MSc. in Business Administration

Master Thesis

Information Processing and Decision Making in Organizations.
The Case of the Department of Fiscal-Administrative Affairs in Ceará (Brazil)

Written by: Sérgio André Cavalcante

Supervised by: Philippe Rouchy

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ABSTRACT

This thesis aims to investigate information processing and decision making in organizations. The overall perspective is dedicated to explore initiatives that managers could use in order to improve information processing and decision making in their organizations. I start by a theoretical overview of the literature and research in the field of information processing and decision making. Then, I proceed, thanks to a case study, to an analysis of a tax administration. Theories will inform comparison and help the reflective analysis concerning the work processes. Finally, I will suggest ideas for change and possibilities of adaptation. The literature review, as well as the case study, indicates multiple relevant aspects to the analysis of information processing and decision making. For example: quantitative analytical techniques, cognitive aspects, the conception of knowledge workers, individual and group work, leadership, the impact of technology, organizational model, continuous learning, and others. Organizational model has to taken into account individual careers and technological developments which put central emphasis on information processes and decision making. Information processing and decision making are important part of the normal functioning of bureaucracies, both private and public. Information processing and decision making can not be simply considered as a commodity: they imply to consider the organizational work to be both technical activity as a social one. An appropriate atmosphere is important for every organization – where should dominate trust, open communication, interaction and negotiation. In this respect, managers have to understand their socio-technical role within the organization. Technological resources and quantitative techniques are important to support the development of speedy and ever changing activities. Continuous learning is therefore a necessity and should happen through informal practices at work as well as traditional teaching. The demands of adaptation are so strong that the behavioral perspective needs to be thought within a common organizational demand.

Keywords: information processing, decision making, knowledge workers, technology, organizational model
EXECUTIVE SUMMARY

Title: Information Processing and Decision Making in Organizations. The Case of the Department of Fiscal-Administrative Affairs in Ceará (Brazil)

Author: Sérgio André Cavalcante

Supervisor: Philippe Rouchy

University: Blekinge Institute of Technology - BTH

Department: School of Management

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Purpose: The thesis aims to explore aspects of information processing and decision making in organizations. The study intends to investigate initiatives useful to managers to improve information processing in organizations and, consequently, to improve the decision-making process.

Method: Starting with a literature overview in the domains of information processing and decision making, the research method is a case study based on qualitative method of observation, note taking, interviews and administrative documenting. The case study was at the Department of Fiscal-Administrative Affairs in Ceará (CONAT), Brazil. The overall approach is to confront findings in the literature with concrete situations of the case study.

Results: The research reveals that information processing and decision making in organizations are important for private and public organizations. People, technology, organizational model and the external organizational environment are central aspects when dealing with information and making decisions. There are some initiatives can be taken by managers in order to allow organizations to succeed when processing information and making decisions, as reported in the thesis.

Keywords: Information Processing, Decision Making, People, Technology, Organizational Model, External Environment.
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CHAPTER 1 - INTRODUCTION

1.1. Context of research

Since the mid-20th century, rapid changes in society have demanded rapid adaptation and flexibility in organizations. In terms of organizational structure, organization cannot afford formal divisions in a never changing hierarchy making the bureaucracy a rigid conservation of vested interests. Organizations who do so forget their professional aim that is to serve a specific purpose and its public. The growing for well targeted consumers in business has informed technology and its application. It has also served the concern for diversified public in modern democratic state. For example, during the mid-1990’s, Sweden has controlled and reduced public spending by reforming all its administrations thanks to transparent procedures and offering to its population an access through information technology to the state services. The Swedish government has reduced accordingly expensive and irrelevant job processes allocating those resources in other growing sectors of society. It demands administration to be flexible, dynamic, and economically well informed, reducing useless levels of intermediary steps along the path from information to execution.

The multiplication of business opportunities and the needs of diversified sources of incomes for larger population have been accompanied by the technological bureaucratisation of business. From the 1960’s until now, the explosion of computer educated employees has brought to the work market white collar employees known as “knowledge workers”. Their main characteristics are that their job definition is relative to information technology. It demands from them the constant adaptation not only to the technological change of their working tools but to the task they serve.

Another related change to the diversification of public, and contrary of the top-down managerial view of organizations where employees fill in one function all their life, is that employees are required to achieve several interrelated goals and use multi-tasking technological tools. Part of the achievement of those demands on employees is achieved through a higher level of education. With better education, employees values is to be able to take up differentiated jobs, understand change and take up initiative in the work environment without asking the hierarchy to provide all the details of the function. It also offers to the more active employees ways to constitute a career within the company. This flexibility of the white collar has been subsumed under ‘intellectual thinking’ which nowadays corresponds to expected mobility in work and tasks fulfilment. The managerial discourse presented the knowledge worker as an add value to the organization’s activities. In this sense, knowledge no longer resides with top level management as a level for power but is distributed to achieve task with more efficiency and accuracy than before.

Distributed information, through technology and management structure is a key resource for efficiency and competitiveness and in the economic domain, wealth creation. Managers’ roles have changed accordingly. They are not expected to command and control employees according to a never changing objective and tasks. On the contrary, because objectives and tasks are changing all the time, it has put an emphasis on the manager to surround himself with a reliable team of employees who understand but also are given the means to accept the ever changing
tasks and assignments. In this sense, the manager is providing the work assignments but also is in charge to master the balance between productivity and continuity through availability, professional goal orientated attitude, and reward for work achieved and team building. Complementary to those organizational changes is the technological resources such as distributed computing, database information and work and communication packages available to any organization to properly develop their activities.

This thesis aims to provide a global outlook in terms of the most important aspects related to information processing and decision making. Information processing and decision making are closely connected, as I am going to expose in this thesis, and they play an important role in every organization, in the sense that they are decisive to define the future of the organization – success or failure -, according to how well-performed are these activities.

Simon (1986) is the main theoretician who provided most of the “insights” to the development of this thesis. Simon points out that nothing is more important to some professionals – such as managers, scientists and engineers -, than taking decisions and solving problems to achieve effective organizational work. He claims that human decisions require a simplification of problems. At the same time, this task presents big challenge: how to handle complexity that is not the result of an exact science? He suggests that choosing issues, setting goals and selecting among alternative actions – i.e., planning activities to make decisions - are important aspects. But contrary to scientists and engineers, managers face the challenge of not having so much direct “outputs” (i.e., decisions) from the “inputs” (i.e., information, the main source for decisions). Simon (March and Simon, 1993) recognizes that perfect rationality is not achievable.

1.2. Research problem

The problem this thesis investigates: how can an organization successfully use diversified decision making techniques and access relevant sources of information to achieve better efficiency in their tasks?

1.3. Structure of the thesis

The thesis is divided into 6 Chapters. Chapter 1, the Introduction, gives a general idea of the context of the problem the thesis applies, as exposed in Section 1.1, and according to the research problem mentioned in Section 1.2. The overview of theoretical main ideas informs the development of this thesis. It is a brief exposition of the level of concern those theories deal with. The research limits are also presented. In Chapter 2, called ‘Organizations in the 21st Century’, I present the role organizations play in the contemporary socio-economic environment and the development of strategies by organizations, as a vital aspect to their adaptation to modern conditions of life. I present the connection between strategies and information processing and decision making. In Chapter 3, entitled ‘Organizational Model and Information Processing’, I present the idea of business model and focus the issue of organizational change. I expose information as a valuable resource and mention different issues relative to information processing. In Chapter 4, called ‘Decision Making and the Impact of Technology’, I present different approaches of decision making. I review some of its quantitative tools and discuss cognitive aspects of decision making in organizations. I show how new technological tools are complementary resources to peoples’ information processing and decision making in
organizations. Chapter 5, entitled ‘People in Organizations’, is concerned mainly with employees’ activities relative to information processing and decision making. I develop issues dealing with individuals and groups at work, the function of the knowledge workers, the approach of leadership, productivity and continuous learning. Chapter 6, entitled ‘A Case Study: the Department of Fiscal-Administrative Affairs in Ceará (CONAT) – Analysis and Discussion’, Brazil, presents the job objective, the organization of its processing, the findings and draws final conclusion thanks to comparison with initial theoretical issues on information processing and decision making.

1.4. Review of the literature

Theorists reviewed in this thesis present different levels of concern. Some of them, for example, deal with information processing at the level of cognitive abilities of employees, and some others, at the organizational level. I will now expose briefly their main ideas and the level of theoretical concern.

In the 1980’s, in business management studies, Michael Porter, according to Lucas (2002), introduced the ideas of companies developing strategies in order to gain and sustain competitive advantage in the market. Porter did so with his “five forces model”, which refers to the forces (other competitors, new entrants, substitutes, buyers and suppliers) that shape the market in which an organization has to survive. He also presented his concept of “value chain”, which consists of dividing the activities of an organization into two types: primary and support activities (primary activities are the activities that create products and services; support activities refer to the company’s activities that support the production and commercialization of products or services). Porter’s ideas apply mainly to industries, i.e., private companies operating with suppliers, customers, competitors.

The authors Lucas (2002) and Sheehan (2005), recognize the importance of Porter’s ideas, especially the “value chain” idea, but argue the need to update them. Lucas (2002), for example, explains that technology has changed a lot the way of developing activities in organizations. Sheehan (2005), on the other hand, points out that nowadays lot of firms’ main activity is not producing goods, but focused on services presented as ‘knowledge’.

In my opinion, and it is the stance taken in this thesis, the main reason for updating Porter’s ideas is the fact that information has taken an important place in organizations. It becomes a valuable tool in order to perform activities efficiently. In the business management area, authors write about “competitive intelligence” or “business intelligence”, referring to information as a valuable resource for organizations to gain competitive advantage in the market. In this thesis, I adopt a business management approach of administrative organization. For that matter, I recognize Michael Porter’s ideas of developing strategies to gain competitive advantage in the market and the view of information as a key resource for every organization. Søilen (2005) expresses the idea that information is what really matters concerning resources and competencies of an organization. In that sense, the widely spread concept of “core competences” of an organization, introduced by Prahalad and Hamel (1990) imply dealing efficiently with information.

I also combine the business management approach with information processing dealing with decision making. Denis Rezende and Aline Abreu (2003) deal with information processing at the
organizational level, i.e., information processed by the different organizational units, according to their different activities and processes. They mainly consider information processing along the organization hierarchical levels. They give emphasis to the technological resources available to deal with information for business purposes. Desouza (2001) points out technological agents to deal with information. Authors such as O’Guin and Ogilvie (2001), as also Søilen (2005), point out the formal analytical method of processing information. For Drucker (2002), employees and managers work in formal teams that have to be efficient when dealing with information, in order to achieve the organizational objectives – they have to be skillful in order to perform the organizational activities properly.

Some others authors, on the other hand, point out cognitive aspects of employees when dealing with information. For example: Arnett et al (2000) point out that information can be purposely distorted by employees, or can be used for the sake of appearance, rather than for the intrinsic qualities of information. Hope and Hope (1997) point out that the technological solutions until now are unable to capture the tacit knowledge/information sharing. Dreyfus ([1972], 1992) has tackled the issue of tacit knowledge in information processing and artificial intelligence model. He suggests that the metaphor of the cognitive human brain as a replica of computing programming is a far too simplified model of information processing. He suggests that information processing, including the use of computerized expert systems, is a much more complex phenomenon. It requires capturing the meaning of a complex situation.

The same happens in terms of making decisions in organizations. Harrison and Pelletier (2000) make clear the difference between strategic, tacit and operational decision making, i.e., they deal with decision making at the organizational level. They also give emphasis to managerial decisions. Eisenhardt (1999) clearly emphasize that decisions connect directly to organizational objectives. For some authors (Harrison and Pelletier, 2000; Keeney, 1994), making decisions follows a formal analytical process. Quantitative techniques, for other authors, help to solve decision problems (Coles and Rowly, 1995; Hopewell, 1997).

Other authors emphasize decisions at the individual level. For example, Kahneman (2004), Bratvold et al (2002), Houghton (2000) and Merkhofer (undated) point out the existence of several judgment biases that can affect decision making. Decisions can be done intuitively, i.e., without formal analytical process (March and Simon, 1993). Technology cannot contribute too much in making good decisions, as technology cannot capture cognitive aspects (Dreyfus, 1992). And informal groups in organizations play an important role that can affect all the organization (Wenger, 2004).

In this thesis, I adopt a dual approach mixing aspects of processing information with decision making in the organizational context. In this sense, I consider the issue of organizational efficiency both from an organizational perspective and at the individual level. On the one hand, information can not considered an organizational resource to be captured, sorted, analyzed and deployed – it cannot be seemed just as a commodity. The same happens in terms of decision making: it is not only a formal instrument for the achievement of the organization purposes. Adaptation to the task and its context is central to it. Subjective and personal vision and
individual vested interests can not simply guide information and decision making. There must be a mix of objective (organization) and subjective (cognitive) aspects. Although, one may argue, there are a lot of subjective issues related to dealing with information and making decisions in organizations, my work is essentially concerned with the rational ways one can reach organizational objectives.

It is important to point out that, as the implicit idea expressed in the research problem mentioned in Section 1.2. of this thesis, I consider information processing and decision making as a standard of comparison to study administrative efficiency. The idea is that processing information and making decisions better help to achieve organizational efficiency – in this sense, when we talk about information processing and decision making, which aspects we should consider in order to achieve efficiency? This is a central question that I want to investigate in this research.

It is also important to point out theorists present different perspectives on the same topic. The concepts of “data”, “information” and “knowledge”, for example, are presented in different ways. In this thesis, I will indicate when a specific meaning is more suitable to my task.

1.5. Limitations

I start by presenting general tendencies on information processing and decision making. Those - it may be noticed – are not present in all organizations. A good example is the treatment of employees. In the information technology context, their status has changed. They are known as “knowledge workers” when in the past they were mainly manual workers operating machines. In the decision process, knowledge has been redefined. It doesn’t reside essentially with top management. Managers don’t have to command and control employees but to guide and provide advice and support. Another claim is that organizations use advanced technological tools that shape their form of command in respects to goals. Those are general tendencies in modern organizations all over the world, especially in developed countries.

I can mention other aspects: in this thesis, I consider information technology as all technological resources that help the development of activities in an organization, and I usually refer to organizations in a general way, not specifically mentioning private or public organizations. My idea is to make a research in the existing literature in terms of information processing and decision making (which are usually related to existing practices in private companies) and, then, make an analysis with existing practices in real organization (by developing a case study in the public organization mentioned before), as a way to reach some conclusions. My point of view is that planning activities to process information and to make decisions is important to every organization, and that some general aspects should be considered by every organization, both private and public, in order to achieve efficiency. For that reason, my level of concern in this thesis is the planning activity in the overall organization.

Since I adopt this perspective, which is relative, in general terms, to Simon’s perspective applied to management concern, I will conceive limited discussion on its relevant aspects – selecting features applicable to administrative issues and information technology along topics such as cognitive aspects, quantitative techniques, knowledge workers, leadership, productivity, and others.
The case study will provide the final limitation of the application of the aspects of information processing and decision making want to review. In choosing the Brazilian public institution, I search to contrast the general approach, the findings in the literature with its concrete characteristics. Brazilian institutional specificities will offer a perfect environment to exercise a fruitful comparison. Within a specific institutional culture, private and public companies play different roles. I will take into account those differences between public institutions and private companies when relevant to compare Brazil institutions in regards of information processing and decision making theories.
CHAPTER 2 - ORGANIZATIONS IN THE 21ST CENTURY

2.1. Background

It is the great German sociologist, Max Weber (1968), who pointed out the historical importance of bureaucracies as a source of rationalization of work by emphasizing the efficiency of administration through the calculability of results. Our society, in Drucker’s (1999) terms, has become a “society of organizations” and a new industrial engineering (Davenport & Short, 1990). Drucker claims that the major tasks are performed in and through organized institutions. Although organizations have existed since a long time, they have become a central reference for people only recently, when different aspects of people’s lives started to be, directly or not, associated to them. An example of their importance is that Drucker tell us that nine out of ten educated people will work as employees in organizations. The rational for the existence of organizations is their role as social units. Human beings consciously create organizations to achieve specific objectives.

When we talk about organizations, inevitably we have to talk about management. In this sense, management is the work of planning activities and achieving objectives, analyzing results, and improving the way of doing things. Although the roots of management go back 150 years, the area of professional study started only in the 20th century, with Frederick Taylor (Drucker, 1999). Management is a concern for the rationalization of work and the reach of better efficiency for profit or proficiency. Drucker (1999) says that management is a practice rather than a science, and that management must focus on results and performance: management, according to him, concerns to organizing resources to attain expected results.

When management started to be an area of scientific studies, in the beginning of the 20th century, the world was very different from now. Organizations were involved in a more stable and predictable environment, when compared to this beginning of 21st century. In the late 20th century, a lot of innovation changed the way people live: airplanes, telephone, fax, computers and, more recently, the Internet. Organizations have had to take into account new realities to deal with these changes and to get advantages from them in order to survive. The environment in which organizations have to develop their activities has changed more and more, and very fast. Organizations have become vulnerable to the changes in the environment, which were not so common in the past. Slowly, managers realized that it was not enough anymore to try to have an internal organizational efficiency, but, on the other hand, be so vulnerable to the external environment. For that reason, managers in organizations started to think about how it would be possible to be ready for the changes in the external environment, and the conclusion was that the development of strategies would help organizations to have a long-term life.

In Chapter 1, I mentioned the situation of Sweden. Since the mid-1990 Sweden has controlled and reduced public spending by reforming all its administrations. The Swedish government has reduced expensive and irrelevant job processes and allocating those resources in other growing sectors of society. But Sweden is a rich country, with a high developed society, although the situation was not always like that. Sweden had an economic crisis from 1850 until 1930, as many other European countries, which also brought around a million of Swedes to immigrate to the United States. But in the 20th century, Sweden and Europe as a whole overcome several problems
and found their own way to reach the development. Nowadays, in Sweden, decisions in the public sector are just adjustments in a context of a system that works properly, in general. Brazil, however, faces a different situation. The Brazilian economist, Celso Furtado, talking about perspectives for development in the northeast region of Brazil, said that the poor countries (i.e., countries in Latin America, Africa and Asia) have to create their own strategies for development. Otherwise, he said, they’re going to give their destinies to the global processes of reproducing initiatives that make them forever dependent and not developed (Rosa, 2006). DeGaulle also defended a similar idea all over the world, that countries have their right to auto-determination (it is political as well as economical). In fact, South America has to make sure to secure its sustainability, if necessary state own economy to give itself the infrastructure that will allow private business to flourish.

In 1999, the Brazilian crisis and some related academic work motivated me to write this thesis. Ecalle (2005) remarks the 1999 Brazilian crisis was an indirect consequence of the Russian crisis, through the general degradation of the investors’ anticipations on emergent markets. The crisis had also internal structural causes. For example, persisting public deficit were evaluated to be around 6 to 8 % of the PIB for the central Brazilian government. To this deficit, one can add the other deficit of the federal states. Gruben and Kiser (1999) point payments of interest contribute to the growth of the administration deficit. According to them, this deficit problem makes investors reluctant. However, they indicate the country took steps to correct the federal deficit, such as reducing funds transferred by the federal government to the states and municipalities and increasing federal income takes. They also indicate government should take important actions, such as pension reforms and debt negotiations between state governors and the national government. Ferreira and Tullio (2002) remind that indiscipline in the fiscal policy and expansion of the weight of the government sector in the economy contribute significantly to the Brazilian economic disequilibrium.

Are reducing public deficit, pension reforms and debt negotiations, as exposed by the above mentioned authors, good decisions to contribute to solve Brazil’s problems? Is organizational reform a more adequate means to consider change facing the public sector efficiency and durabilibility? What should be done to foresee good solutions and implement decisions to make Brazil a better place to live in?

In Brazil, it is common to use management principles taught in business schools in public administration. To some extent, it is certainly possible to apply some innovative ideas across private and public sectors. However, employees and specialists of the public sector feel that, sometimes, entrepreneurial management principles are not appropriate to the public area. It is necessary caution when dealing with ideas, according to public sector characteristics and the country framework. The main difficulty is that the private sector is open to fierce concurrence which pushed it to innovate to maintain margin of profit, survive or expand, whereas the governmental sectors is rather conservative representing partly the durability of the state.

In this context, there is a difference between information processing and decision making for private organizations and for public institutions. Information and decisions in private companies are usually associated to return on investment, net profits, and the globalization of consumer markets. The aim is the maximization of profit. On the other hand, information and decisions in
the public area refers to legal and local cycles of decisions. The final aim of a public institution is to offer good public services to the benefit of society. Consequently, information processing and decisions in private and public companies require different kind of analysis in regard of the different roles they play in society.

Strategies of private organizations concentrate on achieving production and profit efficiency, partly because they want to grow and expand investments. The objective of public organizations is very different, based on the history and philosophy of public services and the conception of benefits for the whole society. In this thesis, I do not hold any value judgment on the different roles assumed by those institutions. It is important to recognize them. My perspective, in this work, is to analyze information and decision making in both types of organizations according to their specific characteristics. The concern of this thesis is knowledge transfer, cooperation and adaptation. The view is that public institutions could incorporate good ideas from private sector as also the private area could also incorporate the public institutions’ ideal. For that matter, it is important to adapt ideas to the specific aspects of each institution – in the public and private sectors.

As Søilen (2005) explains, it is common that public institutions find themselves in situations resembling private companies. They have to develop strategic plan to develop their activities (deciding the guidelines of their public policies), keep control on expenses, and attract educated employees. Usually, they find themselves in competitive situations. Governments have to decide which kind of business they want in their regions, attract companies to settle in their regions, identify regional competing for the same resources, take part in international cooperation, etc. As in private companies, managers and employees in public institutions have to be aware of multi-leveled aspects affecting their environment and activities.

In the coming Section 2.2., I present some important ideas originated from the private sector concerning strategy and organization. Michael Porter has developed those ideas and private companies have adopted them intensively. I will make some reflections about the value of application to the public sector.

2.2. Strategic thinking

Strategies have a direct link to information and decision making, and it is important to explain this connection, in order to make clear the context in which I am going to expose information and decision making in this thesis.

Development of strategies has become recently (in the 1980’s) an area of study in management science. Michael Porter, Lucas (2002) explained, developed a strategic model for traditional businesses including ideas such as the “value chain” and the “five forces model”. I introduce Porter’s ideas of value chain, five forces model and competitive advantage, in order to make clear their connection with information and decision making.

2.2.1. The “value chain”

In 1985, Porter used the term “value chain” to divide the activities of an organization into two types: primary and support activities. Primary activities are the activities that create products and
services. Support activities refer to the company’s activities that support the production and commercialization of products or services. Figure 2.1 illustrates the “value chain” idea:

Figure 2.1. The Value Chain

![Value Chain Diagram]


2.2.2. The five forces model

“The five forces model” refers to the forces shaping the market. For Porter, an organization survives according to 5 components: competitors, buyers, suppliers, new entrants and substitutes. We can see Porter’s Five Forces model below, on Figure 2.2:

Figure 2.2. Porter’s Five Forces Model

![Five Forces Model Diagram]


2.2.3. Porter’s model of competitive advantage

Porter presented a simple idea about how firm can gain competitive advantage in the market (Figure 2.3). According to him, an organization can gain competitive advantage using two different strategies: by offering good prices (cost advantage strategy) or by offering a better product (differentiation strategy). The competence of the organization consists of its resources and capabilities in order to implement one of those strategies.

Figure 2.3. Porter’s Model of Competitive Advantage

![Competitive Advantage Diagram]
2.3. New ideas for a new context

About 20 years ago, Michael Porter exposed his ideas on strategies for the first time. Since then, the world has changed calling for a re-assessment specially vis-à-vis information technology. Information technology has become a valuable resource for organizations, changing the way organizations deal with strategies.

There are some new ways to interpret Porter’s ideas. Lucas’ (2002) explanation of ‘supply chain management’ (activities involving “procurement”, “inbound logistic”, “operations” and “outbound logistics”) is one example. On the other hand, technology, Lucas clarifies, now applies to all activities in an organization. For example: technology promotes new ways of establishing relationship among companies, buyers, suppliers, establishing new rules for dealing with each other. In fact, new technological advances have a big impact on the conception of whole new business models, such as the conception of virtual organizations.

Sheehan (2005) also says that it is important to sharpen Porter’s strategy tools in the case of knowledge intensive firms. Their main activity is focused on direct application of knowledge to solve clients’ problems (such as consultants, accountants and law firms, for example), rather than in the process or product. He points out some interesting aspects. For example: in knowledge intensive market, competition is different, because, although there is a hard competition, organizations also cooperate with their competitors through conferences, common training programs and also by sharing work on larger projects. The bargaining power, in knowledge intensive firms, is not intense, because there is a gap between the firm’s experts and the clients.

Søilen (2005) considers the connection between Porter’s model of competitive advantage with our interest in organizational rationalization. Based on Porter’s model of competitive advantage, Søilen explains that resources and capabilities of the organization will not provide by themselves the competitive advantage but information.

Regarding the aspects giving competitive advantage to a company, Prahalad and Hamel (1990) mention “core competencies”. According to them, core competencies are the way organizations integrate multiple technologies and coordinate diverse production capabilities. Those competences take years to build. Core competences involve dealing with the valuable resources of a company. How is it possible to identify valuable resource? The authors define a valuable resource as, for example, the one that can give to the final product/service a significant contribution to the end product/service. It seems that information is part of organization’s valuable resource.
The business environment is intrinsically associated to competition. Information processing and decision making in organizations are aspects inherent to the context of providing competitive advantage to the organization. Competitive advantage is the organizational capability to implement and maintain strategies that allow organizations to have a superior performance over other similar organizations in the market. In this respect, even if other companies try, they will not be able to imitate the aspects that provide competitive advantage to the organization, because of the unique combination of them.

Here, I critically review the idea of competitive advantage in the public sector. According to Sigalla and Viard (1999), 21 of the 45 states in the USA provide tax credits for companies investing in Research & Development (R&D) conducted within the state. They notice, however, that no studies have evaluated the benefits a state takes from tax credits. They raise a concern about the fact that credit politics is ineffective. The authors explain that companies look at much more aspects when making location and investment decisions. For example, they look at land and construction costs, distribution facilities and labor, the location of suppliers and natural amenities. Those features are some of the attractions a state can present for investors.

Questions are: is tax incentive a good strategic decision to attract investments in one region? Which information has government to analyze in order to make this decision? In the next section, I am going to expose a model adapted to the public area, based on Porter’s Five Forces model.

2.4. Public institutions: a critical review of the idea of competition

Søilen (2005) shows how to apply the idea of competition to the public sector. He illustrates by an example in building a public intelligent model to attract regional investments (Figure 2.4). It is possible to analyze several aspects. Accordingly, there are entry barriers for a company start the business (such as infrastructure costs) and also exit barriers (costs related to ending an activity, such as loss of income and employees benefits that companies have to pay). The companies (taxpayers) may choose to locate the investment in other competing regions. There are also in the environment political parties and interesting groups, as also local and national governments that establish the policies companies work with.

**Figure 2.4. Environment Scanning Model for Public Intelligence**
This model matches the idea of analyzing several aspects to attract regional investments. In Brazil, in the northeast region of the country, where Ceará state is located, many other states have tried to reach economic development in attracting industries to their region. These states have provided tax incentives to attract investments, as part of the strategic planning for development. This public policy, however, created a situation known as ‘fiscal war’ whereby several states compete to attract industries.

The analysis of public management in Brazil has to take into account some specific aspects of the country. Governments, for example, should also support social projects with the same emphasis as trying to attract industries. Deep social inequality and high unemployment level demand an urgent need for better public services in all areas, such as in education, health assistance, security and housing. The concept of efficiency, which directly involves the measurement of economic results, has to be applied carefully in the public sector, especially in countries where state investment is also needed purveyor of social and economic development. Public institutions, for example, provide subsidies to rural agriculture. Those sectors may perform poorly on the market of agricultural goods, making its economic worth questionable. However, its role is mainly to reduce the rural unemployment and avoid migratory fluxes to big cities. It is clear that public sector efficiency involves political, social, economic agendas.

The critical analysis I make in this thesis searches to assess the different means of providing organizational change taking into account technical innovation in information technology. How is it possible to organizations to deal with better information and make good decisions? How is it possible to have a whole view of a complex situation and have a decision-making process taking into account complex matters such as social, regional development? (1)

(1) In Brazil, for example, more than calculation, public managers have to learn about social development. It is important to learn about small business management, credit and rural assistance, association, cooperation. It is important to learn about ethics and honesty. It is necessary transparency and direct social control.

In this work, I focus the issue of information processing and decision making in a context of continuous changes. The research in the literature revealed that people, technology, organizational model and the external organizational environment are central aspects when dealing with information and making decisions. Figure 2.5. illustrates the idea:

Figure 2.5. Information Processing and Decision Making in Organizations: Main Aspects to Consider
In next Chapter, I am going to write about business model and information processing. It is necessary to mention BPR (Business Process Reengineering) which had a massive impact on the way one regard organization efficiency with information technology implementations. Business models, BPR and information itself are going to be central aspects in the next Chapter.

CHAPTER 3 – ORGANIZATIONAL MODEL AND INFORMATION PROCESSING

3.1. Introduction

There is a close relation between information and organizational models. A business model, according to the concept that Lucas (2002) exposes, is a description of how an organization works, a general template that describes its major activities. Lucas also says that business models combine with strategy to guide major decisions at a firm. And information, as we know, is a vital element to the decision making process. According to the mentioned author, the dominant business model for a long time was the company with these characteristics: a physical location, its own employees, and several hierarchic levels. This traditional business model can be associated to the bureaucratic model. Analyzing an organizational model is important because organizations (private and public organizations) need to be always adopting to a changing environment, and for that reason I am going to expose the main characteristics of the bureaucratic model, in order to analyze new possibilities to deal with information.
3.2. The bureaucratic model of organization

3.2.1. Context

Max Weber wrote about bureaucratic organizations in the modern society. It is important to understand the historical context in which organizations were involved at the beginning of the 20th century to understand the characteristics that they presented when Weber analyzed them. Organizations in the beginning of the 20th century were exploring ways to create more rational, efficient and scientific method to develop activities. The idea was that organizations should be more productive and profitable. The attempt was to implement a rational system to achieve specific organizational goals. Employees should work in a calculated way in order to reach the goals of the organization.

3.2.2. Characteristics

Bureaucracies, according to Weber, presented some specific characteristics. Some of them were: unity of command, hierarchy, supervision and subordination, division of work, rules and regulations to develop tasks, training of workers, detailed rights, obligations, responsibilities, extensive use of written documents, a career based on promotions, general rules to evaluate performance, and others. All these characteristics facilitate the implementation of legal/rational type of authority structure. (Barron et al, accessed 20.10.2006). Decision making in bureaucratic organizations was to guarantee the achievement of the organizational goals. Its major advantage was the calculability of results. Nowadays, these aspects seem obvious, but they were all inventions at the time Weber lived (Borgatti, accessed 23.10.2006). The characteristics that he identified, mentioned before, were the reasons why these organizations worked so much better than other types of organizations. Indeed, in the beginning of the 20th century, bureaucracies were a great success, as they had introduced concepts of fairness and equality of opportunity into society. The bureaucratic organizations proved to be technical superior when compared to other form of organizations, because of aspects such as precision, speed, reduction of material and personal costs. For Weber, bureaucracies present a direct connection to rationality.

Mascarenhas and Vasconcelos (2004) explain that the bureaucratic organizational model implies a clear division of tasks and roles. In this context of bureaucracy, using rationality involves choosing the most appropriate means and resources to achieve organizational objectives. The idea is that, when everyone in the organization follows the rules in order to achieve the expected efficiency, managers consider that they are doing well their work. Taylor’s scientific ideas were, in some sense, a practice of the bureaucratic theory, because his ideas assumed a division between “thinking” and “executing” activities: employees were in charge of doing the manual work (executing), and, managers were in charge of establishing objectives and planning activities (thinking). Bureaucracies present a specific way to deal with information and make decisions, based on the division of people and tasks. In bureaucratic organizations, the different units and subunits have people to select, analyse and distribute the information to managers, who are responsible for the decisions. This way of working is present in many organizations until now.

3.2.3. Criticism
Around the middle of the 20th century, a lot of criticism to bureaucratic organizations started to take place. Many authors (such as Elton Mayo, McGregor, Merton and Gouldner) exposed that it was important to pay attention to human relations in organizations, so that it would be possible to understand conflicts, natural hierarchies and informal groups. These human relations could interfere in the organizational efficiency. The criticism was so hard that nowadays the term bureaucracy suggest inefficiency. The main criticism to the bureaucratic model was that organizations don’t work like machines, and employees are not machines components. The lack of attention to human relations, to the behavior of individuals in the organization, was its weakest aspect. There are conflicts, cliques, sidestepping of rules and the chain of command that can not be ignored (Borgatti, accessed 23.10.2006). According to Baron et al (accessed 20.10.2006), conflict within the organization received very little attention. Order was overemphasized. Macro-issues were not touched. In bureaucracies, personalization is discouraged and people’s value depends on their technical skill. The work can become so routinized that there can be little space for individual thought or creativity. Employees have to do what their superior say and they don’t participate in the definition of how they can perform their tasks. It is important to say that Weber viewed bureaucracies as having both positive effects (efficiency, for example) and negative impacts (de-humanization).

Until now, organizations present those bureaucratic characteristics. Søilen (2005), for example, says that in most organizations the departments operate in isolation: each department gathers its own information. However, it is important to have in mind that, because of the new communication technologies, information now can flow easily in all directions, supporting decision making in different ways, and in different levels. Everyone now deals with information, for different purposes. As Hope and Hope (1997) expose, knowledge and decision making no longer reside with top management, but must be shared with frontline employees. In that sense, some changes have happened.

3.3. Developing a new organizational model: some important aspects

Management theory have presented a consensus about the importance of having organizations more flexible and with less hierarchic levels, because in that way it is easier for them to adapt better to the market. Organizations now (private and public ones) have to be less centralised and formalised, in order to be able to process information easier and to develop a better decision-making process. A decentralized management system with a central coordination unit seems to be appropriate to any organizational model. Decentralization means that decision making happens where the necessary information to decide is available.

It seems clear that bureaucracies are better for some organizations than for others. In particular, bureaucracies are not well-suited to industries in which technology changes rapidly or is not yet well-understood (Borgatti, accessed 23.10.2006). Lucas (2002) exposes that the Internet and the World Wide Web enabled some new businesses. These new business change rapidly and are not well-understood until now. Some examples are: 1) Portals (locations that someone browsing the web is likely to go to as a starting point – for example: Yahoo, America Online); 2) Outsourcers (companies that develop competence in some service and provide that service to others. Examples of outsourcers’ companies for technology services: CSC Corporation (Computer Sciences) and EDS (Electronic Data Systems); 3) Hubs (a kind of electronic broker or intermediary to connect to groups that wish to interact. For example: a hub that matches shipping
Bureaucracies excel at business involving routine tasks that can be well-specified in writing and don’t change quickly. Public institutions don’t operate in a completely stable environment, but the bureaucratic model is appropriate for them. Bureaucracies will not ‘die’ so soon, although many authors have suggested ‘new organizational approaches’. Bureaucracies have a long history, even before the beginning of the Industrial Age. The modern corporation is a big bureaucracy and the knowledge worker is a white collar, working in an office. It is important to point out that a bureaucracy can really develop the characteristic of inefficiency - especially if authority is highly centralized and if there is excessive formalization-, but not necessarily bureaucracies have to lead to inefficiency. A bureaucratic model can incorporate new ideas. For example, nowadays it is inconceivable that employees act like robots and do not express their ideas and opinions regarding their work. It is also important to mention that productivity seems less dependent on the time spent by employees at work. And the stress of work also seems to have increased in organizations, although the new technological resources to help the development of activities.

Until now, there are many people who believe that it is possible to have a rational organization based on clear and delimited rules. It doesn’t mean that it is not important to plan and organize. Of course it is. However, it is important that rules, processes and methods don’t represent an obstacle to innovation, creativity and flexibility, in organizations in the private or public sectors. Although public agents have to act according to laws, for example, specific situations usually require from them analytical and interpretation sense that are important to assure coherence and flexibility in their acts.

Interpersonal issues will be always present in organizations, and for that reason the bureaucratic model has to consider the human aspect. Some questions should be done when adapting a bureaucratic model or defining a new one, such as the impacts that improved productivity have on employees nowadays (in terms of motivation and recognition, for example), the impact that technology have on employees relationships (the social groups, for example), and others.

According to Lucas (2002), the organization that offers the best chance of success is the one that actively incorporate technology into its design. Because most of the work in a bureaucracy is office work, information technology is very important to the development of different tasks. For example: on-line work with documentation, multi-taking and internet, intranet facilities, and others. It is important to use technology to coordinate activities internally as well as with other organizations in its network, moving quickly when dealing with partners, and having team members working on varied tasks. It is necessary, he says, to have information widely available and shared, and decentralised decision making. The objective, he says, is to take advantage of expertise where it exists in the network, and to remain flexible to respond to opportunities and the competition.
It is important to point out that an organizational model consists not only of objective tasks and rules that are formally established. It also consists of the informal environment that is present in all organization, in terms of the relationship among people. Although it is important to have organized and distributed tasks, it is also important to have in a new business model a management style based not on command and control, but on participation, trust, communication. In terms of the organizational structure, although there can be hierarchic levels, it is important that they are flexible and that people from different units and levels can interact properly. It is important to have in mind that the most appropriate structure depends on the organizational characteristics, and that it is not an end in itself: its purpose is to help the organization to achieve its objectives as also to help employees to be better professionals and human beings.

The literature points the importance of having multi-functional working teams and responsibility delegation. Many authors have suggested organizational models based on flexible design. However, most of these new models haven’t succeeded. One of the reasons for not having successful flexible organizational models was the inability to deal with the increasing amount of information. The evolution of the information technology can help organizations in this respect. Transparent acts supported by appropriate technology can guarantee the necessary flexibility even in departments where detailed rules are necessary. However, the most appropriate model depends on the specific characteristics and culture present in the organization. The fact is that there is a new challenge relative to the study and support of new ideas regarding the development of activities in organizations. As exposed in this topic, there are numerous issues to face.

Here, it is important to mention the Business Process Reengineering - BPR model of carrying out changes in organizations. Hammer and Davenport introduced the BPR idea in the 1990s. According to Valiris and Glykas (1999), BPR provide guidelines to reorganize processes in an organization. BPR focus on organizational efficiency, by radical redesign of business process.

3.4. Information Technology: BPR as a new competitive resource

Business Process Reengineering - BPR, as mentioned before, is a radical approach that aims also radical improvements in the organizational performance. A BPR redesign usually requires the introduction of new technology. Information Technology, in fact, is a key enabling agent for BPR. But the literature shows that there are other different approaches to organizational change, based on incremental improvements. Some of these approaches are:

- Total Quality Management – TQM (development of projects to improve quality all over the organization);
- Six Sigma (in simple terms, it is a methodology to identify defects and to eliminate them);
- Benchmarking (implementation of improvements based on best practices in operation in other similar organizations);
- Business Process Management – BPM (continuous improvements in the organization based on the advent of software tools).

But how is the BPR methodology? Davenport and Short (1990) refer to the 5 steps of process redesign, as follow:
1- Develop business vision and process objective (prioritize objectives and set stretch targets)
2- Identify processes to be redesigned (identify critical or bottleneck processes)
3- Understand and measure existing processes (identify current problems and set baseline)
4- Identify IT levers (Brainstorm new process approaches)
5- Design and built a prototype of the process (implement organizational and technical aspects).

DELL Incorporated, a PC company established in the market since 1983, provides a good example of applying a reengineering model of change. Lucas (2002) mentions that a loss in 1992 shocked the company and forced it to re-examine the way it was doing business. DELL decided to establish direct ordering by phone and fax, keeping the smallest inventory as possible. When Web ordering came along, DELL invested in this new technology. DELL now is concentrating more on customer service than selling computers, since the PC market price has equalized. Ford and Procter and Gamble Corporation are other examples of companies that have reengineered their processes. People in organizations should be able to recognize when and where to reengineer their business, as a key element to survive in the market.

It is important to mention that Davenport and Short’ BPR methodology is just one among many others. Valiris and Glykas (1999) mention the literature presents several BPR methodologies. They classify these methodologies as follow:

- methodologies that adopt a view of the organization from a process perspective (where aspects such as the time taken for transforming inputs into outputs, the methods to perform this transformation and the expense of the whole process are analyzed, for example);
- methodologies carried out by researchers in the field of information systems (who realized the need to understand the organizational environment in which the systems are going to be implemented);
- lately, Valiris and Glykas (1999) expose, a few methodologies started to also address to people (their roles, interactions, and use of available resources, for example).

When we analyze the 5 steps of process redesign suggested by Davenport and Short, as exposed before, it is possible to notice a focus on a process perspective. There is also reference to Information Technology. But there is no mention to the human aspect. In fact, the lack of attention the human dimension was one of the hardest criticisms to the BPR methodology in the 1990s.

We can not dissociate business processes from interaction of people, but reengineering treated people as if they were just organizational components to be also re-engineered. In fact, as I am going to expose later in this thesis, the importance to focus also on people, and not only on processes, is that innovative and creative ideas in organizations come from their employees. On the other hand, if people’s behavior, desires and expectations don’t receive enough attention in an organizational approach, any change initiative will work properly. According to Zairi and Sinclair (1995), a survey in UK industries showed that respondents consider human factors of primary importance, as the respondents answered that the most important techniques in BPR were training employees, communication of objectives and performance measurement. It is
evident the importance of all employees in a process of organizational change. For that reason, BPR should consider human dimension as an important part of the development and effective implementation of a new solution within any organization.

Other criticisms to BPR model of organizational change are:

- the implementation of reengineered processes are usually difficult, slow and expensive, specially when the approach involves multiple and simultaneous changes;
- frequently, BPR was used just as an excuse for job cuts;
- there is a security issue involved in abolishing processes and implementing new ones;
- organizations usually rely on implementing software/systems packages that were built based on best practices that don’t fit the particular organization’s needs, because it is not so easy to adapt these programmes;
- reengineering has a diversified set of technologies - as new tools proliferate, they are difficult to integrate;
- sometimes, there is a high level of expectation about immediate results to be achieved after implementing BPR, while there are usually only gradual returns.

Zairi and Sinclair (1995) mention different tools and techniques used in re-engineering process, such as: 1) process visualization (the development of a vision of the process); 2) operational research/method study (they are ideally suited for the reengineering task); and 3) change management (in particular, the management of organizational change, as people usually perceive reengineering as a threat). Zairi and Sinclair point out that most of the organizations use a mixture of tools and techniques when implementing BPR.

Although the literature mention that it is possible to apply BPR both to operational (or manufacturing) work as also to administrative (or service) work, it is worth noting that Davenport, Jarvenpaa and Beers (1996) point out that knowledge work is different from operational or administrative work. I am going to expose the main characteristics of knowledge work in Chapter 5, Section 5.4. Here, it is important to mention that a knowledge work is performed by professionals of high level of skill and expertise and includes activities such as advertising, education, accounting and consulting, for example (Davenport, Jarvenpaa and Beers, 1996). The mentioned authors say that neither the current laissez-faire approach (which means having knowledge workers designing and evaluating their own activities) nor the reengineering approach is appropriate. They say that knowledge work redesign requires an intermediate participative course between the two extremes. In fact, differently from what happened in 1990’s, the idea now is to combine reengineering with incremental and continuous approach of TQM or Six Sigma, for example. In Chapter 2, I exposed that public institutions may use the idea of gaining competitive advantage adopted by private companies, although more carefully. The radical redesign (BPR), as also the incremental improvements (TQM, Six Sigma, BPM) models of organizational change, for example, are interesting as they incorporate change of organization for public sector administration as well.

It is important to notice that implementing a BPR model means to collect and analyze information that will have as a result a decision to promote radical change in the way of developing activities in an organization, mainly by introducing technological resources. On the other hand, information processing – by human and computers - daily occurs in the normal
development of organizations’ activities. In the next section, I am going to expose different aspects relative to dealing with information in organizations.

3.5. Information as a competitive resource itself

A widely spread model for gaining competitive advantage is based on the resource-based idea. It consists of identifying the company’s resources that may give a firm competitive advantage. Resources are all organization’s assets, processes, people, (and, as exposed in Chapter 2, information) etc, and the unique combination of these resources create an initial advantage for the organization. Companies have always to add new resources in order to sustain the resource-based advantage. In that sense, additional information is always necessary to provide competitive advantage to an organization. Figure 3.1. shows in a simple way the idea of the resource-base model of competitive advantage.

![Figure 3.1. Resource-Based Model of Competitive Advantage](source: adapted from Lucas, Henry C. (2002) Strategies for Electronic Commerce and the Internet, Cambridge, London: The MIT Press, p. 10.)

According to Simon (1997), the real significance of information revolution is that information and information processing are themselves becoming object of systematic scientific investigation. But he points out that we don’t have to process information just because it is available in the environment. This is an important aspect for this thesis, because we usually think that we could make better decisions if we just had more information. But in Chapter 4, Section 4.1., I am going to expose that too much information doesn’t necessarily mean decision accuracy.

It is important to map specific problems when searching for information, in order to try to collect information more efficiently. O’Guin and Ogilvie (2001) writing about business intelligence, express the importance of following a sequence of steps. According to them, the initial steps are identifying specific questions and developing specific hypothesis. O’Guin and Ogilvie give an interesting example of company collecting information in the market to make an effective business decision. They say that the first step is to define the business decision that management must take. In the example, the decision was to decide what strategy the company should use to win an attractive aircraft contract and achieve a good financial return. The authors say that the company needed answers for questions such as:

- what technical solution would the other main competitor propose?
- what price would they bid?
- how would they structure their offering with financing, design assistance, etc?
Then, after these initial questions, the company should develop specific hypotheses about the answer to each question, and should also identify signals in the market that the competitor would emit if the hypothesis were true. According to O’Guin and Ogilvie, there are sources that would see these signals, such as suppliers and key customers, for example. The company should develop a data collection plan, analyze the data and reach a conclusion. This competitive intelligent plan, according to the authors, would allow the company to develop a winning strategy that clearly differentiates their offering vis-à-vis their competitor. O’Guin and Ogilvie’s ideas imply to collect and analyse information so that a company can perform better than a competitor in the market. The Business Process Reengineering - BPR model of change exposed before (in Section 3.4) could be used here. BPR could help to identify the core organizational processes and to redesign them radically, using Information Technology as a key enabler.

In this regard, it is important to notice 2 aspects: (a) one, the human aspects of knowledge and skills, in terms of having professionals using their abilities to perform activities in organizations; (b) the other is the implementation of organisational change through information technology. In Chapter 4, Section 4.4., I am going to expose the impact of technology in organizations.

3.6. Concepts: data, information, intelligence, knowledge

But what is information? According to Albrecht (2004), information is an association of data elements that acquire meaning in a particular context. Here, it is worth noting Alan Newell’s and Herbert Simon’s researches in the field of artificial intelligence. Their experiments assume that there was no fundamental difference between natural intelligence and artificial intelligence, and that the mind was the “software” of the brain. They carried out experiments based on the idea that the brain could work as machines, i.e., according to rational and systematic rules. However, our brain has not only structural components that allow it to work, but also components that human beings cannot understand and that give us, for example, feelings, intuition and genuine creation abilities. It is in this context that in this thesis I consider information processing, i.e., as a mental process that involves structural and phenomenological components (Drăgănescu, 1986).

According to Albrecht (2004), data is the essential raw material, an element to be manipulated. Drucker (2002) explains that, when information is not yet organized, it is still data. Søilen (2005) presents a difference between data and information - and he also introduces the concept of “intelligence”. According to him, data is a communicative sign that we express in written, visual or verbal way; information, on the other hand, is data gathered in sentences that express ideas. Intelligence, for him, is actionable information, i.e., information that helps to make good strategic decisions. And what is knowledge? Hope and Hope (1997) explain that, “knowledge (...) is a fuzzy concept concerned with human cognition and awareness”. Information and knowledge, however, are terms that are usually used in the same meaning. Hitt et al (2002) explain that knowledge is different from data and information, because it is a social product that comes from interaction. Hitt et al have the same point of view of Søilen and Drucker when analyzing what is data and information. According to them, data has to be analyzed, classified and inserted in a context to be turned into information.

But why is it important for an organization to differentiate what data, information and knowledge are? As I exposed before in this thesis, different authors consider that information is a valuable resource to provide competitive advantage for organizations. For that reason, it is important to
identify which data can result into information. Sometimes, when someone in a company makes an environment scanning, he/she finds only data. Then, it is necessary to organize the data and make an analysis, in order to transform it into information. And by mixing information with personal experiences, judgments and insights it is possible to acquire knowledge that can be valuable for organizations. It is worth saying that in the business studies the topic ‘knowledge management” has been an area of increasing researches. In this thesis, I am going to analyze in the case study if employees perceive the difference among data, information and knowledge, how they deal with them and how important this is for the organization.

3.7. Dealing with diverse sources of information: Integrated Management

Zairi and Sinclair (1995) say that organizations are always attempting to move toward proactive decisions, reach a customer-focused performance, and adopt improvements using different approaches to management. They say that it is important to integrate different management practices, such as strategic planning, performance measurement and change management. The focus should be always to move away from reactive management to strategic customer focus management. In that sense, Business Process Reengineering – BPR, exposed before, can form an integral part of management of any organization when used correctly. On the other hand, based on the idea of integrated management, organizations should adopt continuous improvement and also re-engineering of processes, after identifying the best approach to each core process. Both Total Quality Management – TQM and Business Process Reengineering – BPR can use Benchmarking, for example. And the organizational strategy should drive TQM and BPR. In this context, information is a key element, as it is important in any management practice. For that reason, I am going to expose more details regarding information in organizations.

When dealing with information, it is necessary to select data, organize it into information, analyze the information and act. Søilen (2005) presents an interesting representation: he calls data, information and intelligence as “intelligence products”, and shows that an action accompanies each intelligence product. Figure 3.2. shows his idea:

![Figure 3.2. From Data to Intelligence – with Corresponding Activities](source: Søilen, Klaus S. (2005) Introduction to Private and Public Intelligence, Lund: Studentlitteratur, p. 39.)

It is important to point out, however, that there is not one specific and direct formula to deal with information: each organization has to do it according to its own characteristics. According to several authors (Drucker, 1999; Hitt et al, 2001; Johnson et al, 2005), organizations should have clearly defined and explicitly expressed their objectives, in a way that all employees know in which direction they are going, and for which purpose – clear objectives, they say, are important to guide employees when developing their activities. In that sense, information aims to help organization to achieve its objectives. According to Drucker (2002), the process of collecting
information requires first determining the objectives. He says that it is important to ask: “What information do I owe? To whom? When? In what form? And also: What information do I need? From whom? When? In what form?” In that sense, dealing with information in organizations means that it should achieve specific objectives. It is worth noting that nowadays there are different technological tools that help employees to deal better with information in the development of their activities, as I am going to expose in Chapter 4, Section 4.4.

3.8. The case of the Swedish National Financial Management Authority

Here, it is important to mention an example of dealing with information. Pettersson (2001) describes the process of building a system for handling information for the Swedish National Financial Management Authority, known as ESV. He exposes that some of the ESV’s tasks are to collect and structure financial information, to provide financial and personnel administration systems for agencies, and to stipulate the government’s requirements for new personnel and financial administration systems. The problem, according to him, was that it was time-consuming to search for information and often several persons could be looking for the same information, having as a result a lot of duplication of work. The idea to build a system for handling information aimed:

- to make possible to monitor new and market information;
- to store profiles on players on the market;
- to use the Intranet for presenting the information;
- to create a knowledge base for internal knowledge and experience;
- to use the available information on the Internet in a more efficient way; and some others.

The process of building this system involved to different phases: 1) the analysis of how to collect and structure better the information needs; 2) the implementation phase, which involved analysis of aspects such as Organization, People, Technical Solutions and Evaluation.

3.9. Information: organizational objectives and socio-psychological aspects

It is important to pay attention to some aspects that can make information contra productive. For example, the information can be irrelevant, because it doesn’t have a link to what the person is working with, or it is not interesting enough, or maybe the person already knows the content, or simply it can happen that the information arrived too late (Søilen, 2005). All these aspects influence the performance of the organizational activities, and, as a consequence, the performance of the organization as a whole. In that sense, information can also help employees and managers to know how to do the job.

But there is another aspect related to dealing with information in organizations. It is the socio-psychological implication of information in a work environment. For example, Arnett et al (2000) say that there are different types of information usage (see Figure 3.3.), such as:

- congruous (research findings and conclusions are used to provide decision-makers with the necessary information to solve problems);
- incongruous (information is purposely distorted to alter the implications of the findings);
symbolic (information is used for the sake of appearance rather than for the intrinsic qualities of the information);
- affective (information is used to make decision-makers “feel good” about their decisions).

These different types of information usage mentioned by Arnett et al (2000) imply that dealing with information can involve manipulation for personal reasons. How can organizations avoid this aspect? In Chapter 5, Section 5.2 of this thesis, I mention a possible way to avoid the incongruous, symbolical or affective usage of information.

**Figure 3.3. Information Usage**

<table>
<thead>
<tr>
<th>Type of information usage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instrumental usage</strong></td>
<td>Research findings are used to fill information gaps.</td>
</tr>
<tr>
<td>- Congruous</td>
<td>- Information is used in a manner that is consistent with the intent and implications of the study</td>
</tr>
<tr>
<td>- Incongruous</td>
<td>- Information is purposely distorted to alter the implications of the findings</td>
</tr>
<tr>
<td><strong>Conceptual Usage</strong></td>
<td>Research findings, although not directly applicable to problem at hand, are added to general knowledge base</td>
</tr>
<tr>
<td>- Product</td>
<td>- The results of the project are added to knowledge base</td>
</tr>
<tr>
<td>- Process</td>
<td>- Information learned from the process of conducting the study is added to knowledge base</td>
</tr>
<tr>
<td><strong>Symbolic Usage</strong></td>
<td>Information is used for appearance’s sake</td>
</tr>
<tr>
<td><strong>Affective Usage</strong></td>
<td>Information is used to make decision-makers “feel good”</td>
</tr>
</tbody>
</table>

CHAPTER 4 – DECISION MAKING AND THE IMPACT OF TECHNOLOGY

4.1. Decisions and cognitive aspects

The way individuals make decisions and solve problems is a recent area of study – most of the decision making theory was developed in the twentieth century. Decision theory considers three different approaches: decisions under certainty, risk or uncertainty. In decisions under certainty, each alternative is associated only to one consequence, which means that choosing one alternative implies a choice to its respective consequence. In decision under risk, there are different consequences to each alternative, and the probability of occurrence of each consequence is known. Finally, when the probabilities are unknown, we have decisions under uncertainty – in that situation, given a setting of alternatives and consequences, the decision maker’s preferences are ordered based on the ranks of the alternatives. It is important to point out, however, that the study of decisions under uncertainty considers alternatives and consequences as given from outside, or previously determined. It is more concerned with exploiting conceptual procedures for choice, according to some criteria – and not related to establishing objectives and analyzing alternatives.

In this thesis, I am writing about decision process in organisations at a general level. In this part of this thesis, I am going to expose some human judgement alleged flaws which the organisation theory of decision making is supposed to correct. In that sense, it is important to start by exposing March and Simon’s (1993) point of view. According to them, human beings are not able to achieve perfect rationality. They also expose that it is not possible to ignore the important role of emotions in behaviour. In fact, it is not possible for human beings to perceive the environment objectively, in the sense of understanding and processing completely all information available, and then making decisions. We all have a limited perceptual capacity, and we must recognize this aspect. For that reason, when dealing with information, via reading or listening, for example, we proceed in a selective way. We naturally select the information that we think is the most appropriate.

One interesting aspect is how people perceive information. According to Hamrefors (1998), people act based upon their cognitive limitations and certain personal traits, and also based on previous experience of situations. He explains that the environment of the organization tends to influence people in organizations. He says that the more freedom of initiative, transparency and communication, the better it is for an individual to be able to use his/her ability to process information and make decisions.

We all have a selective process of perception. Our perceptions are subject to factors of time, attention, stress, as also personal ‘biases’. Regarding biases, behavioral theorists have claimed that a lot of psychological traps distort human’s perception about reality. For that reason, one of the most important things is to be aware of them, in order to try to avoid the traps or minimize their impact.

The research in the literature is rich in explaining different judgment biases. Some of them are:
- illusion of control (the tendency to believe that it is possible to control outcomes which clearly are not under control of any person);
• hindsight (the tendency to think that the world is more predictable than it really is);
• optimism and overconfidence (the difficulty of people to balance their beliefs with realism);
• availability (being influenced by the information that is easy to find);
• anchoring (the tendency to anchor on an idea and not adjust away from it sufficiently).

It is important to illustrate a real situation in which a judgment bias can affect a decision making. For example, Drucker (2002) explains that too often the more quantity of data is taken to mean information, but sometimes data turns out not to be information, but misinformation. His idea matches with a research study mentioned by Bratold and Begg (2002). According to it, rather than reducing uncertainty, too much information only makes decision-makers more confident, without contribution to the accuracy of the decision. This increasingly confidence (overconfidence bias) can lead to a judgment error. Figure 4.1. illustrates the idea:

Figure 4.1. Too Much Information

![Figure 4.1. Too Much Information](source: Bratvold, R. B. et al (2002) ‘Would you know a good decision if you saw one?’, SPE Annual Technical Conference and Exhibition 29 September – 2 October 2002, p. 8.)

In addition to the biases, there are other factors that can influence people when dealing with information. For example: depending on its source, information can receive different subjective treatments; depending on the time or on the person “humor”, information received can be viewed more favorably or not; depending on the nature of the situation, information can be analyzed using shortcuts and simplification.

The organization theory of decision making is trying to understand some of these biases and errors. It is important to find ways to counteract them. One important way to counteract them is having a formal decision-making process.

4.2. Decision making in organizations

Decision making is a process where the final result is a decision, a course of action. Information is a valuable resource for those who are going to make decisions because it helps to reduce the amount of uncertainty related to a decision. Different fields of knowledge have tried to develop a structured decision-making process (known as expert systems), such as in medicine, engineering, molecular biology, geology and many others. In these areas, experts have used technical information to select a course of action, which involves recognition of the problem, searching for
information, selecting different alternatives and making the decision, by choosing the best alternative.

Feigenbaum (1990) has worked in the field of artificial intelligence since a long time and confesses to be optimistic about having computer systems operating through knowledge basis. He recognizes, however, that there are many problems, such as the rigidity of computer when dealing with vocabulary, concepts, and expressions. He says, for example, that programs cannot distinguish circumstances of events and also cannot make analogies of situations. For that reason, we can ask: is it worth to use computers to make decisions in organizations? In this thesis, I am going to analyze the use of computer systems in the organizations and the possibility of having them making decisions there.

The ability to make good decisions and to rapid adapt to changing situations may be one of the most important aspects for organizations in this new century, and the main reason is that good decisions can imply a long-term life for companies. However, in this respect, it is important to mention here a major difference between decision making in private and public organizations. Whereas private companies have to react fast to the changes in the market, and a limited number of people do the major decisions, the fundamental values of a public institution is related to society’s well-being. There is an implicit agreement between those who work in the public area and those who, in some sense, gave them the administrative power to guarantee the achievement of the social objectives. It important to update rules related to the development of activities and tasks in the public sector, according to changing situations in the external environment, but a more complex process is involved. It is necessary transparency and participation of society when making decisions. For that reason, decisions in the public sector don’t have to be so fast when compared to decisions in the private area. The participation of society in public issues is an aspect that is not present in all societies. Differently from countries such as United States, Switzerland and France, for example, Brazil doesn’t have tradition in terms of having a participative democracy, although public institutions have developed some participative mechanisms recently.

Keeney (1994) emphasizes that we usually associate decision making to solving problems, by generating and evaluating alternatives. He points out, however, that values, not alternatives, should be the primary focus of decision making. He argues that value-focused thinking helps uncover hidden objectives, leads to more productive information collection, improve communication, facilitate involvement and enhance the coordination of interconnected decisions. His main idea is that organizations should act in a proactive way, by identifying opportunities, rather than acting in a reactive way, waiting for a problem to happen and then, searching to solve it.

Figure 4.2. illustrates the central role of thinking about values:
In Chapter 2 of this thesis, Section 2.3, I mentioned Sheehan pointing out the importance to focus on value creation for customers. According to him, an organization achieves value creation when performing problem-solving activities, i.e., identifying and giving solutions to clients’ problems. Sheehan ideas apply to firms that use intensive knowledge. In his words, “rather than being embodied in the process or product, knowledge resides in experts and its application is customized in real time based on clients’ needs” (Sheehan, 2005). He gives as examples firms in consulting, auditing and advertising activities, as also law firms. His attempt is to demonstrate the need to adapt Porter’s model when we talk about organizations operating in a “new” economy.

Keeney, as Sheehan, emphasizes the importance of decisions in organizations. Keeney says that we have to try to develop a more profound way of thinking when making decisions, not only with the purpose of finding punctual solutions to specific problems. As an example, he mentions a decision involving the transportation of hazardous material. Because of the nature of the material, the fundamental objective should be minimizing health impacts when making the transportation, in the sense of avoiding accidents and the exposure of people to the hazardous material. This fundamental objective has to shape the decision in terms of, for example, choosing the best route. A shorter distance will minimize the chances of an accident? Certainly, it minimizes costs, but it may turn out that a shorter route goes through a big city, exposing more people to the material.

Many authors criticize the common thinking of profitability and “beating” the “rivals” (Geus, 1997; Kim and Mauborgne, 1997; Ohmai, 1988). They say that the focus of any organization should be the search for new ideas, the creation of value to the company. The focus should be innovation. In that sense, making decisions have a deeper sense. Easton (2002) describes how a company can use wireless technology in innovative ways. According to her, using wireless technologies, companies can gain competitive advantage by differentiation from other competitors. That differentiation depends on the way each company will use this new technology. A company, for example, can allow clients access a database inventory, so that they can see if the company has the product, how much does it cost and in which area of the store they can find it. On the other hand, instead of a scenario where customers request information, there can be the possibility of sending information automatically to the customer, based on location sensitivity. For example: a company that offers products that change their prices very frequently, and that can also vary from location to location, can use wireless technology to keep customers updated on where they can find the best prices at the closest location. It is important to exceed customer
expectations, providing faster services in a more efficient way. Owing to the quality of information and service value added provided by the possibilities the wireless technology offer, Easton says that any company can gain and sustain advantage in the market.

Harrison and Pelletier (2000) point out different aspects related to management decision, as illustrated on Figure 4.3. They present this aspect in terms of “dimensions”:

- organization (the locus of management decisions);
- level (decisions made by top, middle and operating management);
- significance (management decisions are very important to the long-term success of the organization);
- rationality (they are eminently rational);
- strategy (the strategy of the organization is a key aspect to management decisions);
- outcome (which is the attainment of objectives) and
- uncertainty (it will be always present in management decisions).

**Figure 4.3. The Dimensions of Management Decision**

![Figure 4.3. The Dimensions of Management Decision](image)


The “dimensions” mentioned by Harrison and Pelletier (2000) refer to management decisions. Management decisions require a broader scope of analysis because such decisions affect or impact in some way how the organization works. They are non-routine and non-recurring decisions, with a lot of uncertainty in the outcome. The model suggested by Harrison and Pelletier is important because it can give to the decision-maker a whole view of the context in which a course of action is involved. However, the mentioned authors say that there is a different type of decisions in organizations: the routine and recurring decisions, which imply a fairly certain outcome. This type of decisions doesn’t require a direct involvement of managers. Employees in the organization that don’t have a managerial function are in charge of them. I am going to expose and analyze how management decisions and routine and recurring decisions happen in the case study (Chapter 6).

Sheehan (2005), as exposed before, presents a new way to see Porter’s model, and in the illustration of his ideas (Figure 4.4.) it is clearly expressed the importance of a decision-making
These problem-solving activities are the primary activities in the organization; the support activities play an indirect role in creating value for customers. The primary activities are in the following illustration in a circle, in order to emphasize a cyclical value creation:

Figure 4. The Value Shop

Organizations generally have a plan of action - or they rely on procedures that are their plan - before starting to search for information. Organizations collect and analyze information to reach specific objectives, i.e., to answer questions previous established. However, Simon (1989) exposes that there are people who find solutions to problems without following a systematic and previously established process. We know that, in real life, a big number of decisions occur without people following a specific plan. In fact, according to March and Simon (1993), “intuition” is a frequent behavior of experienced decision makers. Although these decisions involve uncertainty (i.e., the probability of occurrence of the different alternatives are unknown), they usually succeed. Although their decisions are not always right, frequently they are correct. The decisions are correct, even though they seem to have required almost no processing time or effort. Their decisions are the result of years of training and experience. But not all people are like that. In fact, most of us – and even the experienced people – are subject to make errors while processing information and making decisions.

4.3. Quantitative analytical techniques

Decision makers can use quantitative methods to make decisions. For example:

- Decision tree (a method to choose between several courses of action based on quantifying the values of outcomes and the probabilities of achieving them);
- Game theory (it refers to decisions in an environment where various players interact: the decisions are strategic reactions to other agent reactions);
- Bayesian inference (a method in which evidence or observations infer the probability that a hypothesis may be true).

However, difficulties arise when one tries to use quantitative methods effectively. For example:
the probability inherent to them;
• the problem of expressing ideas in a quantitative model (which requires correctly identifying all the possible events);
• the uncertainty related to establishing the values of the probabilities;
• the possibility of applying different decision criteria - related to the decision maker’s attitude to risk - that implies arriving at different outcomes;
• and also the impression that only specialists should make decisions using mathematical models (considering the fact that most of people don’t have background in dealing with these quantitative techniques).

Although all these difficulties to use quantitative tools, they help to acquire and cultivate a systematic approach to the long-term view and to consider a range of alternatives and possible consequences. It is important to mention that private and public organizations can use quantitative analytical techniques when making decisions.

4.4. The impact of technology

Technology resources can improve the development of tasks, because they allow easy and fast access to accurate information. In fact, there are a lot of advantages relative to using technology resources in organizations. For example, technology helps to distribute information and power, to enrich the communication process, to promote innovative ideas, to improve the need for a continuing learning, to keep people motivated for the job, and many others. Nowadays, all over the world, more and more organizations have increased the amount of money they spend in information technological solutions, which have the ultimate objective of providing and sustaining competitive advantage to the organization. In any organization, all departments have had the impact of new technologic instruments in the late years.

In the past, the idea of using technological resources was to process and provide information to support managers to make decisions in the highest organizational hierarchical levels. At that time, information was controlled and centralised. With the introduction of microcomputers in the organizations, it was possible to start a decentralisation of the information process, and “networks” gave to organizations the possibility of having a more integrated and efficient information flow.

March and Simon (1993) expose that the new technologies should help to reduce the restrictions on rationality imposed by the cognitive limitations of individuals. Nowadays, there is a common sense that technology can provide useful tools for human beings in the development of their activities. Information technology has an important role in supporting human beings in performing their tasks. But this way of thinking was not always like that. During a long time, a lot of scientists assumed that technology could be used instead of the human being intelligence.

The experiences developed in the field of artificial intelligence can provide good examples about the possibilities of using technology to perform tasks. Artificial intelligence is based on the idea of modelling human thinking. The experiences carried out in this field are based on the natural scientific way of working, which consists of studying and discovering something uniform and predictable, something that works following specific and deterministic rules. In the 1960s and 1970s, for example, scientists started to develop expert system (or knowledge-based systems) to
solve problems in the medicine area (such as MYCIN’s and DENDRAL’s systems). These systems performed reasonably well for “closed” worlds, i.e., where specific answers could be storage to pre-established questions. But the experiences related to identifying a complex situation failed. Only human beings are able to develop a whole vision and a complete understanding of a situation that requires a subjective approach. According to Dreyfus (1993), when an activity is dependent on meaning, when the situation is not explicit, there is no computer program that can substitute human intelligence. In that sense, if we consider information processing as an activity that aims to add value, for example, or to expand ways of thinking, only human beings – and not computers - could be able to have “insights”, to understand implicit meanings in a whole context. For that reason, only human beings could effectively make decisions. Recently, it has been recognized that ‘brains’ are the most important resource for organizations and that it is important to coordinate human intelligence operating sophisticated computers.

Technology has changed organizational practices in different ways, such as in planning and managing physical facilities, in the organization of work, in collection of information in databases. But March and Simon (1993) point out that the impact of information technology in the decision-making process is restrict. Drucker (1999) shares the same point of view: he says that the use of computers in organizations doesn’t change the fact that people have to make decisions, and not computers. Drucker (2002) exposes that top managers have been frustrated with the data that information technology has provided. Information technology has been an area of study where the focus usually is on the use of modern technologies – to search for data -, rather than focusing on information, which should be the central aspect of the term. Information, he explains, is an abundant resource, and what is needed is not more data, more technology, more speed. In fact, what we really need is to use technology resources to help us to think in a different way, in a creative way. We have to use information technology to add value to the activities that we usually perform, to develop our creativity and innovative sense. Hebert Simon, according to Floridi (2004), expressed the point of view that “technology expands our ways of thinking about things, expands our ways of doing things”. This is, however, a potential usage of technology. Because of the possibility of dangerous and unexpected situations relative to the use of technology by human beings, universities have an important role in this respect. It is necessary an educative effort toward ethical procedures, instead of focusing only on using technology to achieve economic results. We all have to pay attention to the way we are using the technological resources.

Nowadays, information technology allows processing a growing amount of information in organizations. Some technological resources that organizations have used to perform different tasks, as Rezende and Abreu (2003) expose, are:

- **Executive Information Systems – EIS** (a software that aims to provide managerial information from a database; they were introduced in the 1980s, and their main objective was to give the executive exactly what they wanted);
- **Decision Support Systems – DSS** (they were developed to help managers to make decisions, especially in terms of comparing and classifying risks; DSS were introduced in the 1970s, and the user could choose between numerous options and configure the programs to specific needs);
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- **Enterprise Resource Planning – ERP** (they are packages of management softwares, offering extensive and useful functionalities);
- **Data warehouse** (used to storage data from different sources);
- **Artificial Intelligence – AI** (programs that simulate human “thinking”, such as Expert Systems – ES and Data Mining; the 1980s saw the first commercial application of Experts Systems – ES, i.e., programmes to give advice and solve specific problems in a certain field of knowledge; Data Mining consists of a technology to search and select information); and also
- **Internet an Intranet**.

Recently, Data Mining and Data Warehousing have been the hottest topics in the technological field in organizations in the area of information storage and retrieval (Marín-Llanes et al, 2001). Agarwal, Ghosh and Pattnaik (1998), on the other hand, mention that organizations have broadly accepted Enterprise Resource Planning – ERP due to the extensive and useful functionality they provide. It is important to notice that those are only some examples of technological tools. Other technological resources that have helped employees to perform their activities are: Strategic Information System – SIS, Customer Relationship Management – CRM, Electronic Business Software and Supply Chain Management.

In Brazil, governments don’t spend very well the money that they collect from taxes. The bad usage of money is not only due to corruption: there is usually an inefficient usage of money. There are basic procedures in private organizations - such as estimating the demand for a certain service, establishing goals and timetables, monitoring results -, that are not common in the public area. All society loses when there is a bad service, due to corruption or inefficiency. How to be more efficient is a big challenge in the public area (although there are a lot of examples of inefficiency in the private area, expressed mainly by dissatisfied customers with products/services). One of the most important initiatives in the public area, as an attempt to spend the public money better, is to use technological resources: the decision for adopting electronic proclamation for government purchases is one example. Some public institutions in Brazil have started to use electronic proclamations to buy goods and services. The idea is to have more efficient public purchasing as also to establish new ways of administrative communication among government and the society. Electronic proclamations have provided faster and more transparent acquisition processes. It has also proved to save costs, because traditional procedures can be a way to corruption and/or the payment of high prices. But even with the adoption of electronic proclamation, governments can continue to pay high prices if there is no systematic evaluation of the average prices of services and products in the market.

Here, it is important to expose Clay Christensen’s idea about disruptive technologies, as mentioned by Lessig (2002). Christensen considers a disruptive technology a product or service that is completely different from what exist in the market. It is a new idea/product/service/process that change the way of doing things. Portable computers and the Internet are examples of disruptive technologies that he mentions. According to Christensen, it is very common that successful organizations focus so much on improving the product/service, that they are incapable to ‘see’ that it is time to do things in an innovative way. He says that this blindness is not due to bad management, or because the organization is irrational or doesn’t understand the nature of the market, for example. This happens because the organization consistently develops superior
products/services for current customers, in a way that it is incapable to develop new technologies that depend on unidentified or undeveloped markets. Christensen says that disrupters should be supported, because they produce movement toward a more efficient and prosperous economy. It means that efficiency doesn’t mean necessarily improving the way of doing something. It can require doing something in a completely different way. His ideas are similar to the Business Process Reengineering – BPR concept. Both of them take into consideration the importance of making a radical new approach in order to achieve a superior performance.

Although technology has enabled knowledge workers to deal better with information and to help them to make better decisions, it hasn’t had much influence in the way people deal with each other in organizations, i.e., the informal groups, where the knowledge sharing happens. Some organizations have tried to use technological applications that help knowledge workers in the process of sharing information, supporting interaction among groups. But until now it is not possible to capture the knowledge sharing, which is an important aspect of learning (Hope and Hope, 1997). In Chapter 5, Section 5.7, I am going to expose the importance of the informal groups, or “communities of practice”, in the organizational learning process, which definitely is not under much influence of technological advances.

4.5. The decision-making process

All organizations have a specific way to make decisions. A decision-making process is already something that is established within a company – not a model that can be applied from outside. But when an organization formally designs a ‘help to the decision process’, it has the possibility of achieving better outcomes. A big problem about trying to have a plan for making decisions, however, is that making a plan doesn’t necessary mean good results – and the reason for that is the fact that all organizations are involved in unpredictable scenario.

Harrison and Pelletier (2000) expose in details a decision-making process (Figure 4.5.), where setting objectives is an initial point. There is a need to subsequently rework the objectives by searching for alternatives (by scanning the internal and external environment for relevant information), comparison and evaluation of alternatives, choosing the alternative, implementing the decision and following-up and controlling the outcomes, according to the initial objectives. They remain at a general level of formalizing the decision process. They don’t talk about decision making as specifically focused on solving problems. On the other hand, they don’t focus on creation of value.

Figure 4.5. A Decision-Making Process
Establishing specific objectives: Objectives are what is expected to be achieved, and begins the decision process. Some authors express the idea that usually defining a decision problem is the initial aspect of a decision making. However, the focus should be identifying opportunities to create value, establishing specific objectives. Searching for alternatives: It involves scanning the internal and external environment for relevant information. The information that is going to be collected requires aspects such as defining exactly what information is necessary, identifying the sources where to find it, and how to collect it. It is important to have a different set of alternatives, but, unfortunately, most time decisions consider only few options. Analyzing alternatives: It means comparing and evaluating how well each alternative will meet the objectives. It is important to establish what are the consequences related to each alternative, according to some hypothesis. It is also important to understand the link of the different alternatives with other areas, processes and people. Choosing the alternative: The selection of the course of action occurs among a set of alternatives. It is important to establish a high standard for alternatives, because then any chosen alternative will be a good option. But the process of making a choice is not an act with an end in itself. Implementing the decision: It is important to effectively engage employees in decision making, because only in this way it is possible to effectively implement decisions. Analyzing the outcomes: The outcome of any decision implies the results that are expected when the decision is implemented, i.e., if the objectives were reached, according to what was initially established. It is extremely important to analyze the decisions’ outcomes and learn with the mistakes.

Here, it is important to point out that decision making (as also information processing) is not a neutral technical activity. There are different interests involved in every decision, both in public and in private organizations. It is an illusion the idea of having only technical decisions to problems. A successful decision depends also on how suitable it is to the different parts affected by the decision (the political aspect). It is necessary negotiation among the different ‘actors’ involved.

Due to the fact that it is impossible to predict the future, is it worth to renew planning to make decisions in organizations? When we talk about the need to have a plan in order to make decisions, some aspects seems unpredictable. Both private and public organizations have to analyze the real importance of being always planning. Organizations can plan how to make decisions in different areas, in different situations. It is possible to make a plan, for example, on diagnosis like financial balance of accounts, extension/restriction of services, technical re-configuration/change, etc. Would it be better if organizations didn’t have plans for decisions? What if people followed their intuition when having to make a decision?

Kahneman (2004) developed the idea of thinking systems as a cognitive process, i.e., mainly related to the view that decisions come from a decision process that takes place inside our brain. According to him, there are two thinking systems called intuition and rationality. (1) The first one refers to ideas that arise spontaneously in our brain, by themselves. These ideas come fast to our
brain, without effort, and usually they come associated to emotions. (2) The other one is a conscious process that follows rules of thinking and that requires effort. Ideas come slowly to our brain, and we can control them. It is important to try to balance the use of both systems of thinking, depending on the situation. The exclusive use of one of them – intuition or rationality – leads to extreme decisions. But Kahneman explains that incoherence in decision making happens even when people have enough information to make good decisions (judgment biases, as exposed before, in Section 4.1. of this Chapter, may be one of the reasons for that). What is the importance of Kahneman’s ideas in this thesis? Kahneman’s ideas are important because they help us to be aware of our limitations as human beings. Even when we are specialists in a field of knowledge, and we have enough information, we can make wrong decisions due to cognitive mistakes. It doesn’t mean, however, that we don’t have to try to find better ways to decide, on the contrary. We have to learn how to deal better with our cognitive limitations.

4.6. Internal and external environments

In modern organizations, people have to deal with different and complex information in their work. There is information from inside the organization (the internal environment) and from outside (the external environment). Usually, managers and employees have to make decisions after analyzing information from both environments.

The external environment in which organizations in the modern world are involved is complex and under frequent changes. The external environment embraces political, social, demographic, legal issues and others. Due to the fact that it is important the analysis of these different issues, decision making is complex. It is necessary, for example, detailed economic planning, analysis of management issues, legal implication of decisions, etc. It is not easy to deal with information and make decisions in a dynamic environment. The level or uncertainty tends to be high. Both types of organizations, private and public, are involved in a complex scenario. Because it is necessary to analyze different aspects of the environment, both of them have to make decisions carefully.

There are several factors contributing to the complexity of environment. A careful analysis of the organization’ external environment means an attempt to minimize uncertainty. In other words, it is an attempt to maximize the benefits to the organization. Søilen (2005) identifies eight dimensions that constitute the macro environment of organizations (see Figure 4.6. below): political, economic, judicial, social, infrastructural, demographic, technological and ecological. He points out that people tend to concentrate their focus on the dimensions that they think are important for the organization, ignoring other dimensions. They make errors because of that.

Figure 4.6. Hussey and Jenster Industry Analysis Modified
In small and simple organizations, there is little specialization of tasks, and usually the manager-owner makes all analysis, planning and controlling everything. The manager-owner makes all important decisions. But big organizations usually require the division of activities into departments, as a way to have more specialization. In fact, one of the reason why there is an organization in the first place, is to take into account and rationalize the different processes (infrastructure, technology, economy, social, juridical etc.) into departments. These departments have their own managers. The chief executive officer and the staff are in charge of making the link among the departments. It is necessary interaction and exchange of ideas among people from different areas, which means cost and time, and also the possibility of facing unpredictable events. Although the different goals of public and private organizations, the analysis of the external environment is important to both of them.
CHAPTER 5 – PEOPLE IN ORGANIZATIONS

5.1. Introduction

The internal environment of any company has some central strategic resources, such as: the finance capability to elaborate and implement strategic actions; the planning and coordination of the organizational processes; the organizational flowchart; its human resources; and others.

These resources are strategic only when they allow the organization to present a good and differentiated performance. How can managers and employees deal with information and make decisions properly? Hamrefors (1998) underlines the importance of people having freedom of initiative in organizations. He also pinpoints the importance of coordination, transparency and communication. These seem to be vital aspects. He points out the importance of a good relationship between employees and managers. I am going to analyse in the next section the relationship between employees and managers and the consequences for information processing and decision making.

5.2. Employees and managers

As I presented in Chapter 4, the act of making a decision is only one aspect among many others. These others are: establishing objectives, collecting information, searching for good alternatives and analyzing them, implementing the decision, evaluating the outcome and correcting mistakes. The process of dealing with information and making decisions is a dynamic learning process, which implies gaining experience and knowledge more and more. Usually, there is a traditional way of making decisions in organizations – private or public. Managers establish the objectives and make the most important decisions, after analyzing the different alternatives of action. After implementing a decision, they evaluate the outcomes. However, this is a traditional way of management, as I am going to expose in more details in this Chapter, Section 5.5.
All employees in an organization should be committed with the organization’s mission. In that sense, aspects such as trust and communication, participation, interaction, discussion, transparency, ethical and honesty actions are very important elements inherent to achieve better outcomes. It is important that creativity have place in all organizations, public or private ones. For that reason, managers have to create an appropriate atmosphere in the organization. A good internal atmosphere is a very important aspect. It allows employees to interact properly, exchange ideas and develop their potential talent – certainly, insights emerge when there is an appropriate atmosphere. Only in this way it is possible to avoid the incongruous, symbolical or affective usage of information (as mentioned in Chapter 3, Section 3.9). But there is no best way in terms of having a plan to process information and make decisions. It depends on the nature of the business, on the company’s organizational culture, on the specific style of employees and managers in the company, and others.

Managers are important to coordinate the analytical process that will have as result a decision. A functional area in an organization usually develops its own way of processing information and making decisions, and it is important to match different priorities and views with the corporation mission – which implies the need for a clear vision about the organizational intent, reflected in clear organization structure, clear units and clear department with clear objectives. It is important to articulate decision making at the unit levels to the corporate level, and managers play a decisive role in this respect. The linkage between decisions taken in the business units and in the corporation level is a fundamental aspect for the success of the company. For that reason, it is vital to do a special analysis regarding how to add value to the organization “value chain” (Rayport and Sviokla, 1995).

According to Eisenhardt (1999), managers involved in dynamic and competitive markets develop the ability to see threats and opportunities sooner and accurately. However, I understand that this happens not only to managers working in private companies operating in a competitive market. Managers in private and public organizations have to deal with specific characteristics of these areas. On the one side, private companies’ managers have to think and react according to the needs of customers, for example. Usually, they can change faster the way of doing things in the organization, by changing people, processes and technology. On the other hand, managers in the public sector have to have other attitudes. Activities in the public sector have to be performed as determined by law. Changes in personnel, technology and in the structure of the organization, for example, follow a different process when compared to changes in the private area.

The important point in this part of the thesis is that, as Eisenhardt (1999) exposes, managers slowly become experts in their areas. In my opinion, this is a fact that happens in both types of organizations, public or private. This aspect doesn’t mean that formal meetings with other employees don’t have place or that it is not necessary extensive information analysis. Eisenhardt says: meetings, discussions and real-time information are always extremely important to succeed. And this is important in both sectors, i.e., private or public organizations.

5.3. Individual and group work
How should people work in companies? Should they work in teams or can they act better individually? Because individuals can have cognitive biases when analyzing situations, would it be correct to think that teams would be more able to have a clear perception of things, and, consequently, be more able to make better decisions? Kahneman (2004) says that, in average, groups perform better than individuals working in isolation, i.e., groups’ solutions to problems are usually better than individuals’ solutions.

One of the reasons is that in groups there are individuals with different abilities and knowledge. This fact makes the group reject incorrect approaches and do fewer errors. But Kahneman points out that when people in a group present the same judgment biases, the group performs poorly them individuals. In groups, people tend more to extreme decisions than individuals alone. In other words, it is important not only to work in teams, but also to have people with different way of thinking working on them. Houghton et al (2000) express the idea that teams face similar information-processing challenges when compared to individuals, because they can express similar systematic errors in judgment, leading to bad decisions.

5.4. Knowledge workers

Knowledge workers are the effect of the society of service, the shift from the industrial work to the office work. Drucker first used the term “knowledge workers”, 50 years ago. Other terms associated to “knowledge workers” are “white-collar workers”, “service workers”, or simply “professionals.” Although “knowledge worker” is widely used, there isn’t a consensus about its definition. There are different definitions for it, and different categories of work have been included as “knowledge work”, such as managers, accountants, lawyers, consultants, advertisers, systems analysts and programmers (Hope and Hope, 1997).

Many times the term “knowledge work” is used in opposition to manual work. However, it cannot be said that there are exclusively intellectual activities (without requiring any other part of the body, except the brain), or exclusively manual activities (without requiring any kind mental activity). Systems analysts and programmers, for example, are activities that clearly present both elements, the intellectual and manual activities. However, there is a consensus in terms of considering “knowledge work” as service work, and that the main tool to develop it is the human brain. It is also important to consider that there are different categories, or segmentation, for “knowledge work”, according to their main characteristics.

McKellar (2005) says that Davenport’s definition of knowledge worker is one of the best: “knowledge workers have high degrees of expertise, education or experience, and the primary purpose of their jobs involves the creation, distribution or application of knowledge.” This definition implies that dealing with knowledge means aspects such as having personal skills or talent, having formal education or training and experience acquired by the worker. On the other hand, Spira (2005) identifies knowledge workers as the people who work in the “knowledge economy”, which is defined as the “economic environment where information and its manipulation are the commodity and the activity”. Ramirez and Nembhard (2004) say that, according to Nickols, “knowledge work involves information and manual work involves materials.”

There is controversy about the number of knowledge workers. McKellar (2005) says that
Davenport estimates that 28% (twenty eight per cent) of the workforce in the United States are “knowledge workers”, and that others estimate that this percentage is around 45% (forty five percent). According to Ramírez and Nembhard (2004), “knowledge workers account for more than two-thirds of the workforce.” But the important aspect for this thesis is that the literature points knowledge workers as an increasing category of employees all over the world.

Knowledge workers develop tasks that involve processing information. They usually have to use technologic resources in their activities. Knowledge workers spend a lot of time collecting and analyzing information, and information technology has provided important tools to support the development of their activities. There are technologies to help employees to search, select, organize and storage information. According to Spira (2005), “knowledge workers spend at least 20% of their time each day searching, and the majority of those searches fail or do not provide complete results.” Desouza (2001) provides the same information. He says that, according to a study carried out by Gartner Group, knowledge worker spend 60% of their time searching for important relationship in data. According to Desouza, intelligent agents, i.e., softwares that assist users, performing predefined tasks, can help employees to save time and perform their tasks easier. In that sense, it is evident that technology can help to improve productivity.

Knowledge workers have to be able to adopt different work, as work flexibility is in their attribution. On the other hand, there is a need for having managers connected with skillful employees and the information economy. Managers, for example, have to provide appropriate tools to knowledge workers in order to allow them to perform their tasks appropriately. There is a need for a good relationship, which means a good interaction among individuals - and also among teams throughout all the organization. There is also the need for having the employees’ collaboration and partnership, matching the employees’ interests with the organizational objectives and strategies.

It is important a qualified personnel working in public institutions as a way to make them more efficient in their mission of offering good services to society. It is the same in private companies. But qualified personnel performing activities with efficiency is not enough, as I am going to expose in this Chapter, Section 5.7.

5.5. Leadership

Nowadays, all over the world, managers have adopted the position of treating the employees as better as possible. Employees are now an important source to provide the necessary wealth creation, innovation, creativity, and, consequently, long-term success that any company needs. But it was not always like that. Managing people have presented different aspects through the history of modern organizations. I am going to mention some of these aspects.

Mascarenhas and Vasconcelos (2004) explain that in the most part of the history of management in organizations there was the idea of the perfect and superior rationality of top management. Top
managers were responsible for establishing the strategies of the organization, because they were supposed to be the most appropriate people to do it. The idea at that time was that the market models the way organizations have to work, and top managers set the strategies according to it. The idea of managing people was that it was important to make them perform their tasks as better as possible. Employees should behave in harmony, doing what managers established for them to do. In that way, the organization would achieve efficiency.

But when entrepreneurs started to understand the importance of employees to gain competitive advantage in the market, they started to establish a new way of dealing with people. They noticed that it was important to have an internal organizational environment based on trust and collaboration. They noticed that it was important to have a place where all people were learners; where people could express ideas openly and employees could be more autonomous when performing their activities; where creativity and innovation were supported; and also where employees were more than mere human tools for the achievement of organizational objectives. It was the beginning of the flexibility of market and work as being delegated to the worker. It is worth noting, however, that some of these aspects, such as more autonomy and flexibility to employees, are more common in the private sector. In the public area, civil servants have to follow rules that guide the development of their activities.

We now live a time where organizations have to take into account that all human beings have their own objectives, and these objectives, on the other hand, have to match with the organizational interests. Nowadays, the idea is that reflective thinking is important for the organization, and that everyone has a limited rationality. In that sense, all decisions have to consider different points of view. There will be conflict of ideas, but dialogue and negotiation is the better way to achieve consensus. The organization is a place where different people have more or less influence on the decisions, but all of them share a common vision about the future of the organization. Nowadays, organizations encourage and support employees to achieve their own objectives, because in that way they will try to perform as better as possible in order to also help the achievement of the organizational objectives.

It is this context that leaders, instead of managers, take place. The management literature clear emphasize that more than “managers”, organizations need “leaders”. Geist (2006) and Welch (2005), for example, say that managers maintain a task-oriented perspective, while leaders understand the link between their job and the company’s goals. Managers, they say, know how to do the job, and they fear competition, while leaders show how to do the job and also like to work with the best people, to ensure the organization will prosper. They point out that leaders establish positive energy, optimism and trust, by setting the example. Covey (2006) expresses the idea that a leader needs a complete understanding of the human nature, and that they have to inspire employees. Karani (2004) also says that leaders understand themselves and the limitation of their people. According to Karani, leaders value the diversity, the interaction among people and their continuous learning.

In summary, the literature emphasizes a big difference between being a manager and being a leader. It is important to mention here the usage of the term manager. In this thesis, I do not refer to the old-fashioned managerial style. It means also leader, considering the fact the formal denomination is not as important as the attitudes that someone practices in the organization.
5.6. Productivity

According to Drucker (2002), productivity of the knowledge worker is a central question in management. But what is productivity? According to Hope and Hope (1997), we can understand productivity as the comparison between the output or added value from a given set of inputs – for example, people, technology, materials -, over a particular period. They say that manufacturing productivity is the traditional approach, where inputs and outputs are relatively straightforward.

Ramirez and Nembhard (2004) express the point of view that the nature of knowledge work is really more complex, because tasks are not so fixed, there’s not an established standard, and the work can be performed in different ways, according to each worker. But they recognize that it is important to find a way to measure productivity, because it means the possibility of improving it more and more. However, they point out that many approaches for measuring productivity are based on Taylor’s ideas and engineering methods, which are not appropriate anymore.

According to Hope and Hope (1997), a good model of productivity improvement involves the ability of managers to use technology to improve the organization and the quality of the workforce, and whether such improvements meet strategic objectives. But they explain that it is not enough to introduce technology in an organization. According to them, although technology can help to reduce time spent on a task, it doesn’t necessarily supports, for example, employee empowerment and it doesn’t mean a greater customer satisfaction. The good ideas to add value to the work come only from employees, not from machines, they say.

The organization’s history, culture and values influence the employees’ productivity. For that reason, managers in this 21st century, instead of trying to command and control employees, should try to create an internal atmosphere of transparency and trust. Managers should make a partnership with knowledge workers, placing them at the center of their strategies, because it is not possible to have a long-term success without truth, commitment and loyalty. Only in this way employees can become more productive: when they feel that they can trust on the organization for which they work, when they feel that the organization cares about their personal and professional development.

Managers have to try to involve employees with the organizational objectives and to cultivate a sense of responsibility. They have also to give to employees the necessary resources to perform their tasks properly. An important aspect for the improvement of the organization productivity is to be sure that the organization has good employees doing what they really know and enjoy doing. In this new century, employees are becoming more and more specialists in their tasks, which is an important aspect to achieve a superior performance.

It doesn’t mean, however, that, by becoming specialists, employees will have only a limited or partial point of view of the organization activities, or that they will perform mechanical and/or monotony tasks. They have to receive effective training to be experts in their activities. They
have to be specialists and, at the same time, they have to have a whole vision of the organization. And they also have to be able to add value to the activities that they perform. Managers should encourage employees to offer new ideas. When there is an atmosphere of trust and commitment, employees share information easier and there are real opportunities for continuous learning. Information sharing is an important aspect that managers should encourage among employees, because this is a way to have more creative and innovative ideas inside the organization and, consequently, more value-added to organizations. Some organizations present different and dispersed groups of employees who try to protect their knowledge from other colleagues, and this is the worse situation that any organization should avoid.

But to achieve a superior productivity all organizations should think about how to share with all the employees the benefits from the improvements in the organization performance. A big challenge that organizations face is concerned to incentive measures, in the sense of how to make them closely linked to value-added performance, and how to distribute the benefits. Each organization has to measure the value-added work according to the specificity of performing the organization’s activities. It is necessary to identify the relevance and quality of the new ideas and approaches. This is a big challenge for management in this 21st century, as exposed by Drucker. Until now, however, there are no effective universal techniques to do that properly (Ramirez and Nembhard, 2004).

5.7. Continuous learning

Different authors claim that it is important to modernize organizations. In fact, in terms of employees, for example, there is an effort in the sense of having qualified people working in them. However, it is not enough having people attending courses, in a continuous formal education to learn and update technical abilities. Of course, it is important to have employees in a continuing learning process, but it is also necessary that people in organizations match practice and theory, as also commitment with really implementing innovative attitudes. Both in the private and public areas, it is common to not have transparency in the relations among employees and managers, as also among employees and employees. It doesn’t make sense to talk about modernization when there are no changes in the social relations. The biggest possible modernization is in people’s minds.

It is important to assure the development of an organizational culture where intelligence takes place. Organizations should support innovative ideas, the interaction among people, the skill enhancement of people – which implies the improvement of technical abilities as well as the interpretational and sense-making skills. More than efficient employees, it is important that organizations have independent people. All organizations should give conditions to employees to be independents, i.e., to develop intellectual abilities to learn, create, innovate, communicate, interact. All employees should have their individuality respected. When organizations only want the achievement of efficiency, the individuality of people disappear, as they start to act as robots. Information processing and decision making would be only mechanical processes. There would be only employees, not individuals. There would not be place for creativity or innovation. And rather than seeing learning as a property of an individual, the focus should be development of the organizational intelligence. In that way, new “insights” emerge with benefits to individuals and the organization.
Peter Senge and Etienne Wenger are two authors that clearly present the different ways of understanding how learning can take place in organizations. Senge (1990) gives emphasis to the achievement of specific results when adopting some procedures. He writes about, for example, “system thinking” (a conceptual framework to see patterns clearly, and to change them efficiently, based on the idea of interconnected actions). He also points out the importance of team learning (he presents the idea of “learning laboratories”, where dialogue sessions would foster team skills). On the other hand, Wenger (2004) presents his ideas based on the social theory of learning. According to him, there are different theories of learning. He develops his ideas mainly based on the theories of practice and identity. Wenger emphasizes the informal atmosphere of an organization – he focus on the so-called “communities of practice”. For Wenger, there are not so direct “inputs” and “outputs”. Communities of practice, according to him, don’t address simply the perspective of doing something together, in group. He explains that some characteristics – such as having a shared repertoire, being in a mutual engagement and in a joint enterprise – are vital aspects that must be present in communities of practice. He writes about a learning process that comes from negotiation of meaning, participation, and other aspects. He points out that we cannot create, determine and manage communities of practice. He claims, however, that it is important to design a social infra-structure in order to foster learning – in terms of allowing people to learn the ability to participate, to belong, to negotiate meaning, to deal with the informal “boundaries”.

These two points of view are important, because an organization should consider learning in both aspects, i.e. learning through a formal process (teaching, training) and learning situated in the work place. As consequence, an organizational model should include both ways of learning. A new organizational model implies mechanisms to facilitate innovative information processing and decision making, where continuous learning – both formal and informal - has a permanent place.

From Chapters 2 to 6 of this thesis there was a research in the literature regarding information processing and decision making in organizations. I exposed the changing context in which organizations operate their activities, the use of information as a key resource, cognitive aspects relative to making decisions, the decision-making process, knowledge workers, leadership, the impact of technological resources, the development of a new organizational model and many others. It was a theoretical research. Before starting to expose the case study, it is important to review briefly what I found in the theoretical research and what may be applied to public companies and what may be left out.

The research in the literature revealed, for example, the importance for an organization to achieve efficiency. I also found in the literature that in some situations public institutions find themselves in competitive situations. In the case study, I am going to expose the importance of having CONAT working in an efficient way. However, competitiveness (that embraces ideas such as ‘the value chain’, ‘the five forces model’ and the ‘Porter’s Model of Competitive Advantage’) will not be analyzed in the case study, as it is more appropriate to private companies. On the other hand, the research in the literature was clear about the importance of analyzing the context in which an organization is involved, when processing information and making decisions. I am
going to expose this context in the case study, as a way of having an appropriate view and understanding of why and how activities are developed there.

Although there are different types of information usage, according to the theoretical research, I am not going to analyze this aspect in the case study, because I understand that it requires analyzing and comparing different situations in a micro perspective, which is not the focus of this thesis. The differences between management decisions and routine and recurring decisions, on the other hand, will receive special attention in the case study - I am going to expose in the case study how these different types of decisions happen. The research in the literature revealed the importance of having organizations making decisions in a proactive way, by identifying opportunities and thinking about values. I am going to expose the situations in which it is possible to make decisions in CONAT using an open approach. I also mentioned the usage of quantitative techniques when making decisions and different aspects related to the external environment of an organization, according to ideas presented by some authors. However, I am not going to expose deeply the usage of quantitative techniques when making decisions in the case study, as it embraces technical issues that are difficult for those who don’t understand the Brazilian tax system. I am also not going to analyze deeply the different aspects related to the external environment, as it requires analysis of political-socio-economic aspects of the country as a whole.

In CONAT, I am going to analyze the main issues relative to people (such as the relation between employees and managers, individual and group work, knowledge workers, leadership and productivity) as also technology, according to what I found in the literature research. I understand that all aspects regarding these topics apply to public institutions. I am also going to analyze organizational model and learning process in CONAT. I will describe other different aspects related to CONAT, such as its organizational structure, the organization and distribution of tasks, hierarchic, achievement of goals, and others.
CHAPTER 6 - A CASE STUDY: THE DEPARTMENT OF FISCAL-ADMINISTRATIVE AFFAIRS IN CEARÁ (CONAT) ANALYSIS AND DISCUSSION

6.1. Introduction

The case study is at the Fiscal-Contentious Department in Ceará - CONAT. I initially present a description of CONAT and a brief exposition of these aspects: (1) the Republic of Brazil and the State of Ceará, (2) the Brazilian tax system and the State Department of Treasure in Ceará – SEFAZ, (3) The Judicial and the Contentious Administrative Systems. The objective is to make clear the role of CONAT in its relevant context. I will describe different aspects of CONAT, such as its organizational structure, human and technological resources, information processes, the organisation and distribution of tasks, hierarchic, achievement of goals, continuous education and others.

6.2. The Federal Republic of Brazil and the State of Ceará

The Federal Republic of Brazil consists of 26 states and 1 Federal District – Brasília -, the capital. The country is divided into five regions: North, Northeast, Central-West, Southeast and South. The 26 states are distributed in these regions, and each state has several municipalities. Ceará is one of the Brazilian states, and it is located in the Northeast Region of Brazil.

6.3. The Brazilian tax system and the State Department of Treasure in Ceará

The Brazilian Federal Constitution establishes general rules relative to the tax system of the country. According to them, the Union, the States, the Municipalities and also the Federal District are able to collect specific taxes. So, it is a decentralised tax system. The Union, for example, is able to collect taxes on income and earnings (IR), on financial operations (IOF), on rural land property (ITR), and others. The States can collect taxes on circulation of goods and transportation and communication services (ICMS), on motor vehicles (IPVA), and others. The Municipalities and the Federal District are able to collect taxes on urban land and property (IPTU) and on services (ISS) - except those subject to ICMS. In order to collect their taxes, the Union, the States, the Municipalities and the Federal District have their own tax institutions, such as the Federal Revenue Service (SRF), at the Union level, and the State Department of Treasure in Ceará - SEFAZ, for example.

Brazil’s tax system is complex. Recently, the Federal Government has tried to adopt a policy of simplification. ‘Super Simple’, for example, is the name of a new tax that unifies 08 different taxes (06 Federal taxes, 01 State tax and 01 Municipal tax) in just 01 tax. Several negotiations among representatives from the Union, States, Municipalities, business entrepreneurial and civil associations took place. It is very difficult to make an agreement. Although it is important to have a more simple tax system, there are complex issues involved in order to achieve an agreement.

The history of State Department of Treasure in Ceará – SEFAZ dates back 170 years ago (Law 58, 26.09.1836). Its main activity is to collect taxes to the State of Ceará. SEFAZ is a state
SEFAZ presents a mix of centralised and decentralised administrative structure, composed of central and local units. Figure 6.1. presents a simplified representation of SEFAZ’ organizational structure. The central units deal with regulatory, supervisory, and planning activities, and they are located in the capital of the state, Fortaleza. The local units undertake executive and operational functions as set forth by directives of the central units; they are present in different parts of the capital and also in the countryside of the state of Ceará. SEFAZ organizational structure has several local units that form a huge network of taxpayers’ assistance and support.

There is a decentralized structure of management. The administrative units (central and local units) have specific managers. All managers are under the general direction of the Secretary of SEFAZ.

Recruitment to the State Department of Treasure in Ceará occurs through public competitive examination. Brazilian citizens holding a university degree are eligible to apply to the administrative careers. SEFAZ promotes training programs for its employees to constantly qualify them. In 2006, SEFAZ has approximately 1,500 (one thousand and five hundreds) personnel. The technological resources are regularly updated in order to provide employees with the most modern tools. There are different computerized systems that are constantly fed with data collected from taxpayers.
Here, it is important to mention some administrative principles that guide Public Administration. All over the world, public institutions have to follow some administrative principles that guide public activities. These administrative principles are different in each country. In Brazil, for example, the principles are in the Federal Constitution, and some of them are: Legality, Morality, Publicity, Impersonality and Efficiency. The legality principle is concerned with the fact that public institutions have to perform activities determined by law. The general principle of public activities is the supremacy of public interests over private ones. This is one reason explaining why administrative agents have to act according to laws. The achievement of efficiency is another major principle. For that reason, it is important to update rules to develop activities and tasks. It is also important an appropriate organizational structure and qualified personnel, for example. The publicity principle implies the transparency of public administrative acts.

In the next section, I am going to present some aspects regarding the Judicial and the Contentious Administrative Systems. The objective is to make clear the role of the Department of Fiscal-Administrative Affairs in Ceará – CONAT. CONAT is a department that is connected to the State Department of Treasure in Ceará – SEFAZ (see Figure 6.1. before), but that presents a high level of independence, which is expressed by the fact that it is ruled by a specific law.

6.4. The Judicial and the Contentious Administrative Systems

Public Administration presents 2 different systems to correct illegal administrative acts: 1) one is known as the Contentious Administrative System. This system is also known as French System, because the separation between the Judicial functions from the Administrative implemented in France, in 1790. Some version of this system is now adopted in Finland and Greece, for example, although with some differences from the French system; 2) the other one is known as the Judicial System. England first adopted this system. It is the system that is present in the United States and in Brazil, for example. In the Judicial System, Courts (the Common Justice) solve all litigious matters. Although Brazil adopted the Judicial System in 1891, since 1761 it is common that Public Administration take initiatives to correct illegal administrative acts, i.e., it is possible to adopt internal administrative controls. Nowadays, this internal administrative control applies specifically to 1) tax issues between the Public Administration and tax payers; 2) illegal acts that civil servants practice when performing their functional activities.

6.5. The Department of Fiscal-Administrative Affairs in Ceará

6.5.1. Introduction

Law 7.066 created the Department of Fiscal-Administrative Affairs in Ceará - CONAT in 28.12.1963. Some structural changes have been made affecting the way CONAT works since then. Currently, Law 12.732/97 conducts CONAT. CONAT is responsible for judgment decisions on contentious matters between tax payers and the State of Ceará. It especially applies to matters regarding taxes on circulation of goods and transportation and communication services (ICMS). Instead of having fiscal matters analysed on Courts (the Common Justice), where formal and expensive procedures are required, the administrative contentious offer the opportunity of a faster and more informal way of analysing and solving fiscal problems. CONAT is a reference in terms of good public service in Ceará. It is an institution that is always trying to offer an excellent public service to society.
6.5.2. Organizational model

Figure 6.2. is a simplified representation of CONAT’s organizational structure:

CONAT presents a bureaucratic organizational model where employees daily develop specific tasks according to their units. CONAT incorporate technology in its design: there are several computer-based systems that help the development and coordination of activities internally. There are rules and operational processes at CONAT. These rules are always under continuous improvement. Information processing and decisions occur as determined by law (CONAT is conducted by a specific law, as I mentioned before).

Although there is a bureaucratic organizational model, employees from CONAT sometimes join teams at SEFAZ to develop specific projects. For example, CONAT’s employees can participate in projects that aim to improve SEFAZ’s strategies. So, although CONAT’s employees work with specific tasks, they can develop other activities when it is necessary, although this is not a common situation.

6.5.3. Information processing, decision making and technological resources

The administrative judgments, or decisions, follow a formal process at CONAT, according to the different units (CEPAT, CEPED, CECON, CEJUL, etc). In general, the sequence of the administrative judgment at CONAT happens as follow:

a) different units of the State Department of Treasure in Ceará – SEFAZ send fiscal-administrative matters to CONAT (they consist of different tax documents associated to one specific issue);

b) some internal controls are done on computer;
c) the tax payer’s justifications and other documents are attached to the process;  
d) then, a decision is given to the matter (it is called administrative judgment at 1st level, where one person is in charge of given the decision);  
e) after this initial judgment, the tax payer is notified about the decision;  
f) in some cases, the tax matter will be submitted again to judgment – at this time, in one of the chambers of administrative judgments (2nd level decisions, which are collective decisions), that have equal representative members from the treasury department and from tax payers.

When analysing the processes, employees at CONAT have clear objectives in terms of information needs. Information is a key resource at CONAT. It comes from tax payers, fiscal authorities, different departments at SEFAZ, other institutions and also from computer systems. The flow of information is in all directions. Most of the time there is a need to document information in the written or printed form.

It is important to mention that decision making at CONAT can occur in two different ways: a) the technical decisions to the fiscal-administrative matters between tax payers and the state of Ceará; and b) CONAT’s strategic decisions, which means concrete actions to improve the service that the department offers to society. Most of the time, there is a routine info-gathering approach that leads to specific and technical decisions, where the decision aims to solve a specific problem. But, in other situations (usually related to the organizational strategic decisions), there is an open searching process for information that will help the decision-making process. In that situation, there is a value-thinking approach. In both situations, it is important to determine specific objectives before collecting information.

So, decision making at CONAT presents a mix of a) decisions made under certainty (where each alternative can be associate to only one consequence): this is the case of the technical decisions. Also b) decisions made under uncertainty (where there are different consequences to alternatives and the probabilities of occurrence are unknown): this is the case of the strategic decisions. The external environment (especially the fiscal, economic and political issues), has influence on strategic decisions at CONAT.

It is also important to mention that: (a) fiscal laws provide the guidelines to technical decisions at CONAT. Sometimes, the usage of specific fiscal quantitative methods help understanding the context of a tax problem, and, consequently, help to find an appropriate solution to it; (b) strategic decisions don’t require quantitative methods. In fact, there is no explicit usage of quantitative tools in strategic decisions.

On the other hand, the decisions to the fiscal-administrative matters usually don’t involve cognitive aspects, as they are very technical decisions – although sometimes cognitive aspects can influence these decisions. The strategic decisions are more subject to the influence of cognition aspects than the technical decisions.
Technological resources are an extremely important tool at CONAT. They are present to offer support during the development of activities. They provide useful information that support decisions to the fiscal matters, which are always done by human beings – not by computers.

6.5.4. Personnel

All employees at CONAT are graduated, and most of them have post-graduation courses. They are selected from the State Department of Treasure in Ceará – SEFAZ. It is qualified personnel, with a long time of working experience and very specialized knowledge in fiscal matters. There are some management functions at CONAT - for example, each CONAT’s unit (such as CEPAT, CEPED, CECON and CEJUL) has its own manager, and all managers are subordinated to CONAT’s president.

Managers are in charge of organizing and distributing tasks, as they also help the development of activities in their units. CEJUL, for example, which is the unit where decisions at 1st level occur, is composed of 18 employees and 1 manager. At the beginning of each month, the manager distributes his employees the fiscal matters, establishing some computer-based controls. During the whole month, the manager helps the 18 employees in the task of finding solutions to the fiscal-administrative problems.

Although the 18 employees are qualified knowledge workers, the manager helps them to find fair solutions to the problems, searching for net-based materials that support the decisions and promoting the cooperation among employees, for example. He is also in charge of assuring that all the technological resources that support the development of activities are working in a satisfactory way. The manager cares about people’s needs, as employees and as human beings. The same happens in the other CONAT’s units, in general.

Most of the employees perform their activities individually. But some tasks require interaction and exchange of ideas with other professionals, from different units inside CONAT and, sometimes, from outsiders. Technical decisions at 2nd level, however, are collective decisions: there are daily formal meetings to make the decisions. The strategic decisions at CONAT usually take place in the end of the year, in an informal meeting. They are also collective decisions. In this meeting, employees and their managers establish the goals units have to reach. During this meeting, managers and employees exchange ideas about the problems in each unit, possible solutions and best alternatives. The implementation of the solution occurs during the next year.

Employees have to reach specific goals in terms of the amount of technical analysis related to fiscal matters that each unit can possibly do. It is a negotiation process. Managers expect the achievement of the goals. Monthly, there is an individual evaluation of each employee’s performance – as well as each unit as a whole. Some employees are more productive than others, in quantitative terms. Some are more productive in quality terms regarding their technical work. Some employees are productive in terms of cooperation with other colleagues, initiative and innovative ideas. The annual evaluation of performance for employees and managers influence directly employees’ promotion.

Tax problems usually cover very complex situations. It requires employees’ concentration and in depth analysis of the case in order to find its best solutions. The division of work into different
units makes easier the development of tasks. There are communities of practice in CONAT – usually according to each unit -, where employees present a shared repertoire and mutual engagement, in a joint enterprise. These communities express their own way of understanding situations and negotiation of meaning. So, CONAT’s organizational model presents both formal aspects, such as planning of activities and division of tasks, as also informal ones, where employees do not follow pre-established ways of thinking and acting.

Employees at CONAT are always under continuous professional education. They are usually participants in training programmes offered by SEFAZ or other institutions (universities and training institutes, mainly). Those programs try to develop not only technical abilities, but also employees’ understanding and sense-making skills. In CONAT, the focus is not on individual brilliance but on the development of intelligence applicable to the organization functioning.

6.6. Theoretical research x the case study: comparative analysis

6.6.1. Introduction

CONAT as a public institution is in charge of administrative judgement of fiscal matters. It deals with a lot of tax rules. Although tax payers should legally know and respect them, many motivations intervene in the process. CONAT is in charge of giving satisfactory decisions to the conflicts between tax payers and the Public Administration. Efficiency is important to CONAT. It implies a tradeoff between solving tax issues in a fast way, and finding good solutions to them (it doesn’t make sense to have fast solutions if they are not good, as also it doesn’t make sense to have good solutions that are not fast). For that reason, qualified personnel and simple organization structure is relevant to CONAT efficiency.

But it is important to proceed to an in-depth analysis of CONAT activities. How to measure CONAT efficiency? Does efficiency there mean to give as many good solutions as possible in a short period of time? As exposed before, the Brazilian tax system is very complex, with rules changing systematically. On the other hand, Brazil is a country with one of the highest tax pressure in the world, where public services usually don’t work properly (that means that there is no appropriate public education or health care system, for example). There is not an appropriate environment to pay taxes in the country. Tax evasion is high in Brazil. Many small businesses operate by avoiding legal procedures. Corruption is endemic in the country. The accumulation of these aspects affects CONAT efficiency. This situation demands an in-depth analysis of the context in which this institution functions. The ideal situation would be that CONAT would deal with little or exceptional cases of tax issues. The fiscal administration is in constant struggle to re-inforce its legal laws in an economy that can take them with great difficulty. But in reality, the number of tax matters waiting to find its solution from CONAT is very high. Employees’ hard work is not enough as the source of the problem is not to be found there. Thinking about CONAT efficiency demands to approach some of the business values that should be injected into the legal framework.

Is it possible to rationalize some methods of working there? I understand that, in general, CONAT tasks’ distribution is appropriate as there are no irrational procedures. As a public institution working under the principles of legality and publicity, some procedures demands time,
and legal obedience. They are not irrelevant. As exposed in this thesis, it is important to analyze carefully the idea of efficiency in the public sector.

### 6.6.2. Organizational model and information processing

The overview of the literature suggests a more flexible organizational model meaning less hierarchical levels, in order to be able to process information and better decision making. The research in the literature revealed that the most appropriate model depends on the characteristics of each organization, but that it is important to incorporate technology into the organizational design. For example, Business Process Reengineering - BPR is an interesting model to carry out changes in organizations, by radical redesign of business process and incorporation of technology.

CONAT presents few hierarchical levels, and flexibility is present in some existing form since as it has mechanisms to adapt to the changes in the environment and to improve the way of doing work. CONAT, in the context of a public institution, presents the characteristics of a bureaucratic model. To update the bureaucratic model of this administration, it needs to successfully incorporate information technology in the design of its work processes. Employees expect the coming of a ‘virtual’ CONAT, i.e., where documents and forms will be available online. CONAT has never adopted BPR as a model to carry out changes. CONAT focus on continuous improvements.

In terms of information processing, the literature review presents differences of stage of technological evolution (in software and hardware). In software engineering, for example, early issues were with language and “data”, using theories of “information flux” to understand how to communicate with a machine through software. Then, the managerial area of the 1990’s emphasizes “knowledge”, and “intelligence” as a result of existing off-the-shelves software management systems. According to the 1960’s artificial intelligence literature, although human beings and computers process information, the way people and machines treats information is different despite the fact that software developers have spend considerable time to find out formal ideas about human language, cognition and communication processes to help them design software interfaces to communication with computer machines. The 1990’s management literature show that clear and specific organizational objectives are important when dealing with computer supported information processes. CONAT case study shows that employees develop their tasks without noticing explicitly the differences between the concepts of “data”, “information” and “knowledge”, for example, as the model of work must be compliant with traditional practices of office work rather than total computerization of all documentation, databases, on-line tax payment facilities etc. In the traditional office work, somebody is controlling implicitly the information as he/she has to convert data that he/she has in his possession into information for another worker or the public. For example, employees have to analyze numbers in order to convert them into information, to acquire knowledge about the matter and then find a solution to a problem. It is a natural and systematic process.

### 6.6.3. Decision making and the impact of technology

According to the findings in the literature, it is important to differentiate the different types of decisions. In some cases, for example, the search for a solution follows a routine info-gathering
approach, while in other situations it is necessary a more open and wide search. But the literature focuses more on the decisions under uncertainty, where the probabilities of occurrence to the consequences of alternatives are unknown. In that sense, the literature points out that it is important to have a value-focused thinking and that the establishment of a decision-making process can help the achievement of better outcomes. It is not possible to ignore cognitive aspects, as different judgment biases and errors can affect decision making.

CONAT presents a mix of both types of decisions – a routine info-gathering approach to make decisions, as also decisions that require a more open approach. Specific fiscal quantitative methods help to understand the context of a tax problem. Consequently, they help to find an appropriate solution to it. But strategic decisions don’t involve quantitative techniques. Cognitive aspects can influence decisions requiring a more open approach, in comparison to the technical decisions - technical decisions are not under so much cognitive biases, as the search for a solution follows a routine info-gathering approach that implies fairly certain outcomes.

The literature mentions that technological resources may help employees to develop activities. In CONAT, computers are used to storage and retrieval, while employees deal with situations that require a whole understanding of the context. With the implementation of an overall system, it would be possible to develop routines faster and easier. For example, some internal procedures could be implemented in computer template which user would be asked to fill in. In this respect, the technology resources offered by off-the-shelves software management solutions available help a lot the development of tasks. However, human beings have to do the analytical information process, as also have to make decisions, and not computers.

6.6.4. Personnel

According to the literature, to process information and make decisions better, aspects such as communication, participation, interaction and transparency are very important, and managers can play a decisive role in this respect. I discovered in the theoretical research that groups usually perform better than individuals, although they also can express judgment biases and make errors. Another aspect is that knowledge workers are an increasing category of employees. Knowledge workers are not necessarily managers, but also employees working with new software management solutions in their work environment. In terms of leadership, the literature emphasizes that there is a big difference between being a “manager” and being a “leader”. Productivity of knowledge workers is another big challenge in this 21st century. Until now, there is no consensus about an appropriate method for the measurement of employees’ performance.

Communication, participation, interaction and transparency are present in CONAT. There are individual as well group decisions. In terms of the technical decisions to the fiscal matters, however, no one can say that the group decisions are better than the individual decisions. This happens due to the fact that there is no “right” or “wrong” decisions, as subjective judgment is present, and people can express different points of view. Managers at CONAT present several characteristics of “leaders”. All employees in CONAT are knowledge workers. The measurement of their productivity involves not only the amount of work that employees do, but also the quality of the work and also aspects such as employees’ collaboration, participation and contribution with innovative ideas.
The research in the literature also suggests the importance of transparency for an organization, which means social relationships whereby work is a place to people interact properly and have an effective participation, in a trustful and enjoyable environment, where continuous learning (both formal and informal learning) can take place. In general, CONAT presents an environment where honesty, integrity, transparency, open communication and interaction take place. People there are always under continuous learning, both formal and informal learning.

6.7. Conclusion

My purpose with this thesis was to investigate the most important aspects regarding information processing and decision making in organizations. I looked for an overall perspective helping organizations to deal better with the increasing amount or even overload of information available in the environment. It is useful that information is readymade available for decision making. The investigation in the literature and the case study revealed that there is not only one way offering a deterministic formula directly applicable to organizations’ information process. To better decision-making process, there are several aspects the organizations have to analyze, depending on its core activities and its institutional characteristics. This thesis tried to provide an overall perspective of these aspects.

The initial first overview consider the nature of the organization as secondary: in general, information processing and decision making are important for both private and public institutions. The literature is clear about the importance of information for private companies: they use it in order to try to gain competitive advantage over competitors. But public institutions face the same challenge as private companies. My case study at CONAT, a public institution, showed that all organizations have to be always trying to perform as better as possible. On the one hand, private companies have to compete for market, customers, profits; on the other hand, public institutions have to be always improving the services, employees’ training, information infrastructure offered to the benefit of society. Both of them, private and public organizations, have to present good performances, although with different purposes.

Another conclusion is that information is not a simply a resource to be captured, sorted, analyzed. We can not deal here with information as a commodity. One of the reasons is the fact that there are a lot of subjective aspects relative to the treatment of information in organizations. In other words, specific “inputs” don’t necessarily lead to the expected “outputs”. Another reason is information offer the possibility of expanding our way of thinking, in terms of providing “insights” that can lead to innovative actions. This also applies to decision making.

One more important conclusion is the difference between: a) information processing and decision making as part of activities developed daily in organizations, which requires employees’ skills and technological resources; and b) the process of adopting an organizational model of change to the achievement of efficiency, such as Business Process Reengineering – BPR, which implies redesigning processes through information technology. The implementation of Business Process Reengineering – BPR in the Brazilian administration could innovate the way public activities are developed. It would be necessary a value-focused approach, however. The implementation of BPR computer systems, covering different areas in the public service, would imply different aspects, such as redesigning administrative processes, specific computer solutions for particular uses, installing and educating people to work with, innovation in management and others. It is
important to analyse the context and also the social environment where technology is going to be implemented, for example.

This research revealed that the idea of trying to make an organization more efficient requires reflective analysis about several aspects. It is important previous and extensive debate about why it is important to make the organization more efficient, how to do it, probable difficulties to face, what are the priorities, which kind of technology could support actions, the expected benefits. It is necessary to involve professionals from different areas, with different points of view. The ability to combine opinions from different people will ultimately benefit the whole society. The implementation of technological resources is able to help the emergence of new organization models only if the technology interacts properly with the internal and external organizational environment. In fact, it doesn’t make sense to try to make an organization be efficient only in terms of achieving the organizational objectives. It is important to take into account the individual desires and aspirations of employees and also the whole context in which the organization is involved, for example. Extensive focus on technical solutions and not enough previous exchange of ideas can lead to failure in the implementation of changes in an organization.

I can conclude that we are just entering a period when there will be more and more technological resources to help the development of activities in organizations. Slowly, technology will be so inherent to the development of activities into organizations that employees will not notice them. But people in organizations should avoid the idea of performing activities in an automated way and not being able to develop a critical view of the purpose of their work. Although the benefits of technology, they will be always concerned to technical solutions. People have to have ethical, legal, economic and social concerns about the results of their intervention in the society. Computers cannot present these concerns. We all have to be always updating the way of analysing the world, mixing different points of view in a critical and responsible way. We have to reflect, act, value and learn. There is no intelligence divorced from these aspects. These are important conclusions that I can extract from this research.

Another conclusion is that we don’t process information and make decisions in an objective or neutral way. Two people process the same information in different ways, for example. Computers, on the other hand, perform exactly as they are programmed. When we talk about human beings, there is a grey zone, because there are cognitive aspects influencing human behavior. It is important to recognize that human beings’ actions involve a lot of subjectivity, while technological resources follow strict rules. Technology is important only to support the development of activities, because the real understanding of a whole situation, in a complex context, is an exclusive human being’s ability. Only human beings can understand subtle relationships that are impossible for computers.

It is possible to automate the daily work of CONAT, for example, through online processing, based on computerized supported system. In that way, work would be simplified, and some of the procedures the employees do, removed. The idea is that is possible to rearrange employees toward tasks that they can perform better than machines. At the same time, there is a need to implement flexible technological resources, so that employees can adapt them to particular situations and add continually new and different routines. This is an exclusive human being’s ability, which involves planning, evaluating, controlling results and others. Computer programs
will never be able to substitute human intelligence, because machines cannot have ‘insights’, understand implicit meanings, distinguish circumstances of events or make analogy of situations.

I remark also that people cannot avoid completely biases and errors when processing information and making decisions, both at individual and group levels. However, a first and important step that can help in terms of not being so vulnerable to their influence is being aware of them (and technology – it is important to recognize - can help to reduce the cognitive limitations of individuals). Information processing and decision making are as much a technical activity as a social one. For that reason, it is important to understand the different groups of people working together in an organization – they play a decisive role in this respect.

The research also showed that an appropriate atmosphere is important for every organization. Trusty, open communication, interaction and negotiation have to be present in modern organizations. In this respect, managers are very important. There really is a difference between being a manager and being a leader. But one important conclusion, after the case study, is that there is not a pure “manager” or a pure “leader”. In some occasions, a person can manifest characteristics of a leader (when creating an internal good environment for employees, for example), and, in some others, the same person can be a traditional manager (when expecting the achievement of the organizational goals, for example).

Finally, one another important aspect that could lead to a better information processing and decision making in organizations is continuous learning. It is important to notice that continuous learning is possible through informal practices at work (where identities emerge according to the development of activities), as it is also possible to learn through a traditional way, when objectives and rules are formally established. For that reason, it is important to not have only a behavioral perspective (where the focus is on the employees’ needs) or, on the other hand, a perspective where only the organizational demands are important (focus on organization’s goals and objectives). It is important to have a mix of both approaches. It is also important to match theory and practice. More the individual intelligence, it is important to build an organizational intelligence.

6.8. Suggestions for further researches

As I exposed in Section 1.5., the overall theoretical idea developed along this thesis provide an overall perspective of information processing and decision making. For that reason, I do not discuss each of their aspects in the thesis’s topics. Some topics (such as information processing and decision making) could be developed with further researches regarding their cognitive aspects, the existence of quantitative tools, the question of leadership, and the provision of knowledge workers.

Performance evaluation of knowledge workers and leaders, for example, would demand a more detailed analysis, with a micro perspective. One could extract many other ideas from the body of this thesis.

However, other macro analyses in further researches are also possible. For example: how could society participate in a more effective way to help public organizations to process information and make decisions better? How could public organizations share information with other public
organisms in order to allow accuracy of information and provide other advantage for the functioning of institutions?

I can make 02 more suggestions for future researches, in the field of tax management. The first one is a study that is more specific on the exact transaction that is going on between tax payers and employees and the whole process of tax collecting until administration of money. The other suggestion is to analyse what existing package of softwares dealing with state tax system and the changes it implies to do.

In summary, information processing and decision making can provide different “insights” in terms of innovative ideas that can help the improvement of the studies that are carried out in these areas.

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