cluster Analysis**

While doing the cluster analysis we get to a solution using three groups that involved the 109 interviewees (see chart 1). This was a mathematic result based on the answers obtained from the questionnaire and the decision making evaluation cases.

- The first group (cluster 1) that we called Professionals with medium experience and the best performance in solving cases, consists of 31 interviewees and is characterized for having in general a high performance in developing the Decision Making Cases compared to the rest of the interviewees, although the mean of the cases is not very good. Besides, the data in the sample shows that the interviews were graduated in state universities qualified by MEC as good quality, the average age is 34 years old, the average number of years of experience is 12 years and they worked in fewer companies than the other interviewees.
- The second group (cluster 3) that we called Professionals with few experience and medium performance in solving cases, consists of 47 interviewees that in comparison with the first group their development was not so favorable in solving the cases of decision

making. Besides the interviewees of this group were graduated in private universities qualified by MEC as good quality, have an age average of 30 years old with 10 years of professional experience, have seven years of experience in the area of expertise and have worked in more positions than the first group interviewees.

- The third group (cluster 2) that we called Professionals with a bit of experience and medium performance in solving cases consists of 31 interviewees. Although this group has similar characteristics as the first one, the performance in solving the cases of decision making was considerable lower. This group of interviewees had a mean of 41 years old with more or less 20 years of professional experience, had 16 years of experience in the area of expertise in the sector. Besides, it could be seen that this group is similar to the second because in both the university where the interviewees studied were qualified as good quality by MEC and were particular universities.

Chart 1: Results from Grouping Analysis

<b>Final Cluster Centers</b>			
	Cluster		
	1	2	3
Student Age	34	41	30
Number of additional courses	1	1	0
Total years of experience	12	20	10
Total number of companies	3	4	4
Years of experience in the area of expertise	8	16	7
Number of Areas in which the interviewee worked	1	1	1
Number of sector in which the interviewee worked	2	2	2
Years of experience in the sector	9	16	5
Years of experience in the position	3	4	3
Evaluation of the faculties by MEC	5	4	4
Kind of Faculty or University	2	1	1
Case 1 – General Administration	30,06	23,90	21,06
Case2 - Marketing	24,36	14,22	19,91
Case 3 - Finances	35,16	16,94	16,84
Mean of Cases	29,86	18,35	19,26

## 5. Final Considerations

The objective of study is to correlate the relation between knowledge and quality of the decisions of professionals in Administration. This objective is very challenging and ambitious, due to the amplitude and diversity of the literature related with the subject and, as a consequence, the difficulty to establish limits, inter-relationships and boundaries between several disciplines and topics (psychology, education, science of decision, organization and economics).

At the beginning it was presumed that the good decisions in the administration area were the result of a greater availability of knowledge. In other words more knowledge will imply better decisions. To prove this a field study was done with 109 executives coming from management and chief levels with a minimum of five years of experience, studying an MBA in Retail, Management Trainee, Corporate Finance and International Executive programs of the university of Sao Paulo. Although the field study was exploratory-descriptive, the results obtained from them were coherent with the theory revised. Before analyzing these results it is important to clarify the inconveniences of measuring the interviewees' quality of decision through answers to the decision making cases presented in the study. The difficulty is because of the numerous factors that could influence the process of solving the cases, besides the factors endogenous factors that the authors could not control. The empiricist results of the research fulfilled the expectation previous to the study. Even more they confirm, in some way, the initial suppositions created from the literature review and explains the conceptual model used. We observed the following:

1. The data of the research shows that, even though, the skills of the older adults could increase as year's passes, their skills to solve problems decline. This confirm what STERNBERG (1995) and DEBBIE & JANICE (1996). These authors suggest that the academic abilities of older adults decline as years passes, even though their repository of tacit knowledge has increase. The results shows that the oldest adults of group 3 (cluster 2) from Chart 1 had the worst performance in the Marketing case, probably because this is a relatively new functional area that evolved in few years with concepts every time more sophisticated and difficult to be absorbed. According to what the authors mentioned above, this group of interviewees will present the lower performance. However, while comparing the performance of this group in the General Administration case with the performance of the youngest adults qualified in group 2 (cluster 3) of Chart 1 it could be observed that the oldest adults had the best performance. Probably this is because this case presents a decision making situation that implies the use of common sense and knowledge coming from experience.
2. The results of the study also revealed the interviewees, with the highest grades, were graduated from state universities classified as good quality by MEC (2002). Besides their average age is 34 years old with a maximum of twelve years of professional experience. This means that graduated students from state universities classified as high quality and with an average experience had a better performance in solving the cases of decision making. Although the correlation analysis did not show any relation among the variables years of professional experience and the variables that tries to measure the quality of the decision (the

three cases of decision making). The grouping analysis (clusters) shows that these same individuals had the best results in solving the decision making cases. These results are coherent with the ones obtained by STERNBERG (1995) in his research about the common sense. In his research Sternberg evaluated the relation between tacit knowledge and experience. The results showed that the individuals graduated in good quality institutions and with a high level of education have positive correlation with the tacit knowledge. (See chart 1)

3. An interesting point to highlight is that professionals with too much experience and medium performance in solving the cases, who are at the same time the professionals with more professional experience in general and also in the area of expertise and sector, were not as successful as the professional with medium experience and a better performance in solving the cases and as the professionals with few experience and medium performance in solving the cases. These results shows big indications that experience is by itself a determinant factor in the decision quality. Thus, what is important thing is not the experience quantity, but what we learned from this experience or its quality. (See Chart1)

From this study we can conclude that for good decisions, besides a high level of education in good quality institutions, is very important to have a doses of experience. The results of the study and the studies in the bibliography (STERNBERG, *et. al.* 1995: BROCKMANN & SIMMONDS, 1997 and GUINIPERO, *et. al.* 1999), shows that the knowledge from the experience is responsible for the right decisions and qualified decisions. This does not mean that the knowledge increases proportional to the age, but it increase according to what was learnt in the years of experience. In the sample studied the individuals with an average experience (12 years) make better decisions than the individuals with less experience (8 years) and then those with a lot of experience (20 years).

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