Luiz Carlos Duclós Valdinei Leandro de Santana

Processos de negócios 1

INFORMATION STRATEGIC CYCLE putting IT where IT belongs

Strategic

Managerial

Transactional





INFORMATION STRATEGIC CYCLE: Putting IT where IT belongs

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Luiz Carlos Duclós Valdinei Leandro de Santana

INFORMATION STRATEGIC CYCLE: Putting IT where IT belongs.

Coleção Processos de Negócios, 1



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To Nana, companion in struggles and several journeys. To Rita, Luciana and Ligia, partners for ebey occasion.

To Rô, my love and Bruno, my son, that abstained from family time so that I could dedicate to the book.

To our students, faithfull and sincere critics of endless versions of this book.

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INTRODUCTION

It is quite common to meet businessmen that are unhappy with the results of their investments in Information Technology (IT). There can be a lot of reasons for that. According to Drucker(1999), companies do invest a lot in IT, but, under a keen eye, the investments are made more towards the Technological T, with appropriate levels of information regarding its operational aspects, while the Informational I is relegated to a second sight. Information is a core necessity for the businessman to create the corporate strategy. Flexibility and simplicity on analyzing information will be fundamental for companies that want sustained competitive advantage and results optimization.

The challenge of effectively managing information *versus* investing in IT is the core subject of this book. As the whole subject is ample, there is no desire nor pretension in exhausting or uncovering magic formulae to solve it; analyzing the relation between IT offer and demand during the 80's, 90's and the years following, its possible to perceive changes that may shine a light upon how to prioritize investments in IT in order to achieve better results.

During the 80s, IT, an assembly of hardware, software and telecommunications, had a higher demand then the offer, and the solutions that it provided were insufficient to correspond to the organizational needs. Before the 80's the use of IT was restricted to the specialists and engineers locked away in the laboratories, far from the reach of most companies.

The decade of 1990 was very prosperous for IT. The majority of the components within IT solutions became electronic in detriment of mechanical ones, allowing a myriad of new possibilities that could be fully explored by those who could afford it. Telecommunications evolved to allow information to transverse the world in less then a second, IT being an enabler of the advent of global business. Even though IT was expensive during these years, many companies managed to solve information problems with the application of IT to improve the efficiency of its businesses processes. With the dawn of the new millennium, or right before, the offer of IT became stronger then the demand required to improve the efficiency of the businesses, even though many have yet to notice this inversion. There are a lot of offerings of IT in the market. Suppliers knock at company's doors on a daily basis with of-the box solutions for every problem. In order to avoid the feeling that "TT exists to solve problems that were caused by IT", its necessary to understand TI as but one of the components of Information Systems. It is necessary to understand the problem, then find alternatives, analyze them on the lieu of business and, timely, implement the appropriate solution.

In the Information Strategic Cycle, strategy is created, operationalized, executed and monitored. The strategic information becomes managerial and transactional through the steps that are contained into the Information Strategic Cycle. This tool helps managers to promote IT strategic alignment, identify the impacts that IT causes upon the strategic management and promote the continuous improvement of the business processes sustained by IT.

During the Information Strategic Cycle, its necessary to justify and prioritize the investments made in IT, according to the 10 steps that compose the cycle.

- 1) Critical Thinking;
- 2) Fundaments of Strategy;
- 3) Strategy creation;
- 4) Strategy translation;
- 5) Current status modeling (AS-IS);
- 6) Corporate change;
- 7) Future status modelling (TO-BE);
- 8) Managerial analysis;
- 9) Business Case;
- 10) Corporate learning.

This logic sequence of steps is didactic and has been applied successfully in post-graduation and MBA courses to solve real life problems that existed within organizations. It represents as the information that is delivered to the strategic level is transformed in managerial information and promotes changes that are needed for the survival and prosperity of the organization.

There can be no solution for an undefined problem. **Critical thinking** must be encouraged in order to prevent misuse of corporative money without a proper focus for investment. Managers must dish out solutions that don't generate value to the core business

A company's **strategic fundaments** are formed by the mission, vision, values and policies. Sometimes facts may hide in plain sight. Investments that are to be made in IT must be aligned with the company's strategic fundaments.

This book follows two different approaches for strategy formulation: The first approach organizes the strategic information as a process of Competitive intelligence, while the last considers strategy creation as a dynamic process without rigid rules for the strategic thinking to happen. Both coexist in the academy and the corporative environments.

Corporate strategy is a path that leads to the fulfillment of the corporate vision, and must be translated and understood by all the employees. Strategic maps are used as tools for translating strategy; strategic objectives are displayed in a cause-effect relation on these maps. Critical processes are displayed within the strategic maps and in the company's value chain.

Before solving problems, one must identify its root causes; in order to identify them, the current business process **(AS-IS)** is modeled displaying the actors involved with it. Displaying the problems and the causes it is possible to give a focus to the strategic changes needed.

Information technology is only part of solutions to information problems. IT impacts on the daily routine in the organization and causes **organizational changes.** These changes must be planned in order to lower resistances, considering, beyond technology, strategy, structure, business processes and people.

Well planned changes generate value to both products and services within the organization. It is possible to propose new or improved business processes (TO-BE) either with or without the use of information technology. Enterprise resource planning (ERP) might be used to support the increased necessity of business processes. In order to control the process, the following step in the Information Strategic Cycle contributes to generate information that is needed under **managerial analysis**. Business Intelligence (BI) may be used to consolidate operational data into cockpits, warnings, multidimensional data cubes, data mines, managerial reports and statistics. Key Performance Indicators are used to measure the operational effectiveness and to generate feedback about strategic performance.

While using this book in post graduation courses, students generated a final report, built according a **business case**. Business cases are a justification for the investments that are needed in IT, represented through means of cashflow, IRR, NPV and payback. A business case is a professional way to justify these investments in an IT strategic project.

Finally it is possible to contemplate the **organizational learning.** An initiative or strategic project is a set of actions that promote organizational changes that aim both to improve corporate performance and to aid the company in reaching its objectives. At the end of the project, it is possible to generate learning data, leading to lessons learnt in the process of executing the information strategic cycle.

Each of the steps that compose the Information Strategic Cycle has been organized as a chapter of the book. It is recommended, didactically, the sequential reading of the chapters while the web site www.businesscase.com.br completes the book with practical examples that have been developed during post-graduation and MBA courses. There is also one example of a Business Case at the end of the book, wich can be used as a reference material during the studies.

The final considerations synthesize the Information Strategic Cycle as a method that directs IT investments. IT then is put where it belongs. This method explains that what generates competitive advantage isn't how much is spent in IT but how to properly direct these investments in order to promote strategic change that will aid the company's ultimate survival and prosperity.

1 CRITICAL THINKING

Houston, we've had a problem here. Jack Swigert, Apollo XIII

Every organization has its own timing for implementing projects that involve strategic decisions. With the learning that occurs within the organizations, bonuses and rewards might be awarded to employees as they contribute to the company's goals. These goals are unfolded to each employee, which, in turn, receives a set of indicators that are linked to the corporate strategy. For example, a strategic goal that aims to "improve operational efficiency" might be translated to a specific manager as "reducing total production time" and again, translated to the operational staff as "lowering total setup time for the cutting machine from 15 to 10 minutes". Executing strategy is part of everybody's jobs.

1.1 Problem Solving Techniques

As the strategy happens through the organization, the need to improve performance might emerge, and, in order to achieve that, the Methods for Analysis and Solution of Problems (MASP) may direct the implementation of improvements. Several models for improvement cycles exist, most notably the PDCA (*plan, act, do, check*) and the DMAIC (*define, measure, analyse, improve, control*), which have a lot of common characteristics. Kallás and Coutinho (2005), quote Jorge Gerdau in a speech during the *Balanced Scorecard Latin America Summit* de 2003:

> If we consider the PDCA management model, we find out that, historically, the Brazilians have problems with the CHECK. We get annoyed by being questioned, when that should occur naturally. That is something that we should learn from the American people

DMAIC Cycle

Several decisions are taken emotionally within the organizations, but professional managers prefer to justify decisions rationally. DMAIC is a method for analyzing and solving problems that allows decisions to be made over data and facts. Some tasks must be done in each of the DMAIC cycle steps, as follows:

Define:

- Define the problem;
- identify the customer and the customer needs.
- brainstorming for root cause identification.

Measure:

- create a plan for data collection;
- collect the data;
- calculate the process' sigma performance.

Analyze:

- analyze collected data;
- analyze the process;
- test and validate the data and the root causes.

Improve:

- *brainstorming* for solution alternatives;
- select the most appropriate solution.
- deploy a pilot-test;
- verify improvements.

Control:

- integrate the new solution to the management system;
- train the employees;
- guarantee that the root cause keeps blocked;
- document the lessons learnt.

PDCA Cycle

The PDCA cycle is also known as Stewhart or Deming's cycle. According to Campos (1994), the word method is derived from two greek radicals – "*metas*" and "*hodos*", meaning, respectively, "result to be achieved" and "path". Therefore, the PDCA *method* is a path to achieve an expected result.

In a very similar way to the DMAIC cycle, the PDCA also requires the completion of tasks in every of its steps:

Plan:

- locate a problem;
- define an objective;
- create and action plan.

Do:

• execute the plan.

Check:

• verify the completion of the objective.

Act:

- take corrective actions in case of failure;
- padronize and train upon being successfull.

Brazilian companies that adopted to total quality control programs in the early 80's use the PDCA method. DMAIC method has been adopted by companies that opted for SIX SIGMA projects. Six Sigma projects use statistic methods that aim to reduce failures to 3,4 occurrences per million of attempts. It isn't possible to determinate which method is actually better.

Funnel Method

Solving information problems often requires methods of system analysis and and systems engineering. Fig 1 demonstrates the funnel method for information problem solving. It's a generic method that can be used for problems diverse then information ones. When this method is used towards solving information problems, the first three steps on the funnel refer to system analysis, while the last two parts refer to systems engineering (LAUDON; LAUDON, 1999).

At the **step 1**, it is necessary to understand what kind of problem is going to be faced. It can be a technology, business process, people or other organizational dimension problem. Many people within a given organization may diverge about a coincidental problem as they are affected in different ways by it. It is imperative to understand how each person or group position their opinion about the issue, as the ideological conflict is necessary during the problem analysis.

During the **Step 2**, the problem and its causes must be analyzed. Why does the problem exists? This is a "detectivesque" task that takes investigation and evidence collection. The broader these collections, the better the problem will be understood: data can come from interviews, documentation, quantitative analysis and other sources. This step aims to uncover how the problem was originally created and which factors keep it happening.



FIGURE 1 – Funnel Method Source: LAUDON; LAUDON, 1999, p. 195.

During **Step** 3 some decisions are took in order to choose what can and what must be done. What must be done is related to the company's strategic goals. What can be done is related to the availability and viability of resources. Usually a company can't create new products and services immediately, or hire another team or plunge into different markets. All alternatives should be analyzed in order to select the most appropriate option.

The **Step 4** marks the beginning of the systems engineering process. Solutions must be planed and expressed as goals, scope, schedule, resources required and costs. There is an expressive challenge in this step that involves the language used during the application of IT. A common

vocabulary is needed in order for people to be able to share ideas and perceptions during the implementation of IT projects engineered this way.

The implementation of the problem's solution is done during the **step 5**. Any implementation of new information systems generates greater or smaller changes on the company's routine. Managing these changes and padronizing business processes are critical to the implementation of a system. A solution is efficient if it does well what it promised to do, efficacious if solves the problem and contributes towards the corporative goals and effective if it is simultaneously efficacious and efficient.

Not all problems in the corporate world can be solved directly; problems related to Information Systems are complex because they wrap up three dimensions in its existence: technology, organization and people. Complex problems have an infinite number of possible solutions and also have people that possess divergent perspectives. Its hard to find the best solution while respecting the scarcity of resources. Critical thinking is necessary to avoid the waste of precious time and resources.

AVE Method - ARIS Value Engineering

August-Wilhelm Scheer started the ARIS (*Architecture of Integrated Information Systems*) and AVE (*Value Engineering*) concepts at the Saarbrucken university at Germany. One of the objectives of AVE method is to use the business processes as a link between business managers and IT technicians. At Image 2 it is possible to see a resume of the AVE method.



FIGURE 2 – AVE - ARIS Value Engineering Method Source: IDS SCHEER AG, 2005, p. 8.

The search for excellence on managing **business processes** is the main goal for the AVE method. Efficiency and efficacy at the business processes, both internal and external, determinate the economic success of the organization. The main goals of BPM (Business Process Management) are the improvement of customer satisfaction, productivity and corporative competitiveness. The AVE method must be regarded as a reference for generation of aggregated value and depends on the proper use of tools, methods and personal experience on managing continuous strategic change and improvement.

During the **process strategy** phase, five outcomes are generated: a products X markets matrix; a list of the Critical Success Factors (CSF); a map of the process that belong to the value chain; a portfolio of processes and a list of strategic objectives for each critical process. The AVE method is indicated in cases were promoting a systemic view of the organization may promote process optimization aligned with the strategy and focused on relevant processes. The critical process factors (CSF) come from the products X markets matrix. The following are illustrative examples of CSFs: service quality, service delivery and customer satisfaction. The CSFs can be compared to current performance, to the competitor's performance (benchmarking), to the customer's requests and to the market condition. Processes in the value chain in the AVE method are classified in three groups: management, primary and support processes. The process portfolio may be created with the objective of classifying the business processes in quadrants that span from two axles: current performance and CSF impacts. Relevant process prioritization is done from the selection of business processes with low performance and high impact on the CSFs. Each process so prioritized is related to the strategic objectives considering three dimensions: cycle time, quality and cost reduction. The process strategy leads the process design phase.

As the company evolves to the **process design** phase, previously prioritized processes are analyzed and optimized for future implementation. Six outcomes are perceived at this point: process analysis, identification of process optimization factors, determination of each alternative's improvement potential, viability test, cost-benefit ratio of the solution. Decision making at this step determinates largely the sustainability of BPM initiatives within the organization. Successful organizational changes largely depend on the quality of the outcomes of this phase.

While the processes are analyzed, graphical modeling is employed to represent the current status of the business process (AS-IS). Non-valueaggregation activities are identified, as well as shared responsibilities, system interfaces and weak spots. Current process optimization factors are also identified and analyzed from the problem's cause, problem itself and problem's effect perspectives. A Pareto's analysis is conducted to identify the 20% top optimization factors that have a potential for an improvement of 80% in the process as a whole. If it is possible to identify these quick wins, they should be implemented first, in order to create a favorable mood on the involved people. Three guidelines should support the process choice in this phase: maximization of viability of the changes deployed. Success of the organizational change will be true only if the organizational change better displays the improvements over the Key Performance Indicators (KPI). Viability tests that employ simulation are recommended in order to evaluate if the potential improvements actually cause the desired effect over the performance indicators. Lastly, this phase must generate a cost-benefit or a return-over-investment analysis, along with a plan for future implementation of business processes (TO-BE). This implementation plan should contain clearly defined milestones for the implementation phase.

AVE expects the occurrence of five outcomes during the process implementation phase: organizational structure adaptation, procedure change, change or deployment of new IT tools, milestone monitoring and business management competence creation. During this phase business processes provide a link between business and development of new IT supported applications.

According to Chandler (2003), structure follows the corporate strategy. BMP implementation doesn't demand the utter abandon of departmental structure in the organization. During the implementation, its necessary to point out a process owner, who is responsible for the effectiveness of the business process, aiming to improve both efficiency and efficacy. The process owner is responsible for promoting the changes needed within the organization. In order to create new process management competences the process owner may call in for counseling and support from professional coaches that are apt to act as process advisers. For each of the milestones defined during the process design, activities related to these steps must be performed. Both activities and milestones are controlled and monitored in order to guarantee the strategic alignment between the CSFs and the business objectives, as well as the accomplishment of the expected results.

During the **process control** phase, four results are found: Key Performance Indicators (KPI) are generated, performance is evaluated, a process for reviewing the other processes is created and a system for report generation is introduced. Several groups are the main stakeholders at this phase: high management, process owners and employees responsible for process success. The executives are usually attracted by aggregated data and notifications in case of serious deviation from the strategic specifications; the operational staff prefers to have access to detailed process information. Process owners are focused on information that regards cycling time, quality and process costs. Process owners are also attracted by analysis of current performance X projected performance X historical performance, mostly because these temporal reference aids on identifying tendencies within the process behavior.

The AVE method classifies indicators in three monitoring groups: strategic business indicators, management business indicators and IT service indicators. Balanced Scorecard is one example of technology that helps monitoring strategic indicators. Management indicators help process owners to keep the process in check. IT service indicators help on the evaluation of the Service Level Agreement (SLA) maintained between the organization and the IT service area. Proper application of these indicators leads to an integrated vision of the business processes.

The continuous improvement of process is based over the extended revision of business processes. Process design evaluates the current situation and projects a future, improved, status. Given time, the future status (TO-BE) becomes the current situation (AS-IS) and new needs might emerge within the organization, be then either regulatory, new adaptations needed or even auditor recommended changes. Process mapping that occurs during process design may assist in auditing the company. Process control determinates which managerial reports should be used for each of the business processes as well as its seasonality. Each indicator validity is displayed within reports, and is validated by means of the actual need for information, quarterly, monthly, weekly, daily, hourly or even online.

1.2 Information Strategic Cycle

Information Strategic Cycle is a tool that helps to properly target the IT investments, focusing in risk mitigation and profit maximization. Analog to other cycles and methods, the Information Strategic Cycle also needs a properly defined and localized information problem. The Business Case that is developed at the end of the cycle synthesizes the steps within the Information Strategic Cycle in a report that helps to identify and justift IT investment.

2 STRATEGIC FUNDAMENTS

As we elevate our sight, we stop seeing the boundaries Japanese Adage

Beuren (2000, p. 51), upon analysing IT impact on generating sustained competitive advantage from a broad perspective, concluded that "TT tends to play a secondary role, when compared to information". That researcher even quoted Gilbert (1997, p. 11):

IT by itself rarely suffices in order to achieve sustained competitive advantage. A pen whose ink is unending is insufficient in order to write an excellent romance. Start at a good technology and then search for opportunities for using it is like writing bad romances and like producing bad corporate strategy. Information technology only helps to explore opportunities that are created by competitive formulae.

Internet, for example, is an extremely important technology and unsurprisingly it siphons a lot of attention from managers, executives and stakeholders. Winning managers see the internet as a complementary technology and not like a strategic cannibal. In order to bring internet as a corporate ally, it is necessary to change perspective: internet doesn't automatically makes strategies obsolete, despite affecting them profoundly (PORTER, 2003).

2.1 STRATEGY MATURITY

Gluck, Kaufmann e Walleck (1980) have created a model that describes strategy maturity and evolution on an organization. The model was created during a decade of intensive changes in the business model, most stimulated by globalization. This model is presented in FIGURE 3 displaying the evolution that must occur in each of the steps as well as what determines the situation of a company in one or the other step. The strategic maturity starts with budget management, evolving to strategic planning, passing through advantage construction and culminating in strategic management.



FIGURE 3 –Maturity of Strategic Management Source: GLUCK; KAUFMANN; WALLECK, 1980, p. 4.

At **phase** 1, the focus is on cash flow management and yearly budgeting. All techniques employed are simple and focus on medium term goals. Budgets are internal, department wise and consolidated. The strategic objective rests over financial control.

At **phase 2**, the planning horizon is broadened from yearly to three to five years, using historical analysis and tendency projection, like in sales prediction. External economic and market data are employed to base this prediction. Plans remain quantitative, focused on internal performance, aiming to lower the differences between goals and results, while maintaining control over whichever resources are available.

At **phase 3** a rupture in the internal focus presents itself, as the external, competitive environment becomes priority in order to obtain and sustain competitive advantage, as well as understanding the competition.

Resources and strategic thinking become aligned, dynamically allocated. The firm begins to review its product portfolio, adding value or reducing costs to attain more costumers. This creates demand for new services and products as an answer to external, competitive pressure and not as an internal initiative.

Upon reaching **phase 4** the company will be directed by its own innovation flow, being capable of creating and modifying its environment. Sustained competitive advantage becomes the ability to swiftly respond to market changes, speeding and shortening its products lifecycles. Values, culture and organizational strategies are redirected to reinforce business processes and core competences.

This maturity model has no relation to time; companies can remain in phase 1 indefinitely. The greater challenge is breaking into phase 3, given the necessity of a broader, ample reorientation to the external environment and the knowledge necessary for accomplishing its goals. On the last phase, strategic management, it is necessary that the company is capable of monitoring and influencing the external environment, in order to properly formulate and implement effective strategies (GLUCK; KAUFMANN; WALLECK, 1980).

As a paralel to strategic maturity models in organizations its possible to find information technology maturity models, as noted by Albertin and Albertin (2009, p. 64-65):

Organizations should adopt system development methodologies as an intrinsic part of their IT projects, aiming to guarantee the management processes and quality levels demanded by the company, while employing technology that is an ever-growing demand for organizational, internal and external processes. This demand for management organization tends to lead the organizations into reaching maturity levels for IT, one of them being the Capability Maturity Model – CMM, defined by Humphrey (1989).

2.2 Business perspective VS Information Technology perspective

The critical success factors (CSF's) began to direct the Management Information systems (MIS) starting with the analysis done by Rockart (1979) about the challenges that managers faced when trying to

take decisions based on the contemporary information systems. Rockart (1979) defined the CFS's as "a limited number of fields and the results that they present that, when being satisfactory, will yield favourable competitive results to the company. According to Laurindo(2002), the CFS analysis is considered a classic in the field of Information Technology.

The CSF's can be applied towards different targets. Can be related to the industrial field, to the strategic objectives of given organizational units, to departmental targets or even to each manager's agenda. Laurindo(2002) enumerates the steps to be taken in order to apply the CFS's in the construction of information systems:

- analysis of the company and the nature of the business field;
- identification of CSF's;
- definition of thresholds (quantitative and qualitative) of the desidned CSF's;
- definition of information systems necessary to control these thresholds

This method presents some advantages: it helps the manager in determining the factors over which the managerial attention must be set; binds the manager into developing good measuring and reporting of the factors; restrains data compilation needs to only what is really necessary, avoiding waste of efforts; dodges the risk of creating an information system that collects only the information that is easy to collect; recognizes that some CSF's are time dependant and others only significant to certain managers, thus requiring constant monitoring. The CSF's bind the information systems to the corporate business.

For Torres(1999), the CSF's have the following characteristics: they are few in number (less than 10, generally 3 to 6); are of vital importance to the company; are differentiators between companies; have grave influence over the relation of the company with its environment, mainly on target or intended markets; are characteristics to the field of action or to the product category; can be distributed amongst the operational activities of the company, mainly for the most significant parts of

the business process; many CSF's are related to the perception and the necessity of the costumers over the characteristics of the product.

Laurindo (2002) agrees that relating the CSF's is very useful for creating MIS's, but emphasizes that this methodology isn't complete and should not be employed in an isolated way. Ward and Peppard (2002), based on the Venkatraman presentation done in 1996, in the University of Cranfield in the UK, proposed the DIKAR model (Data, Information, Knowledge, Action, Results) where the CSF's are complemented by the use of the BSC (Balanced ScoreCard) as displayed on image 4.



FIGURE 4 – DIKAR Model Source: WARD; PEPPARD, 2002, p. 207.

Ward and Peppard (2002) suggested a consolidation between the Balanced Scorecard (BSC) and the CSF's in order to provide a holistic approach to the requirements for building information systems. The DIKAR model presented on image 4 help in achieving IT strategic alignment. These factors point the necessities for new information systems.

The DIKAR model also brings some clarification over the difference that exists between the business and the IT perspectives. While the business perspective aims towards optimizing results, ID perspective

aims to transform organizational data into information. There is also difference in the concept of intelligence. As managers understand intelligence as competitive intelligence, the field of information technology spreads the concept of Business intelligence as a technology that is capable of improving the analytical capabilities of the organization when employing tools like queries, reports, data mining, statistical analysis, simulations and management cockpits. Both perspectives are complementary, but care should be taken when deciding how to properly prioritize IT investment.

In this book we explore the BSC, position the CSF's as one of the competitive intelligence tools and complements the model with practices that are inherited from Business Process Management (BPM). To ease the reading and the understanding of the relationship between the practices here presented, we employ the Information Strategic Cycle. This cycle displays, in a didactic and chronologic way, the management practices that can promote organizational change with the use of information technology. The DIKAR model has been employed to introduce the basic concepts in the next chapters of this book.

Data

Data must be processed, organized and ordinated in order to allow human beings to understand its significance. As an example, consider a register machine in a supermarket; merchandise code, name and price are raw data when analysed separately. The report informing the costumer how much should be paid is one information, as well as the result of higher level processing like total sales by region, by merchandise class and by year (LAUDON; LAUDON, 2008).

Information

Organizations difer in the way they use management and strategic **information**. Marchand (2005) created a framewok with four aixes that aims to evaluate how organizations employ they information in order to compete:

- risk management
- cost reduction
- value addition
- creation of new realities.

The most ancient way of information use is **risk management**. Risk management has been evolving in fields like finances, auditing and accountability. Financial, legal, marketing and operational risks information is utilized by these fields. Actual risk reduction is only achieved with proper information being available in the proper moment, and employed in a fast way to respond to risks. Control systems that are capable of detecting potential events of disruption can help on reducing risks, but it is the corporate culture that actually prevents management catastrophes. Risk management and mitigation is specially critic during the moments of great organizational change.

Cost reduction is the second form of use of information in order to achieve competitive advantage. Information can be employed to increase efficiency of business processes and corporate transactions. Cost reduction is usually associated with the reengineering techniques and the total quality movements of the 90's and 80's, respectively. There is a focus on eliminating all tasks that do not add value and on automatizing business processes. Some organizations are able to achieve cost reduction with mass customisation of processes, products and services that include client services.

Another form of information use is **value addition.** Information is used to better understand and to improve customer satisfaction. Also, acts as a link to increase and deepen the relationship, helping to determinate customer behaviour.

Information can also be used to generate innovation. **New** realities may be created through the development of new products, better service or use of new technologies to generate new business opportunities. Many companies employ the concept of competitive intelligence and market knowledge to create new products and services as swiftly as the market demands. Information is employed to mobilize people, ideas and creativity inside the organizations. Marchand (2005) has concluded that the organizations use one combination of all these information applications in order to compete. Each company should develop its own mix of applications, focusing the efforts in the most effective balance.

Knowledge

As the information systems are predominantely social constructs, purely technical implementations of these systems often yield sounding failures. Ward and Peppard (2002) determinate that managers need more than a MIS, as displayed in Image 5. It is not the information that generates better results; it's the knowledge transformed into action that does so.

Nonaka and Takeuchi (1997) propose a model for knowledge management, emerged from their research over Honda, Canon, Matsushita, Nec and Nissan, called middle-up-down. This model proposes the interaction that is necessary to the creation of knowledge in the organization. Knowledge is created by the middle management while they perform their leadership roles, inspiring and motivating both the employees and the higher level management. This positions the middle management in the intersection between the organizational structures – the information that the company owns – with the business processes.



FIGURE 5 – Socio technical perspective in knowledge management. Source: Adapted from WARD; PEPPARD, 2002, p. 512.

Organizational knowledge is classified in two forms: tacit and explicit. Explicit knowledge can be articulated, transmitted, systematized, formalized and organized grammatically or mathematically. Tacit knowledge is embroiled within the individual experience and is composed of intangibles like personal beliefs, perspectives, values, insights, intuition, emotions and abilities. Tacit knowledge is the most important source of competitiveness within the organizations and can be measured only through the actions taken (NONAKA; TAKEUCHI, 1997). Both forms of knowledge are complementary and their interaction is the main source of knowledge creation, codification, storing and reutilization in the organizations.

To become a knowledge producer, the organization should opt to follow the Knowledge Spire presented at the FIGURE 6. This image displays the knowledge conversion process. **Socialization** is the sharing of tacit knowledge by observation, imitation and joint practice. **Externalization** is the conversion from tacit to explicit knowledge, through metaphors, analogies, concepts, hypothesis and models. **Combination** is the assembly of different forms of knowledge by grouping people in meetings, or even through technologies like computer networks or telephones. **Internalization** turns explicit into tacit knowledge through the learning process (NONAKA; TAKEUCHI, 1997). One of the main problems in Knowledge Management is the tendency that people have in withholding knowledge. Even the ones that do not actively do so, may not be completely motivated into sharing what they know (TERRA, 2001).



FIGURE 6 – Knowledge conversion methods Source: Adapted from NONAKA; TAKEUCHI, 1997, p. 80-81.

Some people believe that the computer is the cornerstone for Knowledge Management, but the computer's capacity is limited. In 1936, the concern of Alan Mathison Turing, after completing his masters, was actually knowing what the computer could do. First, he created the Turing machine, which allowed to calculate any function receiving the appropriate instructions. After working for England with decoding German communications during World War II, he worked in the U.S. with Von Neumann and participated in the design of the first computer: the ENIAC. Turing created a test to identify if the computer is intelligent, which is to put a computer and a person separated by a wall and when the computer is able to impersonate another person, it may be considered intelligent. The computer is a tool to support the management of information and knowledge. It is the people that turn knowledge into action.

Action

According to Probst, Raub and Romhardt (2002), numerous studies show that the fact wher or not individuals use the knowledge depends largely on convenience. It is likely that people seek knowledge if it is only necessary to make a short phone call or an informal request to a colleague who is sat nearby. People are less likely to do an independent research in a library or a database. The best way to encourage people to use organizational knowledge is make the information available, easy to use and convenient to the user.

Romhardt Probst and Raub (2002) describe information centers that are able to increase communication among employees. These centers are located in central points of the offices. The graphic presentation of materials and a plenitude of seating space make these places a confortable invitation to hang around. The information is presented in different ways, ranging from simple information on the walls up to video equipment and interactive computer terminals. The content of the messages may include administration, sales and products advertisement, suggestion box, ombudsman and feedback management, project team information and a impersonal marketplace ideas for comments on various topics that are displayed.

People play a fundamental role in the information system because they are the main agents of change within organizations and they are users of information. No computer can simulate or model the human behaviour, it is the people who use the information to create new knowledge. Knowledge is not synonymous to accumulation of information, but a group of them articulated through the empirical, cognitive and emotional legitimacy. Knowledge management is a set of processes that govern the creation, dissemination and utilization of knowledge within organizations with the purpose of assisting the decisionmaking. Modern organizations are facing extremely dynamic environments, causing dramatic changes in the way they are managed. To achieve success in this scenario it is necessary to develop, within the people that are part of the organization, the ability to learn new information and to unlearn the obsolete, antique ones (ANGELONI, 2002).

People turn information into knowledge and the organization is made of people. The challenge is to aid the knowledge to flow from the individual to the group and from the group to the organization. You must make information suitable for the use of people. The people take action and act as agents of organizational change.

Results

The purpose and focus of information systems are classified as shown in TABLE 1. The strategic role of the system increases as you move toward the pursuit of advantage with external focus. The simple automation of business processes usually offers little strategic value. The information system rarely meets the information needs of managers and there are two main reasons:

- does not include external information;
- the simplicity of treatment with little context information.

In the first two blocks with external focus of TABLE 1, the system can generate information through the exchange of files with interfaces (EDI – electronic data interchange) or allow direct access to their information sharing systems. To internally create and sustain competitive advantage, Information Systems may be involved in changes in business processes or changing the organization's role in its sector providing some kind of innovation that has repercussions in the external environment.

Purpose Focus	Operational Efficience	Effective Management	Creating or Sustaining Advantage
Internal	Proccess Automation	Management Information System	Integration with change initiatives
External	Organizational Interface	Direct access to shared information	Inovation in the organizational role

TABLE 1 - Purpose and focus of information systems

Source: Adapted from WARD; PEPPARD, 2002, p. 34.

2.3 FUNDAMENTS TO STRATEGIC PLANNING

The fundamentals of strategic planning provide the foundation for strategic management. Many decisions are made hastily due to the pressures faced by executives. The values shape behaviour. The vision, mission and policies guide the decisions of executives in their daily routine. The commitment to the values of the organization, its mission and the long-term vision helps executives be secure on their daily decision-making, avoiding lengthy meetings and endless discussions. If an investment is not aligned with the strategic fundaments, it is not approved because the company cannot waste time nor money.

Values

Values influence people's behaviour, examples such as ethics, honesty, flexibility, professionalism, respect, search for solutions in a team, opportunism, rivalry and simplicity are values that are related to moral and prevailing opinions in the organization. The values are typically stable over time and are reinforced by the attitudes of executives more than by speech.
Vision

The vision creates the image of the organization over the long term. "In 2015, for NASA to be providing," "have the largest fleet of bikers in town"; "have more than 50% of new customers generated by word of satisfied customers", are some examples. The strategy is the way that embodies the vision. The vision, when shared among all employees of the organization, creates synergy and promotes the strategic alignment between people.

Mission

The mission defines the organization's business and may make mention of the creation of customer value. "Developing food products with high nutritional content," "delivering pizzas in less time and at the lowest cost on the doorstep of the customer", "find the right partner and the right profile for a lasting marriage" are examples. The mission need not be limited to one sentence and may contain a statement of the essential pillars that the organization uses or more complete descriptions of niche markets and focus of activity.

Policies

They are high-level guidelines that facilitate decision making of executives and can lead to operational procedures. When creating a new department it is usual to establish a reference policy. Sometimes policies are explicit, as the quality policy. "Meeting the needs of customers in compliance with the agreed requirements and practicing continuous improvement of products and services" can serve as an example of a policy. Other times the statements are implicit and informally agreed. "During this month we will give in to pressures up to 30% discount on products that are on high inventory level," can serve as an example. Operating procedures standardize the daily activities and tasks through documented rules in line with stated policies.

2.4 INFORMATION AS AN STRATEGIC ASSET

The four steps of the strategic problem, presented in FIGURE 7 are explained by the Information Strategic Cycle. Competitive intelligence

and Strategic thinking are apresented as practices for strategy formulation. The Balanced Scorecard works as a tool for both translating strategy with the Strategy Map as evaluating the strategy through performance indicators. Strategy execution is achieved through business processes.



FIGURE 7 - Four parts of the strategy problem

Information is an asset that needs to be managed the same way as other assets such as human resources, capital, property and material goods (MCGEE; PRUSAK, 1994). The challenge to manage it derives from the potential that information has to generate competitive advantage as result of management and effective use of information to optimize results and reduce uncertainty in decision-making. Beuren (2000) complements by stating that the potential of information depends solely on the user and that the main difference between information and other assets of the company is that it is infinitely reusable and does not deteriorate or depreciate depending on use.

Information about threats and opportunities, strengths and weaknesses are used to create scenarios for the formulation of strategies. The information can be used to differentiate products and services and in some cases is the product itself. In implementing the strategy, IT provides new ways for the standardization of business processes. The performance information is essential for the evaluation of the strategy and the creation of a flexible organization, where there is a constant learning that recognizes the need to modify the strategic objectives when they become obsolete (MCGEE; PRUSAK, 1994). The information is essential to keep these four parts coherent and harmonized to each other.

3 STRATEGY FORMULATION

If you know yourself and your enemy, you shall not fear the result of your battles. If you know yourself but not the enemy, you shall be defeated once for each one of your victories. If you don't know yourself nor your enemies, you shall lose all your battles. Sun Tzu

Most business organizations have difficulty to correctly perceive what happens in the external environment because they are focused on what happens inside. Executives acknowledge that survival depends on forecasting trends and move faster than the competition. This process of monitoring the environment can be structured or dynamic, while being structured it uses practices of Competitive Intelligence and when it is dynamic it is based on the strategic thinking of shrewd executives that are tuned to what is happening in the markets.

3.1 COMPETITIVE INTELLIGENCE

Competitive Intelligence is a continuous and systematic process that allows a company to detect the signs of their relationship with the environment and transform these signals into information to support the strategic decision processes. The goal is to anticipate the market movements, seeking to minimize risks and keep the organization in the situation as stable as possible. The process of organizational intelligence, as shown in FIGURE 8, involves the coordinated work of intelligence officers, intelligence analysts and strategic decision-makers. The raw information about people, products, services, markets, trademarks / patents and customers is collected by investigators and intelligence agents before being filtered, summarized and analyzed by experts and intelligence analysts. When structured and indexed, the information will form the corporate memory and is used in decision-making through files and information products (JAKOBIAK, 1991).



FIGURE 8 - Competitive Intelligence System

Strategists can rely on the practices of Competitive Intelligence to collect and analyze information concerning the capabilities, vulnerabilities and intentions of their competitors. Miller (2002) states that the intelligence system is not structured in most companies, especially those small and medium businesses. The process of maturity of the system depends on the reality of each organization and the economic sector of activity. A Competitive Intelligence system goes through five stages ranging from the informal flows to improved ones that provide support for strategic decisions.

The **first phase** is marked by the absence of any explicit process of intelligence and administrative processes. Informality is a characteristic flow of information circulating on the organization without planning and without any clear focus. The process of strategic decision-making is not supported by information and awareness of the problems is incomplete.

In the **second phase** begins the valuation of information, although the flow is still within the informal organization. The collection work catches the attention of executives, but there is no centralized analysis. The focus remains uncertain and only a few sectors of the organization can take advantage of the information. The decision is tentatively supported by limited information due to a lack of process reliability.

The **third phase** is characterized by the initiation of the formal flow of information by centralizing the collection, which goes on to define a focus. Although the work of analysis is still incipient, there is good use of information within the organization. The process of decision-making is increasingly supported by timely information. At this stage it becomes clear that there is need for processing information in a professional manner.

The **fourth phase** is the professionalization of Competitive Intelligence in the organization. The information flow is regular and with a clearly defined focus. The internal and the external collection, centralized. The analysis work is professional. The process of strategic decisionmaking is fully supported by timely information. The correction of the vices that may exist within the intelligence activities, such as withholding of information within the organization, competition between agents and lack of care for aspects of information security, effectively starts.

The **fifth phase** is the specialization of Competitive Intelligence in the organization. The flow of information has daily rhythm, synchronizing data collection and analysis with effective information management strategy. Analysis tools are used with ease, allowing analysts to use most of their time on tasks that add more value to intelligence. The process of decision-making is strongly supported by timely, comprehensive, deep and accurate information, minimizing the risk to the strategy.

According to Miller (2002), knowledge of extraprofissionais skills is essential to the creation of human networks of collaborators. These skills go beyond those recorded by Human Resources and networks help to identify and interrogate External sources of information. For Besson and Possin (1996), the network is an indispensable tool for acquiring discrete, undisclosed information. A person who speaks Serbo-Croatian or moderates a cultural association has more potential to question another person in search for strategic information then someone who does not. The effective operation of an intelligence network is an evidence of maturity of the Intelligence System.

Classification of Intelligences

Between the competitive action or other events in the environment and the generation of intelligence are important steps. The sooner we get the information, the more proactive may be the reaction of the organization. As shown in the image 9, there may be rumors in the environment until the definitive knowledge of the event or action. It is important to have a network for sources of public information for generating Competitive Intelligence. When a report is generated or the information is recorded in a database or when it appears in books, articles and libraries, the value of information falls because it can not be timely information anymore.



FIGURE 9 – The emergence of Intelligence

Dugal (1998) and Silva (2005) List ten types of intelligence from the perspective of the public to whom it is intended, lifetime of the information, processes involved in obtaining, processing, dissemination and cost. These ten types of intelligence include:

- current intelligence;
- business intelligence;
- technical intelligence;
- warning intelligence ;
- intelligence estimates;
- Intelligence Working Group;
- targeted intelligence;
- crisis intelligence;
- foreign intelligence;
- counterintelligence.

Some types relate to past events and other proactive. Competitive Intelligence practices generate information products to strategic formulation.

The **current intelligence** captures the first press reports about an event and provides this information directly to the user without much analysis. The spread occurs through the intranet, or orally, or even daily summaries. It is a product of information very short-lived, perishable, fragmented, inaccurate and limited.

The **business intelligence** is the result of regular monitoring of the environment and actual or potential competitors. It involves a research, trend and market discontinuities analysis. Information products generate profiles of competitors, actors and analysis of market segments. As the time between research, analysis and information product generation is lengthy, its impact on strategic decisions is not direct.

The **technical intelligence** is created through monitoring of patents of new products, processes and technologies filed by competitors. It also investigates the work developed in universities and research laboratories, and early identification of technological breakthroughs and scientific trends. The technique differs from the business intelligence because its users come from research and development teams, not the executives.

Warning Intelligence seeks to detect early warning signals of opportunities and threats in the environment. The result of coordinated work between observers and analysts depends on the ability to judge the importance and relevance of the signals. There are intelligence analysts who consider when it is the right time to deliver the information to strategic decision-makers or whether they should continue monitoring the environment.

The **intelligence estimates** creates scenarios. The analysis is quantitative and qualitative data regarding the interpretation of analysts. As the results are scenarios based on assumptions, estimates could prove wrong over time.

Intelligence working groups use an external expert to coordinate a working group. The goal is to transform tacit knowledge into explicit. **Targeted intelligence** aims to answer a specific question of an emerging necessity. It is an information product that is sporadic and created according to the corporate demands. This product relates to other information products.

The goal of **crisis intelligence** is to alleviate or nullify the effects of a crisis. During these periods, the normal process of Competitive Intelligence is not enough to meet the emergency state of the demands. A special group is formed of within the competitive intelligence analysts extinguished soon after the passage of the emergency. The cost is not a crucial factor in this case, but the result on time.

The targets of **foreign intelligence** monitoring are the governments, the international market and competitors. Tools are used for political risk analysis and assessment of industry attractiveness. There is much variation between countries, which generates difficulties such as ethical standards, reliability of information and role of government. **Foreign intelligence** is expensive and time consuming.

Counterintelligence aims to protect the organization against the intelligence activities of the competition, focusing on information security, because confidential information cannot leak to the competition. Starec, Gomes and Chaves (2005) cite the example of the company Petróleo Ipiranga S / A that in 1993 negotiated the purchase of the competitor "Atlantic" without arising any awareness or suspicion on the market. The dissemination of that information was restricted to 15 people, including executives and shareholders. The measures adopted by organizations to guarantee the information security can range from confidentiality clauses in contracts with employees and suppliers to restrict access to certain physical locations within the organization.

Silva (2005) concludes that the intelligence and technical warning may be grouped together to identify opportunities and threats in the environment. Some types of intelligence work over past events like current intelligence and business intelligence. Other types of intelligence are quite specific. Each type of intelligence has its advantages and disadvantages. It is the need for information that will determine what type of intelligence should be used.

Strategic Information

The classic cycle of Competitive Intelligence system is described by Kahaner (1997) as a set of phases and stages. There are four phases as shown in Image 10: Planning and Direction, Collection, Analysis and Dissemination. In Phase 1 the monitoring topics and people interested in information to be generated are defined; Phase 2 consists of the collection and categorization of data, in Phase 3 the information is transformed into intelligence through analysis and in Phase 4 the information product (intelligence) is distributed to interested persons. The cycle of Competitive Intelligence is continuous.



FIGURE 10 – Strategic Information Cycle Source: Adapted from KAHANER, 1997, p. 44.

There are three steps to the Planning and Targeting: understanding users' needs, plan analysis and data collection and validation of the results planned by the users of intelligence. The strategic decisionmakers who are users of information products which will define the topics of environmental monitoring (KIT - Key Intelligence Topics). The kits can be set for strategic decisions and actions, as a topic alert or as a description of the actors.

Examples of kits for decisions and actions:

- competitive environment;
- market trends;
- development and launch of competing products;

• marketing strategies, sales and distribution.

Examples of KITS as topic alerts:

- alliances and acquisitions of competitors;
- changes to policies related products;
- technological breakthroughs;
- regulatory changes.

Examples of kits for description of actors:

- profiles of major competitors;
- profiles of potential customers;
- profiles of influencers;
- profiles of suppliers with interests and purposes.

Users should validate the collection and analysis plan to ensure that the effort to generate intelligence meets the demands and strategic needs. Along with the plan, should be prepared: budget, schedule and allocation of other resources.

At this stage, the data is collected and organized for analysis. The collection can be done with primary and secondary sources. The Primary sources are original and unaltered, such as government documents, annual reports and direct observations and in Secondary sources, the content is subjective as newspapers, books and consulting reports. The sources suggested by Dou (1995) and Silva (2005) can be: formal (databases and suppliers, informal (customers, journals), conferences), experts (conversion of tacit knowledge into explicit by people in the organization), external (fairs, conferences, journals, newsletters, annual reports, patents, internet, newspapers, statistics, trade balance data, list prices, macroeconomic information, governments, laws, patents). McKenna (1992) and Silva (2005) cite other examples based on relationship marketing, such as consumers, employees, suppliers, society, distributors, retailers, advertising agencies, academic researchers, government officials and entities. Tyson (1990) suggests the creation of an internal network of people focused on collecting data from consultants, competitors, customers and other sources. The set of data and information sources available for use in the Competitive Intelligence system is varied.

Davenport and Prusak (2001) suggest the use of information science professionals (librarians) to work to categorize, store and organize data and information for analysis. The data and information that will make corporate memory must be criteriously categorized. The corporate memory, organized as a library, is available to all who need and have access to such strategic information.

Intelligence is generated during data analysis (Sammon, Kurland; SPITALNIC, 1984). Starec, Gomes and Chaves (2005) cite six models of analysis and point out that analysts should be more than just knowing those models because they need to be capable of adapting the model that will be used to the question to be answered. The analysis models are:

- Porter's five forces;
- critical success factors;
- scenarios;
- competitor profile;
- benchmarking;

• SWOT analysis (Strengths, Weaknesses, Opportunities, Threats).

It is important to stress that even as models of information analysis are great tools, they are no substitute for people with an open mind, curiosity and ability to see what others do not see (MILLER, 2002).

Porter's five forces model enables the assessment of the competition level in the industry. The five forces to be examined are: bargaining power of suppliers, bargaining power of customers, products and substitute services, rivalry between competitors and potential / entry barriers for new competitors. In the introduction to the book Competitive Strategy: Techniques for analyzing industry competition, Porter (1999, p. 10) stated that::

There are those who advocate for a sixth force that could be, frequently, the government or the technology. I am still convinced that it is not possible to understand, isolated, the role of the government or the technology; it is necessary to understand then through the five forces analysis.

That is, the impact of information technology must be understood through the Porter's five forces and for the industry and competition analysis it is suggested the application of three main disciplines:

- five forces analysis in the industry;
- competitor analysis;
- strategic positioning.

The strategic positioning involves selecting one of three generic strategies: cost leadership, differentiation or focus on a specific niche market. Before the strategic positioning, competitive analysis should consider not only current competitors, but also the potential ones:

• Companies that are not participating in the market, but that may overcome the entry barriers in a particularly cheap way;

• companies for which there is obvious synergy in acting in the sector;

• companies for which the engaging on the new industry is an obvious extension of business strategy;

• customers or suppliers that may backwards or forward integrate their business;

• possible mergers and acquisitions among established competitors.

Porter's five forces analysis method provides a comprehensive review of industry structure and its level of competition.

The term **Critical Success Factors** (CSF) is broad. Can be used internally when applied to management goals and the strategic objectives. In the case of Competitive Intelligence, the CSF can be used to evaluate the industry attractiveness and business strength by analyzing the external aspects. We position the competition and the organization's performance against the CSF's in a matrix. The comparison identifies advantages and disadvantages relative to competitors in each Critical Success Factor in that sector.

Scenario analysis allows alternative estimates of the variables in the external environment that impact the organization's performance. Scenario is not reality. Predictions can be classified as probable, positive or negative, for example. Best practices recommend building two to four scenarios. Despite the uncertainty about the future, building a scenario means to describe in detail, consistent and creative what the future might be through gathering qualitative and quantitative elements. According to Lodi (2005), the formulation of strategy using scenario building depends on the company's ability to influence the environment and your risk appetite. From this intersection, the company can adopt more defensive, preventive or proactive strategies. Scenarios with preventive strategies seek to maximize the flexibility against future omens, while defensive scenarios react or manage threats and risks. Proactive scenarios are visionary and aim to influence the future to fulfill their vision. The wellbuilt scenarios respect the risk taking policies and the organizational ability to influence the environment.

To assemble competitor profile, Porter (1999) indicates gathering and synthesizing information on products, dealers / distributors, marketing / sales, operations, research / engineering, total costs, financial, organizational, administrative capacity and other pertinent information. When referring to products, one should gather information on the product lines breadth and depth and the reputation of these products from a consumer perspective. Information on coverage and quality of the structure of distribution channels, the company's relations with the canals and capacity of service channels. Information about market research, development of new products in marketing and sales force training skills are also pertinent. Operational information about age and sophistication of machinery and equipment used, manufacturing costs, economies of scale and learning curves in the incorporation of new technologies, flexibility of facilities and equipment, potential for increased capacity, quality control, transportation costs, labor force and relationships with unions environment, cost of raw material used and the degree of vertical integration. Information about research and development of new product patents, forms of research that the company uses, engineering staff capacity, creativity, simplicity, quality and reliability of products and services should also be considered. Information on total costs and profitability, shared services across multiple business units, as the competitor generates scale production and scale economy are also important. Information on the competitor's cash flow, borrowing capacity and credit in the short, medium and long term, equity, ability to raise capital, inventory levels and accounts receivable is a constant concern. About the organization, information and clarity of purpose and values, organizational fatigue, consistency between actions and strategy. Information on the quality of executive leadership, ability to motivate, ability to coordinate, age, training and management skills. Information about staff turnover, including networking contacts with the government. The profile of competition aims to discover strengths and weaknesses of current and potential competitors, what are your strategic plans and predict what will be the reactions to our strategic initiatives forward.

The Fundação Nacional da Qualidade (FNQ) has released a committee report on Benchmarking theme. The report coordinated by Pagliuso (2005) states that benchmarking practices are fundamental to the comparative performance both within and outside the industry sector.

Benchmarking is a method for comparing performance of any process, practice or product management technique with a process, practice, or similar product that is running more effectively and efficiently on their own or in another organization, in order to understand the reasons for superior performance, and the possibility for the organization to adapt and implement improvements.

The committee warns against confusing Benchmark with Benchmarking. Benchmark is a performance measure, a milestone. It can be quantitatively represented by a result or qualitative in terms of a process or a practice. While Benchmarking expresses an action, the benchmark is the product of the action. The FNQ rewards organizations with excellence in performance. The thematic report prepared by the committee also makes suggestions on how a company that won the National Quality Award can answer benchmarking requests from companies interested in knowing the best practices awarded.

SWOT analysis is a classic tool in strategy formulation. The formulation of a competitive strategy includes four basic factors that determine the limits of what the organization can perform successfully. The strengths and weaknesses of the organization have built their skills in relation to current and future competitors, as threats and opportunities in the industry define the competitive environment with its risks and potential rewards. Porter (2000) makes two additional alerts for this classical analysis: one for the internal aspects, where the strengths and weaknesses are matched with the values of top executives, such as the attitudes of executives within the companies that influence people and their behaviour, and another for the external aspects, in which the threats and opportunities are combined with broader expectations of society. Innovation needs to meet the needs of society and needs to be aligned with the time-to-market. SWOT analysis, although simple and intuitively clear, requires major analysis to generate consistent strategies.

For Gomes and Braga (2001), there are two major difficulties of the analysis phase of information. The first is the training of intelligence analysts in the methodology, which takes time and persistence. The second is the lack of recognition of the importance of the work of intelligence analysts. The tasks of intelligence analysts are perceived as less activity within some organizations.

Improved strategic decision making depends on the rapport between researchers, experts and decision makers. The information needs to reach the strategic decision maker for information products. Information products can be disseminated, files, profiles of actors involved, executive summaries on topics in the form of alerts, charts, and TABLE. Creativity needs to be used to effectively communicate the results of analyzes. Information products need to be aligned with the kits (Key Intelligence Topics), and should use language and frequency appropriate to the strategic decision-maker failing to generate distrust and misunderstanding. According to Gomes and Braga (2001), the keyword in this step is "convincing".

Strategy formulation is the basis of information available and no strategy is better than the information from which it derives. Information has the ability to reduce uncertainty about the environmental conditions where the company operates. The challenge is to enable managers with information that will help realize the goals of the organization through the efficient use of resources (BEUREN, 2000).

3.2 STRATEGIC THINKING

There are differences between the dynamics of strategic thinking and structuring processes of Competitive Intelligence. Strategic Thought is dynamic and changes according to the perceptions of strategic decisionmaking on issues relevant for the survival and prosperity of the business. More important than having a strategic plan formally documented, is the process of strategy formulation and implementation of goals vital to the survival and prosperity of the organization. The degree of structure of intelligence systems to support strategy formulation varies with the maturity of strategic management. The translation of the strategy for people who execute the strategy can be made regardless of the level structure of these systems. The FIGURE 11 presents issues related to competitive analysis and the choice of strategy. There is not always a structured information system for capturing, analyzing and disseminating information related to the competitive analysis and the choice of strategy. Even when there is a Competitive Intelligence System, there is the strategic thinking on the part of the executives who make decisions in a dynamic fashion and inspire people with a shared strategic vision.



FIGURE 11 - Strategic Thinking and Competitive Intelligence

The Strategic Plan is a tool for planning and strategic control of the organization. It contains an overview of the strategic foundations, policy analysis similar to those presented earlier, strategic objectives, goals and actions for organizational change. The Business Plan is a tool for fundraising. It is more specific and contains an executive summary, defining the business, products and services, target markets, the synthesis strategy, a marketing and sales plan, and a financial plan. Regardless of the type of plan, they lose value over time. The process of formulating the strategy is what has value.

Mintzberg has a structured questioning of models of strategy formulation. The formulation process is dynamic and strategic decision is

the product of a power play between those involved. The strategy cannot be defined in static terms as strengths / weaknesses and opportunities / threats, things that are related in time. For Mintzberg, Ahlstrand and Lampel (2000) the strengths and weaknesses should be seen as brakes and engines of the organization. Strategic thought is dynamic.

The formulation of strategies is an ongoing process of organizational learning where misses and hits coexist. The success of these strategies is associated with the elimination of the gap between thought and action, between formulation and implementation. In periods of great turbulence and rapidly changing environment, the approach of Mintzberg, Ahlstrand and Lampel (2000) allows the performance of emerging strategies that are not provided in the formal processes.

The leadership abandons the role of creating deliberated strategy and becomes a consolidator of the learning process that enables emerging strategies. The strategy, under the approach of Mintzberg, Ahlstrand and Lampel (2000), ceases to be formulated by the distancing and abstraction of everyday reality to become a strong critic immersion in routine day-today. It is critical immersion and reflection that enable the development of Strategic Thinking.

Executives formulate strategies that do not spend much time in executive office reading reports and analyzes the performance sector. Executives who serve as leaders, know your organization, your customers, your products and services. These executives develop the sensitivity and wisdom to know the difference between the best times to promote change or avoid it (MINTZBERG et al., 2006). However, to Castor and Zugman (2008, p. 2):

[...]the concept of corporate strategy is seen by scholars as the effort to find a compromise between three factors: (1) the logic of creating value in having multiple businesses under one management team, (2) the choice of businesses that make up a portfolio; and (3) the skills, processes and structures used to manage the portfolios.

The real challenge for executives is to detect sudden discontinuities that can undermine the organization's future. Stability tends to shrink the dynamic and strategic thinking ability to detect this decrease. The development of a collective mind helps lessen the perception that the strategist is someone sitting on a pedestal, dictating brilliant strategies to other people run. Strategy formulation is essentially a process of synthesis and this is the reason for the failure of formal planning. When not failing, the formally designed plans end up reflecting existing strategies or are similar to the strategies of competitors. Therefore, strategic thinking needs to be disseminated by the organization to work as a collective mind that can detect the best time to change.

The methods, in general, should not be understood as a straight path to follow when it comes to strategic management because following the strategic track can take flexibility. Hence, it is important, for the executive leadership, to establish a shared vision and outline as a path that stretches towards realizing strategic vision. Perhaps management methods should be understood as a track in the woods, which is more flexible than a railroad yet also working as a path.

4 STRATEGY TRADUCTION

We have two ears and one mouth so that we can listen twice as much as we speak. Epictetus

An overemphasis on achieving and maintening of short-term financial results can lead firms to invest too much on quick and superficial fixes at the expense of creating long term value. The initial proposing idea of the Balanced Scorecard was the creation of indicators aiming to adjust the balance between financial and non-financial measures. The Balanced Scorecard helps to clarify that the sustained corporate growth depends on intangible, intellectual assets. The strategy evaluation should benefit from the fact that, while keeping the financial / accounting measures as decisive results, there is no exclusive focus on improving these measures in the short term. The idea evolved to balance financial and non-financial indicators, targets between short, medium and long term, quantitative and qualitative indicators, indicators that measure external and internal aspects, and display then among trend indicators and results. The evolution of the Balanced Scorecard is continuous. In this chapter, the strategic map and the Value Chain are used as instruments for communicating strategy.

4.1 BALANCED SCORECARD

The Balanced Scorecard is a methodology for translating strategy and promoting strategic alignment. There are other methods that can complement and even replace the Balanced Scorecard in the process of communicating strategic objectives and performance assessment: Management by objectives (MBO), Tableau de Board, the Performance Pyramid, among others. Kaplan and Norton created the Balanced Scorecard system originally as a strategy measure in 1992. The performance indicators, known as KPI (Key Performance Indicator), were used to measure the achievement of strategic objectives. The methodology is constantly improved and is currently used to communicate strategic objectives. The Balanced Scorecard considers the updated strategic foundations, part of the Strategic Thinking, for translating strategy, describing the cause-effect relationship between the strategic objectives. The Balanced Scorecard is a tool suitable for strategy formulation. In this tool, the performance indicators are broken down from the strategic goals, communicating the strategy for everyone. The performance indicators provide feedback over which the executives evaluate the implementation of the strategy. The main components of the Balanced Scorecard are shown in the image 12 and are: Strategic Map with cause-effect relationship between strategic objectives, performance indicators, targets and initiatives (KAP-LAN; NORTON, 1997, 2000, 2004).



FIGURE 12 - Components of the Balanced Scorecard

Much more important than achieving a system of performance measurement indicators, it is to mobilize the company toward changes and innovations necessary for its survival and prosperity. Using the Balanced Scorecard, the organization makes a commitment to transparent communication strategy and begins a process of generating synergy among people. The Balanced Scorecard model is not prescriptive because each organization demands revisions in accordance with their needs. As can be seen in the image 13, the strategy map describes the relation of cause and effect between the strategic objectives, being deployed from these performance indicators. Challenging targets are created to reflect the expected jump in performance. Initiatives summarize the actions necessary to change the organization and close the gap between current performance and goals. For strategic alignment it is a vital necessity that people get committed into creating synergy in their daily actions (KALLAS; COUTINHO, 2005).

Strategic Map

The Strategic Map is a description of how the organization creates value and translate it into a page of the logical cause-effect relationship between the strategic objectives distributed in different perspectives. To succeed you must have a financial value proposition to the customers. To be successful with the customers it is necessary to create value through internal processes. The people's engagement needed to succeed in these business processes is critical because it is the people that act to operate the strategy. The objectives in FIGURE 15 illustrate a generic strategic map, analyzed from bottom to top, showing the transformation from intangible objectives into tangible (KAPLAN; NORTON, 2004).

In describing the goals, it is important to understand the term "perspective." You must put yourself in another one's place and answer the following questions:

1) To be financially successful, how should we be seen by our shareholders?

2) To achieve our vision, how should we be seen by our customers?

3) To satisfy our shareholders and customers, what processes are critical?

4) To achieve our vision, how we will sustain our ability to learn and innovate?

The generic Strategic Map in FIGURE 13 is not exhaustive and presents some of the issues to be exploited in the development of a specific strategic map. The strategic objectives are organized in a relation of cause and effect, from objectives related to intangible assets and culminating with strategic objectives related to tangible objectives. The amount of perspectives can be adapted to the strategy of each organization.

The financial perspective presents the objectives with measures related to tangible assets, which are goals related to profitability and results for shareholders and investors. Two paths can lead to profitability: increased revenue and reduced costs. Depending on the stage of the life cycle of companies, the emphasis is on either one. To increase revenue, the strategic goals can, for example, focus on sales growth, or explore new sources of revenue. To reduce costs, the strategic goals can, for example, focusing on increasing productivity, elimination of defects or problems and optimization of cash flow. The financial perspective is common in private organizations with the search for profitability represented at the top of the strategic map, while in public organizations an inversion occurs between the customer and the market prospects and financial expectative.



FIGURE 13 – Strategy Map

The market and customers perspective presents basic strategic objectives that relate to market share, capture / prospecting, retention / loyalty, customer satisfaction, segmentation, and focus on profitable customers. For Kaplan and Norton (2004) these goals are consequences of goals that go beyond the fundamental attributes such product / service, management of customer relationships and corporate image. The strategic objectives, in this perspective, focus on the attributes of the product / service, relating to price, quality, availability or functionality over its competitors. In terms of relationships, the company can develop CRM systems (Customer Relationship Management) offering differentiated services to customers. In this perspective it is possible to describe strategic objectives related to the development of the brand power and credibility of the organization's image.

The critical processes perspective presents the strategic objectives related to internal aspects that generate value for customers. To identify the critical processes, the analysis cannot be restricted to cases involving the operation of the daily routine; the organization's critical processes can be located in the research and development of new products / processes or in after-market processes. This is not a mapping of all business processes, but the prioritization of improvements in critical processes throughout the internal value chain.

From the learning and innovation perspective are presented the strategic objectives related to intangible assets. This perspective can be divided into three categories of strategic objectives: human capital, information capital and structural capital. In the human capital category the map presents strategic objectives related to skills, training and knowledge of employees. In the capital information category, organizations explore strategic objectives related to information systems, databases and networks. In the structural capital category, organizations explore goals related to alignment, synergy and teamwork. For Kaplan and Norton (2004), organizations that are able to mobilize and sustain their intangible assets around the critical processes to create value for their clients achieve the industrial leadership. It can be said that the fourth perspective is focused on Knowledge Management and Human Resources.

The use of verbs to promote a clear understanding of the message that the strategic map conveys is encouraged by Kalle and Coutinho (2005), because the straight verbs give meaning to the strategic objective of action, as demonstrated by the following examples:

- maintain customer satisfaction at the level of excellence;
- increase customer satisfaction;
- increase and stabilize the satisfaction levels of customers world-class.

For each verb in the examples cited, the goals of performance indicators would be drawn differently.

The strategic map is an abstraction of reality. It guards the same relation as a map has to a road, meaning that the Strategic Map is not the strategy. As the reality is extremely complex any attempt draw it is an simplification of several of its natural aspects. There may be an oversimplification when the Strategic Map is materialized in a sheet of paper as a tool to communicate organizational strategy and represent the cause-effect relationships that translate into strategic thinking. Learning is the result of strategic reflection on the cause and effect relation between the strategic objectives. The changes reflect the strategic thinking and present themselves in revisions of the Strategic Map. A static Strategic Map, without revisions, will display also a static, past reality. The revisions of the Strategic Map need to show the dynamics of Strategic Thinking, the environment and the strategic action.

Strategic Theme

A strategic theme is a vertical cut in the Strategic Map, including the components of the Balanced Scorecard. Some examples given by Kaplan and Norton (2004) are flexible manufacturing, just-in-time production, solution selling, relationship management, technology partnerships, community development, company growth, risk reduction and increased productivity. The FIGURE 14 presents the strategic theme "Ground Refuelling". A strategic issue is a subset of interrelated goals, their indicators, targets and initiatives.

Ground refueling			
Strategy map excerpt	Performance Indicators	Goals	Initiavives
Rising profit Less planes	By-seat revenue Total leasing costs	20% yearly growth 5% yearly reduction	
Maintain costumers	Number of recurring clients	70% costurner total	Deploy CRM
Lower ground time	Ground time	30 min	Optimize time
Crew awareness	Aware crewmembers	100%	Crew training

FIGURE 14 – Strategic Theme

Source: Adapted from KALLÁS; COUTINHO, 2005, p. 6.

In bigger, more complex organizations, the strategic map is created for the corporation and then unfolded for each of businesses units. Creating an isolated strategic map in one of the corporative departments does not contribute to the creation of corporate synergy. By unfolding the strategy, we achieve the strategic alignment and proper resource allocation within the organization.

4.2 VALUE CHAIN

Competitive advantage is incomprehensible without the understanding of the context and how the processes of a business unit add value to the products. Every organization is a collection of processes that design, produce, sell, deliver and support post-sales activities on its products and services. The business processes unit is representable by using a value chain.

In terms of context, before assessing how an organization can create and sustain a competitive advantage, you must understand that there is also competition among the nations of the globe. An organization obtains and loses competitive advantages, depending on pressure, taxation, education system, conditions of labour, credit, capital investment, protection, market opening and challenges imposed by governments through legislation and regulation of industries. The overall success is based on the success and strengths developed in the domestic market (CALLON, 1996).

In the conceptual framework of the value chain, some activities form the primary processes and others form support processes. Primary processes are those that have the role of adding value to the chain by satisfying the customers. The integration of business processes improve organizational performance. The controlling and developing the business requires support processes, adding value indirectly as administrative coordination, human resources management, technologic development and purchasing. The value perceived by the customer created through the primary processes (PORTER, 2000).

As shown in FIGURE 15, there are five primary processes. The activities of procurement, receiving and storing the acquired resources are grouped in the "inbound logistics". Activities related to the operation of the business unit are used to transform inputs into products and services to customers. The outgoing logistical process groups direct and indirect, channelized, distribution activities. The process of "marketing and sales" offers several ways through which customers and consumers reach the products and services. The post-sales processes guarantees that the customers get the all the added benefits of the purchased product.

ses	Administr a Colaborativ	a tive and supp o vework systems	ort services co	ordination		
proce	Human Resources Workforce training systems					
Support	Research a Computer I Purchases Electronic (nd Developme Aided Design ar data interchange	ent nd Engineering e	(CAD)		Added Value
sses	Entry logistics	Operations	Outgoing logistics	Marketing and sales	Customer services	\neg /
Critic proce	Just-in- time stocking	Computer Aided Manufacturi ng	Sales point and invoice processing	Interactive direct marketing	Client support system	

FIGURE 15 – Generic Value Chain Source: Adapted from PORTER, 2000, p. 35.

An organization creates competitive advantage when it finds new ways of doing stuff or the best way of doing old stuff. Companies can adopt three strategic positions for competitive advantage: cost leadership strategy, differentiation strategy and focus strategy. The first aims to gain competitive advantage by offering standardized products and services at lower costs than the competitors offer. The second seeks to achieve benefits by introducing one or more elements of differentiation in products and services that justify higher prices. Lastly, the third type of strategy aims to gain competitive advantage by differentiating its products and services, but in a market segment more localized or restricted. The competitive strategy of a company divides itself into functional strategies and marketing strategies, production, financial and technological seeking to compose a harmonious and cohesive whole that facilitates the creation of competitive advantage by improving business processes in the value chain (PORTER, 2000).

Internal Holistic View

The value chain analysis helps to identify opportunities for Information Systems. IT may have strategic impact in helping the organization perform their value chain at lower costs than its competitors and provide customers with higher added-value or additional services. The TABLES 2 and 3 show examples of how a multitude of information systems are applied to business processes using the value chain as a reference.

Author	Administrative coordination and support systems	Human Resources Management	Technology products and research	Aquisition
Ward e Peppard (2002, p. 265)	Accounting, payables and receivables	Payroll, recruiting, training.	Projecting, processing, computer aided engineering and manufacturing, market research,	Aquisitions, contractors and supplier specification.
O'Brien (2004, p. 46)	Intranet and Collaboration.	Human Resources qualification systems	CAD – Computer Aided Design	Electronic Data Interchange – EDI
Laudon e Laudon (2002, p. 46)	Programming and electronic communications	Workforce abilities and training repository	CAD.	Acquisition request by E- mail
Martin et al. (1999, p. 551)	Planning models	Workforce planning	CAD and Market research	Online puchasing

TABLE 2 - Support Processes and Information Systems

Author	Inbound	Operations	Outbound	Sales and	Client Support
	Logistics		logistics	marketing	
Ward e Peppard (2002, p. 265)	Quality in- spection, reception and aw material management	Manufacturing, packaging, qualityh con- trol, maintenance.	Finished goods, delivery, accounts receivable, dis- patching	Customer management, sales request, promotions, sales manage- ment, Market research.	Warranty, main- tenance, corporate trai- ning
O'Brien (2004, p. 46)	Automatized just-in-time warehousing	Computer Aided Manu- facturing – CAM	Sales point and online commer- cialization	Directed inte- ractive marketing	Ticketing and user support system
Laudon e Laudon (2002, p. 46)	Automatized warehousing	Computer Aided Machi- ning	Automated pac- king and dispatching	Sales point systems	Automated sys- tem diagnostics
Martin et al. (1999, p. 551)	Warehouse automation	Flexible main- tenace	Invoice automatization	Telemarketing, remote access tools for sales- forces	Remote support and services, teleprogramming
Stair e Reynolds (2002, p. 34)	Raw re- sources control, in- ternal monitoring and auto- mated stocking.	Proccess con- trol systems	Automated fin- ished goods storage and re- trieval system	Promotion planning sys- tem	Service control and costumer follow up sys- tems

TADIDA	тс		•	
TABLE 3 –	Information	systems	primary	proccesses

Information links the various activities of the primary and support processes (MARTIN et al., 1999). Some information systems have the ability to integrate various processes of the value chain such as sales forecasting, capacity planning, resource scheduling and pricing. The Porters value chain very well represents the industrial business units. There are alternative models that represent the generation of added value in service organizations.

The servicing companies do not deliver physical products to the customer. Stabell and Fjeldstad (1998) distinguish two types of service providers: problem solving (Value Shops) and intermediates between buyers and sellers (Value Networks). Examples of business problem solving are engineering, management consulting, insurance, etc. The primary processes that add value are the problem solving abilities, formed by marketing, acquisition of new services, specifying the solvable problem, knowledge management, resource allocation, composing the solution and the ability to execute the proposed solution. Examples of intermediaries: distributors are Internet access providers, cable TV providers, telecommunications providers, among others. The primary processes of intermediary companies are the development and maintenance of infrastructure, promoting the interaction between buyers and sellers, marketing, pricing, contract management, control patterns, sales management, insurance and availability. Regardless of the model, it is the customer perception that measures the amount of impact that any given information have over the company perception.

External Holistic Vision

The value chain of the business unit needs to be analyzed in the context of the competitive environment. Analyzing the value chain from this perspective it is observed that there is demand for information in both directions outside the chain. The collaboration in the external value chain in information sharing can strengthen relationships regulating the sector's five competitive forces: newcomer's threat, suppliers bargaining power, buyers bargaining power, threat of product / service substitutes and rivalry between the existing companies. To add value, managers need to consider the information flow in competitive ecosystem and it is necessary to develop a holistic view in order to exceed the boundaries of the business unit.

The holistic view is not restricted to the limits of the business unit. The strategy relates to the position in the environment. As shown in FIGURE 16, the complexity increases as the business unit and its primary and support processes confront the value chain of suppliers, distributors, competitors, distribution channels, local and export markets.



FIGURE 16 – Holistic Value Chain Source: Adapted from WARD; PEPPARD, 2002, p. 246.

4.3 CRITICAL PROCCESSES

The value chain and strategic objectives analysis complement each other, in the perspective of the critical processes. These analyses aid the management in prioritizing investments and corporate improvements. The value chain positions the critical processes in relation to the othe business processes within the management context. A value chain is as strong as its weakest link. The strategic objectives, within the critical process perspective display the potential impact of each business process in the relation with the customers and the Market. If one critical process has a lower performance then the competition, then it should be improved.

5 AS-IS Current Process

Give me a lever big enough and I shall lift the world. Arquimedes

The FIGURE 17 demonstrates a comparison between the traditional departmentalized corporate structure and the horizontal view that the business process management foments. In the traditional structure, the customer is not the action focus, as the information also flows vertically within the departments. Business process management fits well the competitive environment because it flexibilizes the infrastructure and provides a better understanding framework for both the internal and external customer. Information Technology is the enabler of business process management.

A process is a series of work activies distibuted in the time and space with a start, a development and a clear ending point (DAVENPORT, 1994). The IT is important for the process approach to problems within the organizations. Beyond the automatizing support that it provides, it aids in support activities and allows the sincronization of tasks, effort coordination and automated process performance management (GONÇALVES, 2000a, b). Baldam et al. (2007, p. 19) diferentiate the concept of process, subprocess, ativity and tasks:

Process: a chain of activities performed within an organization that modifies inputs and outputs.

Subprocesso: a process within another process

Ativity: a generic term for the work that a company does though its business processes.

Tarefa: One atomic ativity that is component within a process.

It is not rare for businesspersons to fail to comprehend computing jargon. It is also common that information technology workers do not understand how the systems they provide and support affect the core business. The process mapping allows a simplified representation of the activity list that provides a better communication between executives and IT professionals.

5.1 GRAPHIC MODELLING

Graphic modelling allows the visualisation of process in a rational, clear and concise way that facilitates its understanding by those that are involved in the change or standardization of a business process. The symbols that the modelling employs help to demonstrate the source, documents, activities and destiny of the verbal, written, structured or not structured information in a business process. Graphic modelling also displays decisions and operations that must be performed during the process. Other symbols, different than the conventional ones, are allowed as long as they do not hinder the team's ability to comprehend the information. TABLE 4 presents a set of symbols for conventional graphic modelling that developed to the point of being easy to use to the standard user. The graphic modelling language becomes a common language between IT professionals and executives. There are several employable symbolic conventions and the companies should determinate which set to use during their modelling process.

Symbol	Signification
\bigcirc	Terminal : this symbol represents the starting and finishing points of the process. The words BEGIN and END can be used in the appropriate positions
$\stackrel{\longrightarrow}{\leftarrow}$	Flow: guides the direction of the activity and information flow.
	Activity: description of a task within the process executed with or without IT support.
	Information : data document for input in the MIS or electronic report emitted from the MIS that is associated to any activity. May be also a paper formulary.
	A document with several lanes or several input / output documents can use this symbol.
\bigcirc	Decision : within the symbol goes the question to be answeared or the logic to be employed by the computer taking the decision. The alternatives must be identified, for example, with YES or NO.
	In page flow connector : avoids crossed lines. Numerated with 1,2,3
A	Out of the page flow connector: To be numerated with A, B, C

TABLE 4 – Symbols for standard graphic modelling.

The FIGURE 18 displays one example of how to use the graphic symbols present on TABLE 4. Each ribbon presents one actor or department. It is recommendable to spread out internal and external actors. One way of doing that would be designing first the internal and then the external actors. Another way of providing this segregation would be to follow the SIPOC (*Suppliers, Inputs, Process, Outputs, Customers*) logic There is no correct number of displayed activities. The common sense, the map's objectives and the complexity of the business process determinate how many activities should be mapped.

FIGURE 18 - Graphic modelling

5.2 ROOT CAUSE ANALYSIS

There once was a maintenance manager that described the mission of his department as "repairing all the equipment in the company" which caused him to be execrated. Then this same manager updated the text to "guarantee that all the equipment available in the company works perfectly and continuously", which got him a promotion (CAMPOS, 1994). In a business process, it is necessary to separate the causes of the effects. Control is made over the outcome, the effects. To solve a problem in a process we need to act over the causes. In quality management, the cause and effect diagram is also called the Ishikawa or fishbone diagram. The fishbone diagram helps to solve problems related to business processes. As shown in FIGURE 19, the fishbone diagram is prepared as follows:
- determination of the problem that you want to solve;
- drawing up the 6 fish bones with an "M" on each, meaning
- 1) Mother Nature;
- 2) machine;
- 3) manpower;
- 4) method;
- 5) measurement;
- 6) material.

• Brainstorming identifies the possible causes, classifying them according to the proper spine;

• in each case, we discuss the underlying concept to eliminate different words that mean the same thing in the group;

• we seek to determine the origin of each case;

• there is an attempt to determine the root cause, then act and solve the problem.



FIGURE 19 - Root-cause identification

The world-class organizations use the Ishikawa diagram to identify causes of problems in business processes. The fishbone diagram should be drawn in groups in order to enable analysis of different views of the causes of the problem among people. The diagram should be drawn up in a large scale, so that all involved actors are able to give opinions on the reasons recorded in the diagram. The goal of brainstorming is to get as many potential causes as possible, so no suggestion is criticisable. Selecting the root cause of the diagram occurs only after completing it (ROTONDARO, 2002).

The six fish bones used in the Ishikawa diagram for world-class organizations provide a broader view of the business process, a particular problem and its causes. Identification of the root cause is done in a qualitative way with the Ishikawa diagram. Professional management bases itself on information and facts. Once the root cause is identified, you must prove it quantitatively. The Histogram and Pareto diagrams can be used for a quantitative analysis that justifies the root cause with information for making rational decisions.

Pareto's Diagram

The Pareto diagram is an essential tool for managers. Source data is collected in the Check Sheet, as shown on Figure 20. After tabulation, the data is transformed into organized information in the form of a ranking. In normal situations, few items at the top of the ranking (approximately 20%) will be responsible for most of the causes of the problems (approximately 80%). If the manager is satisfied with these quantitative information the analysis process finishes. Otherwise, the manager prioritizes the items with greater representation and starts a new stratification. The Pareto diagram provides comparative information to help validate quantitatively the root cause of a problem.



FIGURE 20 - Root-cause and Pareto's diagram

Histogram

Validation of the root cause of a problem may require statistical analysis. The Histogram is a tool that allows analysis of measures of central tendency and dispersion measures. A frequency table is used for data collection as shown in FIGURE 21. The use of statistical techniques to validate the root cause of a problem requires maturity of information management and statistical expertise to interpret the results. Whenever possible, you should use the histogram from continuous data instead of the Pareto Diagram from discrete data. Statistics is a great ally of the managers in control and reducing variability in the results of business processes.



FIGURE 21 - Root-cause and histograms

6 ORGANIZATIONAL CHANGE

There is nothing permanent except change. Heráclito

Michael Hammer created the "reengeneering" vernacular, changing his oppinion to the best form of organizational change through the years. In Hammer e Champy (1994), reengeneering presents itself as a "painfull proccess" that is needed at the companies that are already at work because they would need to replace the Technologies in use in order to be able to recreate themselves. These citations refer how his oppinion was changed through the years. Hammer e Champy (1994), reengeneering the organization meant "rebooting".

[...]does not mean reshape what already exists or to make shy changes that leave basic structures intact. This is not a patching process - to brush up existing systems so that they work better. It rather means abandoning established procedures and reviewing the work required to create the company's products and services and providing value to customers. It means to ask "If I were recreating this company today, given my current knowledge and technologies, what would it look like?"

In Hammer (1997), the author changes his speech and refocus to demonstrating how the process orientation was changing people's work, by affirming:

[...]Because of reengineering, business leaders found that they did not know how to manage their business. The reengineering had not only changed their way of working it had also transformed their organizations to the point of becoming almost unrecognizable. [...] Now I realize that that was wrong, the radical nature of reengineering, however important and exciting it was, missed the most important point. The key word in the definition of reengineering is "process": a set of activities from beginning to end that together create customer value.

In 2002, after another period of learning, Hammer began to adopt a new discourse. Hammer currently supports the creation of an executive agenda based on principles such as managing the business towards customers, offering added value, giving priority to those cases, creating order out of chaos; measuring the strategic direction, managing the company "without structures", focusing on the target client, breaking down barriers and expanding the company. To put these principles into operation, Hammer (2002) indicates:

- integrar as iniciativas de mudança;
- prestar atenção nas questões referentes às pessoas;
- tratar cada grupo de modo condizente;
- expor abertamente o comprometimento dos líderes;
- comunicar-se de maneira eficiente.

Michael Hammer has changed position over a decade. The 80's were marked by the spread of total quality management with continuous improvement practices. In the 90s, when Hammer gained international visibility, the promise of radical improvement by reengineering peaked and then sunk. In the present millennium there is a consensus that reengineering should be applied only over business process.

In the short-term, managers have to worry about the continuous improvement of the daily routine processes. Considering the challenging targets deployed from the strategy, it is necessary to innovate to keep the organization competitive. The challenge is to define clearly what processes directly relate to the value proposition of the organization and allocate the necessary resources. Managing processes without connection to the strategy can be tricky in terms of application and focusing resources leading to unsustainable results in the long term (CAIUBY; LUCIANO, 2005).

6.1 STRATEGY INITIATIVE

The initiatives are strategic actions necessary to achieve the goals of short, medium and long-term performance indicators. When there is a gap between the actual result and the strategic goal, strategic action is necessary to promote a change. For purposes of differentiation with the action plans spread in Brazil from total quality management programs, the initiatives relate to "what" should be done to bridge the gap between current and planned performance. The action plan, as shown on FIGURE 22, begins at the initiative and has the format described by 5W/2H, which seeks answers to the following questions: What? Why? Who? When? Where? How? How Much? The "last H", How Much, makes the link between strategic action plan and investment needs. An initiative may be called program, commitment of executive agenda, strategic plan, work or strategic action plan. No matter the nomenclature because it should adjust according to the language used in each organization. The important thing is to cover the gap between poor performances and a bold goal.



FIGURE 22 - Iniciativa estratégica e plano de ação

These initiatives, along with indicators, provide strategic feedback over the results. For monitoring of indicators is necessary to compare the target with the actual value accrued during the period. Organizations that use the DMAIC as continuous improvement cycle aim to implement projects within 16 weeks. The continuous improvement cycle serves as a method of analyzing and solving problems.

6.2 CHANGE TYPES

The strategic goals are challenging and in some cases demand innovation. The FIGURE 23 summarizes the impacts on organizational performance from the incremental change and radical change. Continuous improvement promotes incremental changes (CAMPOS, 1994). Innovation represents a discontinuity with the current situation and can lead the organization to leadership in its industry (KAPLAN; NORTON, 2000). Reengineering reached its zenith in the 90's and was a model for the IT application to make radical changes (HAMMER; CHAMPY, 1994). In FIGURE 23 reengineering is represented as a radical change generated after several unsuccessful attempts at incremental changes. Organizations must balance their goals in terms of incremental changes and radical changes. Standardization of improvements achieved generates solid gains in efficiency and performance.



FIGURE 23 – Tipos de mudança organizacional

There are basically two types of change: incremental change and radical change. These two types are given different names. Porras and Robertson (2003) call for changes in 1st and 2nd order, as Robbins (2000). Weick and Quinn (1999) call episodic and continuous change. Nadler, Shaw and Walton (1995) call continuous and discontinuous change. There is not a consensus on the nomenclature used for organizational change.

To Porras and Robertson (2003) incremental change represents the continuation of key features of the organization and the radical changes involve the breaking of organizational paradigms. For Robbins (2000) the incremental change is linear, continuous and does not imply changes in the organization's external environment. The radical revision of assumptions involves the organization's external environment. For Nadler, Shaw and Walton (1995) incremental change represent the continuation of the existing standards and the radical occurs in periods of disequilibrium and involves severe organizational restructurin. For Weick and Quinn (1999), incremental change is constant, cumulative and evolutionary, representing small daily advances, while radical change is discontinuous, intentional. Regardless of the type of change, organizations need to develop continuously the capacity to adapt to new realities of the competitive environment and other factors that need to change. Robbins (2000) cites six aspects that are triggers of change: the nature of the work force, technology, economic shocks, competition, social trends and world politics. These factors exert a constant pressure in the organization. Nadler, Shaw and Walton (1995) cite as triggers for change: the need to increase the value perceived by customer, reducing the cost of internal coordination, increased competitive innovation, reducing the response time to market, the workforce motivation and managerial capacity to find ways to generate competitive advantage. Some factors that cause changes also help to overcome change resistance.

Huber and Glick (1995) cite five factors to facilitate change, competitiveness; turbulence and complexity of the organizational environment; low organizational performance; personality and beliefs of the organization's managers; strategic dynamism; level of centralization, standardization and specialization of the organizational structure. Depending on the organization, each factor can act as a facilitator or as change resistance.

The changes are essential for survival and prosperity of organizations, yet generate different reactions of the actors involved in this process. Reactions can range from outright rejection to immediate membership through the veiled resistance. Stability does not generate threat. The changes have uncertain outcomes and generate insecurity and change resistance. Change resistance is humanly inherent and managers must learn to work with it.

To Adizes (1998), managing a company is the art of solving problems, which are natural features of the growth created by the changes. More than adapt to change, you must have the ability to predict changes in the environment and convince people in the organization to act quickly. In order to obtain workforce in the process of change it is necessary to develop a culture focused on trust and respect to the opinions of the employees, as they need to feel participants, responsible for the changes. The process of change must have the support of senior management. Adizes (1998) recommends six steps for effective change:

1) **diagnose**: warn everyone that the organization has a problem and the current situation cannot continue as is;

2) **empower**: projects using smaller changes with quick solutions to develop confidence and responsibility needed for larger projects of change;

3) **study the mission and values**: Use the mission, vision and values of the organization to promote the alignment and generate effective changes that contribute to create value;

4) realign the structure to the strategy: review the organizational structure if necessary to accommodate the new reality;

5) **reorganize information systems**: Adjust the flow of information to ensure that the structure works;

6) **reorganize the reward systems**: update the pay system or generate alternative forms of reward for people to feel that there was a reward for their contribution to the change;

When a company adapts to change, it is surviving. To thrive and succeed we must anticipate and be faster than the competition. Trust is necessary because it creates a cooperative internal environment where people feel like winners because they participate in the process of making decisions about the changes (Adizes, 1998).

For Kotter (1998), structural changes and business processes are due to market needs, customer demands, new technologies and new competitors. Kotter (1998) cites eight common mistakes in implementing organizational changes:

1) having no sense of urgency: the sense of urgency may come from the market, competitor study, identification of crises and the windows of opportunity;

2) **not involving top management**: executives must commit to change and form a team with enough power to implement change;

3) **underestimating the power of the corporate vision**: the organization must create a vision for change and strategies deployed from the vision;

4) failing to transmitting the vision of change: communication must use all the vehicles to promote the strategic alignment;

5) failing at fostering the empowerment: the organization should encourage employees to take risks, have positive attitudes unconventional with greater power and responsibility;

6) **not getting short-term results**: the organization must disclose the short-term improvements and reward employees that enabled the best results;

7) **satisfying too soon with the results**: the organization needs to consolidate the changes of the systems, structures and policies, hiring and developing people who can act as agents of change;

8) not incorporating the changes in the organizational culture: the organization needs to promote continuous improvement to direct people's behaviour to meet the needs of customers, increasing productivity and improving performance;

Top management must drive the change and boost the sense of urgency. The actual or potential crisis should rapidly emerge. Sales goals should be aggressive, as well as productivity, profits and customer satisfaction. Information relating to financial performance, customer satisfaction and competition can motivate change. People need to be encouraged to talk about the dissatisfaction of customers and suppliers. Information on future opportunities should be evident to show that if the company does not change the opportunities will be lost. If a failure to generate change happens, that should be used as learning and should be published for all, in order to foster creativity for the next initiative. Developing a culture of change and the pursuit of excellence must be constant within the organization to avoid the common mistakes cited by Kotter (1998).

6.3 CHANGE RESISTANCE

Prolonged periods of success tend to make organizations resistant to change. This resistance is positive because it provides stability and predictability of business processes on the organization. Without change resistance, organizational behaviour the company assumes chaotic characteristics. The problem is that change resistance also prevents the adaptation and progress of the organization. Robbins (2000) describes the types and classifications of change resistance.

Some change resistance types are more easily identifiable than others. Resistance may be of various types: public, implied, immediate or delayed. Pubic and immediate resistances are easier to identify and treat, as complaints, threats of strikes and deliberately slow operations. Implied resistance are more difficult to treat, such as lack of motivation, increased amount of errors, increased absenteeism due to "illness". Some resistances show up later thus appearing to be the "last straw". This latter type of resistance occurs when the reaction is disproportionate to the action of change from which it derives. Change resistance has varied forms of manifestation.

Changes can be classified into individual and organizational. Individual resistances are in the habits, insecurity, economic factors, fear of the unknown and selective information processing. The organizational resistance is in the structural inertia, limited change focus, group inertia, expertise threat, threat to established power relations and threat to the established distribution of resources. Change means taking people and organizations out of the comfort zone, and the resistance emerges as a result to these changes.

The habit is an individual strength that helps us to simplify life by reducing the range of options considered in the daily decision-making. New technologies can generate uncertainty about the survival or future job responsibilities and generate individual resistance. Especially when the change links remuneration to individual productivity there can be opposition caused by fear of reducing future income. The changes replace the knowledge already generated with uncertainty and fear of the unknown. People tend to hear what they want to hear while ignoring information that challenges the idealized world. The individual change resistance is natural.

The process of recruitment and selection, for example, includes and excludes people systematically. These people train and begin to behave in certain ways. When the organization needs to change its own procedures, previously created work promotes inherently the inaction. The organization is an open system and disregard to this characteristic generates organizational resistance, especially when trying to make changes with a limited view over a subsystem without appreciating the larger context. Even when an individual accepts change, there are cases in which the group shapes individual behaviour by promoting resistance. When a group perceives that its expertise within the company is decentralized, it also tends to resist change. The distribution of authority for decision-making may threaten the established power relations and create organizational resistance. The same reasoning applies to the distribution. Any change in the distribution of resources can mean a threat that could affect future distributions. Organizations by their very nature are conservative and resistant to change. The challenge is not the technological but the cultural change.

6.4 MIT FRAMEWORK

At the beginning of the 90s MIT (Massachusetts Institute of Technology) consolidated a lot of research on organizational change and technology application. The framework allows a broad view of organizational change process promoted by the alignment between strategy, organizational structure, technology, people and business processes. The FIGURE 24 presents the five dimensions of the framework of MIT.

If the organization will change due to the use of new technology, then not only the technological and strategic aspects should be considered. The organizational culture must be respected and considered in the change process. People have roles and responsibilities that will be affected. The power relations of the organizational structure may change with the changes promoted by the implementation of new technology.

The technology is the way to do things. Information technology includes software, hardware and telecommunications to support information systems. The change involves changing technology knowhow. When changing the technology you need to invest in equipment, people skills and support for their use. According To Venkatraman (1994), the benefits of using IT are magnified when the change is performed considering the strategy, organizational structure, processes and culture.



FIGURE 24 – MIT Framework for organizational change Source: Adapted from MORTON, 1991, p. 274-275.

There is a difference between the integration between business processes and integration of technologies. The integration between different IT components is technically easier to obtain than the integration of business processes. To promote the integration of business processes is necessary to change the form of relationship between people and work procedures.

The formal organizational structure is represented by the organizational structure and defines how power is distributed among people. The distribution of formal and informal power influences people's behaviour patterns and decision making. The changes in the organizational structure, aligned with the strategy and complemented by changes in business processes, generate better results (HALL, 2004).

The replacement of technology alone does not generate competitive advantage. It is necessary to change people's behaviour, especially the leaders within the organization. For Schein (1992), the culture of an organization takes into account the shared values and perceptions that shape people's behaviour. There are levels of understanding of the culture in an organization, ranging from visual artefacts, as the declared values, beliefs and undeclared values . The culture is extremely complex to be fully understood and perceived. Trying to understand the culture is like trying to perceive the water of a lake, but from the perspective of the fish.

The alignment with the strategy ensures that changes are effective. Structure follows strategy. Business processes and people's behaviour also follow the strategy. A newly created strategy also needs to consider all these dimensions of the external and internal environment. Changes in the socioeconomic and technological environment require balancing with the internal dimensions in the formulation of strategy.

The MIT framework provides a broad overview of the organizational change process in implementing a new technology. The mere acquisition and implementation of technology does not guarantee better results. It is necessary to consider the dimensions of organizational change: strategy, organizational structure, business processes, people and technology

6.5 BUSINESS PROCESS TRANSFORMATION

For Robbins (2000), change is to make things different and innovation is a special type of change, generated from a new idea applied to the creation or improvement of a product, process, technology, structure, system, program or service. Innovative organizations reward both the successes and failures, because celebrating the errors is a way to spread the knowledge that the company encourages daring and inventing.

The typical manager is an agent of change. Change agents are catalysts and assume the responsibility for change, continually reinventing the organization. Among the attitudes of managers who thrive in this environment of change are the exercise of leadership, delegation of power to officials, the sensitivity to differences, sharing of information for improvements in daily routine and encouraging innovations.



FIGURE 25 - Business Process Transformation

Planning for current and future modeling a business process (BPR - Business Process Redesign) is planning an organizational change. To escape the current situation and transform the business process into the proposed situation it is necessary to evaluate the impact of incremental improvements and innovations. The transformation of business process needs not to be radical. The change will be more or less extreme depending on the objectives and available resources. According to the current status of the process (AS-IS) and proposed (TO-BE), it is possible to highlight four important issues in this transformation, as shown in FIGURE 25:

- 1) Requirements
- 2) Incremental improvement
- 3) Innovation
- 4) Changes

The process's client has needs and expectations to be met. Necessities can be very subjective and difficult to interpret. The specific requirements determine the measures that identify satisfaction or dissatisfaction with the outcome. The improvements can be incremental and cause a few organizational changes. Information technology allows different ways to perform an activity. In assessing the opportunities in the IT market, the company can innovate in their processes. An innovation can lead to major organizational changes. The challenge is to balance innovation and incremental improvement in the right measure to achieve the strategic objectives of the organization.

By placing strategic initiatives in action, change is inevitable. When the organization develops an acute sense of awareness and the situation, understanding the mechanisms of change becomes the key factor in taking a proactive stance. The organization of the future will focus on customers, placing the quality of its products and services at the central question of and will have a closer relationship with the community and the environment, greater expertise and fewer hierarchical levels. Leaders of these future organizations have a profile of the coach and motivator. There is no option to change (WOOD, 2002).

7 ORGANIZATIONAL CHANGE

When ideas fail, words come in very handy. Goethe

The true value of a product, process or system is measured through its customer acceptance. The bigger the value of one item over its competition, better are its chances to beat the competitor. Real value bases itself in temporal and local conditions. A fridge in the north Pole is less valuable then the same fridge under the equator. Christmas memorabilia are more valuable in December then in march. True value is a relative measure that matches cost, ease to use, fondness and exchange power.

7.1 ADDED VALUE ANALYSIS

Supplier and customer perceive the value differently. For the supplier it is a result of the division of the cost function (value = function / cost). To the customer is the result of the division of benefits for the price (value = benefits / price). Overall, value is what an organization is willing to do to ensure that particular process runs (CSILLAG, 1995).

The Value Engineering, also called Value Analysis serves to identify the functions of a product, process or service, evaluate them and finally propose an alternative way of performing them in a more convenient or cheap way. Value Engineering is an approach to reduce production costs of goods / services and increase the value perceived by the customer. It isn't a new approach, it has existed since the fifties in the United States of America and was introduced in Brazil in 1964. A simple action plan to implement the Value Engineering is to organize the answers to these questions (CSILLAG, 1995):

- 1) What is the item?
- 2) What does the item? What is it's role?
- 3) How much the item costs?

4) What are other ways to perform the same function?

5) At which cost?

Over the years, Value Engineering was applied differently through various countries. Despite differences in application over time purpose, Csillag (1995) states that it is possible to identify a pattern of three phases. The first is called convergent, when the information is collected and the definition of what is desired is formulated. The second, divergent, when several alternatives are generated. The third again convergent, when from several alternative solutions, one is selected. The Value Engineering methodology is divided into the following steps: collecting and analyzing information, functional approach, idea generation, idea selection and implementation of the better-suited idea to maximize value.

Value Engineering analyzes the functions to identify what is being provided and what the customer needs. This analysis usually involves both technical and marketing teams to define requirements in terms of costumer priority, and include targets for sales prices. This same approach is used for internal clients. The goal is to discover the essential characteristics, called requirements". To get to the more profitable alternative it is necessary to evaluate alternatives including new concepts, recombination, elimination or combination of items, processes and procedures. The life cycle of the product, process or service must also be considered. Csillag (1995, p. 59) developed a definition for Value Engineering, "Value Engineering is an organized effort, directed to analyze the functions of goods and needed services to achieve those objectives focusing on higher profitability".

In Europe, the value-engineering trend involves various methods from TQM to reengineering. The analysis starts at a product or service, passing through the entire set of activities and processes undertaken by the company, including investments, procedures and organizational systems. The name increasingly used for the methodology is Value Management.

7.2 INFORMATION TECHNOLOGY

In general, technology is how the organization transforms its inputs into outputs (ROBBINS, 2000). Specifically, the Information Technology is the means by which data is processed and organized for people's use (LAUDON; LAUDON, 1999). An information system can be a manual system, using only pencil and paper technology, the black board technology level, tables technology announcements or other informal communication channel. In many activities, computers have replaced manual technology for working steadily and reliable, performing millions or even hundreds of millions of instructions per second.

Boar (2002, p. 2) defines IT as the responsible for:

[...]preparation, collection, transportation, retrieval, storage, access, presentation and processing of information in all its forms (voice, graphics, text, video and image). The movement of information can occur between humans, between humans and machines and / or between machines. Information management ensures selection, distribution, administration, operation, maintenance and evolution of IT assets in a manner consistent with the goals and objectives of the organization.

Laurindo (2002, p. 20) afirms that:

IT has evolved from a traditional orientation of administrative support to a strategic role within the organization. It not only supports existing business strategies, but also allows new business strategies to become feasible. The role of IT as a strategic competitive weapon has been discussed and emphasized primarily by new business opportunities it provides.

Rezende (2002, p. 17) defends that:

[...]IT can play an important strategic role to assist the promotion of business and competitive intelligence over your competitors. [...] Not only the strategic role should be played. IT must also meet the aspirations of operational activities, and strategic management of organizations, including production processes, business and financing. Behaving as a key tool in supporting organizations in achieving their goals, acting through its managers in an active, planned, timely, intelligent and strategic way, IT can help companies on joining forces on reconciling stability against changes in the market.

In this book, Information Technology is a narrow concept, it is a set that consists on software, hardware and telecommunications that support information systems. The Software is the responsible part for logical data entry, processing / storage and information generation, like office applications, purchasing, inventory, accounting and sales, among others. Hardware corresponds to the physical part, i.e keyboard, mouse, servers, storage disks, printers, video and other miscellaneous devices. The delivery vehicles for the data, eg local area network, private networks, frequency networks, among internet. radio others, form the telecommunications. Since technology is the way to do things, some technologies are inter-compatible and others are not. The external organizations become under pressure to implement new information technologies for various reasons. Information Technology in the narrow sense used in this book represents only one sixth part of the solution to an information problem.

McGee and Prusak (1994) call attention to the technological utopia where there is a strong orientation to the approach of information management from a technology perspective. This approach avoids a conception of politics, political positioning as an aberration of behavior. The technocrats' efforts are directed to build a technology infrastructure that can provide information to each user individually. Are emphasized modeling and classification of information highlighting the latest types of hardware and software to try to deal with all kinds of information the organization.

Computers have been used commercially for more than three decades in business administration and information processing. Different perspectives and approaches are explored due to the rapid development of technology. Changes in attitudes are caused by both a good and bad experiences associated with the use of IT.

Somogyi and Galliers (1987) described an overview of the historical evolution of the application of IT as a tool to support Information Systems. The first computers were available in the 50's, by which time the information systems used batch-processing cards, tapes, and printers on large computers called mainframes. Information systems were typically payrolls and accounting. From 1960, with the development of research on theories of linear programming and nonlinear statistics, inventory control, queuing theory, decision theories and systems, among others, different activities happened in organizations that used computers processes in Organization and Methods (O & M) departments. The first transactions processing that used databases emerged during the mid-60 with access to large computers via terminal. The Management Information System (MIS), according to the technocratic view, has a concept that have been sedimented from the possibilities of using the resources of enterprise databases, the sophistication of technology and increased capacity of large computers. IT has the power to support and manage sales and purchase orders and inventory as well as uncovering possibilities for use of historical reports containing aggregated data, variations in presentation and exceptions reporting. The management reports allowed the use of IT in support of non-routine decisions of administrators.

Somogyi and Galliers (1987) draw two eras in their article: Data Processing and Information Systems Management, by commenting on systems and emerging technologies in strategic terms. Ward and Peppard (2002) summarize and complement the trends indicated by Somogyi and Galliers (1987) as the third era. The authors conclude that from the mid 80's, when many newspapers and books had presented Information Systems supported by the IT that provided a competitive advantage, a new era has begun, as shown in TABLE 5: the era of the Strategic Information Systems.

In the first and the second eras, there were limitations of software and hardware, with poor and fragmented communication networks. Users had little or no participation in the processes related to the systems operation and IT technicians did not understand their needs. The technology was justified as either an element for cost reduction or to business support. In the third era, there was an improvement of networks and telecommunications, which helped in the process of globalization of business, and users began to understand the technology and use the flexibility in their favour. The limitations became the creativity and ability to innovate. Information technology made possible new forms of negotiation and enabled the Information Systems to evolve into strategic resources.

We are heading towards the fourth era. As there is no possibility patenting innovations in information systems, the differences are quickly copied by competitors. The sustainability of a competitive advantage under the perspective of Information Systems is the ability for continuous innovation, combining the opportunities offered by IT and business to deliver new applications and effective organizational changes.

Technology	Data Processing	Management Information	Strategic information
		Systems	systems
Technology standards	Hardware limitation, spread computers	Distributed, interconected systems, software limitation	Networks
Operation standards	Distant, technician controled operation	Manager Controled	User friendly
System development challenges	Technical problems (coding, Project management	User understanding	Business strategy comprehension
Technology use justification	Cost reduction	Business support	Business enabler
Information systems characteristics	Internal, controlable	Convenient, controlable	Flexible, exte r nal

TABLE 5 – Information systems evolution

Source: WARD; PEPPARD, 2002, p. 24.

The fourth era of Information Systems focuses on the ability to create recurring business value from information. In the fourth era, the critical investments to improve processes and optimize the performance are as natural as the quality in world-class organizations. This ability requires a recurring continued ability to identify new opportunities to improve the organization's business. The IT role is to play as a strategic weapon to generate continuous innovation as the organization needs to develop new skills.

For Davenport and Prusak (1998), competence is the ability to generate results through attitudes, skills, experience and knowledge. The skills of a person are not simply copied or acquired in training, but must be transferred by the practice. Competence is associated with the achievements through which each person produces or delivers and is a link between knowledge and strategy. Ward and Peppard (2002) stated that IT can be used as a competitive weapon if the organization develops three competencies:

• fusion of people's knowledge on business and the Information Technology;

- flexible and reusable architecture and IT infrastructure;
- continuous improvement of business processes.

The fusion of knowledge enables the business strategy using IT innovations and vice versa. The merger allows the rapid identification of opportunities, assessing the degree of organizational change and improved adaptability of the organization. Setting a platform means to influence future options and speed of response to defined processes as a standard delivery allows resource sharing by applications. Standardization increases the speed of response and avoids the fragmentation of technology solutions. The use of flexible platforms creates the ability to respond quickly to competitors' moves relative to Information Systems. Continuous improvement of business processes should use technology, information, and not only communication technology to create a collaborative environment through which the people can relate and deliver value to customers. The information needs to be people-centered. The ability to create recurring business value from the information requires skills and resources to improve organizational performance.

ERP – Enterprise Resource planning

It was in the 1970s that computers became more powerful and inexpensive and the first MRP (Material Requirements Planning) emerged, originally sold by IBM with its mainframes. Part of the MRP is a set of routines for calculation of material requirements from the demands and sales forecasts. MRPs, based on a list of materials structured in levels, calculates gross and net requirements for production and purchasing. To calculate the net requirements it is considered the current inventories levels and parameters such as safety stock, delivery time and economic quotas. MRP did not support the planning of manufacturing capacity (COLANGELO FILHO, 2001). MRP II (Manufacturing Resources Planning) emerged in the 1980s as an extension to MRP. In addition to calculating and exploding the acquisition needs and production, also appeared the CRP (Capacity Requirements Planning), checking the availability of machines and equipment for processing materials. With falling prices of personal computers, departmental systems were developed to complement the solution of the MRP II, but raised islands or silos of information within the organization.

Starting in the 1990s, with the democratization of computer networks, organizations have developed requirements to integrate their applications, which were implemented, divided in the departments, during the 80's. According to Keller and Teuffel (1998), the expansion of globalization and market dynamics in organizations exerted pressure for lower costs and reduce processing time, requiring a new processing model. ERP (Enterprise Resource Planning) came on the market as an integrated tool that enabled business process reengineering (BPR-Business Process Reengineering) using a single database.

The integration is possible due to a single database used by the ERP, as shown in FIGURE 26. The information becomes more consistent, generating greater confidence to decision makers. The use of ERP technology optimizes the flow of information and facilitates access to operational data, enables the process management, encouraging the adoption of simpler, horizontalized and flexible organizational structures. Vendors of packaged software business management contribute to the ERP modules, as shown in FIGURE 26: Sales and Distribution, Finance and Accounting, Manufacturing, Materials Management, Human Resource Management, Support Services and Technical Assistance. Each vendor makes the division individually and discloses business processes supported by each package in the business management software as the best market practice (DAVENPORT, 1994).



FIGURE 26 – Unique Database Source: DAVENPORT, 1994, p. 5.

Norris et al. (2001, p. 5) define ERP as a tool that uses a structured approach to optimize the value chain within the company and states that:

"What the ERP really does is to organizing, codifying and standardizing processes and business data [...]. The ERP software is not intrinsically strategic, rather it is a technology support, an integrated set of software modules that form the core [...] performing the internal transactions processing."

The implementation of ERP requires major changes in business processes and comes to cultural issues affecting the management. The ERP been seen as a tool to streamline processes and reduce costs, including work force costs. This caused strong resistance to implementation. The key to change is the commitment of individuals to adopt not only new technologies but also new ways of working.

In Brazil, no one can say with certainty that a company has implemented all modules of international ERP. At the beginning of the 90s, foreign suppliers have had many difficulties with the "tropicalization" or "localization" of their systems, in adapting the original modules to the peculiarities of the Brazilian tax law. There was no time for a company to implement all modules of an ERP system with this size (CORRÊA; GIANESI; CAON, 2001). The ERPs existed in Brazil before the 90s, not at the sophistication level of the international management software packages, but effective enough considering the available resources and the needs of organizations at the time (HABERKORN, 2003).

Duclós (1975) has described the first phase of construction and implementation of one business management software running on FURB (Fundação Universidade Regional de Blumenau) mainframe. The mainframe processing capacity was shared with several small and medium enterprises in the region. Data entry was done with punch cards, collected through a system of couriers. The integrated business management software managed sales process, inventory, purchasing and finances. The mainframe created and printed reports that were delivered to corporate managers. Duclos (1975, p. 21) already stated:

> "[..] For the company to achieve its purpose, the profit, reports, which are nothing more than discrete information, must come to the right people at the right time. [...] A Management Information System should provide control, tax and management reports over which depends fundamentally the existence of the company [..] sent to the people involved in decision making."

The FIGURE 27 presents the main processes supported by ERP technology in an industrial company. The ERP provides a powerful accounting integration. For each invoice, stock movement, inventory adjustment, production, pointing loss, revenue generation, payment, receipt and other movements, the ERP records the operation. To Haberkorn (2003, p. 74):

ERP (Enterprise Resource Planning) aims at automating the procedures of a company. It covers the planning, implementation and control from the economic and financial perspectives, through a series of known and simple techniques to perform this task more efficiently and faster than any other working method, providing mobility for all company, regardless of their area of expertise in the market.

The integration is achieved by using one shared data entry module that is shared between the modules of the ERP. Accounting plays a key role in the ERP. It is towards the accounting that all the data that alter the company's assets in any way converge.



FIGURE 27 - ERP process integration

The company Benchmarking Partners, published in 1996 a document to support the development of strategic justification and return on investment in implementing a world-class ERP. The TABLES 6, 7, 8, 9, 10 and 11 describe the relationships between issues, strategies, technologies and the potential of ERP. The purpose of the document was to help estimating tangible and intangible returns in the implementation of ERP.

Business Driver	Strategies	Enablers Required	ERP Capability
Achieving A s leadership in the loyalty and service to For customers pro- bra ma Bee cor to o wit	A single face to costumers Fortify	Detailed costumer profile, their purchases and services history.	Wide cover in processes that lin sales, engineering, financing and costumer services
	processes of brand management Becoming a	Single contact point with full access to costumer information. Perfection in sales management with products and price.	Real time client profile acess with invoice monitoring Unique data bate integrated to the invoice management system
	company easy to do business with	Remote access to product information for the sales force with professionals generating queries and services directly from the costumer.	High management capability in pricing, promoting and servisse management.
		Better sales and demand prediction	Wide predictability with special treatment on promotions and spare negotiations.

TABLE 6 - ERP and Sales & Marketing processes

Callainet	Cture to a ser	T1	EDD Datastis1
Subject	Strategy	Technology	EKP Potential
Achieving high	Colaborative	Steady integration between	Unique database for materials,
aceptation of	engineering	engineering and manufacturing	prducts, suppliers, CAD interface
new costumers			for transferring development
to new	Production		components straight to the
products and	ready design		assembly lines
reduce			
development	Hear the	Integration between marketing and	Management of product
time	costumer's	new products development	development and especification to
	voice		support costumer feedback.
		Excelence on change management	Structure review and scriptinig,
		on engineering	documenting and product
			configuration based on workflow.
		Manufacturing and designt	CAD and quality systems interface
		integrated new product	for monitoring relevant data.
		development	

TABLE 7 - ERP and Engeneering and P&D processes

Source: BENCHMARKING PARTNER, 1996, p. 44.

Wood, Paula and Caldas (2003) criticize the so-called «management industry" as a manipulation of the reality held by consultants, gurus, media and business managers who also feed on these "futuristic fantasies." They say that the ERPs during the 90's:

[...] Were considered a true panacea that lead to the "promised land". Thus becoming a threefold phenomenon: marketing, by creating a billion dollar industry around the development and deployment of software; "theatrical" in their characteristic as pseudo-innovation and the distance between image (what was said about them) and substance (which in fact companies obtained from them); and "religious," as the technological "evangelist" role was assumed by the consultants and software vendors in order to profit from the sales of a unguaranteed technological solution.

As a result, many organizations have allocated time, money and energy in poorly sized, void of strategic vision projects, transforming, paradoxically, the dream of "total control" into the nightmare of "total lack of control."

Saccol (2003) analyzed the discourse of the ERP vendors, and claims that the suppliers discourse has some coherence with what various academic research that points to the benefits of adopting this technology, such as access to real-time data integration and process automation. Among the benefits that do not match the practice, the author mentions the flexibility, easy customization, and especially the fact that the vendors offer ERPs as complete solutions that meet all the needs of enterprise information.

Subject	Strategy	Technology	ERP Potential
Added value based Purchases with quality, scheduling, flexibility and cost concerns	Reduced supplier base Increased long term partnerships Supplier evaluation	Integration of supplier performance management systems.	Broad supplier evaluation through capacity, quality and other evaluation factors
		Finances, stocks and reception integration.	Integration of purchases and deliveries through EFT (<i>Electronic</i> <i>Funds Transfer</i>) and EDI (<i>Electronic</i> <i>Data Interchange</i>).
	through classification systems	Supplies contracts management	Centralized contract management with partial liberation, preparation and expedition rights for each item in the production line
		Supplier selection	Automated supplier selection based on pre-set conditions.
		Global, multi-currency purchasing	Multi currency negotiation of Transport fares and import taxes in a by-item or by-contract basis, with proper accountability.

TABLE 8 - ERP and Purchasing & Suppliers

Source: BENCHMARKING PARTNER, 1996, p. 44.

Romeo (2001), from considerations over predictions of the AMR Research and Gartner Group, describes changes in the ERP segment after the end of the last decade due to two factors: time and experience. At the turn of the millennium, there was a shared vision, on the market, over the major ERP providers. Vendors and consultants were perceived negatively by the market because of the recurring failed implementations. Projects usually lasted from nine to twelve months for small firms, twelve to fourteen months for medium and three years or more for large organizations. The main causes of failure were the over-customization, poor end user training and over anxiety in complex system designs. These factors have to be monitored; the vendors have gotten smarter and the ERP customers, more cautious. The implementation projects are no longer supported by the organization reengineering and began to use better practices for Change Management in the companies.

Subject	Strategy	Technology	ERP Potential
Improved Sales customer management satisfaction Optimization	Integrated follow up for sales orders process	Unique customer, product, suplier and integrated process databese for sales order support.	
effective sales order	of the manufacturing	Lower, more accurate stock levels.	Global stock management
treatment and logistic chain Global inventory catalogue	Customer and supplier partnerships	Stock, consignation and thirdy party storaging management	
	Global inventory catalogue	Effective logistic management	Integration with inventory, transport and warehousing systems.
	Effective transport and warehouse management.		

TABLE 9 - ERP Logistics and Distribution

Source: BENCHMARKING PARTNER, 1996, p. 45.

The Deloitte Consulting (1999) released a survey in 1999 with 62 among the 500 largest companies published by Fortune magazine. The research concludes that the implementation of packaged business software is a journey of change that starts with the implementation of ERP and never ends. The end of the ERP implementation is the beginning of a second wave. Immediately after the entry into production of the ERP, the organization's performance falls relative to performance under the previous technology. The recovery takes place in three stages: stabilization, synthesis and synergy. The first stage is the realization of more efficient business processes with increased performance, speed and cost reduction, that lasts for 6 to 9 months. The second stage is characterized by the integration of features outside the field of ERP such as EDI, sales force automation, data warehouse, and other complementary applications; this stage lasts from 6 to 18 months in the search for greater efficiency. The third stage is the synergy of technology, people and business processes to transform the business, exploring new opportunities.

Subject	Strategy	Technology	ERP Potential
Lower costs S improve p quality F p p	Slim, confiable production Flexible	Integration and tracking of production and sales orders	Unique customer, product, suplier and integrated process databese for sales order support.
	p r oduction processes Quality	Melhoria na integração entre vendas, produção e previsões de compras.	Planning, scheduling and flow optimization with shared supplier prediction.
	leadership Supplier quality with price and	Integração entre gestão do desempenho de fornecedores incluindo serviços, qualidade e entregas.	Extensive supplier analysis including stock management
	service improvement	Otimizar o processo de análise e geração de relatórios de custeio através de melhores critérios de apropriação.	Complete cost management with multiple outcome views.
		Aperfeiçoar a incorporação de mudanças de engenharia.	Engineering change based workflow.

TABLE 10 - ERP and production

Source: BENCHMARKING PARTNER, 1996, p. 45.

The ERPII acronym was coined by the Gartner Group in 1990. In Bond et al. (2000), by the article "ERP is dead: long live to ERP II," Gartner addresses the ERP II as an evolution of ERP, as shown in FIGURE 28, with six distinguishing features. Its role evolves from internal to include the external collaboration value chain. The domain changes from focused on manufacturing and distribution to all sectors and segments. The scope is extended to cover processes on all sectors. Processes that were hidden and internal become external and connected. The architecture changes from internal and monolithic to componentized, open, Internetbased, data moves from internal to both external and internal. Gartner attributed in 2000 a probability of 0.8 for, in 2005, the demand for collaborative technology on the ERPII to surpass the ERP

Santana (2006) compared the perception of IT professionals and executives to see if the ERP II is a reality. The results showed that in the group of companies surveyed, there is evidence that ERP technology has not reached all those characteristics cited by Gartner Research Group in 2000. IT professionals perceive a greater strategic impact of ERP than business executives do. ERP helps to improve the integration of internal processes, but needs complementary technology to support business processes that cause the greatest strategic impact. The rank of strategic impact perceived according the opinions of the executives on the strategic variables were:

- 1) Effectiveness (62%);
- 2) Customers (50%);
- 3) inter organizational efficiency (48%);
- 4) Suppliers (42%);
- 5) Operations and costs (29%);
- 6) Market (23%);
- 7) Competitiveness (7%).

TABLE 11 - ERP and financing & Controling

Subject	Strategy	Technology	ERP Potential
Improvement	Shared	Improvement in cost evaluation,	Real time, activity-based cost
business	processing	analysis and reporting.	management
decision processes	services	Global finances management	Multi lingual, multi-currency, transnational monetary
I	Broad cost management		operations.
	Decision making support	Decision suport capabilities	Simulation, modeling, online what-if reporting.
		Better accounts payable and receivable processing	Bank integration

Source: BENCHMARKING PARTNER, 1996, p. 46.

For IT to help improve critical processes, organizations use customization and development of alternative solutions to the ERP.



FIGURE 28 – ERP evolution Source: BOND et al., 2000, p. 2.

No ERP is able to satisfy all information requirements of the organization. Suppliers try to address this issue through customization, which uses technical resources that allow the packaged management software to be modified without compromising its integrity (LAUDON; LAUDON, 1999). The implementation of a project-management software package is a combination of organizational changes and customizations. The use of "best practices" existing in the software can force the organization to review the business processes. The customization of the package management software serves to meet specific needs of the organization. Knowing dose between customization and organizational change is a critical factor of success of implementation projects (LOZINSKI; 1996; COLANGELO FILHO, 2001).

As shown in FIGURE 29, reengineering of business processes, based on ERP, is the most common current approach for implementation instead of reengineering the organization. The assumption used is that the ERPs were designed to support best practices. The essence of this approach is only to develop an alternative to ERP if it does not give any support to the process, or if the process is critical to the organization (COLANGELO FILHO, 2001).



FIGURE 29 –ERP alternatives Source: COLANGELO FILHO, 2001, p. 38.

The Business Blueprint details the plan for improvement in business processes supported by IT. The Business Blueprint highlights the relationship between business processes with the organizational structure and master data set. It also registers the adhesion analysis between the business processes supported by ERP and those that require customization.

By one side, the customization process can affect the cost and time, yet it may also help in the pursuit of excellence in a specific critical organization process. Santana (2006) analyzed the degree of customization required in order to generate strategic impact. Among the seven variables analysed, the variable with the highest degree of customization was "clients" and to a lesser degree were "Suppliers." The variables "Market", "Effective management", "Inter-organizational Efficiency" and "Operation / Costs" showed intermediate levels. Research has shown that the variable "Competitiveness" suffers low influence from the business software package (ERP). There is need for more research to find out how customizations can help the process of creating and sustaining competitive advantage.

Despite the ERP vendors argument about the incorporation of best practices, what ends up happening is a standardization of processes across multiple firms within an industry. When an organization implements a new or better process, believed to be a competitive advantage, the competitor can buy the same practice on the market and match up quickly. The competitive differential is not in implementing standard practices already in the ERP, but neglecting such best-practices becomes a competitive disadvantage (CORRÉA; GIANESI; CAON, 2001). Information Technology is available in the market for those who can afford it. The increased availability and standardization turned IT into a commodity (CARR, 2003).

The customization process is not just another task in project implementation. In some cases, customization can take the relevance of a large project that requires planning, resource allocation and monitoring. It is preferable to accept some standard customizations on a temporary basis throughout the project and renegotiate the situation with the users after they acquire a better understanding of these processes on the ERP. This helps to reduce 50% of the number of customizations even before a single line of code has been re-written (LOZINSKI, 1996).

Even the most advanced ERP cannot guarantee that all modules are perfect and better then all previously developed software products in companies. Sometimes, in particular organizations, the in-house management software developed took years for improvement and should not be immediately replaced by another standard, or even be customized. Manage an interface between two software products may be less complex than simply replacing a specific solution (CORRÊA; GIANESI; CAON, 2001).

7.3 INFORMATION SYSTEMS

An information system that exists to meet the business needs cannot be built only by using computers. The Information System consists of three dimensions: organization, technology and people. In sociotechnical view, the information system technology involves more than two dimensions. The dimensions of the organization and people include the solution of problems created by trends in the external, political, demographic, economic and social environment. Organizations and individuals undergo mutual discovery as the systems are developed through inter-collaboration to optimize the performance of the complete system. The three elements of the Information System adjust and change over time (LAUDON; LAUDON, 1999).

Stair and Reynolds (2002, p. 616) define information system as "elements or a set of interrelated components that collect (input), manipulate (process) and disseminate (output) data and information providing a feedback mechanism to meet a goal."
Rezende (2003, p. 61) states that: "Every system, whether or not employing the resources of information technology, when managing and generating information can generally be considered an information system."

And O'Brien (2004) claims that information systems are an organized group of people, hardware, software, network communications and data resources that collects, transforms and disseminates information in an organization.

As Laudon and Laudon (1999), Bio (2008, p. 218) has emphasized the importance of behavioural and political aspects in the development of Information Systems and stated that:

Before a company is thought of as a set of machines and equipment, or as a formal structure that distributes functions or procedures, systems and computers, should perhaps be thought of as social organization, human. [...] It appears that many administrators and specialists are increasingly immersed in technical solutions, rational solutions [...].

The solutions of organizational problems related to information systems are often interpreted in the light of concepts and techniques of systems, projects and new technologies. The technical approach is shortsighted to the understanding of contradictory behaviours and political obstacles. Bio (2008) concludes that any organizational change and systems is a human fact. Human phenomena in the modernization of systems are extremely complex. A simplified model, although it helps to think, is likely to be misleading to make people believe that human behaviour in organizations can be easily understood.

The technology, in general, represents only 1 / 3 of the solution of an Information System, while the other 2 / 3 are formed by people with their own organization and business processes. Business processes need to adapt to environmental pressures to help the organization to survive or thrive. The organization both consumes and generates information in relation to the environment, and people play a key role because the information systems exist only to satisfy their information needs.

Information Technology versus information Systems

The IT market offers different ways of doing things that can affect the strategic management of an organization. From the internal point of view of the organization, IT provides software tools, hardware and telecommunications to support the Information Systems in organization. When investments in IT are not aligned with the strategy, solutions solve specific problems, but do not focus on what really matters to business prosperity. The strategic alignment of IT is necessary to explain the information systems as shown in FIGURE30.



FIGURE 30 - Effects, alignment and IT support

The results of several studies point to the need for an integrated planning between business strategy and IT strategy. It is this integration that minimizes risks in decision making on investments in new technologies. The alignment is a consequence of the matching process between the elements of the IT plans in relation to objectives, goals and strategic actions to improve organizational performance (AUDY; BRODBECK, 2003).

As shown in figure 31, the technology represents 1/3 of the solution to the problem of information, while the other two thirds are represented by the organization and people. Each organization develops

its own culture with values, policies, rituals, the way people dress, documents and standards of behaviour. The solution of a problem may be information in business processes, procedures, people's behaviour or rules defined by the organization.



FIGURE 31 - Solution for an IT problem

The technology used to solve an information problem need not to be formed by the IT components: software, hardware and telecommunications. The table boards, pencils and paper, calendars, manuals, post-its set in the workplace; signing and other communication tools are also sound technology to bring information to people quickly and at appropriate times. Technology is the way to do things.



FIGURE 32 - IT where IT belongs

The proper place of IT in this context is far from glamourous. Information technology representes around one sixth of the solution on na information problem, according to the FIGURE 32. Other technologies can be employed to create an information system. There are situations in which the IT will hardly suffice, just as in communicating strategic information. There are also information that purposely won't be automatized, even if there is an information system. The information systems may exist through the application of other systems.

8 MANAGEMENT ANALYSIS

What isn't measured, isn't managed. Management Gurus

From the Strategic Map are deployed performance indicators. For each performance indicator, challenging goals can be assigned for the short, medium and long term. Initiatives are needed to improve performance. A monthly frequency is suggested for the indicator monitoring, goal achievement and initiatives cycle. The strategic map is developed for a corporation or a strategic business unit. The unfolding of the strategic objectives into a Strategic Map generates between 16 and 25 performance indicators.

8.1 PERFORMANCE INDICATOR

Key Performance indicators (KPI) provide information regarding compliance with the strategic objectives. The quality of the KPI depends on the availability, accuracy, precision, clarity and validity. Some KPIs are not available in databases and software development or manual acquisition, especially when measuring external aspects to the organization. The accuracy indicates if the KPI is reliable month after month. The precision indicates whether the KPI measure happens at the correct level of analysis and the calculation remains logical and consistent. Clarity indicates if everyone in the organization understands the KPI. The validity indicates whether the KPI is related to the strategic objectives, if it measures what must be measured and not just what can be measured. To choose among several possible KPIs for the same strategic objective, we can build a table scoring those points that influence the quality of each KPI (GONCALVES; OLIVEIRA NETO, 2000).

There are two types of performance indicators, result indicators (lag) and trend indicators (lead). Result indicators show events that have occurred while the trend indicators signal future results. A panel of balanced indicators blend the two types of indicators.

Examples of result indicators include the following:

- number of cars produced;
- Customer retention;
- revenue generated by new products.

As examples of trend indicators, we can mention:

- speed of production line;
- customer satisfaction;
- the development cycle of new products.

KPIs differ from management indicators on the target and number of indicators. The incremental improvement indicators are management-controlled and the number of indicators tends to be high with goals derived from historical data. Strategic KPIs are monitored and the number of indicators tends to be much smaller with targets based on benchmarking. As a strategic goal leaves the Strategic Map, a KPI management becomes an indication of incremental improvement. The management indicators form a large library of potential KPIs.

The measurement to support the measurement of the strategic objectives is made by performance indicators. Performance indicators may be trends and results. Management indicators for continuous improvement can be promoted to the KPI level as they relate to strategic objectives. The use of performance indicators contribute to the organization efforts on focusing at initiatives that actually contribute to the achievement of strategic objectives.

8.2 BI – BUSINESS INTELLIGENCE

Transactional systems that use ERP (Enterprise Resource Planning), CRM (Customer Relationship Management) and SCM (Supply Chain Management) technologies generate a large volume of data, but managers are not interested in the data stored by these technologies, but in their reports or in the transformation of data into useful information for decision making. The Gartner Research Group (2004) evaluated the combination of the data overhead generated by transactional systems and the demand for better and faster decisions and concluded that this combination creates pressures to implement Business Intelligence (BI) technologies. BI technologies aim to consolidate the large volume of transactional data and provide tools to facilitate the analysis for managers.

Business Intelligence is the technology that allows the construction of analytical resources from internal sources and external data. Usually uses ETL processes (Extract, Transform and Load) for grouping the data into an analytical database, separate from the typical transactional ERP technology. Consultations and analytical reports have been around since 1960, the challenge of Business Intelligence is to create greater flexibility and usability for the generation, by the consumer of the information, of personalized information so that there is no need for technical knowledge to create the report or database query data. Flexibility has always existed, but depended on technical expertise, for even the technical barriers could be hard to overcome for this flexibility. The needed flexibility is so that it should allow the construction of reports according to the immediate needs of information, development of rankings, comparing budgeted x real costs and other historical analysis that should be performed, on-the-fly, without the need of technical experts.

Business Intelligence Technology can be considered an evolution of technologies developed in past decades as EIS (Executive Information System) and DSS (Decision Support System). The EIS and DSS technologies existed in emerging markets with the same purpose of BI: supporting informed decisions. BI currently aggregates different tools such as Data Warehouse, Data Mining and statistical analysis in order to provide information to support management decisions. The FIGURE 33 shows seven categories of analytical BI technology applications: Management Cockpits, multidimensional analysis, Data Mining, Alerts, Queries and Reports, Statistics and Simulations.



FIGURE 33 - ETL process and BI application

The Main Source of data for the ETL process are the transactional databases such as ERP, Web and legacy systems. The spreadsheets, text files and other storage media can also be sources of data. The cockpits consolidate information for management executives. Messages, in the form of proactive triggers, alert managers when an anomaly is detected in processes. The multidimensional analysis provides several insights grouped under the data set, enabling features like drill-down. Data mining techniques can reveal trends and behaviours in standard business processes. Tools for flexible queries and reports complete the group of analytical applications typically found in software packages.

There are differences between transactional database (OLTP -OnLine Transactional Processing) and analytical (OLAP - OnLine Analytical Processing). The databases stores transactional data from operational transactions, sales orders, inventory, purchasing, finance, accounting and billing among others. The transactional database undergoes constant intervention from the users, often simultaneously.. An ERP, for example, uses a transactional database. The databases store analytical summaries of the transactional bases to allow the use of analytical applications with greater flexibility and performance. The analytical databases are usually read only, whereas in transactional databases technicians are more caring with the data, in order to avoid redundancies in the modeling. In the analytical databases some technical misconceptions are acceptable in the name of performance, ease of access and flexibility for users manage their own analysis without resorting to IT technicians.

Cockpits

The management cockpits, dashboards, or simply panel performance indicators summarize consolidated information for executives. A common mistake is generating excessive indicators as shown in image 34. A focus should be created on comparative performance information, grouping information by subject with simplicity and flexibility to obtain timely information for the decisions

A panel of indicators should be flexible to both present the KPIs related to the organization's strategic objectives as well as customized KPIs by executive and management area. The panel needs to be dynamic so that the businessperson can select which ones to monitor, reviewing goals and setting up alerts to deviations. Stratified information should be accessible from the panel for drill-down analysis by items such as vendor, product, region, type of defect, customer and others. A panel cannot be isolated, must be integrated with other analytical tools, such as rankings, trend calculations and multidimensional analysis.



FIGURE 34 - management Cockpit

Alerts

Alerts are events sent via e-mail, mobile phone or other resource that are automatically triggered according to pre-set rules that monitor data. Alerts can be generated with or without integration to workflow processes when certain conditions occur. An interesting example of integration would be, when a budget gets overflown, the alert for an interested manager could be automatically generated in the form of a request for approval. This integration allows the manager to approve or disapprove the budget gap quickly. The value of information is greater when it employed in a preventive way from calculations and predictions.

Statistics can be used to generate intelligent alerts. The systematic use of statistical tools applied to business processes expects to reduce variability, identify trends and quickly detect unwanted variations. Techniques for Statistical Process Control (SPC) can be used integrated with business intelligence tools to detect abnormal situations. The simplest frequently used alerts are analysis of variations between goals and results, purchasing responsibility, cost overruns, costs incurred beyond the planned, improper trade discounts, negative cash flow, inventories above the maximum allowed, etc.

Cubes

Multidimensional analysis is the most common analytical capability of Business Intelligence. This type of application origins from a structured database and simplifies data crossing. The process of loading the transactional database to compose the new databases with greater analytical potential is called ETL (Extract, Transform and Load). In the ETL process, data is extracted, cleaned and transformed into the appropriate format for storage in the consolidated database (BRACKETT, 1996; SINGH, 2001).

The data is commonly stored in structures called cubes, as shown in FIGURE 35, in the form of a Data Mart or Data Warehouse. Data Mart is the term used when applied to departmental solutions, and data warehouse and when modeling involves the whole business unit. The technology creates an abstraction of information, allowing different angles of vision, grouping the data in the form of additions, minimums, maximums and other mathematical operations with the indicators chosen by the user. Any of the analysis items can cluster or organize data that exist in the cube in daily, weekly, monthly, quarterly, annual or other userdefined periods (BRACKETT, 1996; SINGH, 2001).



FIGURE 35 - multidimensional analysis

In FIGURE 35 there is an example of a view with the sum of revenues and costs grouped by region with subtotals by year. If detailed information is necessary, an operation called drill-down can open the addition of one region or customer and so on. The tools usually provide resources so that the user can set up their own views without the need to demand services from extra technical staff, allowing the construction of rankings and comparative analysis. Spreadsheets also provide multidimensional analysis capabilities through dynamic charts and graphs (Pivot Tables).

The construction of one or more cubes for storage in a format that facilitates rankings, maximum, minimum and other basic mathematical operations and analysis facilitates access to information but does not add analytical capabilities that enable more discoveries. Data Mining is called by Goldschmidt and Passos (2005) of true technology for KDD (Knowledge Discovery in Databases), relying on specific techniques or traditional and Neural Networks, Fuzzy Logic and Statistics.

Data mining

Atre and Moos (2003) believe that Data Mining is the analysis of data with the intention of discovering hidden patterns of information in large masses of data that is capturable in the daily routine of normal business. Data mining cannot be confused with reporting and queries, and is also different from conventional statistical analysis. Data mining does not need a hypothesis as the statistic does. Instead of having equations to solve these assumptions, Data Mining runs algorithms that automatically generate their own equations. Statistical analysis data can be filtered out during analysis and Data Mining; these should be cleaned and filtered before the analytical process.

The cubes are natural sources of data for application of data mining techniques because they contain a wealth of business data already collected, consolidated, validated and cleaned through the ETL process. The cubes may contain external demographic and geographic data that, combined with internal data, can assist in the analytical data mining to search for patterns, relationships and associations. Data Mining can be applied to transactional databases, but is not indicated because the data isn't clean, the access performance can be low as it isn't organized in a historic day, week, month or other appropriate pattern as the data sets. Atre and Moos (2003) describe specific techniques such as Data Mining: Association, Sequence, Classification, Clustering, Regression and Time Series.

The Association (Market Basket Analysis) analysis is a simple event such as a purchase and can lead to conclusions such as "If item A is part of an event, then there is X% probability that the item B is part of the same event". Using the Association, the company may, for example, relocate items within a store to maximize sales.

Sequencing is an analysis similar to the Association, with the difference that the analysis takes place over time and can lead to conclusions such as "After the customers buy product A, there is $X^{0/6}$ probability that they will buy the product B within the next Y months". Using an analytic tool such as Sequencing, the company can directed discounts to those consumers.

Classification is an analytic capability that lets the company discover who is and is not a potential customer to a certain type of product. In classification analysis the customers or items are grouped in advance according to pre-set, user defined labels, such as loyal, high spending, frequent, the people who respond campaigns by e-mail, people who often return with problems. This feature allows the reduction of analytical costs with promotions in direct marketing campaigns when the tool create rules for automatic classification based on these groups

Cluster analysis is similar to the classification with the difference that the groups are not predetermined. The Data Mining tool assembles the groups automatically. For the application of cluster analysis, techniques used are Neural Networks and Statistics. This analysis is used, to detect problems in manufacturing groups or to find affinity groups for credit cards.

Regression uses one of two forecasting techniques: values from known data to predict the future or based on historical values to calculate trends and statistics. An example of use of known data is forecasting sales of accessories for sports cars based on the number of sports cars sold last month.

The time series differ from regression techniques because the prediction depends only on values of temporal data. For example, determine the rate of accidents during a holiday based on the historical

rate for holidays in previous years. Properties can be attached to the date values as hierarchies of periods, days, holidays, seasons and date ranges.

Other analytic resources that data mining can use to build predictive statistical models for analytical purposes, discover relationships between records in the database, the database segment, detect deviations that could mean anomalies, such as a customer who bought frequently and suddenly spends a long time without buying. Data Mining is a resource that can help companies in figuring out the expenditure regime the customers, what they like and dislike and other information about their purchasing habits.

Reporting

It is important to select the right tools and functionality for each user type of Business Intelligence as shown in TABLE 12. Gartner Research Group (2004) lists six possible benefits from BI technology: direct results, increase profitability, streamline processes, make better decisions, manage goals and minimize risks. According to the needs of internal / external and user profile, different tools and features are indicated. Queries and reports are listed by Gartner Research Group when the number of users is high. The spreadsheet tools are considered suitable for casual users.

Criterea	Executives	Functional	Power users	Occasional	Partners
		managers		users	and
					costumers
Number of	Dozens	Dozens to	Hundreds	Hundreds	Hundreds
users		hundreds		to	to
				thousands	thousands
BI tools and functions	Cockpits, queries and reports	Reporting, cubes, alerts and cockpits	Advanced queries, cubes, flexible reports, data mining	Reports, spreadsheets	Reports
Strategic value	High	Médium	High	Low	High
Access media	Intranet				Extranet

TABLE 12 – Users and BI functionalities

Source: GARTNER, 2004, p. 6.

Microsoft Excel isn't an BI focused application, but it is one of the most popular in terms of productivity for users to collect, manipulate and present data. The challenge is to integrate the Excel BI platform and help IT professionals to control and eliminate the anarchy generated by the numerous spreadsheets scattered throughout the organization. Millions of users use Excel to manipulate data and create their own reports on the tactical and operational levels (GILE, 2005).

The FIGURE 36 shows the partial result of Gile's (2005) research, which was made with 41 users using reports / analysis and with 56 users who create reports / analysis with Excel in North America and Europe. Research shows that Excel is an important tool and should be considered in the strategy to adopt business intelligence within the enterprise.



FIGURE 36 – EXCEL as a BI tool Source: GILE, 2005, p. 4.

The flexibility to integrate data, structuring complex financial modeling scenarios, share data and develop multidimensional analysis makes users adopt Excel as a productivity tool. However, the links between worksheets make the administration of origin and destination of each information inside the endless formulas created by users a very complex task. The possibility of manipulating data generates mistrust on the information presented. A spreadsheet can be attached to an e-mail and disseminate confidential information the lack of access control, only recently addressed by Microsoft. These facts mean that Excel is not seen as a tool suitable for Business Intelligence Projects (GILE, 2005).

To solve these problems, Gile (2005) highlights some trends that can minimize and even eliminate them: 1) Create a central database with data packaged as data source for reports in Excel; 2) Relate the Excelbased data access security features; 3) Create different forms of access by user type routines to import / export; 4) Integration of supplements and products that mimic the interface of Excel. The BI product vendors, aware of these trends are already integrating their solutions with Excel spreadsheets (GILE, 2005).

The conclusion of Gile (2005) is that Excel should be considered as part of the BI strategy for the user companies and providers of management software. Both users who create reports and analysis in Excel and users who use these reports already approved the solution. Spreadsheets are not BI solutions, but they are in the organization's routine and are here stay.



FIGURE 37 - managerial report

The image 37 shows a typical management report. Listings and detailed reports generate an unnecessary volume of information to the manager. A management report presents historical and comparative information so that the result can be clearly interpreted and questioned.

Statistics

With the Statistical Process Control (SPC) improvement management is based on data and facts. Central Tendency and Dispersion statistics check the level of defects in the process. General Electric's Six Sigma method became known worldwide after reporting improvements in the processes that were achieved through the application of this method. In the Six Sigma a defect is an event that does not meet the customer requirements. One sigma represents one standard deviation as shown in FIGURE 38. A process with Six Sigma performance generates only 3.4 defects per opportunities million (ECKES, 2001).





Nikkel (2002) suggests using the eight rules of the Nelson test for the detection of special causes of variation on control charts. The control chart is divided into six zones with width equal to one standard deviation symmetrically located in relation to the average line, as shown in FIGURE 39. The failure of a single test will reveal the presence of special causes of variation. The eight tests are:

1) a single point beyond zone A, ie, above the upper limit or below the lower control limit;

2) seven consecutive points in the same half of the graph, ie, all above or all below average, an event known as "race";

3) seven consecutive points steadily increasing or decreasing in the graph, an event known as "trend";

- 4) fourteen consecutive points alternating up and down on the chart;
- 5) two of three consecutive points in zone A;
- 6) four in five consecutive points in zone A or B;
- 7) Fifteen consecutive points in zone C above or below the average;
- 8) eight consecutive points on either side of average with none in zone C.



FIGURE 39 - Statistical process control

The FIGURE 40 shows the process of improving the performance of a process over time. To reach the last stage where a significant reduction of costs in relation to the process out of control is possible, the process must go through several phases. An example of this improvement process is the case of water treatment companies. One feature of drinking water is the pH that measures the acidity and alkalinity of water, which has a target of pH 7, but can range between 6.5 and 8.5.



FIGURE 40 - Statistical process improvement

When water is outside this range, acid or base is added depending on the desired effect. In the case of a water treatment plant that can mean thousands of pounds of material with a significant cost. In this case, it makes sense to move the process mean towards a goal that requires the consumption of acids and bases that minimize the cost. Before the shift, it is necessary to reduce process variability, the statistical process control helps reduce costs and maintain the process within the parameters that ensure customer satisfaction.

BI tools promise to ease and smooth management through the creation of personalized reports. If for every change in a report a support call is required, the solutions become slow and stressful for both the executive and the technicians. Tools to generate queries and reports have been around since the 60s, the challenge of business intelligence tools is to create greater ease and flexibility for the generation of personalized information by the consumer of information. The creation of the facility should be there is no need for technical knowledge to create the report or query. Flexibility - that has always existed but was dependent on technical expertise - needed is so that it should allow the construction of reports according to the immediate needs of information. Preparing ranks, comparing budgeted X executed projects and historical data analysis can not be dependent activities of specialized technicians.

Controlling the business process is all that matters. The tool can be analytic using the technologies of Business Intelligence, an automatically generated report or a form that has manual control. Depending on the nature of the business process, should be applied advanced technology. The control maintains the business processes within the parameters set by the owner of the process.

Control and planning of change act as opposing forces on the business processes, while the control reinforces the status quo of the situation and provides rewards for satisfactory performance, the planning of change challenges the status quo to new heights of performance. The people apply the knowledge and decide to continue with the control or the best time to change. As the inevitable change, the control prevents the chaos and maintains stable business processes.

9 BUSINESS CASE

Wealth is like seawater. The more we drink, the thirstier. Schopenhauer

An alternative to justify an investment is to develop a Business Case. The scope of the Business Case is a strategic initiative, project or strategy, different from the scope of the Business Plan, which considers the business as a whole. Brannock (2004) cites six critical steps in preparing a Business Case:

- 1. Case charter;
- 2. action plan;
- 3. alignment meeting;
- 4. actions;
- 5. preliminary report;
- 6. final report.

The drafting of the charter is a step often overlooked, but it is an important step. This document describes the problem scenario, objectives, scope, outputs (deliverables) together with an estimate of effort and time for meetings, surveys, studies, trips, activities and other resources of the sponsor to prepare the Business Case. The executive sponsor of the Business Case approves, refutes or requests more details over the case, based on the presentation of the charter.

While the charter mentions "what" is done, the second step in the action plan sets out the "how" to do, respecting the resource constraints established in the charter. The action plan considers the technical aspects to operate and deliver the products defined in the charter. The action plan, after reviewed and approved by the sponsor, is reviewed at the meeting of alignment.

Those involved in decision-making and those that executee the plan are invited to the alignment meeting. At this meeting the sponsor and

team leader present the operation plan of action. According to Brannock (2004), the goal is to make small adjustments to the plan and commit into a "psychological contract" with the Business Case and its goals.

The duration of the execution of actions can be up to 12 weeks for Business Cases that are more elaborate. Brannock (2004) explains that this time may seem long, but it is common to find plans that start and are constantly delayed, stretching for years. Being strict to the schedule is critical to the credibility of the team that develops the business case.

The preparation of a preliminary report incorporating improvements during the initial evaluation is a good practice. Brannock (2004) suggests a period of 10 days to disseminate the draft report among key stakeholders to collect questions and suggestions. Adjustments to the final report, with suggestions from those involved in the decision-making process, help to clarify critical points on the final report

To Brannock (2004) the final report should contain the following sections:

1) Executive Summary: 1-5 page summary containing a synthetic, clear and precise about the Business Case objective, a brief description of the alternatives and recommendations for approval (go) or rejection (no go);

2) Description of the problem: 20 to 10 pages containing a description of the current situation (AS-IS), changing needs and goals of the Business Case, the scope, level of analysis and finally the alternative solutions (potential scenarios, TO -BE);

3) Analysis of alternatives: from 15 to 30 pages to analyze the alternatives with focus on quality, pros and cons, potential benefits and costs involved;

4) Economic analysis: 15 to 40 pages to analyze quantitatively each alternative;

5) Final considerations: 1 to 10 pages for an overview of the report and, if appropriate, solution recommendations.

The section number 3 (analysis of alternatives) is the most important of the final report of the Business Case according to Brannock (2004). This section is called Business Case Analysis (BCA). Devaraj (2002) also states that in many situations a cost-benefit analysis of the alternatives is enough to justify investing in a strategic IT project.

The use of cost-benefit analysis is not a substitute for more sophisticated statistical and financial analysis. However, if there is no economic or political pressure to demonstrate these calculations, then there is no need to spend time and resources on this activity because it does not add value. The Business Case is easier to be developed if there is a "pain" felt by people in the organization, for example, dissatisfaction with information systems, loss of market share, customer dissatisfaction, among others (DEVARAJ, 2002).

To Remenyi (2003), a business case for IT investment involves a process that goes beyond financial estimates to solve business problems the organization. A financial statement of investment, if presented in isolation, is inadequate to justify an IT investment. Remenyi (2003, p. 6) Business Case defines as: "[...] a justification for direct action to achieve an organizational purpose or goal [...]".

To Remenyi (2003), the business case often evolves a financial evaluation comparing potential costs and benefits. Organizational culture determines the ideal shape of the Business Case. The use of Business Cases with a significant degree of subjectivity is quite common. To be subjective, depending on the culture of the organization, may be the simplest way to approve the investment. Remenyi (2003) proposes the consideration of five dimensions in Business Cases for IT projects:

- Strategic alignment:
- results;
- stakeholders;
- technology;
- risk.

The Business Case must demonstrate that investments align with strategic goals. In the dimension that contains the results it is important to identify: Why the problem exists? Why is it a strategic opportunity for improvement? What performance indicators will measure the improvement? What results are expected? In the stakeholders dimension it is important to identify: Who is the sponsor? Who will be the project manager? What are the competing projects? Who is against the project and why? What people have resistance to this change? Who will benefit? In the technology dimension it is important to identify: Which part of the project may be executed by third parties (outsourcing)? Potential solutions integrate with current IT architecture? What are the bottlenecks in IT that have to be overcome? The organization has the necessary skills for the project or will it develop? What are the costs of software, hardware, telecommunications, installation, training, maintenance? In the risk dimension it is important to identify: What are the potential risks? What is the probability of failure? What is the impact of a failure in design and business? Remenyi (2003) concludes that using the Business Case approach for approving investment projects is a key aspect in building consensus among stakeholders and IT staff: everyone feels "co-creators" of the solution.

9.1 ECONOMIC VIABILITY ANALYSIS

Any claim to develop a complete model for making investment decisions is inadequate because these decisions are complex. Two factors work in opposite directions in the investment decision: return and risk. While the idea of future gain or return attracts investors, the risk shoos them away. An investment project can be interpreted as an effort to improve the information quality with intended and unintended investment implications, reducing investment risk. The data acquisition should continue up to the point where the cost of collection and analysis matches the expected gain to be obtained with the use of this information (SOUZA; CLEMENTE, 2008).

Souza and Clement (2008) classify the analysis indicators of investment projects into two groups: indicators related to profitability (gain or wealth generation) and risk related. Among the indicators related to profitability are: Net Present Value, Net Present Value Annualized, Internal Rate of Return Index, Benefit / Cost and Return on Investment added. Among the indicators related to risk are: Internal Rate of Return, Investment Payback (payback) and the Fisher Point. These indicators help the perception of the expected behaviour between risk and return. Some investors are risk averse and thus a willingness to give up additional gains and not face a higher level of risk. The scope of this book is limited to three indicators of the investment project or business case:.

O escopo deste livro está limitado a três indicadores do projeto de investimento ou *Business Case*:

- Net Present Value;
- Internal Rate of Return;
- Payback..

The site www.businesscase.com.br that complements this book offers a financial calculator to calculate and analyze the three indicators listed above. For that it is necessary to input the following information:

- Cash Flow;
- Minimum Rate of Appeal;
- Reinvestment rate;
- Financing rate;

Cash Flow

The FIGURE 41 shows a diagram called Cash Flow; in Business Case, Cash Flow shows the value of the investment costs and returns over the years in which the project will be evaluated by indicators of economic viability. For Souza and Clement (1999) the essence of financial mathematics is the analysis of a monetary value today and given a monetary value in the future. Financial mathematics is a branch of mathematics that studies the changing value of money over time based on an interest rate. The dilemma of the preference for liquidity over immobilization with the expectation of future gain is because money has value over time.



FIGURE 41 - Cash flow

Internal Return Rate

The Minimum Rate Attractiveness (MRA) is the best rate with a low degree of risk and capital available for application under review. The MRA is influenced by market interest rates such as Basic Financing Rate, the Referential Rate, Interest Rate and other localized rates as applicable. The financial market uses one logic were the cost of capturing money is higher than the profit for investing. Thus, the MRA ends up being a floor and a ceiling setting (SOUZA; CLEMENTE, 2004). If the Internal Rate of Return does not reach a minimum rate of attractiveness, the projected investment is rejected (KASSAI et al., 2005).

Before calculating the IRR of the project, it is recommended by Kassai et al. (2005) an adjustment of cash flows considering two market rates:

- reinvestment rate;
- funding rate.

The FIGURE 42 shows this calculation process. All values of expected returns are considered for the calculation of a single future value (FV - Future Value) adjusted for the reinvestment rate. This answers the question: How much would the final year of cash flow be if the returns of the project were applied to the reinvestment rate? At the other end of Cash Flows, all values of investment and miscellaneous expenses of the project are considered for the calculation of a single Present Value (PV) adjusted by the rate of funding. This answers the question: If the investment and total expenditures were all made at the beginning of cash flow, how this would be worth considering a financing rate? This simplifies the operating cash flow for the calculation of Internal Rate of

Return. When the Internal Rate of Return calculated this way is called the internal rate of return adjusted by the market (MIRR - Modified Internal Rate of Return).



FIGURE 42 - Modified internal Rate of Return

NET PRESENT VALUE

The Net Present Value (NPV) is the most known and used method for investment analysis. The Net Present Value is the result of the concentration of all values of a cash flow at the time zero using the MRA (Minimum Rate of Attractiveness) as the discount rate. If the NPV is greater than zero means that the project adds value and deserves further analysis (SOUZA; CLEMENTE, 2004). The investment project is economically viable when the NPV is positive (KASSAI et al., 2005); method shown on Figure 43:



FIGURE 43 - Valor Presente Líquido

Payback

The payback period on investment is a risk indicator that takes on greater importance in dynamic and globalized environments because you cannot wait too long to recover the investment. Payback is the number of years required for the return flow to exceed the invested capital (SOUSA; CLEMENTE, 2004), and varies with the rate of return. Kassai et al. (2005) cites the example of savings account that, at one point had an yearly rate of return close to 6.17%. Using the formula that relates rate of return and payback, the period required for recouping that investment was 11.6 years. The formula for this relationship and the graph generated by it is shown on FIGURE 44:



FIGURE 44 – Return rate and *payback* Source: KASSAI et al., 2005, p. 34.

There are several other ways to calculate the payback. The most used is the traditional payback. To calculate the payback, one adds the values from the cash flow directly, ignoring the fact that money has a different value over time. The payback is similar to traditional payback, with the difference that the values are discounted with consideration to the MRA. Kassai et al. (2005) present five different techniques for calculating the payback. The site www.businesscase.com.br contains these three methods: traditional payback, discounted payback (MRI) and modified internal rate of return set by the market (MIRR). To use the investment calculator in the site it is not needed advanced knowledge of financial mathematics. Just the cash flow of the project and validation the other parameters is required. The site calculates the net present value, the IRR and payback period. As a result of these three calculations it is possible to financially justify.

9.2 INVESTMENT DECISION

The budget is the result of the budgeting process, and in order to plan, the Sales and investment plan and operating expenses must be considered, as shown in FIGURE 45. The investment plan, when deployed from the initiative, it is dynamic because it is subject to synchronized review and analysis with the strategic management process.



FIGURE 45 - Investment plan and Strategic Initiative

Justifying an investment is always a good practice, and, for this, financial mathematics is a tool. Inside the financial perspective, when acceptable levels of return aren't encountered, there is little stockholder motivation to change the organization. Investment decision divides two distinct moments, as seen in FIGURE 46. The ranked moments are "before" and "after" the investment decision. At the first there is focus on financial calculations for analysis of economic feasibility of projects. After the decision to invest there is need to seek council with the company's accounting to assess the impact on the organization's assets. In the second phase the actual results are checked for comparison with the calculated values at the time of investment decision (KASSAI et al., 2005).



FIGURE 46 – Investment decision Source: Adapted from KASSAI et al., 2005, p. 46.

Accounting measures are equivalent to the Internal Rate of Return (IRR - Internal Rate of Return) and Net Present Value (NPV - Net Present Value). The ROI (Return on Investment) is accounting equivalence to the IRR and represents a ratio of operating income and investment value. EVA (Economic Value Added) is the accounting equivalent to NPV accounting and represents the value after the organization pays all invested resources. Kassai et al. (2005) presented several formulas for calculating the ROI, EVA and other financial and accounting measures, as well as alternative formulas for the calculation of Payback, Internal Rate of Return and Net Present Value.

The Business Case is a tool used to professionalize management. Investment decisions are documented with a rational analysis of facts with information about qualitative and quantitative. The strategic alignment of the investment is shown in a qualitative and financial results for the investment are shown quantitatively, and the balance between qualitative and quantitative analysis depends on the culture of each organization. Professional management uses the Business Case as a tool to sell an idea.

10 LEARNING ORGANIZATIONS

We don't see things as they are, we see them as we are. Talmud

Organizational learning refers to the process of how learning occurs, considering the skills and processes to build and utilize knowledge (MARQUARDT, 1996). In learning organizations, people continually expand their capacity to improve the results because they work in environments that promote high standards of thinking and encourage people to learn together (SENGE, 2000). The use of organizational learning practices can help organizations develop flexible systems and adaptable structures.

10.1 CORE COMPETENCES

Organizations learn through individuals who learn. The individual skills, when grouped, result in a collective competence. Learning should be encouraged to develop core competencies in the organization. For Hamel and Prahalad (1990) the competence is essential (core competence) when it passes these three tests:

1) provides potential access to a wide range of markets;

2) contributes significantly to generate perceived value to customers in the products and services;

3) is difficult to be copied by competitors.

Usually an organization has five to six core competences. If the list up to 20 or 30, that probably means that they are not core competences. Developing core competences in the organization helps in the creation and maintenance of competitive advantages (PRAHALAD; HAMEL, 1990).

The short-term competitive advantage can be derived from price, performance or other products' attributes. At long term it derives from

the ability to build, at lower cost and faster than competitors, products and services that are industry leaders. The Real Source of competitive advantage is the ability of managers to consolidate new skills and technology to allow rapid adaptation in order to take advantage of business opportunities. To develop the core competencies the company needs a deep commitment of people at all levels and functions of the organization. A core competence does not wears down through time and the more it is broadly used, the more it strengthens the organization (PRAHALAD; HAMEL, 1990).

10.2 FIVE DISCIPLINES IN LEARNING

Senge (2000) emphasizes that the best organizations of the future will be those that can figure out how to awaken the learning ability of the people. To help organizations in that process, Senge (2000) coined the term "learning organizations" linked to the five disciplines. The "learning organizations" establish systems thinking, mental models, personal mastery, shared vision, group learning and dialogue as the basis to support the creation of knowledge, as shown in FIGURE 47.

The **personal mastery** helps to develop patience and the ability to perceive reality objectively, and by personal choice, leads the individual to share information and knowledge. The personal mastery includes the physical, intellectual and emotional development. The practice of the discipline of personal mastery enables clarification about what is really important in people's lives, aligning personal goals with organizational actions. The difference between where the person presently is and where the person wants to be a creative tension that forces people to seek a solution and change.



FIGURE 47 - Learning organizations

Mental models can be simple or complex theories and generalizations that influence what people see, and how they understand the world and act. Changing the mental model means making interpersonal relationships to improve the view of the world and change underlying assumptions. As mental models are dynamic, changing the mental model generates new behaviours.

The **shared vision** is the establishment of common goals that help people to share their knowledge with focus and without wasting energy. Having common goals creates a sense of community and generates commitment to continuous improvement. The establishment of a shared vision depends on effective leadership.

Knowledge flows from the individual to the group and from the group to the organization. This process begins with the uncompromised dialogue without preconceived ideas to enable **group learning**. The group thinking amplifies the set of problem-solving skills. An individual complements the other to generate innovative solutions. A group ends up helping another group in spreading best practices within the learning organization. Thus, the individual knowledge is transferred to the organization.

The fifth discipline is **systems thinking**, thoughts turned to the corporate body so that no action is taken without considering the impact on other areas of the organization and society. System thinking integrates the other four disciplines of learning so that the whole is greater than the sum of its parts, generating synergy.

In learning organizations, managers assume the role of tutors, guides and internal designers interested in developing people and their individual skills. Managers should align the development of individual skills with the skills desired by the organization. Competitors can reverse engineer and copy any product, but competitors can hardly copy the competence based on groups of people.

10.3 ORGANIZATIONAL LEARNING CYCLE

The evaluation process of the strategy links strategy formulation to strategy execution. It serves as a liaison to ensure that it runs in accordance with the strategy. The evaluation of the strategy, as an integrating element, provides the Source of information through which an organization can create learning, acquire knowledge and adapt their strategies to the competitive environment (MCGEE; PRUSAK, 1994).

The challenge for organizations is to understand what learning means and how it happens inside each one, how it is processed and how it is transferred to the organization. Learning results in improved performance by focusing on improving management and cultivating a team along the lines of a small business. The learning process is the lever for the knowledge organizations (ANGELONI, 2002).

A strategic initiative is a strategic project. The projects generate lessons learned from both success and failure, lessons that can be used to elaborate on points of improvement in new strategic projects for organizational change. The lessons can be learned in the nine knowledge areas of project management according to the Project Management Institute - PMI (2009): cost management, quality management, scope management, time management, integration management, communications management, management risks, human resources management and acquisitions management.



FIGURE 48 – Stretegic Learning Source: Adapted from KALLÁS; COUTINHO, 2005, p. 258.

In FIGURE 48 two cycles can be identified in reviewing the strategy: monitoring cycle and the learning cycle. The monitoring cycle, when run on a monthly basis, shows the reached and those that still require intervention objectives or revision of indicators, targets and initiatives. In the learning cycle, with approximately quarterly intervals, reflections may question the validity and consistency of cause-effect relationships and identify gaps and opportunities for improvement. In the activities of reflection and learning about the strategy problems, temporary unanswerable questions may triggering a review of the strategy formulation process and its foundations.

The learning cycle is an important way of creating and disseminating knowledge in the organization. The competence of a manager is measurable for its ability to reverse an unfavourable situation. Strategic initiatives should be used as projects with well-defined objectives that reduce risks and maximize results. Learning turns knowledge into value-added products and services to organization when helps formulating the best strategies and effective actions.
FINAL CONSIDERATIONS

The Information Strategic Cycle is a management tool. The information is translated into strategic and then into transactional management. The operational information is consolidated into managerial and then strategic. After the strategic learning, the cycle restarts.

It is more important to promote the strategic alignment of IT or identify the impact of the IT market in the formulation of corporate strategy? This book shows that the two points are important and on many occasions demonstrate the importance of the merger between business management and IT. Information plays a key role in the formulation, communication, implementation and evaluation of the strategy.

The Information Strategic Cycle explores both external and internal aspects. Externally it explores practices of Competitive Intelligence and Strategic Thinking to monitor signals in the environment and convert them into executive information; internally, it explores performance management practices for both communicating the strategic objectives and receiving feedback in the form of performance indicators results and the steps taken to achieve the company's goals. In order to an investment in Information Technology to collaborate in achievin management excellence, organizational change must be integrated in this process.

IT took a role as a way of doing things because of its ability to perform activities very quickly and accurately. The globalization of the economy itself had an element of speed that is based on the speed through which information reaches the most distant places of the globe. The contributions to the advancement of IT for the improvement in the business world are undeniable.

IT also can become a sinkhole of transaction costs within organizations. When IT is used to solve problems where it would be possible to apply simpler technology, it generates side effects. The impression people have is that "IT has come to solve the problems did not exist before the use of IT. TO solve problems the organizations should use the critical thinking skills. An information system is formed by the technology, organization and people. Accepting a third party proposed solution without the use of critical thinking, analyzing the three dimensions can generate unnecessary costs and efforts. It is common for vendors of miraculous IT solutions knock at the company's doors saying, "I have the solution to your problems." How can even be a solution, without knowing the problem?

The solution to a problem of information passes through the phases of systems analysis and design. In systems analysis, the problem is defined and analyzed, in order to increase understanding of the causes of the problem, and the most appropriate alternative is selected for implementing. In the system design, the selected solution is planned and implemented fulfill the projected goals solve the problem.

The people transform information into knowledge and improve the results through their actions. People can either be change agents or resistance agents. The solution to a problem of information can be in encouraging, training or creating a conducive environment to people's teamwork. There are simpler and complex, public and proprietary technologies; a business process can use manual or automated technology, and the solution of an information problem can reside on improving the technology.

The IT investment decisions should be analyzed in terms of added value generated from the organizational changes that it enables. The higher benefit and lower the cost of the improvements implemented, the greater the value.

In many cases, the analysis of added value is sufficient to justify an investment. For projects that require reducing risks and maximizing profits it is recommended the preparation of the Business Case, which presents the strategic alignment of the solution and demonstrates financial measures that support the executive decision, such as cash flow, internal rate of return, present net value and payback. The Business Case is a professional way to justify IT investment.

The combination of innovation and continuous improvement is a formula for generating solid and sustained growth. Information technology can help organizations in the change process with tools to support information systems. However, before investing in hardware, software and telecommunications it is necessary to understand the information problem and level of required changes to solve the problem. It is not even emphasizing the strategic alignment of IT, nor the impact of IT in business. We live in an era of fusion between IT and business. The information links business processes to people.

There is no option to change. The organization must change to survive and prosper in business and the challenge is to identify which business processes are critical to improving performance. Frequently the projected indicators in the cycle of Strategic Information do not materialize into information. The learning improves the ability to balance the continuous improvement and innovation correctly.

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APPENDIX – BUSINESS CASE

PROPOSITION OF STRATEGIC INITIATIVE Improving stocking management

Technical responsibles

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PONTIFÍCIA UNIVERSIDADE CATÓLICA DO PARANÁ BUSINESS SCHOOL ENGLISH SEMESTER INFORMATION SYTEMS

BUSINESS CASE



PROPOSITION FOR STRATEGIC ACTION Improvements in inventory management

Team 0

Valdinei Leandro de Santana Luis Carlos Duclós

CURITIBA

2012

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1. Organization presentation

The ALFA Company works within the furniture industry. The industrial plant is located in São José dos Pinhais, having many offices across most states. The company belongs to the European ALFA GAMA recognized as one of the three largest European manufacturers of plastic footers. During the past year, the company underwent steady growth in sales and production of plastic footers.

1.1 Vision

⁴⁴ We will be a global supplier of plastic footers with recognized benchmarks in service, quality, innovation, competitiveness and production capacity distributed more than looking, in a continuous and sustained

the expectations of our customers, employees and shareholders. "

1.2 Mission

⁴⁴ Production and marketing of plastic footers around the world. ³⁷

1.3 Policies and values

Recently the GAMA group has adopted seven critical success factors: service, innovation, quality, people, growth, globalization and the environment. There is obsessive commitment to offering customers an integrated service on continuous improvement with quantified objectives. Innovation helps prioritize investments in new products, technologies and processes. There is also a relentless pursuit of overall quality in the creation of value in services, processes, products and ethical attitudes; the promotion of the appreciation of people who choose to contribute in shaping the future of the group; the deliberate pursuit for rapid growth, both organically and through acquisitions to improve competitiveness in global value creation and reduction of unit costs of marketing, research, procurement, manufacturing and logistics. The use of globalization allows for cooperation with business partners to share experiences, technologies and more advanced forms of organization to maximize profitability and fulfillment of local needs. The group prioritizes social responsibility, best conditions of safety and health in order to prevent damages, and if possible, expand the environmental options available to future generations. The seven critical success factors guide the strategic decisions within the GAMA Group.

2. Strategic theme

This Business Case demonstrates the economic viability of the project to improve inventory management in the company ALFA. The table below shows the relationship between strategic objectives, KPI - Key Performance Indicator, targets and initiatives. The strategic theme is related to the improvement of logistics operations.

Objective	Indicator	Target	Action
Improve profits			
Answear costumer needs			
Guarantee on time deliveries	% of timely deliveri- es	According do the ABC curve: A: 98% B: 96% C: 94%	
Lower stock levels	Total cost of fin- ished goods	Lower 15% in costs from R\$ 1.000.000 to R\$ 850.000.	Improvement on stock management
Empowering people			
Improve mana- gement techniques			

Board 1 – Strategic Theme

The approval of this initiative will help the company ALFA in achieving its strategic objectives highlighted in Table 1. The KPI "Total cost of finished goods in stock" will be improved to achieve the set goal of 15% lower. The strategic theme presents an approach to the strategic map with the cause-effect relationship between strategic objectives, performance indicators involved, the goals and timetable of the proposed initiative.

2.1 Strategic Objectives

The strategic objectives of the unit in Brazil are defined by the Board in Europe. The Brazilian unit follows these strategic objectives that are aligned with the corporate vision of the GAMA Group worldwide. The Brazilian unit has few hierarchical levels and regularly receives visits from directors who are in Europe.



Strategic problem: In the last three years the levels of inventory has increased. This has ensured timely delivery, but at an inadequate cost. The management of logistics in Europe have questioned the inventory levels of the unit in Brazil and asked to identify the cause of the problem and the proposed alternatives to solve this problem. The investment decision will be taken by the Director of Logistics in Europe.

Figure 1 – Strategic Map excerpt

As shown in Figure 1, the company ALFA final strategic objective is to increase profitability. The figure shows how intangible assets are transformed into tangible and demonstrates the relationship of cause and effect of strategic objectives. To increase profitability, the company needs to meet the needs of customers. On-time delivery is critical to customer satisfaction. There is a serious problem with the current level of inventories. The challenge is to find the causes, solving the problem and block the root cause of the problem in order to reduce the inventory level of finished products without compromising on-time deliveries.

2.2 Key Performance Indicator

The Key Performance Indicator related to the strategic objective "Reduce the level of inventories" is the "total cost of the finished product in stock." The average cost is already calculated by the current ERP and will not be difficult to monitor over the course of the implementation of a strategic initiative. Managerially and operationally the problem will be deployed in inventory groups and inventory items respectively. The inventory items are already classified in levels A, B, C according to a ranking of X amount of monthly sales profitability. The classification groups and levels A, B, C helped to identify priorities for improvement focus.

2.3 Goal

The short-term goal is to lower the level of finished goods inventory from \$ 1.000.0000 to \$ 850,000 maintaining the level of customer satisfaction at acceptable levels. The acceptable levels are defined according to the classification A, B, C of stock items. For each item, safety stock will be revised according to the formula:

$$ES = FS * \sigma * \sqrt{\frac{LT}{PP}}$$

Where:

- \checkmark ES = Safety stock
- \checkmark FS = security factor
- \checkmark σ = standart deviation of future demand
- \checkmark LT = ressuply lead Time
- ✓ PP = Standart deviation recurrence

Os itens da classe A serão calculados com 98% de nível de serviço. Os itens da classe B serão calculados com 96% de nível de serviço. Os itens da classe C serão classificados com 94% de nível de serviço. A tabela ao lado apresenta a relação entre nível de serviço e fator de serviço utilizado na fórmula.

Nível de	Fator de
Serviço	Serviço
50%	0,000
60%	0,254
70%	0,525
80%	0,842
85%	1,037
90%	1,282
95%	1,645
96%	1,751
97%	1,880
98%	2,055
99%	2,352
99,9%	3,100
99,99%	3,620

Table 1- Service level

In addition to the KPI "total cost of the finished product in stock" chosen, you will need to monitor the service level indicator in order to prevent the stock from lowering indiscriminately, penalizing the customer. The short-term goal is to lower inventories of finished products. The goal of medium-and longterm is to lower inventories of imported raw materials by reducing imports and developing local suppliers.

2.4 Strategic Initiative

The improvement in inventory management Project is going to help in lowering the stock levels to the expected R\$ 850.000 and reach the strategic goal of lowering stock levels. This initiative is going to be accomplished in 4 months, according to the schedule:



Figure 2 – Schedule: Improving warehousing management accordint to the DMAIC cycle, months june-september

Strictly speaking, the business case does not propose a solution. The Business Case demonstrates the strategic alignment, economic viability and serves as an instrument for the approval of the project budget. The most appropriate solution to be implemented will be established in the late stage of analysis. The implementation of this strategic initiative will use the following steps in the DMAIC cycle of continuous improvement:

- ✓ Define: Is there strategic alignment? Who is the customer? What is the problem? Which satisfy the requirements of sound? The project is economically viable?
- ✓ Measure: What is the frequency of defects?
- ✓ Analyse: What is the root cause?
- ✓ Improve: How to implement the solution in a pilot project?

✓ Control: How to ensure the maintenance of the benefits gained and block the root cause of the problem?

3. Business Processes

Business processes are classified into primary and support. This Business Case demonstrates that the improvement in a critical primary process will help the ALFA company reach its strategic objective of lowering inventory levels. A general diagram locates the critical process in the value chain. The critical process is mapped and some considerations about improvements and changes are made.

3.1 Value chain and critical process

The FIGURE 3 displays the value chain. The Director responsible for Research and Development is in Europe, but innovation can be created in all units in the world. Acquisitions are divided into three processes: import, purchasing of raw materials and services purchasing. Part of the raw materials and semi-finished products are imported from GAMA factories. The logistics also develop local suppliers to reduce dependence on imports. Purchases of services are treated as an administrative process. The tax and accounting processes are treated in the company's ERP, and the tax and accounting reports are also signed by an outsourced accounting office. These are part of the financial control of accounts receivable, accounts payable and treasury process. The critical process treated in this Business Case is the "Management of finished goods inventory" regarding the sales process, planning / scheduling logistics and production.



Figure 3 – Critical process inside the value chain

3.2 Process AS-IS

The process of finished products inventory management involves sales activities of the ALFA company. The sales order is issued by the Client with the support and assistance of the Trade Representative. The order is entered in the ERP by a sales assistant in the Sales Department. In the best situation, the management software checks for available stock and reserves it for this sales order. Every client has a financial limit value of outstanding receivables. The software analyzes current credit and verifies if the outstanding amount of payables plus the amount of the sale order still respects the credit limit. If respected, the billing is released. The sales department does the sales in the ERP that triggers the shipment ETA. The invoice and a payment slip are sent to the customer. This process has caused strains on the relationship between sectors of the company



Figure 4 – AS-IS process

3.3 Needs and Expectations

Workers at the Logistics Department would like the sales staff, the customers and the finance department started agreeing, because "it seems that the people do not talk to each other." The sales order is recorded in

the ERP and when there is no inventory available, the production programmer is expected to run the MRP (Material Resources Planning). MRP plans what the company needs to buy as raw materials in order to produce within the agreed time with the customer and the requested quantities amount. When the material is ready, the sales staff finds that the customer has delayed a payment and the Finance manager does not allow a new billing. People in Finance department complained that the sales team does a lot of pressure to release the product within the same day that the product is ready. The Finance department requests a period of 1 day to do the credit analysis. There are some special clients that should not be checked in credit analysis because they are regular customers that buy a monthly high-volume of products. The Finance department believes that the sales staff should choose potential customers for timely payment potential. Some sellers are calling the finance department asking about commissions over sales that have not yet been paid by the costumers and it is taking a lot of time from the person responsible for payment of commissions. Sometimes sellers insist until the commissions responsible "proves that the customer did not pay." The company will only pay commission after it receives from customers.

People in the Sales Department are excited about the results and obtaining new customers. They have programmed a party to celebrate the record sales of last month. They claim the Logistics team does not recognize the effort they make to develop new customers. They complain about the delay of a few requests due to lack of raw materials. They use the example of a delay in delivery to the largest customer last month, when the Department of Finance took one day to release the billing. People in the sales department said that "the customer is king and only we stand up for the costumer in the firm."

- Below is a summary of needs and expectations described by people:
- ✓ Improve the integration between finance and sales;
- ✓ Increased agility in the release of credit;
- ✓ Secure Access by sales representatives to online commission reports online linked with a list of payments delayed by customers;

3.4 Radical change alternative potential

The ERP supplier already presented the technology to create a colaboration portal. This portal could allow the representatives to post new sales through the internet. Commission reports could be generated by the representatives themselves. Workflows are also presented to allow early warning through email about several preconfigured thresholds. These two technologies could be employed to improve the integration and speed the commercial process.

3.5 Incremental change alternative potential

The MRP considers the safety inventory in order to compute the net purchases. The safety inventory does not consider the service levels accorded with the costumers. The ERP could be customized to calculate the safety inventory correctly. When the ERP was first deployed, the standard credit calculation was implemented. Executing this customisation would allow the safety inventory and service levels calculation before the execution of the MRP. That would help in lowering the inventory levels to the target levels.

3.6 Recommendation

Despite the high relationship improvement between comercial and logistics departments, the colaborative portals and workflows will not be implemented currently. That would be a too big change with too little strategic result. Only the incremental changes are going to be executed: change in credit analysis, implementation of service levels according to the ABC product curve. These are the changes that will help lowering the finished goods inventory.

3.6 TO-BE: Proposed process

In the current process, due to rising payments backlog, many cliof credit ents have problems at the time release. For the ALFA Company this is a very serious condition because the company demands. The inventory levaccording approved produces to els just increase proportionally, by default. In the proposed situation, the moment of credit analysis is anticipated to a point before running the MRP. The previous calculation of safety considers service levels and this will ensure greater availability of A class items.

Additionally, customers will also be classified as ABC. Customers class "A" will have no credit limit. Customers class "B" will have no credit limit, but are blocked if any late payments occur. Customers type "C" are blocked by the credit limit and payment delays. These improvements will help achieve the strategic objective of reducing inventory levels without compromising on-time deliveries.



Figure 5 – Proposed situation

4. Managerial analysis

After implementing the strategic initiative the gap between the curent and the expected results shall no longer exist. The KPI will be monitored by a management cockpit, the cost ranking for inventory, by product and by ABC class, statistical analysis, multidimensional analysis and other tools. The business case team decided to monitor the KPI through a report that compares current and historical yearly data.

4.1 Indicator monitoring

FIGURE 3 presents the goal of inventory reduction: R\$ 850.000. The present yearly average is R\$ 1.000.000. It is noticeable that last year the peak value has been higher then R\$ 1.000.000. The report also shows a steady growth tendency between past years. The managerial report will be created monthly in order to foster the KPI monitoring.



FIGURE 6 – Total cost of finished goods, (1000s R\$), lowest is better

5. Economic viability

To analyse the economic viability, the minimum attractiveness rate, reinvestment rate, financing rate and Project time length have been considered. The tool employed for this calculation is available at<u>http://www.businesscase.com.br/?link=Calculadora</u>

5.1 Analysis Parameters

\checkmark	MAR – Minimum attractiveness rate:	15% e.y.
✓	RR – Reinvestment rate:	6% e.y.
✓	FR – Financing rate:	15%
√	Time length:	3 years

5.3 Cash flow

The required investment is R\$ 60.000. This is going to be used to customize the curent ERP, train people and adjust business processes. The goal of inventory reduction won't be achievable within the first year, due to an incoming high amount of sales. The project forecasts a lowering of R\$50.000,00 yearly. Aditional R\$8.000,00 have been provisioned as additional costs.

Year	Investment	Return	Expenses	Net	Acc. re-
					sult
0	-60.000	0	0	-60.000	-60.000
1	0	50.000	-8.000	42.000	-18.000
2	0	50.000	-8.000	42.000	24.000
3	0	50.000	-8.000	42.000	66.000

Board 2 - Cash flow

Traditional payback calculated over the cash flow is of 1.43 years.

5.4 Net Present value

 \checkmark NPV:

R\$ 35.895,45

O NPV (*Net Present Value*) from financial mathematics is akin to EVA (*Economic Value Added*) in accounting. It also displays the economic added value. Represents the economic value added. For each balance cash flow, the values are discounted to present value by applying the TMA (Minimum Rate of Appeal). Projects with NPV greater than zero add value and are economically viable.

The NPV of this project is greater than zero. Considering the TMA used, this project adds value and is considered economically viable.

The payback is best suited for analysis than the traditional payback. The traditional payback does not consider that money has time value. The payback considers the TMA as the discount rate.

The payback is 1.74 years (s).

5.5 Internal Rate of Return

MIRR - Internal Rate of Return: 30.62% pa

The IRR (Internal Rate of Return) of financial mathematics is similar to the ROI (Return on Investment) accounting. The IRR is the rate that resets the NPV. The MIRR (Modified Internal Rate of Return) is an improved version because it uses the IRR rate financing (TF) and the Reinvestment Rate (TR) to adapt the IRR the market reality. The positive balances of cash flows are reinvested until the end of the project and updated by TR. Negative balances of cash flows are financed and brought to present value by TF. The two totals are used to calculate the MIRR.

The MIRR is superior to MRI. This means that this project is recommended because it generates real gains for investment.

The payback period calculated from the MIRR is 2.59 year (s).

5.6 Payback

The average is between the paybacks of 1.92 years (s). The difference between the highest and lowest period is 1.17 years (s). Among these three calculations of payback, the more conservative of 2.59 years (s). In the field of economic analysis, it is better to be conservative.

6. Technical Responsible

These are the reduced resumées of the business case team, responsible for the activities presented on this work.

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Ph.D. in *Computer Applications in Industrial and Systems Engineering* at University of Southern California in 1982. During 1975 developed the SIG concept in small enterprises, anticipating the informatization viability by fifteen years, before the consolidation of micro computing. In 1983, created the concept of quality and cost control for software TSL – Total Software Life Cycle. Quoted in the book Software Pioneers, written in 2002 by worldwide authorities in Software Engineering,. As CEO of NTS introduced in Brazil the concept of software quality control. Is a Professor in the Business School attached to Pontificia Universidade Católica do Paraná (PUCPR) since 2001 and in the Grupo Educacional UNINTER since 2008.

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M.Sc. in Management, graduated at PUCPR in 2006, following the research line of Information and Knowledge Strategic Management Has been working with IT in business since 1991. Has worked as IT Manager in a multinational company, Consultant, Project Manager and Consultant Manager. Graduated from Universidade Federal do Paraná (UFPR), as Bachelor in Computing, specializing in Quality Management, preferring the term Management Quality. Is currently Director at Pelissari, company specialized in SAP for management improvement. Senior Member of ASQ – American Society for Quality. Is a professor in post-graduation and MBA courses.

7. Final considerations

This business case is merely an example that doesn't aim to be complete or perfect. Each business case must be adapted to the needs of both the individuals and the company. The business case attempts to demonstrate the existence of strategic alignment, presenting a problem and the benefits of solving it. If the business case ends up by being able to approve the budget of a strategic initiative and obtains the compromise, by the high management, then its goals are reached.

Suggestions can be presented directly to the authors through the web site <u>www.businesscase.com.br</u>. The site presents 10 steps to create a similiar case to this example. The practice exercises developed during the classes are also available for download.

In the case of reader usage of the model, please authorize its publication on the web site, according to the following instructions:

- Keep a message on the end of your business case, stating:
 "We hereby authorize the utilisation of this case in the web site www.businesscase.com.br"
- 2. Send an electronic version of the document to any of the authors.

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