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IS/IT User Requirements Definition
A Business and Management Concepts Point of View

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1 Abstract

The specification or the definition of the User Requirements is the process of organizing information about new, or existing final user needs. This study defends that the set of an information system User Requirements, is the base of the sustainability of any new business strategy, and the only IS/IT activity that can be declared for sure, that it's totally included in the organization "Core Competences". So, if it doesn't make sense to give to Outsourcing or to contract Facilities Management to do "Core Business" functions or activities, it's essential to involve the best internal organizations skills and competences in the User Requirements definition activity.

This work developed a model for Business Processes & IS/IT Alignment Strategy Life Cycle, as well as a set of new IS models in order to proceed to the analysis and survey of the user requirements, in a language understandable by all business and engineering managers; "Business and Management Concepts".

2 Main Concepts and Models Used to Support This Study

This chapter describes the main concepts used to support the present study: (i) The Information as a Resource; (ii) Business Processes; (iii) The Role of IS/IT Within the Organization; (iv) Business Concepts Definition; (v) SAM Strategic Alignment Model; (vi) IS/IT Benefits Management Life Cycle; (vii) Software Development Life Cycle; (viii) Reconciling IS/IT and Business Processes Reengineering; (ix) MacFarlan Strategic Grid; (x) Information System Costs Oliveira's Model; (xi) SECI Nonaka and Takeuchi Model of Knowledge Creation; (xii) Vankatraman (1996) DIKAR Model; (xiii) CSF Critical Success Factors Management; (xiv) IS Strategy; Business Intelligence and Competitive Intelligence.

2.1 The Information as a Resource

Information is used as a strategic resource by enterprises and organizations, in order to support competitive advantage. The idea that "information" is a resource like capital or work is assumed today by almost technicians, managers and academics. However, its entrance provoked a deep change in the productive processes as well as in social and occupational structures of the involved human resources. This change wasn't provoked by the information resource itself, but because it compelled the companies and organizations to introduce a set of new languages and methods of raised curries technological, related with IS/IT. (Information Systems/Information Technologies)

According to Castells (2000), in the post-industrialism period the most advanced societies adopted a new social structure provoked by a change in goods production to services production. This new social structure was characterized by the rise of a new generation of knowledge intensity resources, extended to all realms of economic activity through the information processing.

2.2 Business Processes

A Business Process is the set of tasks and rules needed to reach specific results from end-users and to serve external or internal organization costumers.

More than ever, the enterprise managers have the constant responsibility to redefine the undertaken business processes, in order to support competitive advantage. This strategic change formularization and respective IS/IT planning within the organization, must be followed by constants redefinitions and strategic alignments in order to improve organization global performance. So, IS/IT can be used as a tool in order to line up the existing business process with the enterprise strategy to implement. The success of this alignment begins with a full understand of the business strategy to undertake. For this effect it's usual to redesign the Business Processes in order to take advantages of the IS/IT capabilities.

So this study defends that IS/IT and business managers must study carefully all business processes and IS/IT portfolio, in accordance with three basic premises: (i) How IS/IT can improve existing business processes; (ii) How can the information technologies support and undertake the new business processes; (iii) How to align Business Processes & IS/IT, in order to react rapidly to new strategic changes.

Business Processes are characterized by the following components: (i) **Tasks-** Can by characterized as the set of one or more interconnected basic procedures that after finished, contributed in a positive form to the goals of the project or to the sustentation of the organization. Tasks are characterized by the following attributes: (i) Duration, as the time needed to execute a task; (ii) Preceding tasks, which without is conclusion the execution of the current task is compromised; (iii) Linkage Type as the type of link between a task and is precedent. There are four possible linkage types: (i) Finish-to-start (when a start date task, depends of predecessors finish date), but you can also link tasks at their start or at their finish; (ii) Start to start, (iii) Finish to finish; (iv) and Start to finish).

(ii) **Rules-** This study defends that a rule is composed by a set of basic Boolean proposals (true or false), necessary for Business Process execution. Rules are characterized by the following attributes: (i) Rule Exactness as the exactness related with the probability to be true if the antecedent is also true; (ii) Rule Covering that is measured empirically by the number of activities that appeal to this rule. If the rule has a great covering means that one definitive process of business (or set of processes), is very dependent of this rule. Table 1 represents a possible characterization of business rules covering and related exactness:

	Low Exactness	High Exactness
High Covering	The rule is rarely correct, but it is frequently used in this type of business.	The rule is frequently correct, and frequently used.
Low Covering	The rule is rarely correct, and rarely used.	The rule is always correct, but rarely used in this type of business.

Table 1 Characterizing Business Rules

Resources- Humans resources, equipment or materials resources needed in tasks execution. By default equipments and materials are organized by strategic and functional skills.

Human resources are organized and managed by knowledge or skill group members, in business processes.

There are many techniques to execute a Business Process Survey. A standard method is to describe each Business Process in an intuitive Flow Char, through functional areas. The follow Figure 1, represents an example of the use of a business process survey tool.

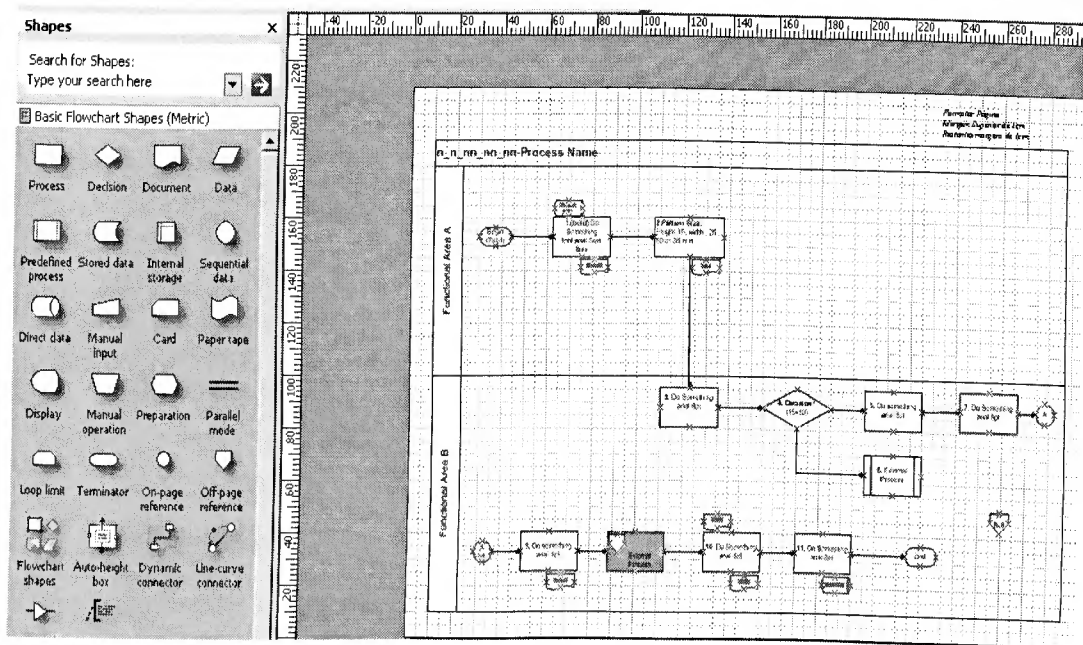


Figure 1: Business Process Survey.

The flowchart presented in Figure 1 is composed by a set of symbols representing business action types that can be used in a linkage sequence in order to present the tasks compositions across the functional Units.

2.3 The Roles of IS/IT Within the Organization

To characterize the roles of Information Systems (IS) and of (IT) Information Technology within the organizations, business and IS/IT managers are likely to have the temptation to condense the two areas in the expression IS/IT and use it as a single designation. However, there is a distinction between the term *Information Systems* (IS) and the term *Information Technology* (IT), since “Information Systems involve the study of theory and practices related to the social and technological phenomena, which determine the development, use and affects of information systems in organizations and society”... [while] ...“It is thus both tangible (e.g. with servers, PC’s Routers and network cables) and intangible (e.g. with software of all types). IT facilitates the acquisition, processing, storage, delivery and sharing of information and other digital content.” (Ward & Peppard, 2002)

According to Tunick & Bosick (1997), the implicit contract between IS/IT and the organization rests on a counterbalancing set of expectations and responsibilities, as showed in Figure 2.

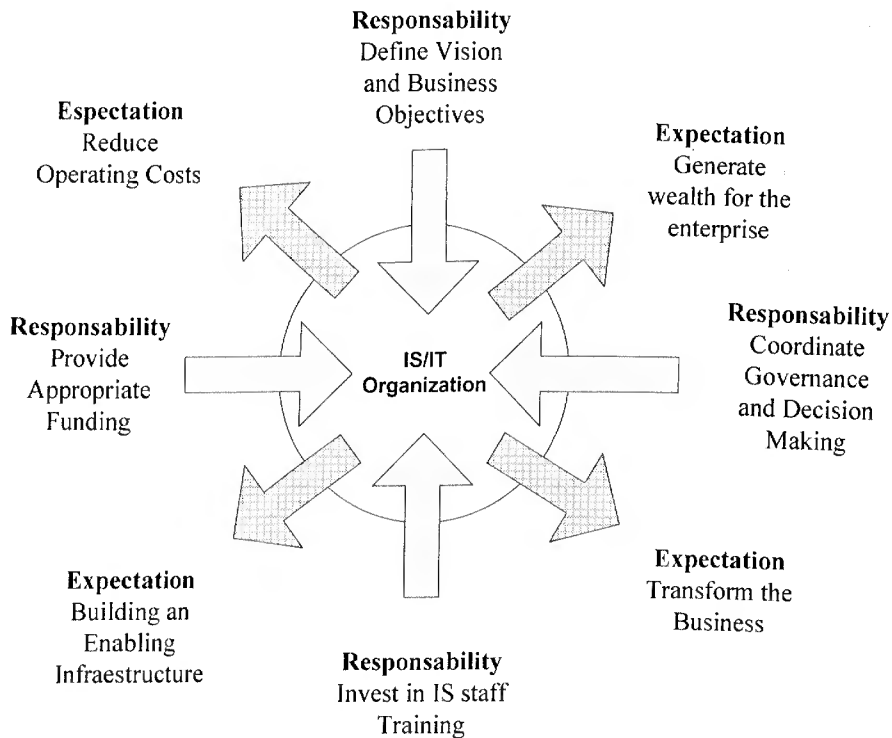


Figure 2: The Organization Responsibility & IS/IT Expectation

Meanwhile there is a major dependence recognized by almost business and IS/IT managers, between organization management and IS/IT capabilities.

In all business responsibility levels, business and IS/IT managers have great expectations in IS/IT outcomes. So, if business strategy is responsible for vision and business objectives definition, business and IS/IT managers expect that IS/IT will generate wealth for the enterprise. In business support responsibilities for the governance coordination and for the decision making, business and IS/IT managers expects IS/IT to build and enabling business infraestructure. Even in business operational responsibilities, business and IS/IT managers expect IS/IT to reduce operating costs and to transform the business.

This model also enhance that organizations have the responsibility to guarantee the appropriate support to IS/IT infrastructure, by providing IS/IT staff training investments and appropriate funding, in order to allow that the IS/IT works in the best conditions.

This set of responsibilities and expectations is a result of an evolution in IS/IT, that escaped from a traditional orientation to support only administrative tasks, towards a more strategic role within the organization.

In the last decade, many IS/IT managers concentrated their work in planning IS/IT needs, linked to long-term drivers. According to Kovacevic & Majluf (1993), only a system clearly linked to the long-term drivers of the organizations strategy has the chance to become a relevant contributor to business success.

In fact, Tunick & Bosick (1997) study was published in 1997, when Globalization was expanding. So this study can be considered a soft approach to IS/IT expectations, although it's well related with the nineteenth decade, because today we are leaving a new reality. Organizations have to compete in a global open market, where products and services life cycle was shortened, and organizations have to change and adapt constantly their IS/IT strategies to new business strategy goals, in order to increase their own innovating capacities. Business and IS/IT Managers have more and more expectations regarding IS/IT. They expect not only to reduce operations costs, or business transformations, but also a *Key contribution* to increase effectiveness and efficacy toward supporting new Business Strategies. In fact, IS/IT can help organizations in adopting new Business Concepts more rapidly as well as new Working Models, in order to win Competitive Advantage from their competitors.

So, this study defends that for most large and midsize organizations without major management dysfunction's at the financial or personal levels, the adverse IS/IT outcomes are likely to result from a lack of alignment between IS/IT and Business Processes.

2.4 Business and Management Concepts Definition

According to Dearlove (2002) Business Concepts are ideas and concepts that shape how we think about the role of managers in a changing business world. So, Business Concepts facilitate the understanding of the set of political, economic, social and technical factors that can influence enterprise decisions or their organizations performance by business leaders, analysts and engineers.

Two main approaches can be used in Business Concepts definition:

Linguistically as a symbolic representation with a general signification that covers a set of objects with common properties.

Philosophically as an abstract representation of an object.

What Business Concepts tries to outline is the value that will be provided by business or what business will do in order to provide potential profits or value-added to business. So, it can be considered as the foundation for all business tasks and activities.

This study considers that all technological and engineering concepts are Business Concepts in their own area. For example Enterprise Management has: Action-Learning; Activity-Based Costing; Agility; Adhocracy; Balanced Scorecard; Benchmarking; Boston Matrix; Branding; Burnout; Channel Management; Core Competencies; Core values; Crisis Management; Decision Theory; Discount Cash Flow; Downsizing; E-Commerce; Emotional Intelligence; etc, while maths has: Infinitesimal Analyses, Analytic Geometry; Statistic Analysis; etc.

In Mechanics and Industrial Engineering Maintenance the main Business Concepts are: Lifecycle Costs Analyses; Failure Mode Effects and Critically Analyses, Fault Tree Analyses; Stock Manager Economic Level's; etc.

According to Dearlove (2002), most Business Concepts have some of the following characteristics:

Temporal Category

They meet an immediate need, or anticipate one that is not yet recognized.

Self Contained

Even though they are built on earlier ideas, the best concepts stand on their own.

They can be understood independently from what came before.

Real World Credibility

Either from the extensive research or from experience at the sharp-end of business and preferably both.

Intellectual Rigor

The quality of thought and insight is another distinguishing feature of ideas that last.

Some ideas are deliberately vague to allow universal applications. Great concepts are razor sharp they have their own internal logic. They are consistent, and provide useful definitions.

Simple

The best concepts are derived from basic and universal principles. They are intuitive and help us to make sense of the world around us.

Practical

Perhaps the real difference between fads and ideas that last is their usefulness to manage-their practical application.

Although the characteristics described bellow, are mainly focused in economical and enterprise management Business and Management Concepts, in general they also can be applied to all the all other technological and scientific areas.

2.5 SAM Strategic Alignment Model

According to Sledgianowski & Luftman (2005), both information technology (IT) and business leaders are continually looking for better management practices that help them align IT and business strategies. This alignment seems to grow in importance as companies strive to link IT and business in light of dynamic business strategies and continuously evolving technologies.

Venkatraman & Hendersen (1991) proposed the Strategic Alignment Model (SAM). The presented SAM model was improved by the same authors Venkatraman & Hendersen (1999), which is shown in Figure 3:

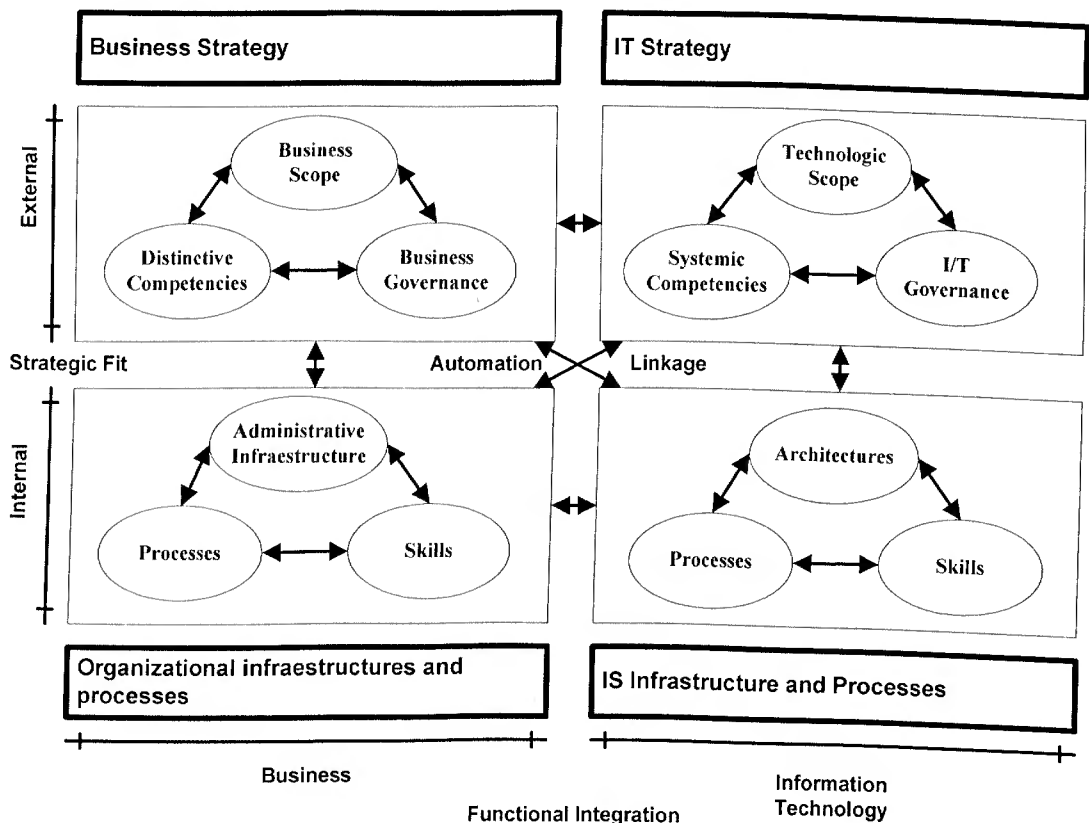


Figure 3: SAM Strategic Alignment Model.

According to Venkatraman & Hendersen (1999), the presented model termed Strategic Alignment Model, is defined in terms of four fundamental domains of strategic choice: (i) Business strategy; (ii) Information technology strategy; (iii)

Organizational infrastructure and processes, and (iv) Information technology infrastructure and processes - each with its own underlying dimensions. The power of this model is illustrated in terms of two fundamental characteristics of strategic management: (i) Strategic fit; and (ii) Functional integration. More specifically, four perspectives of alignment are derived with specific implications for guiding management practice in this important area.

The presented model shows the two fundamental features of strategic management; (i) The strategic fit represents the interrelationships between external and internal components; (ii) And the functional integration represents the integration between business and functional domains.

Venkatraman and Henderson (1999) claimed that the four dominant alignment perspectives that use the two strategies as the driver are equally useful and powerful in thinking about the role of IS/IT in organizational transformation.

This approach provides four perspectives for alignment analysis, with specific implications for guiding management practice in Business and IS/IT alignment, but doesn't answer to simple questions like:

- How to relate a IS/IT task with my Business Processes set?
- How to recognize when and where Business Intelligence must be used?
- How to relate IS/IT intensity costs with global costs?
- How to estimate when and where Business and IS/IT Knowledge are needed?
- When and where IT Maintenance and Technical Support Team is more needed?
- When and here analyze and survey of user requirements is needed?

2.6 IS/IT Benefits Management Life Cycle

According to Ward & Peppard (2002), identifying the IS/IT target benefits implies an iterative process of establishing the investment objectives and the possible business performance improvements that the system and associated changes should or could deliver.

This process model of IS/IT benefits management is an evaluation model that includes five phases as graphed in Figure 4.

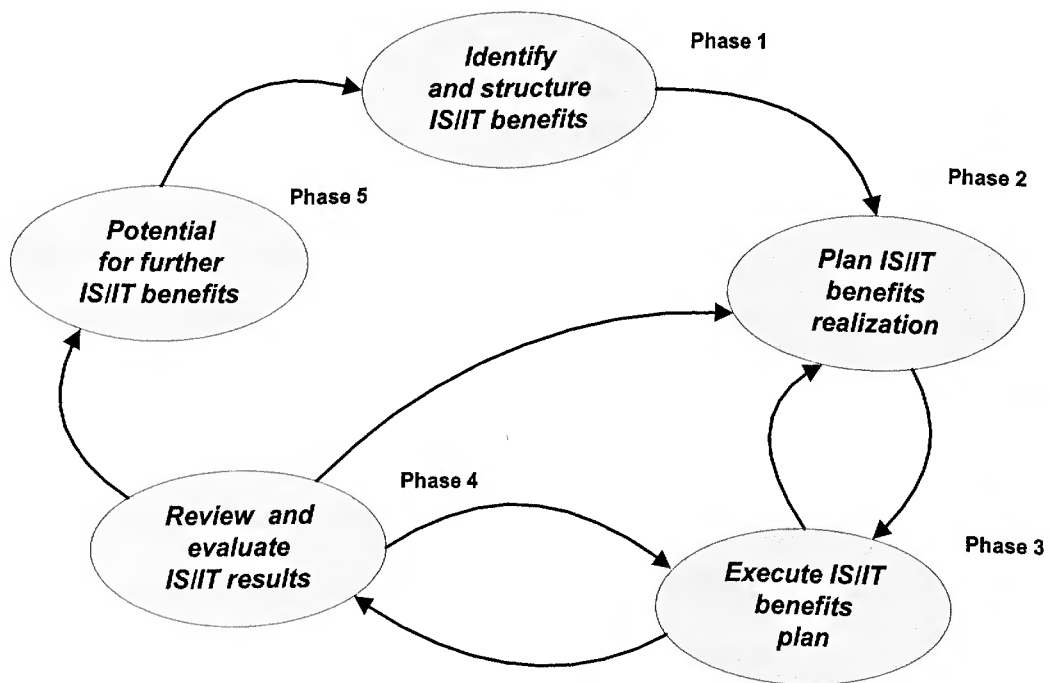


Figure 4: Process Model of Benefits Management

(Font: Ward & Peppard (2002))

The dependences and related feedback between the benefits phases sequence are represented in Figure 4 by arrows.

In fact, IS/IT alone doesn't bring success and doesn't improve financial performance nor gives direct profits to organizations. However, IS/IT can improve business performance when used in conjunction and in total alignment with Business Processes.

2.7 Software Development Life Cycle

According to European Space Agency (ESA) (1994), the software life cycle starts when a software product is conceived and ends when it is no longer available for use, i.e. it contains the whole of the development, operations and maintenance activities.

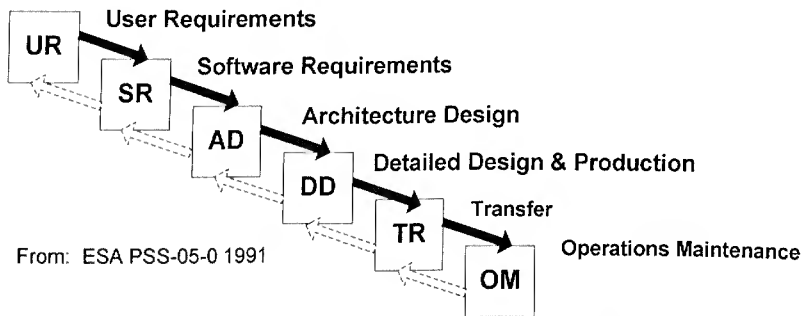


Figure 5: Waterfall Software Development Life Cycle Model

(From: European Space Agency ESA PSS-05-0 1994)

The definition of the User Requirements (UR) is the 'problem definition' phase of an information project. This phase is where the scope of the future information system is defined and the user requirements are captured.

The definition of the Software Requirements (SR) is the 'analysis' phase of a software project. A vital part of the analysis activity is the construction of a 'model' describing 'what' the software has to do, and not 'how' to do it.

The definition of the Architectural Design (AD) is to define the structure of the software. The 'model' constructed in the SR phase is the starting point. This 'model' is transformed into the Architectural Design by allocating functions to software components and defining the control and data flow between them.

The Detailed Design & Production (DD) of the code DD is to detail the design of the software, and to code, document and test it.

The Transfer (TR) of the software to operations purpose is to establish that the software fulfils the User Requirements. This is done by installing the software and conducting acceptance tests.



Once the software has entered into the Operations and Maintenance (OM) phase, it should be carefully monitored to confirm that it meets all the user requirements, and supports all information transactions needed to support business processes.

Despite the important contribution to Information Systems (IS) development needs, the Waterfall model doesn't include business processes strategy needs.

2.8 Reconciling IS/IT and bpr

As Ward & Peppard (2002) pointed, understanding the current situation involves obtaining an in-depth understanding of the business strategy, the business and technology environment and the current status of IS/IT in business.

Questions	Business Processes Reengineering (bpr)	IS/IT Strategy Formulation and Planning
Formulation	1. How can business and IS/IT managers re-engineer the business to provide advantage?	1. How can IS/IT be exploited to provide business advantage? (impact).
Implementation	2. How can business and IS/IT managers improve business processes, to ensure the success of the strategy?	2. How can IS/IT ensure the success of the business strategy? (alignment)

Table 2 Reconciling IS/IT and bpr

(Font: Ward & Peppard, 2002)

The formulation and implementation of changes in Business Processes, requires a deep understanding of the business and of the technology involved in order to understand how IS/IT must be applied innovatively to provide business advantage and ensure the success of the changes in business strategy.

2.9 MacFarlan Strategic Grid

MacFarlan Strategic Grid considers the IS/IT contribution to the business results, based on their industry business impact. According to Ward & Peppard (2002), the usefulness of this derivative matrix is born out by the ease with which management can categorize applications according to their current and potential business contribution. MacFarlan Strategic Grid categorized information systems based on their business contribution, in four quadrants according to their impact intensity in the present and in the future.

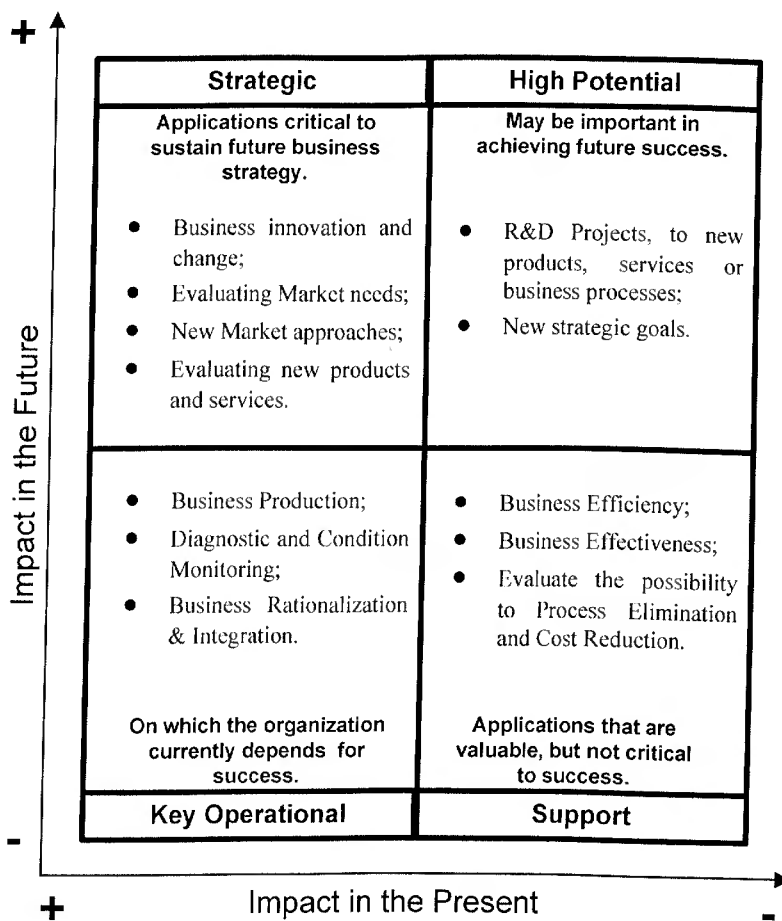


Figure 6: MacFarlan Strategic Grid

2.10 Oliveira's Model for Information System Costs

Oliveira (2004) developed a model for Information Systems Costs evaluation, with the following algorithm:

$$\text{Information System Costs (ISC)} = \text{ITCC} + \text{HRCRIA} + \text{OC}$$

Where:

ISC = Information System Costs

ITCC = Information Technology and Communications Costs

HRCRIA = Human Resources Costs Related with Information Activities

$$\text{HRCRIA} = \text{HRPR} \times \text{HRC}$$

Where

HRPR = Human Resources Participation Rate in IS/IT

HRC = Human Resource Costs

And:

OC = Other Information Systems related Costs.

2.11 SECI Nonaka and Takeuchi Model of Knowledge Creation

According to Nonaka and Takeuchi (1995), there are four knowledge conversion types: (i) Tacit to Tacit (Socialization); (ii) Tacit to Explicit (Externalization); (iii) Explicit to Explicit (Combination), and (iv) Explicit to Tacit (Internalization). After Internalization the process continues at a new 'level', as a 'spiral' of knowledge creation.

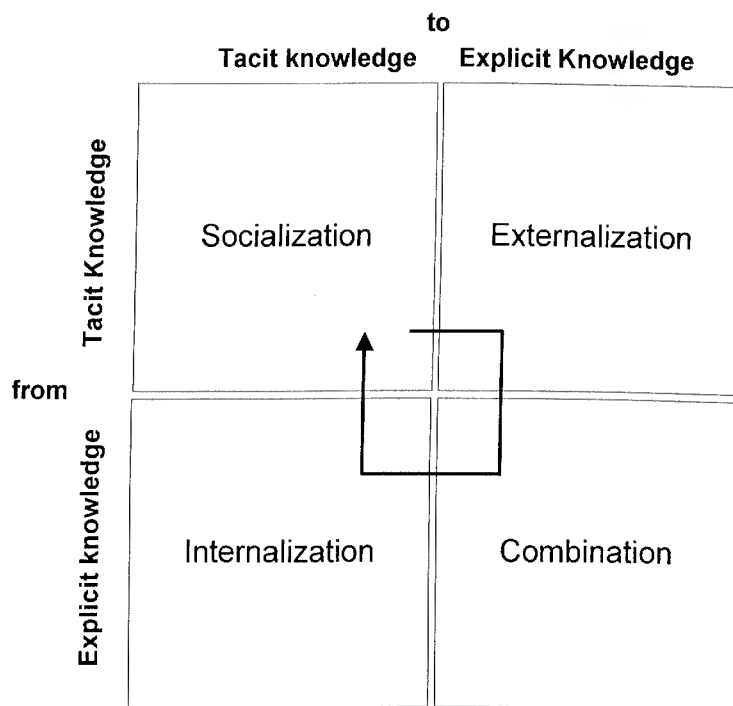


Figure 7: SECI Model of Knowledge Creation

Socialization enables the conversion of tacit knowledge through the interaction between individuals. One important note is that an individual can acquire tacit knowledge not exclusively through language but by observation, imitation and practice.

A good example of socialization is the relation between the teachers and their students. However, it can be also the relation between two experts in the same technical or scientific area.

In practice, Socialization involves capturing knowledge through physical proximity. The process of acquiring knowledge is largely supported through direct interaction with people.

Externalization requires the expression of tacit knowledge and the translation into comprehensible forms that can be understood by others, through two key factors: (i) Tacit knowledge articulation, that is, the conversion of tacit into explicit knowledge; and (ii) Through the translation of tacit expert knowledge into readily understandable form.

Internalisation is the conversion of explicit knowledge into organizations tacit knowledge. This requires the individual to identify the relevant knowledge for himself within the organizational knowledge. Learning by doing, training and exercises allow the individual to access the knowledge of the group or organization.

Combination involves the conversion of explicit knowledge into more complex sets of explicit knowledge. In this stage, the key issues are communication and diffusion processes and the systemization of knowledge.

In fact, Nonaka & Takeuchi's SECI model analysis the different conversions types, involving explicit and tacit human knowledge, but doesn't refer to the resources and atomic procedures used by the subject to develop those transformations.

2.12 Venkatraman (1996) DIKAR Model

Venkatraman (1996) proposed the DIKAR knowledge model evolving; Data, Information, Knowledge, Actions and Results.

This model illustrates the relationship between data, information, knowledge, actions and results in order to view it from left to right (IS View), and progress through a series of stages (Process, Interpret; Decisions; Drive).

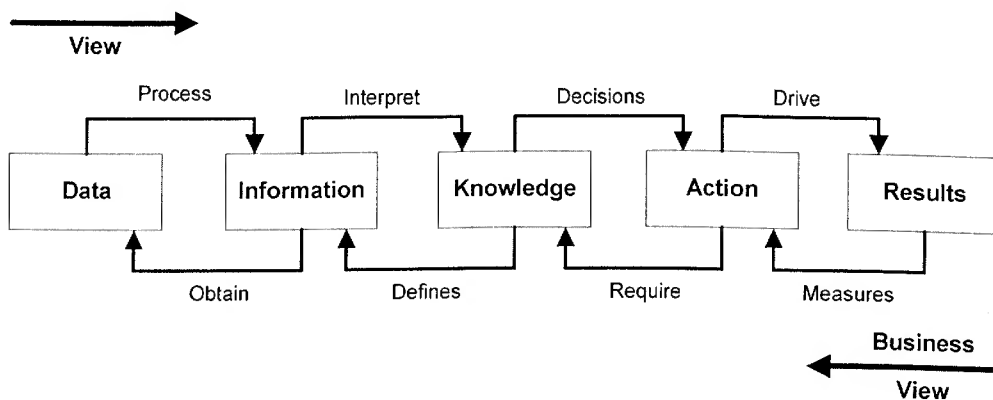


Figure 8: DIKAR Knowledge Venkatraman (1996) Model
 (Font: Vankatraman (1996) in Ward & Peppard (2002))

The DIKAR model can also be useful if the observer reverses the view from right to left. This perspective (Business View) is called the RAKID approach to the model and also progress through a series of stages (Measures, Require, Defines, Obtain).

2.13 Critical Success Factors (CSF) Management

According to Rockart (1979), Critical Success Factors (CSF) are a limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization.

But as Whymark (1999) pointed, CSF have an important feature. They focus on the users needs and ignore the data availability, and so promote a top down analysis of what is needed. So, CSF are mainly used in business strategy definitions and can be a good tool in order to help business leaders and IS/IT managers in focusing their attention on the most critical aspects of business.

Whymark (1999) proposed two main models in order to evaluate the existing CSF, graphed in Figure 9 and described as follow:

The first CSF PI & CIN, model was developed for executive information systems use, and allows that business and IS/IT managers improve the focus on the business performance by determining a number of Performance Indicators (PI) for each CSF. Each CSF will have two or three performance indicators (PI) which describe how the CSF is to be reported. The PI needs data that correspond to the Critical Information Needs (CIN).

The second CSF Hierarchy Model is composed in four main separated parts; (i) industry CSF related with industry environments, (ii) enterprise internal organizations CSF, (iii) executive managers CSF and (iv) functional units management.

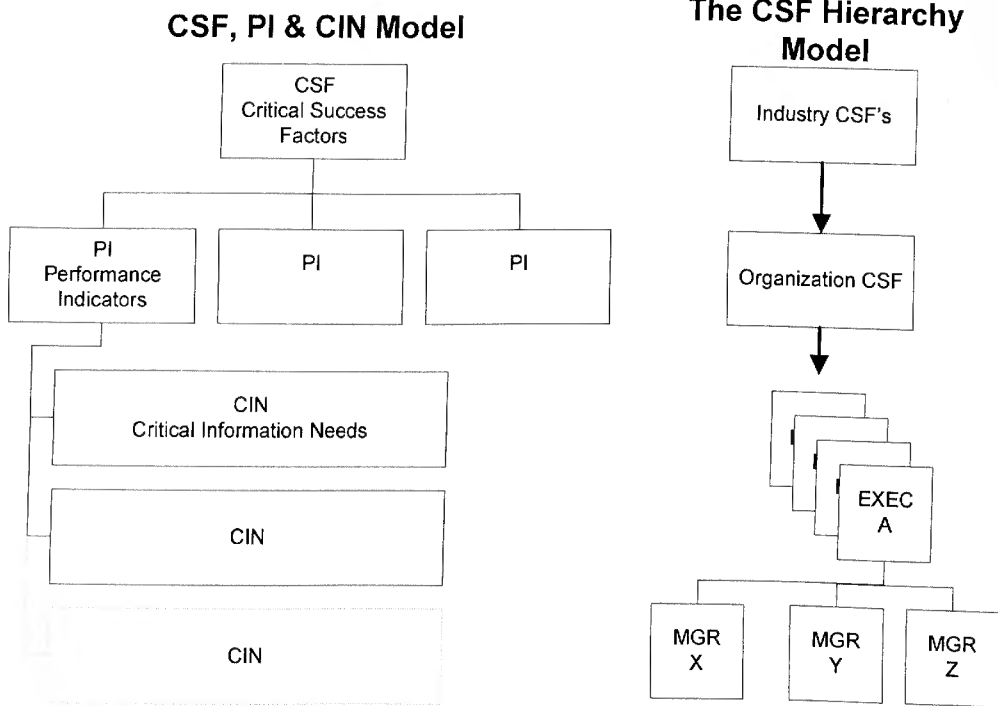


Figure 9: CSF, PI & CIN and CSF Hierarchy Whymark (1999) Models

Ward & Peppard (2002) argued that CSF are activity areas that should receive constant and careful attention from management. The current performance status in each area should be continually measured, and that information should be made widely available.

The presented model graphed in Figure 10, adopted from Ward & Peppard (2002), assume that there are a reasonable number of CSF per objective, and that there are a two main important questions about CSF that must be considered: (i) How can IS/IT help achieve the CSF? (ii) How the existing systems inhibit achievement of CSF? (This question implies a SWOT analysis of existing systems against the CSF) According to the same authors, Ward & Peppard (2002), and regarding the optimal number of CSF, they argued that too many CSF suggest that the objective is unachievable, although too few CSF are not ambitious enough.

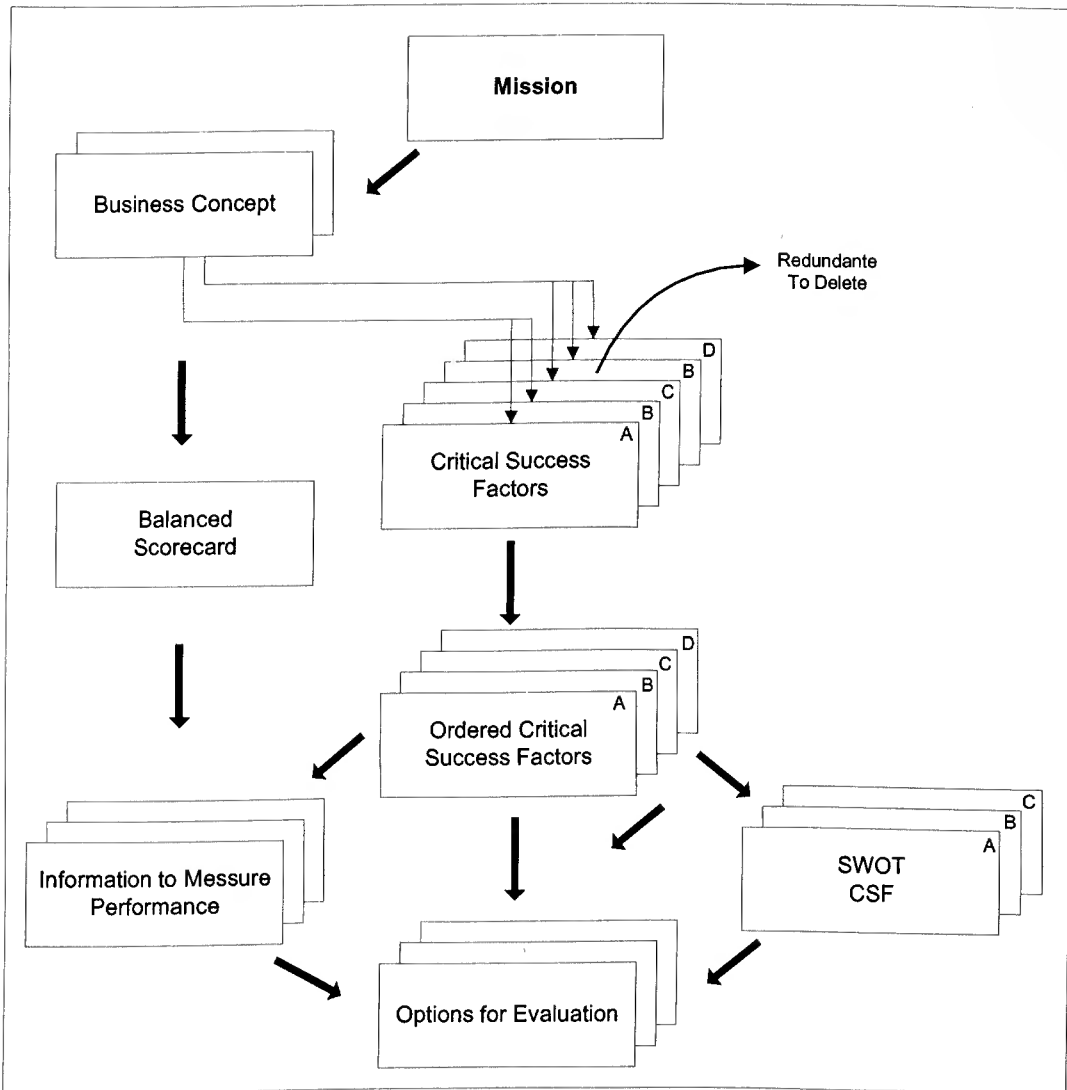


Figure 10: Critical Success Factors Basic Processes

(From Ward & Peppard, 2002)

This study defends that CSF analyses can be used in several different ways and with a big number of different proposes. So, CSF plays an important role in linking business tactic and strategic objectives and Information Requirements.

This study also defends that the CSF approach can involve all top and intermediate managers in Business Processes & IS/IT Alignment Strategy, and implies the use of a Business Language, according with organization internal culture, that everyone in organizations understands. So, this study defends that the CSF can be considered a good practical level to determine business strategy.

2.14 IS Strategy; Business Intelligence and Competitive Intelligence

According to the Web Encyclopedia Wikipedia, strategy is a long term plan of action designed to achieve a particular goal, most often "winning". Strategic planning is an organization's process of defining its strategy and making decisions on allocating its resources to pursue this strategy, including its capital and people.

According to Ward & Peppard (2002), in a IS point of view IS strategy determinate the organization's requirement or 'demand' for information and systems to support the overall strategy of the business. It is firmly grounded in the business, taking into consideration both the competitive impact and alignment requirements of IS/IT.

According to Gibson (2004) a Business Intelligence (BI) system is a technology that provides significant business value by improving the effectiveness of managerial decision-making. In an uncertain and highly competitive business environment, the value of strategic information systems such as these is easily recognised.

According to Porter (2001) Competitive Intelligence (CI) is the process by which organizations gather and use information about products, customers, and competitors, for their short term and long term planning.

3 Business Processes & IS/IT Strategy Alignment Life Cycle

According to Ward & Peppard (2002) most organizations are today aware that information systems strategy must be developed within the wider context of the corporate and business strategy formulation and implementation processes.

This study proposes in Figure 11, a sequential and iterative Business Processes Life Cycle model that includes not only the sequential set of business processes, but also the feedback between phases represented by arrows.

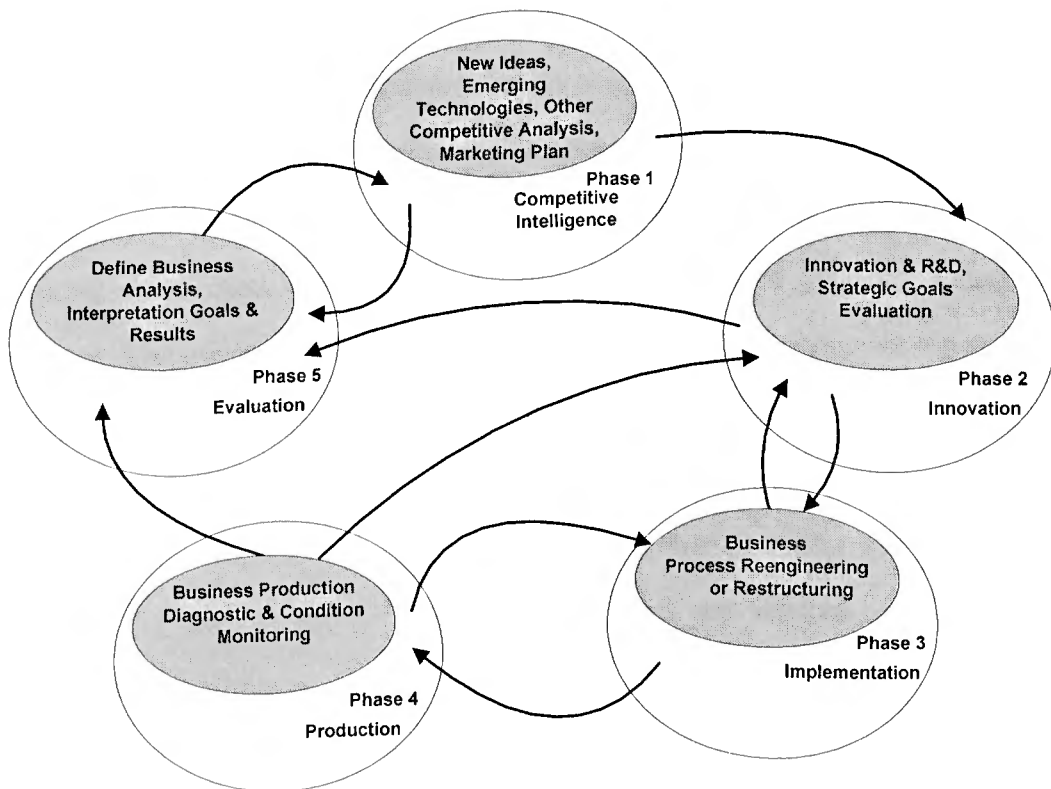


Figure 11: Business Processes Life Cycle

Venkatraman and Henderson (1993) do not believe that there is a superior universally mode to formulate and implement a strategy. Since a superior universally approach wouldn't be strategic because all firms would adopt it.

So, the proposed model is not a mode to formulate and implement a strategy but a Business Processes Life Cycle, showing where and how strategic plan decisions can influence and condition the administrative and operational decisions.

The presented model claims that a Strategy Implementation has to run through this Business Processes Life Cycle Phases sequence by influencing, restructuring and implementing rules in order to adjust all tasks and resources within organization to conditions and constraints and get as outcome, the biggest profit possible through the satisfaction of customers and end users in current day to day exploration.

According to this study an important feature of business processes is that they are characterized by having an iterative learning cycle that turns them more and more efficient as time goes by. Meanwhile, what looks to be a good feature can also become the biggest enemy in shifting or implementing a new business strategy, by turning business processes alignment with strategy into a major challenge.

In fact, some Business Processes are likely to preserve themselves, despite business top manager orientation to strategy changes. As Mayer & deWitte (1999) pointed, world class enterprises are learning the value of building flexible and dynamic business processes into their corporate structures to give them the agility to respond to a changing environment.

In the presented model, all Business Processes Phases are characterized by having their own knowledge bases, skills and business goals: (i) Phase 1 is related with **Competitive Intelligence**; (ii) Phase 2 with products and services **Innovation**, and to proceed to Strategic Goals Definition; (iii) Phase 3 represents the business process **Implementation** in order to support business strategy; (iv) Phase 4 represents business **Production** of products and services needed to execute and complete the organization strategic goals; and (v) Phase 5 is the **Evaluation** Phase, where business results are interpreted, according to the strategic goals.

More than ever, the use of IS/IT affects the competitive advantage, since it is embodied in every Business Processes Life Cycle phases, and is involved in achieving linkages among all the activities providing value. As Bergeron & it al. (2004) claimed, strategic alignment or fit between the global and IS/IT strategies, is a

notion that is deemed crucial in understanding how organizations can translate their deployment of information technology (IT) into actual increases of performance.

In Figure 12 this study presents a complete combination between IS/IT and business processes skills needed in the execution of each Phase. In this model, any business strategy has to be followed by a IS/IT Strategy Alignment in order to allows the support of new products or services innovations or even to support new Working Models.

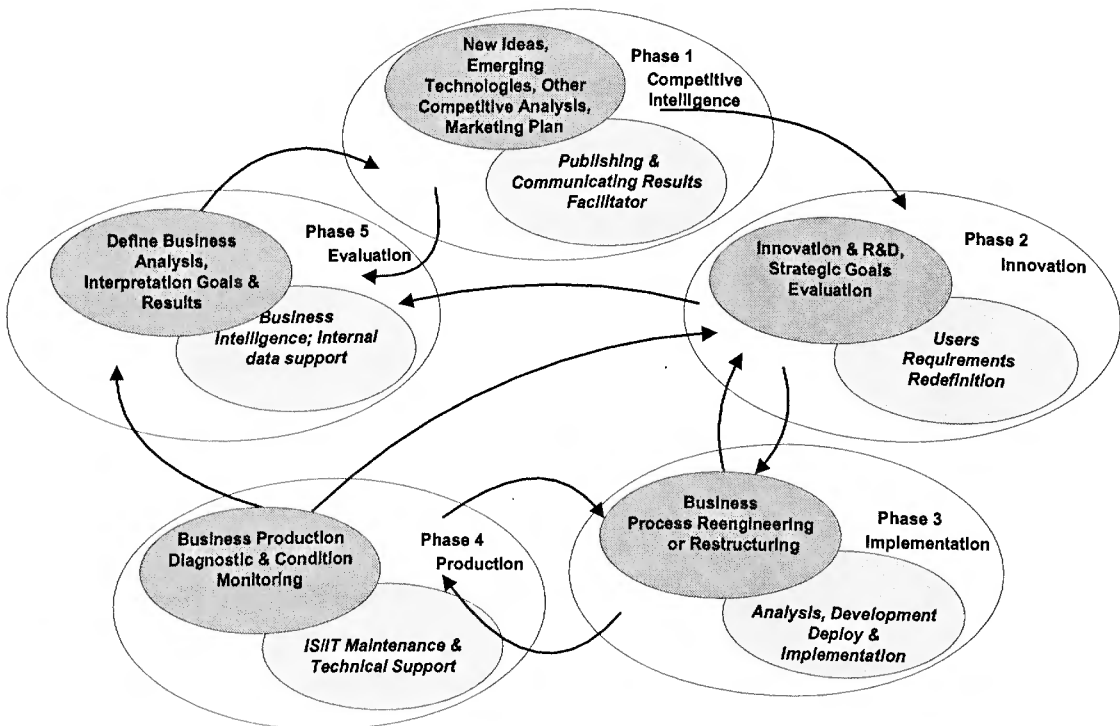


Figure 12: Business Processes & IS/IT Strategy Alignment Life Cycle

The proposed model, enhances the importance of Business Processes and IS/IT Strategy Alignment to reach business strategic goals and results. This study defends that the power of a full technological alignment can influence the business goals and the organizations competitive advantage, so the IS/IT strategy alignment becomes an essential ingredient for all the business processes strategy.

This study also defends that once business leaders discover that a new IS/IT technology may provide new business opportunities, and the new IS/IT technology is not considered a complement of an existing one, IS/IT managers must study it from

the first Phase in order to evaluate in which Business Processes Phases this new IS/IT technology fits best.

This study also defends that the linkages between Business Life Cycle phases imply that any change in one or more Business Processes & IS/IT Strategy Alignment Life Cycle phase, can affect the output result. In fact one phase can influence the following, by passing there own good or bad results. So linkages are not only the sequence between phases, but the relationship between the way one phase is performed and is own influence in the performance and cost of the following. So Linkage requires big optimization and coordination to take place.

According to Porter (1998), managing linkages thus, it is a more complex organization task then managing value activities themselves. Given the difficulty of recognizing and managing linkages, the ability to do so often yields a sustainable source of competitive advantage.

The Life Cycle Phases Sequence, Linkages and Feedback needs in each of the phases are described as follow:

3.1 Phase 1 - Competitive Intelligence

According to the Department of Industry, Science and Resources of Commonwealth Australia (2001), the key challenge for firms is to develop and sustain competitive advantage in a complex business environment. Markets and technologies are changing rapidly, cost pressures are increasing, customers are more demanding, and product life cycles and time-to market are shrinking. In this environment, firms need to focus on their future markets and use strategic technology planning to stay ahead of the game.

This phase represents the main enterprise capability to identify the success factors for the development and to sustain the organizations competitiveness.

Business Processes Contribution
<p style="text-align: center;">New Ideas, Emerging Technologies, Other Competitive Analysis; Marketing Plan</p> <p>Rise of new ideas, identification of emerging technologies, Other Competitive Intelligence and Marketing Plans.</p>
IS/IT Contribution
<p style="text-align: center;">Publishing & Communicating Results Facilitator</p> <p>Use of Office, Internet and drawing, tools to compile, publish and disseminate the analysis results.</p>

Table 3 Competitiveness Phase

3.2 Phase 2 - Innovation

According to CEC Luxembourg (1996), Innovation is the introduction of a new and improved product, service or production process on the market. It embraces not only technological considerations but also organizational, managerial, commercial and training requirements which contribute to the economic competitiveness of the firm and hence the regional economy to which it belongs.

Business Processes Contribution
<p style="text-align: center;">Innovation & R&D Evaluation-Strategic Goals</p> <p>Main goals definition; Perception of the competitive co-evolution market; Planning of competitive strategies IS/IT Contribution:</p>
IS/IT Strategy
<p style="text-align: center;">Users Requirements</p> <p>The specification of the User Requirements is the process of organizing information about new, or existing final user needs, claimed by a change in business strategy.</p> <p>There are two types of User Requirements: Information System (IS) requirements and Information Technologies (IT) requirements.</p>

Table 4 Innovation Phase

3.3 Phase 3 - Implementation

According to Porter (1998), "Corporate Strategy" addresses the composition of a firm portfolio of Strategic Business Units and institutes formal Business Processes responsibilities. Periodically Strategic Business Units submit Business Process plans and results for review by top management.

Business Processes Contribution

Business Processes Re-engineering or Restructuring

According to Davenport & Short (1990) Business Processes Re-engineering (bpr) is the analysis and design of workflows and processes within and between organizations. Hammer & Champy (2003) argued that rethinking and radical redesign of business processes is fundamental to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed.

Restructuring is an important sub set of bpr, which cares for incremental changes needed to improve efficiency and effectiveness in existing Business Processes, while maintaining basically the same human resources and machinery.

Clemmer (1995) wished, "grant me the patience to continuously improve some processes, the courage to radically reengineer others, and the wisdom to know when to do either", BPR is a multi-disciplinary subject and needs more than IT specialists.

IS/IT Strategy

System Analysis, Development, Deploy and Implementation

The software development life cycle model, shown as follow in Figure 13, is the Waterfall Phases Model. This model summarizes the phases and activities that must occur in any software development project.

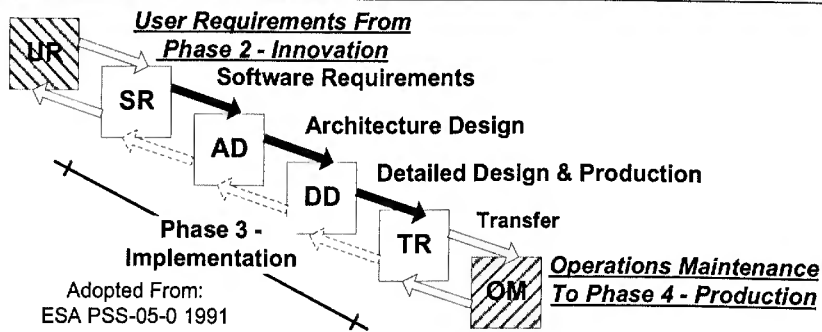


Figure 13: Waterfall Approach

(Adopted from European Space Agency ESA PSS-05-0 1991, as described in Figure 5)

The set of Waterfall Model Phases are executed sequentially, as shown by the heavy arrows. Each phase is executed once, although iteration of part of a phase is allowed for error correction, as shown by the dashed arrows. The complete system delivery occurs at a single milestone at the end of the Transfer (TR) phase.

Table 5 Implementation Phase

This study defends that the formulation and implementation of changes in Business Processes requires a deep reconciliation between Business Process and IS/IT. This subject is well presented in Table 2, by the Ward & Peppard (2002) Reconciliation BPR and IS/IT model.

3.4 Phase 4 - Production

According to Porter (1998) Value Activities can be divided in two broad types, Primary activities and Support activities. Primary activities are the activities involved in the creation of the products or services and in the sale and transfer to the buyer as well as after sale assistance. Support activities support the primary activities needs and each other by providing purchase inputs, technology, human resources and various firm wide functions.

Business Processes Contribution
Business Production, Diagnostic, Control & Monitoring
Primary Activities:
Material Requirement Planning (MRP); Just in Time, Work in Progress Tools, Kanban; Logistic (Inbound; Outbound), Warehouse, Inventory, Stocks Management, Transport, Packing, Procurement and Marketing & Sales
Support Activities:
Financial; Sales & Purchase Control;
Human Resources, Capital Goods, Payments and Receiving;
Diagnostic Routines, Condition Monitoring
IS/IT Contribution
IS/IT Maintenance & Technical Support
Effort to maintain, all IS/IT necessary to support critical information in good conditions to Business Production, Diagnostic, Control & Monitoring, Maintenance of Expert Systems and Intelligent Agents
The main tasks are: planning maintenance; technical support and evaluation maintenance.

Table 6 Production Phase

3.5 Phase 5 - Evaluation

Organizations typically gather information in order to proceed to business evaluation. This information must covers fields such as production performance, sales evaluation, competitor analysis and marketing research. Business evaluation affords organizations to accumulate knowledge in order to gain a sustainable competitive advantage. Organizations may regard such business intelligence as a valuable core competence in their business area.

Business Processes Contribution
Define Business Analysis & Interpretation Goals
Define criterions for data analysis and interpretation business results with the following concerns: Business Goals Evaluation; Data Understanding; Statistical Modeling Application; Model Evaluation; Define external data necessary to enrich analyses models; Data analysis & interpretation results, according with the interests and methodologies of which business activity; Identification of chances and market threats.
IS/IT Contribution
Business Intelligence; Internal data support
Include the use of Business Intelligent Software, internal developed, or with the use of COTS (Commercial off-the-shelf) tools. Use of techniques like Data Warehouse, Data Mining, Data Quality and others, with the following phases: Dataset Preparation; Data Modeling Research; Model Evaluation; Model Deployment

Table 7 Evaluation Phase

4 IS/IT Costs and Alignment Phases Contributions

As Ward & Peppard (2002) pointed, based on the outcome of the strategy process, the overall business rationale for a new or improved system will have been identified; the nature of the target benefits types and the extend of changes involved to obtain them will depend on their impact and criticality for the business strategy which in turn determines whether the system is strategic, key operational, support or high potential.

The graphic result presented by Figure 14 is the outcome of a brainstorm meeting, with seven IS/IT senior consultants and top managers and others stakeholders participation, in several business areas such as logistic and transports, manufacturing and assembling aircraft components and structures, chips maintenance and financial institutions.

The brainstorm meeting was supported by a computer design tool and an overhead projector in order to develop a prototype based on tentative representing the stakeholders vision of: (i) the use of human business resources intensity participation rate; (ii) IS/IT human resources intensity participation rate; (iii) costs intensity; (iv) and their main type of contribution of the several Business Processes & IS/IT Alignment Strategy Life Cycle phases in the MacFarlan Strategic Grid.

Figure 14 outcome was based in an ensemble of three models: (i) Oliveira's (2004) Information Systems Costs Model; (ii) MacFarlan Strategic Grid; (iii) and of the proposed Business Processes & IS/IT Alignment Strategy Life Cycle model. As result Figure 14 intends to represents in a single graphical report way, the several Business Processes & IS/IT Strategy Alignment Phases contributions to business, as well as the several types of financial efforts, involved in the IS/IT within a standard organization.

In Figure 14 each phase can belong to more than one region of the MacFarlan Strategic Grid. Phase 5, for example, is divided between Support and Strategic contribution.

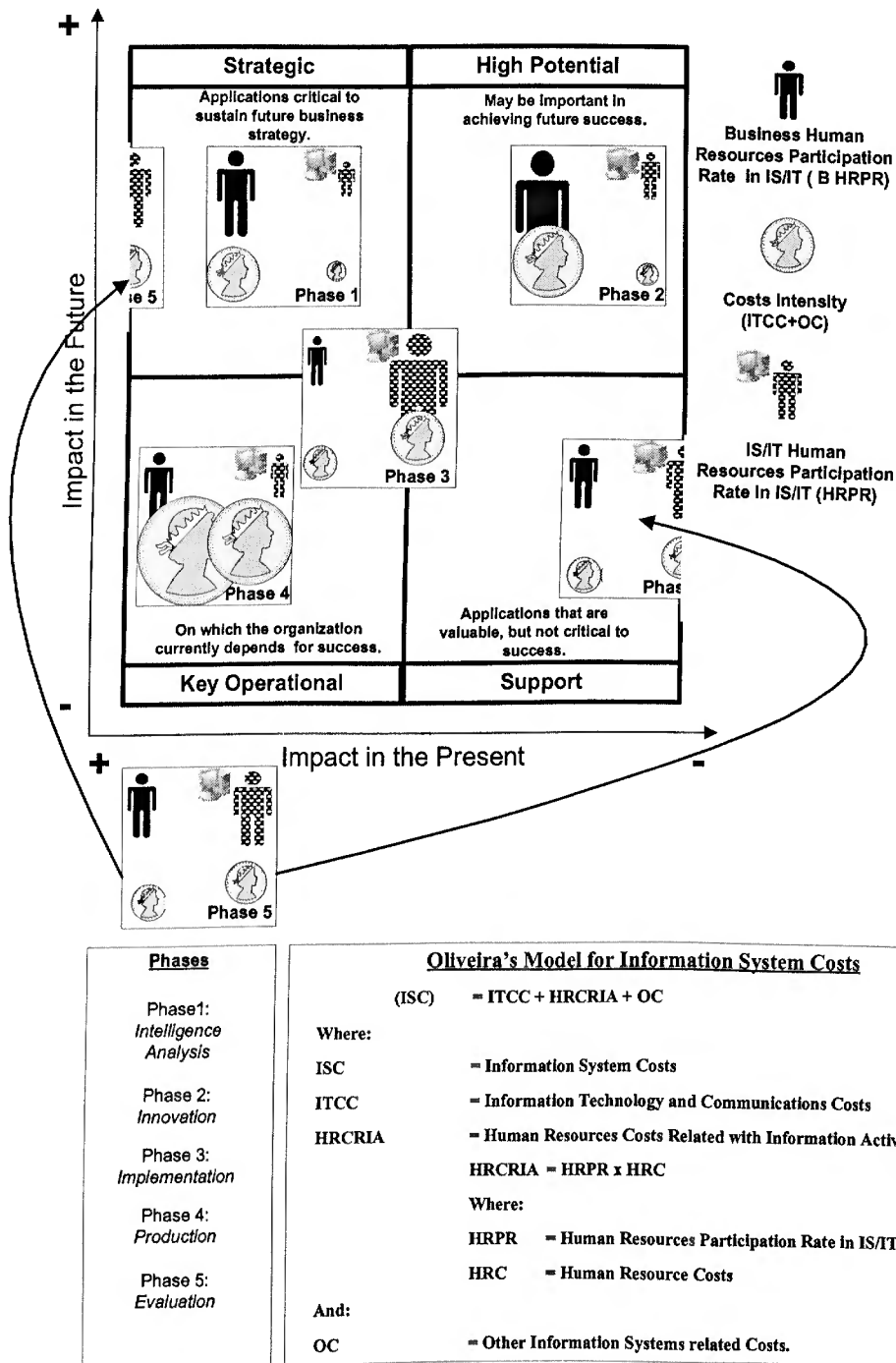


Figure 14: IS/IT Costs and Alignment Phases Contributions Evaluation Model

It's important to enhance that each organization has its own Business Processes and IS/IT applications portfolio, with its own business and IS/IT knowledge resources

intensity needs. In Figure 14, each Business Processes & IS/IT Strategy Alignment Life Cycle phase is represented by a square located in accordance to the MacFarlan Strategic Grid contribution segments.

Using the Figure 14 graphics presentation model, the brainstorm stakeholders represented the several important sets of the IS/IT portfolio and its contribution to business, in a traditional production enterprise, according to stakeholders professional experience. This model was used to evaluate the intensity of Business and IS/IT (HRPR) Human Resources Participation Rate in the IS/IT (represented by the human figures sizes), and the expected Costs Intensity (ITCC+OC), where the (ITCC) variable represents the Information Technology and Communications Costs, and the (OC) variable represents Other Information Systems Related Costs (Represented by the coins sizes).

The proposed model also considers that business resources or IS/IT resources needed to support Business Processes and IS/IT activities can be provided by internal or external resources, according to business enterprise strategy.

Figure 14 represents each contribution phase of the Business Processes & IS/IT Strategy Alignment Life Cycle described as follow.

4.1 Competitive Intelligence Contribution - Phase 1

According to the stakeholders team, in Phase 1 there is a little IS/IT presence. This Phase is characterized by the use of Office Tools such as Text Editors, Worksheets, Presentations tools, Email tools or other communication tools as main support. Despite the IS/IT low presence, business processes are very intense in Business Knowledge resources because of the business Competitive Intelligence and Marketing Analysis skills required. So Phase 1 main contribution is to establish the Strategic business region.

4.2 Innovation Contribution - Phase 2

In Phase 2 the stakeholders considered that any IS/IT development related with new innovations in products or services, belongs to the R&D process. The IS/IT presence aims to support R&D development. Meanwhile Phase 2 is more intense in IS/IT resources and knowledge than in Phase 1, because it's where the IS/IT and business managers execute the survey of the User Requirements in order to support the new services, products, business processes or production models related to Innovations and to the R&D processes outcome. Phase 2 gives its best contribution to achieve business future performance, so it represents the principal **High Potential** applications set.

4.3 Implementation Contribution - Phase 3

Phase 3 is responsible for the System Analysis & Development Phase for IS/IT and by Business Processes Reengineering (BPR) provoked by changes in business strategy goals. So, Phase 3 was considered by the stakeholders the most intense in IS/IT Knowledge Resources.

As Ward & Peppard (2002) pointed, reconciling the IS/IT and BPR as presented in Table 5, resumes the main questions in the formulation and implementation of IS/IT and BPR Business Processes Reengineering in order to support business advantage and ensure the success of the business strategy. Ward & Peppard (2002) also suggests that Business Processes and IS/IT strategy pass to a reconciliation process in order to make possible to determine the opportunities, threats and IS/IT requirements inherent in the business strategy.

According to some authors the use of Enterprise Resource Planning (ERP) software doesn't reduce the intensity of resources and knowledge needed to the software implementation process. As Francalanci (2001) claimed, ERP projects shift a significant proportion of the implementation effort from code development to the

parameterization of a pre-existing software package. In fact, what really append is a significant change in the scope and focus of IS/IT work, by a high increase in functional consulting and expertise needs in the different ERP modules. ERP implementations need major efforts in Business Processes Reengineering (BPR), to adapt the organizations to the predefined work processes embedded in the ERP. In order to facilitate the explanation work, this study assumes that both business and IS/IT resources knowledge effort and costs intensity needed in an ERP implementation is similar to traditional software development, deployment and implementation. As Francalanci (2001) noted, the different resources expended by a software project, human time as been consistently documented as the most challenging to estimate reliably. In this matter, ERP projects proved similar to traditional software development.

Phase 3 acts in *all types of business contribution* represented by the MacFarlan Strategic Grid regions.

4.4 Production Contribution - Phase 4

As Kling (1999) claimed, malfunctioning computer systems are not simply an opportunity loss, such as a book that is bought but not read. When people organize their days about the expectations that key technologies will work well -- and they don't -- they often spend considerable time tinkering to get systems to work, waiting for help to come, and so on. In Phase 4, the IS/IT main function is to give technical support, to plan and to evaluate maintenance of all existing software and hardware systems. In fact in most organizations there's no need to involve intensity knowledge resources in both IS/IT and final Business Processes users since only involves operating skills. But, despite this phase generally requires low knowledge skills intensity, it was considered by the stakeholders as one of the most expensive, because involves all hardware, communications, and software maintenance in order to support all business production of products and services. So Phase 4 can support

complex business automation processes as for example: machinery automations using embedded sensors and others complex output devices. There are some business and IS/IT managers that ignore Phase 4 (Production contribution) importance. This study defends that this fact can result in a business collapse provoked by a IS/IT bad function or bad quality results. Phase 4 was considered by the stakeholders the main **Key Operational** contributor and the main responsible for the sustainability of all currently activities.

4.5 Evaluation Contribution - Phase 5

Phase 5 was considered by the stakeholders the phase where business and IS/IT managers, assembles and process critical information, in order to evaluate business performance and improve efficacy and effectiveness. Phase 5, gives is main IS/IT contribution to business **Support**. However Phase 5 outcomes, was considered by the stakeholders fundamental to sustain future business activities. That's why part of Phase 5 gives a **Strategic** contribution to business too. In phase 5, business and IS/IT human resources must know how to take advantage of IS/IT Business Intelligence concepts and tools.

4.6 ISC Report Presentation Model

This study also proposes a new Information System Costs Report Presentation Model graphed in Table 8, in order to facilitate not only the evaluation of the IS/IT costs but the Business Process & Alignment Strategy Life Cycle Phases type of contribution to business by IS/IT managers and others stakeholders.

The Information System Costs (ISC) report model presented in Table 8, adopted a formula for human resources costs related with information activities, according with each Business Processes & IS/IT Strategy Alignment Life Cycle phase and MacFarlan Strategic Grid contribution, showed as follow:

$$ISC = \sum_{Phase=1}^5 \sum_{MacFarlan=1}^4 ITCC_{(Phase, MacFarlan)} + HRCRIA_{(Phase, MacFarlan)} + OC_{(Phase, MacFarlan)}$$

Note that in this basic formula, Business and IS/IT human resources have the same mathematician treatment.

For the Oliveira's (2004) model HRCRIA (Human Resources Costs Related with Information Activities) the proposed report model adopted the following equation:

$$HRCRIA_{(Phase, MacFarlan)} = \sum_{r=1}^r HRPR_r * HRC_r$$

Where "r" can represents entire production units or just a single individual human resource participation in IS/IT. This participation can be separated in atomic values for each pair MacFarlan and Business Process & IS/IT Life Cycle contribution.

So Table 8, proposes a new possible representation of this values in order to enable an expert evaluation of IS/IT MacFarlan Strategic Grid and Business Processes & IS/IT Alignment Life Cycles phase contribution to business.

.Phases	MacFarlan Oliveira's	Strategic	High Potential	Support	Key Operational	Total:
1ª Phase Competitiveness	Percent in Use	100%				100%
	<u>Business:</u>					
	ITCC	8.000				8.000
	HRCRIA	2.000				2.000
	OC	1.000				2.000
	<u>IS/IT:</u>					
	ITCC	500				500
	HRCRIA	250				250
	OC	250				250
Total:		12.000				12.000
2ª Phase Innovation	Percent in Use	100%				100%
	<u>Business:</u>					
	ITCC	55.000				55.000
	HRCRIA	4.000				4.000
	OC	2.000				5.000
	<u>IS/IT:</u>					
	ITCC	1.000				1.000
	HRCRIA	1.000				1.000
	OC	1.000				1.000
Total:		64.000				64.000
3ª Phase						
4ª Phase						
5ª Phase Evaluation	Percent in Use	10%		90%		100%
	<u>Business:</u>					
	ITCC	500		7.000		7.500
	HRCRIA	500		7.000		7.500
	OC	500		2.500		3.000
	<u>IS/IT:</u>					
	ITCC	2.000		11.000		13.000
	HRCRIA	1.000		11.000		13.000
OC	500		6.500		7.000	
Total:		5.000		45.000		50.000

.Phases	MacFarlan Oliveira's	Strategic	High Potential	Support	Key Operational	Total:
Totals	Percent in Use	100%	100%	100%	100%	100%
	Business:					
	ITCC	---	---	---	---	---
	HRCRIA	---	---	---	---	---
	OC					
	IS/IT:					
	ITCC					
	HRCRIA					
	OC					
ISC:	---	---	---	---	---	

Table 8 MacFarlan Strategic Grid with Quantitative Costs Analysis Report

Even if the proposed new presentation report only represents a simple exemplification of a possible approach, this study defends that this new report presentation can be used as an analytical tool, in order to quantify and evaluate Business Process & IS/IT Strategy Life Cycle, according to business contribution using the MacFarlan Strategic Grid and the Oliveira's (2004) Information System Costs Model.

The new report presentation proposed in Table 8, as the intention to help business and IS/IT managers and stakeholders to understand IS/IT global involving and for results compare between organizations in the same business area or with the same competitive strategy.

According to Caraça (2003) the only activities that are not possible to compare results, are between Zoo internal animal activities and the involving human society activities.

Despite this study doesn't includes *Case Studies*, the feedback founded from business and IS/IT top managers and other stakeholders in the brainstorm meeting, about this approach was of a big interest in order to evaluate their own Information System Strategy. So, hypothetically this subject-matter can be used itself in the future as a topic for a new entire study.

4.7 Business Process & IS/IT Benefits Management

Venkatraman & Handerson (1993) pointed that the difficulty to realize value from IT investments is firstly due to the lack of alignment between the business and IT strategy of the organizations that are making investments, and secondly due to the lack of a dynamic administrative process to ensure continuous alignment between the business and IS/IT domains.

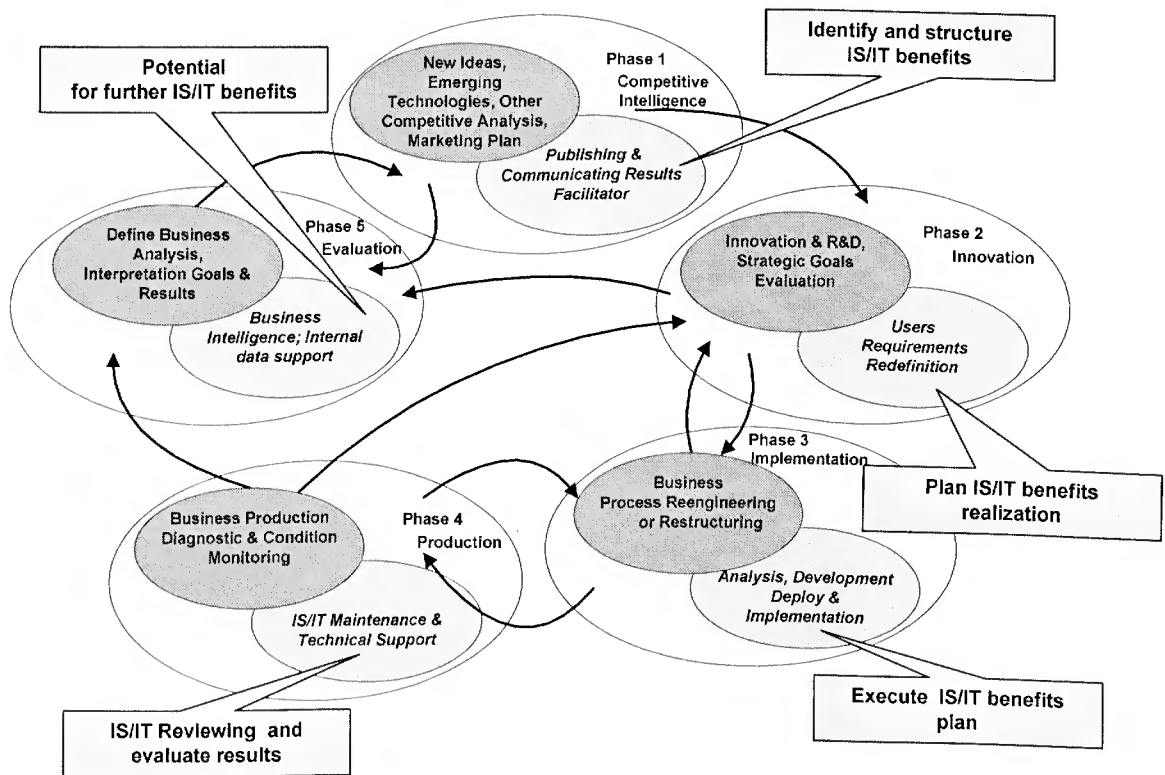


Figure 15: IS/IT Business Processes & IS/IT Benefits Alignment Life Cycle

This study defends that the IS/IT Benefits Evaluation proposed by Ward & Peppard (2002) and presented in Figure 4 is totally compliant with the proposed Business Process & IS/IT Strategy Alignment Life Cycle model as graphed in Figure 15: (i) Identify and Structure IS/IT benefits it's a Phase 1 Competitive Intelligence attribute; (ii) Planning IS/IT benefits realization it is part of the User Requirements Redefinition in the Phase 2 Innovation Process; (iii) The execution of the IS/IT benefits plan is a Business Functional Units (BFU) responsibility, so it's well related with Phase 3 Implementation; (iv) The review and evaluation of IS/IT benefits results is an iterative

business process, that deserves always the best attention from business processes execution main responsible, so it is part of Phase 4 Production; (v) To determinate the Potential for further IS/IT benefits it is a Phase 5 Evaluation.

This study also defends that this is not a simple factual coincidence because IS/IT Benefits are part of the IS/IT organizations strategy, so the proposed model assumes that this is a natural relation. In fact, IS/IT alone doesn't bring success and doesn't improve financial performance nor gives direct profits to organizations, however it can improve business performance when used in conjunction and in total alignment with Business Processes.

5 IS/IT Resources Policies within Organizations

The main scope of the previous chapters was to demonstrate that IS/IT must be in alignment with business processes goals in order to respond to strategy changes and to develop an overall organizational extended period capability and enhance organization competitive advantage.

But how can IS/IT and business managers provide the necessary IS/IT resources in order to maintain and develop business processes and IS/IT alignment?

According to Ward & Peppard (2002), deciding from where IS/IT resources should be sourced has become a critical issue to organizations.

Despite this subject deserves a deeper approach, this work wouldn't be completed if this important matter was ignored. This study considers that basically there are four types of IS/IT resources politics: (i) IS/IT Outsourcing; (ii) Facilities Management; (iii) Standard Software Package Acquisition; (iv) In-House development. The four resource types are described as following.

5.1 IS/IT Outsourcing

According to Oliveira (2004), Outsourcing and Facilities Management emerged, in IS/IT context in the eighties, configuring concepts and some practices where the *management* was already practicing expert in other areas of life organizations.

As Reis (2001) pointed, outsourcing consists in transfer to another organization, some internal functions of the outsourcing organization contractor, like Information System Management. Outsourcing may include the totally or only a part of the Information System.

This study defends that there's a basic rule in Outsourcing or Facilities Management use services; is that no one contracts outsourcing or facilities management services to do "Core Business" functions or business processes.

According to Ross and Westerman (2001), most outsourcing arrangements deliver from one or more of three capabilities: (i) Infrastructure services and centre operations; (ii) Applications development and maintenance; (iii) and Business processes.

So, costs infrastructure services and centre operations result primary from the ability to leverage scale economies of IT operations and application management.

This study considers that Outsourcing can be basically described in the following three types: (i) Product Incremental; (ii) Process Incremental

If IT and business processes Outsourcing enables greater focus on strategic priorities, Outsourcing may become increasingly important to build more agile firms. While in infrastructure services and application development the main goal is to focus in the ability to costs saving, in IT and business processes is in create more agile firms.

5.1.1 Offshore and Nearshore Outsourcing

According to Cearley & it al (2005), global sourcing is an irreversible trend, rather than a cyclical shift. By 2015, 30 percent of traditional professional services jobs will be delivered from emerging, rather from development markets like India, China, Russia or Brazil.

Nowadays, application offshore and nearshore outsourcing garners costs savings from significantly lower rates in countries as India, China, Brasil, Phillipines, Russia, Shout Africa and more.

But, presently, only big outsourcing companies as IBM, ORACLE, Microsoft or SAP have global enterprises structures that allow turning to advantage the development cost saving from countries like India or China. They use those countries as the result of Global Economy and with the rise of a new Network Enterprise structures, they created Excellent Software Development Centers with low costs. The effort to create

Excellent Centers raise in most cases by local initiative business strategies to turn in global advantage local competences and skills.

In fact according to Nicholson & it al (2001) small firms do not have the managerial experience, the financial resources and the methodological know-how to manage offshore projects the way large firms do.

The Portuguese IS/IT human resources have very competitive costs comparatively with IS/IT human resources of others countries in the EU and with USA. This study defends that Outsourcing Offshore and Nearshore can represent a good opportunity to increase IS/IT Portuguese industry, but instead, we hare assisting of a big IS/IT knowledge base human resources emigration to those countries.

5.2 Facilities Management

As Oliveira (2004) claimed, Facilities Management is characterized by services rendered from one organization to another in the scope of the automatic treatment of information or communication needs.

5.2.1 Product Incremental Facilities Management

In Product Incremental Outsourcing, the developer is contracted to develop a part of an overall system. It's usual that in large and complex systems, the client organization doesn't have the capability or required skills to develop a particular application set. A possible solution is to contract an Outsourcing supplier in order to develop incremental parts of the needed software.

5.2.2 Process Incremental Facilities Management

In Process Incremental Outsourcing the customer organization simply contracts external services to perform all or part of the functions of one or more of their process steps or components, in an incremental mode to their information departments.

5.3 Standard Software Package Acquisition

A software package is a bundle of one or several files that either are necessary for the execution of a computer program, or add features for a program already installed on the computer or network of computers. Software packages can either be in a standardized package format to be installed by a program that is integrated with the operating system, or be a self-sufficient installer.

This study considers that there are three types of standard software package acquisition described as follow: (i) ERP Enterprise Resource Planning; (ii) Business Process Software Package; (iii) Commercial off-the-shelf (COTS) software.

5.3.1 ERP- Enterprise Resource Planning

According to Davenport (1998) ERP (Enterprise Resource Planning) software is the most important development in the corporate use of information technology in the 1990.

ERP are business management information systems that integrate all business facets, including planning, manufacturing, sales, and marketing.

According to Porter (2001), we are entering a new evolution stage in terms of how IT is affecting industry value chains. Previously, each firm has achieved improved performance by integrating its activities and processes as well as its suppliers and costumers interactions through IS, most recently via Enterprise Resource Planning (ERP).

In fact the ERP software packages provide the possibility to integrate all IS activities and business processes needed to manage the organization value chain. According to Tom Melchiorre of SAP America Inc, ERP outsourcing promises to free the IT staff to concentrate on the application of technology, not on the technology of applications. As Oliver & Oliver (2002) pointed, in 2000 ERP was been adopted by the majority of the Fortune 500 top enterprises and as the market becomes saturated, ERP are

filtering down to median sized enterprises and to regions beyond those initially penetrated, Europe and North America.

So, the most part of the big companies have implemented (or tried to implement) ERP systems with the objective to concentrate their strength in “core business”.

But implementing ERP System, it's not an easy task. According to Oliver & Oliver (2002), ERP Systems are large and complex integrated software packages that support standard business activities. The scope of ERP Systems aligned with their numerous configuration alternatives and breadth of organizational impact, makes the task of implementing them considerable, extending in many cases over several years. As Francalanci (2001) pointed, ERP projects shift a significant proportion of the implementation effort from code development to the parameterization of a pre-existing software package. The different resources expended by a software project, human time as been consistently documented as the most challenging to estimate reliably. In this matter, ERP projects proved similar to traditional software development. In fact, implementing ERP involves to impose the use of Business Processes of an existing software, representing (what ERP suppliers want us to think) the “best practices” in the area.

Businesses Processes are characterized by having an iterative learn cycle, turning them more and more efficient and embedded in business culture as time goes by. But, what looks to be a good attribute, can be as well a big barrier in shifting or implementing a new business strategy. In fact, Business Processes have the bad habit to preserve themselves despite top manager orientation, to strategy changes.

The existing Business Process must be aligned with the existing ERP Software Business Processes set that represent, purportedly, the “best practices” in organization business area. So, in most cases ERP software implementers have to proceed to big changes in organization, through Business Processes Reengineering (BPR). In fact Business Process Reengineering involves not only Business Processes changes but also human resources skills and capabilities changes.

According to some authors, this particular domain proved that it's very difficult, and some times even impossible to go back in BPR implementation if something ran wrong. So, this study defends that to select and implement a particular ERP is like to marry with the ERP software supplier, and with a Software Package solution. So, ERP costumers and implementer suppliers have to be prepared for good and bad moments.

According to Mayer and deWitte (1999), making changes to the logic and structure of a business process generally introduces new requirements on the supporting infrastructure. So there are two major risks of failure that inhibit implementations: (i) meeting initial expectations of time and expense; and (ii) risk of change to an ongoing operation.

So, this study defends that it's important that business and IS/IT managers formulate the following questions before decide to implement an ERP software package: (i) When the ERP implementation ends, the main outcome is that the organization has the same (or similar) Business Process as competitors and uses "generic practices", purportedly called "best practices". Is this the waited result of the ERP implementation?; (ii) In advantage we will have the full enterprise strength concentrated in a single goal, our "core business", and a IS/IT integrated system, covering all value chain business areas. This fact gives to organization Competitive Advantage?

According to Oliveira (2005), in the conception, implementation and use of Systems of Information problematic context, in business management, the question and the importance of cultural factors have to be warned and instilled in the behaviours rationality support to individual and organizational domains.

5.3.2 Business Process Software Packages

This type of software packages are focused in a limited set of Business Processes. This kind of software packages are usually developed by experts in one (or more

similar) restrict and specific business area. In fact, the “Core Business” of this type of Software Houses is to develop software in focused and specialised business areas.

This type of standard software packages usually have consulting and monitoring accompaniment, which is executed by the supplier Enterprise business experts in order to help costumers to adopt the new Business Processes.

Those specialised services can include a software “Gap” development to align the software with specific existing Business Processes which are needed to support business strategy. So this kind of standard software packages can be considered as part of a personalized expert service in business areas.

As Caldeira & Ward (2003) concluded, this kind of partnership success depends on strong informal relationship. They claim that the partnership with IS/IT outsourcing suppliers does not make the firm vulnerable to imitation by competitors. Business relationships related with IS/IT products and services, are based on trust and on personal relationships, so the cost was not considered important.

5.3.3 Commercial off-the-shelf (COTS) Software

Some of the most significant changes that have confronted Business Processes Software Package Acquisition efforts in the past few years is the result of the use of Commercial off-the-shelf (C.O.T.S.) software.

According to Matis (1999), COTS software applications include any software applications that are configured for the use of a specific function without altering the basic program. In other words, a Commercial off-the-shelf software can be used by the end user with little or no adaptation.

But rarely COTS software satisfy all necessary user requirements, usually they solve only a part of Business Process needs, although its design contribution importance.

According to Wallnau, (2004), it's important to understand that COTS products often have an unavoidable impact on system design.

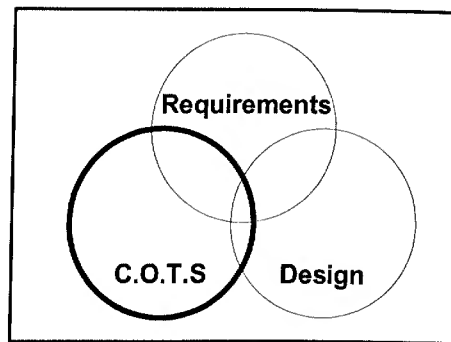


Figure 16: COTS Trade-off Regions

(From: Wallnau (2004))

Figure 16, illustrates the trade-off regions as intersections among COTS software, Information Systems Design, and User Requirements.

The main reasons for the use of this types of software programs are: (i) COTS software costs; (ii) COTS software availability; (iii) COTS software developed to readily meet specific functions and solve specific user requirements with no adaptation possible.

But, despite the big importance of COTS software, the use of this kind of Software Packages, has is own risks related with its nature. This study considers that there are four essential points that IS/IT and business managers need to verify before a COTS software acquisition: (i) Verify that the COTS software will meet the predefined basic Scientific Concepts, Business Concepts, Math Models or Technical requirement; (ii) Verify that COTS software results will meet user requirements and system specifications; (iii) verify COTS contribution to global Information System design; (iv) verify that the COTS supplier has provided the software product in accordance with defined development policies and business best practices.

5.3.4 Outsourcing; Facilities Management; Software Packages SWOT

Strengths	Weaknesses
<p>(i) Strengthening resources and flexibility in technology and service to underpin the business strategic direction; (ii) Adoption of the “best practices” to value chain, especially in areas out of organization “core business”; (iii) Evaluate and learn new “best practices”; (iv) Concentrate strengths in “core business”.</p>	<p>(i) Loose or weaken skills and competences in IS/IT areas; (ii) Loose or weaken differentiations capabilities, because of general “best practices” adoption.</p>
Opportunities	Threats
<p>(i) New business opportunities with the immediate introduction of emerging technologies or new academic skills, without in-house effort resources; (ii) Redirecting the business and IT into “core competences”; (iii) Improving and innovating business processes, skills and emerging technology, by passing financial and technological risk through software suppliers; (iv) Adopt new “best practices” learned from competition expertise.</p>	<p>(i) Select a wrong outsourcing or a facilities management supplier without the necessary skills and expertise in order to execute a particular project; (ii) Political, financial or other internal instability in the outsource or in the facilities management supplier organization; (iii) Cultural mismatch between organization and outsource or a facilities management supplier; (iv) Data privacy loss; (v) The divulgation of internal business practices and knowledge to competition; (vi) Total or partial dependency from outsourcing or or a facilities management supplier suppliers, with big financial and technologic risks.</p>

Table 9 Outsourcing; Facilities Management; Software Packages SWOT Analyses



5.4 Outsourcing; Facilities Management; and Software Package

Acquisition in a Short and Medium Term

In the short and medium future term, this study defends that the success of Outsourcing and Facilities Management of IS/IT services and products will depend on the diversification of the sources. This implies that IS/IT managers have to balance between suppliers offer capacities, and most of all to manage multiple capacities teams, with different competences, enterprise cultures and skills and - possibly- in different countries.

This study defends that Open Source Software (OSS) will have a fundamental role in software development. In OSS, having more user developers increases the rate which evolves the software. Users are treated as co-developers, so they should have access to the source code of the software, and are encouraged to submit additions to the software, code fixes for the software, bug reports and documentation.

As Cearley (2005) claimed, OSS is a catalyst that will restructure the industry, producing higher-quality software at a lower cost. Through 2010, OSS products will account more than 10 percent of the Portfolio of Global 2000 companies, but by 2008, 95 percent of Global 2000 organizations have formal open sources acquisitions. So, OSS will directly compete with closed-source product in every software infrastructure market. Software products and services suppliers will necessitate to balance between the idealized open-source stewardship model and the need to maintain control and leverage certain technological aspects for competitive advantage.

This study defends that OSS will cause a software development revolution, because it will decrease the developer tools supplier dependence, moving revenues streams from licenses to services and support.

5.5 In-Home Software Production (Insourcing)

According to Ward & Peppard (2002),...this type of software production have traditionally been provided in-house by a central IS function.

Insourcing means that the required software needed to support the organization Information System was developed by internal organization IS/IT personal using their own capabilities and skills. Those organizations have their own Information Technology (IT) departments in order to respond to internal software needs. However, while big organizations had abandoned the “In-House” production of software, medium and small enterprises continue to see internal software development as a competitive advantage. According to Caldeira & Ward (2003), the firms that where more successful in adopting IS/IT did not rely on external solutions as an alternative to the development of IS/IT knowledge and competences in house. The main objectives of those firms is to stay ahead from their competitors, using IS/IT knowledge.

So, while big organizations concentrate their innovation strength in their products or services “core business”, small and medium enterprises (SME) continue to concentrate their efforts in the development of software solutions in order to improve internal Business Processes.

As Caldeira & Ward, (2003) noted, despite this internal software development effort, in these firms the access to unique software was not seen as critical to the business and some firms even sold their software to potential competitors.

5.5.1 In-Home Software Production SWOT

Strengths	Weaknesses
<p>(i) Deep knowledge of organization culture and internal languages by the IS/IT internal human resources; (ii) Deep knowledge of the IS/IT existing technology and business resources by the IS/IT managers; (iii) IS/IT human resources are always available to handle with IS/IT problems within the organization.</p>	<p>(i) High internal dependency on internal IS/IT human resources; (ii) Internal IS/IT human resources with a high negotiation power.</p>
Opportunities	Threats
<p>(i) Internal integration capacity with other IS/IT of costumers and suppliers; (ii) Internal capacity to align IS/IT to existing Business Process; (iii) Competitive Advantage with the capacity to explore new IS/IT facilities; (iv) IS/IT business opportunities by turning In-house development in an Outsourcing Software business.</p>	<p>(i) Competitive advantage performance loss, provoked by a deficient use of IS/IT resources. (ii) Evaluation errors and the use of wrong practices can provoke a competitive advantage loss.</p>

Table 10 In-House SWOT Analyses

5.5.2 In-Home Software Development in a Short and Medium Term

As Ross & Westerman (2001) claimed, new technology capabilities will introduce some valuable opportunities to cut costs but firms are more likely to pursue Outsourcing because it better positions them to seize strategies opportunities.

In fact, some authors defend that the outsource software development had a real positive effect in organizations, with the divulgation of the “best practices” in business areas. This study defends that the main important questions related with this matter are: (i) It's important or not to use IS/IT internal organization competences and skills as a source of competitive advantage or competition strategy differentiation?; (ii) Despite the actual organizations efforts to concentrate organizations strengths in the “core business” with the growth of the use of Outsourcing software services, maintaining internal IS/IT skill and competences capacities can be useful to support business process activities?

In fact this second point can be supported by Outsourcing resources, but this study defends that organizations have always to preserve skills and competences in IS/IT to manage those resources in a Product Incremental Outsourcing or Process Incremental Outsourcing.

According to Caldeira & Ward (2003), unlike larger enterprises, in manufacturing SME even technical IS/IT skills can be a source of competitive advantage, because SME usually have scare of financial resources and do not have the same ease of hiring qualified resources. They also conclude in their study that the best IS/IT managements of SME, interiorized this preoccupation besides actual Outsourcing tends.

This study also defends that there is a big possibility that large and midsize organizations will return to In-Home software development strategy, with the use of internal IS/IT skills and competences as a source of competitive advantage or competition strategy differentiation

6 The IS/IT User Requirements Survey

This study identified two types of User Requirements: (i) Information Systems (IS) requirements; and (ii) Information Technology (IT) requirements.

6.1 IS User Requirements Survey

According to Reis (2001) User Requirements Survey is the identification of information services needs and must attend to the following tasks: (i) Inventory and anticipation user needs, and (ii) Verification and validation user needs.

Another good definition from Sommerville (1997) is that, User Requirements survey is the specification of what should be implemented. User Requirements are descriptions of how the system should behave or descriptions of systems properties or attributes. They may be a constraint on the development process of the Information System.

So, the specification of the User Requirements is the process of organizing information about new or existing final user needs, claimed by a change in business strategy.

There are two essential reasons to User Requirements Redefinition: (i) Automating an existing process; (ii) Business Process and IS/IT alignment, claimed by a change in business strategy, although the new business strategy can be simply to take advantage of an emerging IS/IT.

As Brooks (1997) claimed the hardest single part of building a software system is to decide precisely what to build. No other part of the conceptual work is as difficult as establishing the technical detail of the IS requirements, including all the interfaces to people, to machines, and to other software systems. No other part of the work so cripples the resulting system if done wrong. No other part is more difficult to rectify later. So, this study defends that the set of the User Requirements of a Information

System it's essential to the alignment process between the existing IS/IT and the new enterprise business strategy.

According to Courage & Baxter (2005), IS/IT managers must adopt a User Requirements survey strategy that involves actual users, in order to understand their needs. As result, IS/IT managers must talk to the actual users, the people who will use the product until the end of the day, to gain an understanding of their perspectives and needs. This understanding includes their tasks, goals, context of use, and skills.

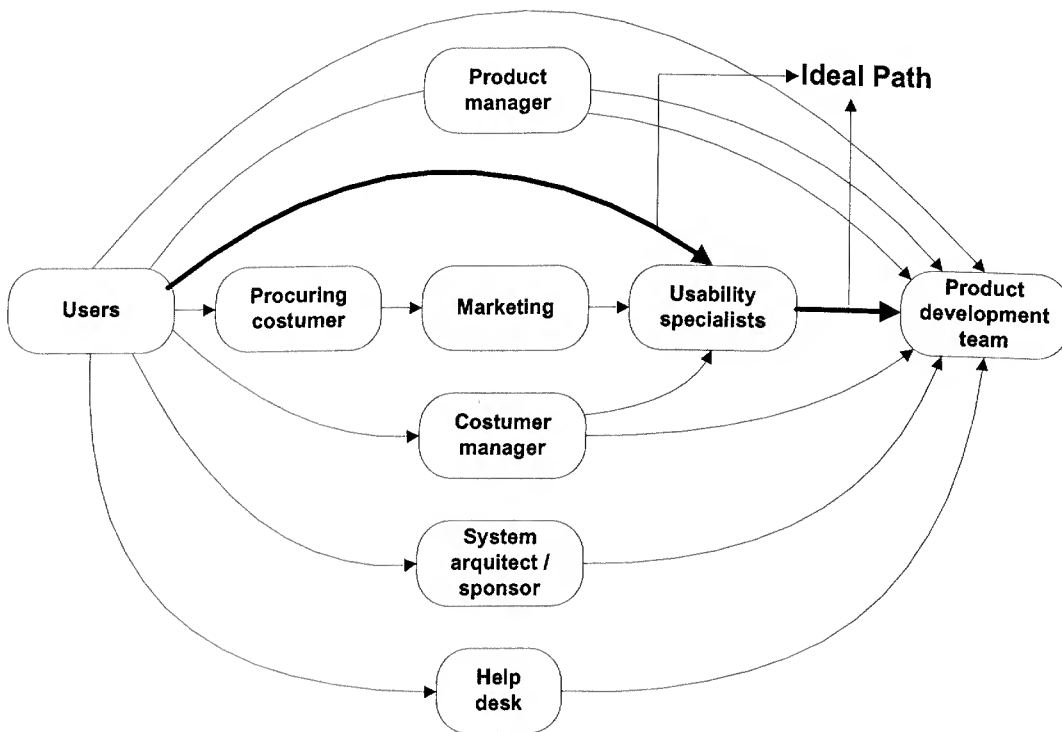


Figure 17: Ideal Communications Path between Users and Development Team.

(Font: Weigers, 1999)

Figure 17, shows the typical communication paths between users and the Software Product development team. The ideal path is shown in Figure 17 with the heavy arrows

This study defends that this type of approach, with the use of intermediate project sponsors to describe new or changes in User Requirements, is not as wrong as it

seems. The business processes portfolio changes are always claimed by a change in the business strategy, despite some times this change in business strategy is only to take benefits of an emerging IS/IT technological advantage. So, with a deep dependence from the project scope, the final user's opinion can have more or less implications and related interest with the new Users Requirements to implement (unless the main project goal is to automate an existing Business Process). But, when the project scope involves major changes in the organization, for example, changes in the employees' occupation, downsizing, internal hierarchic relationships, new skills or competences, new technological knowledge, thru actual users opinion is less important.

As Courage and Baxter (2005) pointed, IS/IT managers may think that they understand what the end users want and need, because other sources have told them on their behalf. This is the number one mistake that IS/IT managers can make. IS/IT managers have always to evaluate who can give the best contribution to User Requirements survey work. This study defends that this evaluation is very important, because it can consume a big volume of resources and time. Software development costs, resources and schedules have tight deadlines and budgets.

In fact, according to Courage & Baxter (2005), one of the big myths surrounding the user requirements gathering is that it takes too much time and money. However there are a variety of methods for identifying user requirements that may be adjusted to the schedule and budget available, such as: (i) interviews; (ii) surveys; (iii) wants and needs analysis; (iv) group card sort; (v) group task analyses; (vi) focus groups; (vii) field visits.

According to Boehm (1998), addressing the risks of mismatches to user project needs and priorities resulted in substantial participation of the user-project personal in the requirements definition Phase.

Hamel & Prahalad (1990) defined “Core Competences” as “the collective learning in the organization, especially how to coordinate the diverse production skills and integrate multiple streams of technologies”.

This study defends that business “Core Competences” represents to organizations one of the most important differentiation key-factor to competitors and must involve the best “Core Business” knowledge. So, an important fact in the User Requirements Redefinition is that: User Requirements Redefinition is the only IS/IT activity that can be declared for sure, that it’s totally included in organization “Core Competences”. If doesn’t make sense to give to Outsourcing “Core Business” functions or activities, it’s essential to involve the best internal organizations skills and competences in this fundamental activity.

6.2 IT User Requirements Survey

There are a variety of different requirements involved in the Information Technology (IT) needed to support Information Systems (IS).

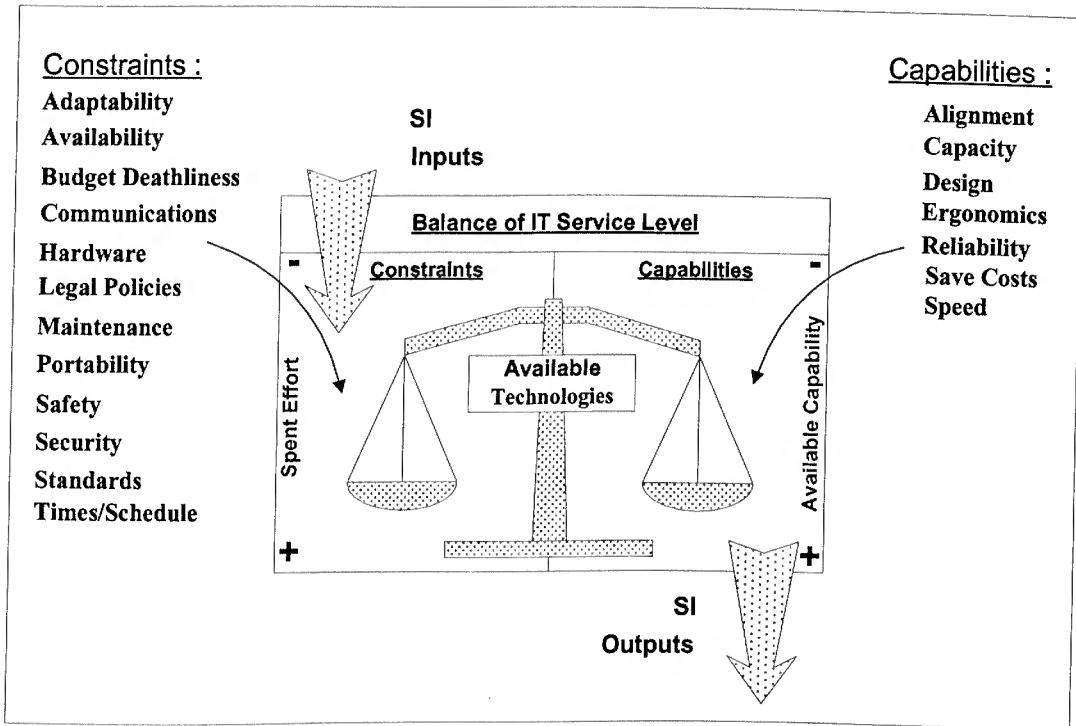


Figure 18: IT Requirements Analyses

This study presents an IT Requirements Analyses model graphed in Figure 18 that shows the necessity to balance between what constraints and capabilities, in order to get a certain IT Service Level. So, the best balanced level point service is when both spares are in equilibrium constraints and capabilities are in total equilibrium.

For example, if IS/IT managers need more capacity in the capability spare, they have to put more Hardware implying more safety, security, maintenance, etc, in the "Constraints" spare.

So IS/IT managers must consider both Constraints and Capability Requirements of the available technologies in order to obtain a certain IT Service Level.

This study considers that IT Service Level evaluation must be considered as a "business strategy" problem, so it must involve not only IT manager's skills and

competences to evaluate the actual IS/IT “State of Art” but also the top managers in order to evaluate the IT Service Level needed to business processes support.

Although IT Service Level is intangible, it can be evaluated by the following points: (i) Final user's opinion, related with their own perspectives and needs; (ii) Comparing existing organization IT portfolio with competitors or with organizations IT portfolio with similar size and needs; (iii) Evaluating effectiveness and efficacy of maintenance best practices.

This study defends that IT management is an intense iterative task that involves a constant search of new, better and emerging technologies and maintenance “best practices”. So this activity implies not only a deep organization IT portfolio knowledge but also a general knowledge about all available technologies in order to evaluate the “State of Art”. This evaluation implies that IT managers must have a distinct character with personal good sense in order to balance between IT Constraints requirements and IT Capability requirements.

This study also defends that, IT managers can't forget that Information Technology exists to support IS activities in alignment with Business Processes, and despite IT is not included in the organizations “core business” (in traditional organizations), it can represent Competitive Advantage to the organization business.

The most important IT Constraints and Capability Requirements are described as follow.

6.2.1 IT Constraints Requirements

6.2.1.1 Adaptability

Adaptability measures how easily a system handles with requirements changes claimed by changes in Business Strategy. Adaptable systems are accepted to live longer in organizations, although the extra work in preventing optimizations modularity facilitates future developments. This constraint is fundamental to increment changes in initial strategy.

6.2.1.2 Availability

Availability measures the ability of a system that needs to be used during its intended operations periods. This measure relates the time life and the capacities availability of systems or equipments with the organizations needs.

A typical example of an available requirement is between On-Line work and Batch processing.

6.2.1.3 Budget Deathliness

Every organization activities, even those who are part of “core business” processes, have their own budget deadline. This study considers that IT isn't an exception and an IT budget deadline is a business “good practice”.

This study also defends that the best way to work with budget deathliness in IT activities is the same as in other working activities, with Financial Analyses Techniques in order to evaluate the new IT acquisitions.

The existing financial amortizations plans of the IT materials and components can be a good argument to negotiate new acquisitions or Budget Deadlines with top managers in order to adopt organizations with new available technologies.

6.2.1.4 Communications Interfaces

A communications interface requirement makes part of the networks protocols specification. In order to use a consistent terminology, this study proposes the OSI as model for Open Systems Interconnection, with its seven layers of abstraction. This means that a communication interface requirement should use a consistent terminology. Performance attributes of the interface may be analyzed and specified.

6.2.1.5 Hardware

The Hardware requirement specifies all or part of the computer hardware, and peripheral (as modems, printers, routers, etc), as well as the "ROM" (Read Only Memory) software support.

Hardware requirements, like those described as follow can be characterized with many attributes according with IT mission: (i) Speed / memory performance; (ii) Physical memory support in RAM (Random Access Memory); (iii) External mass storage devices such as disk drives to direct support or mirror backup; (iv) Qualifications requirements according with Hardware used mission. There are some Business Areas that claim for special Qualification Requirements, for example in Naval, Aviation or Space industries; (v) Environmental requirements that affect the selection of hardware may be stated humidity, temperature and pressure; (vi) Physical limitations on the size or the weight of the hardware components.

6.2.1.6 Legal Policies

Legal policies in order to handle with licensing of all software and hardware tools, components and operation systems needed to support the IT and IS operations.

6.2.1.7 Maintenance Support

The IT maintenance support it's very important and can involve a big quantity of economical and human resources, depending of IT productions needs. IT maintenance can be supported by internal or external (outsourcing) resources.

6.2.1.8 Portability

Portability can be measured in terms of software routines that don't have to be changed to port the software from one environment to another.

If migration to another hardware base, operating system or development language is intended, then any requirements to run with different hardware and software interfaces should be stated as portability requirements.

Portability can be vital to organizations management, when there are changes in IS/IT strategies not only to install a new hardware or operation system platform, but also when IT managers intend to adopt a new software package and have to migrate all data from one platform to another in order to preserve historical data. This study defends that the IT Portability can be considered as a key-factor to Business Processes & IS/IT Alignment Strategy success.

6.2.1.9 Safety

Safety requirements characterize the user protections against potential problems such as hardware or software faults. This type of requirement is responsible for the evaluation of risks related with software and hardware failures. This includes data mirroring and backup and other redundant support system equipments and policies, in order to minimize eventual software or hardware damages effects.

6.2.1.10 Security

The Security requirements are related with threats in systems integrity or confidentiality. The safer integrity IS/IT needs to be protected, not only against

external and undesirable software intrusions like, hackers, virus but also by computer damages, and natural disasters like inundations or fires.

The confidentiality security requirements controls and evaluates IT rules and policies related with users access and rights in the system. According to Daniel Roberts (2005), ORACLE Principal Product Manager, there are five human users' group types: (i) Static Group- Members that are affected to Business Process by strategy, knowledge or skills organized groups; (ii) Dynamic Group-The human resource belongs to one or more static groups. But when a specific group has a set of attributes that automatically relate him with a specific strategic or functional group in the organization, he belongs to a Dynamic Group.

For example:

If (HR belong to marketing) and (title =manager)

Then

(HR Belong Marketing Management group);

(iii) Nested Groups- This group is a composition of other groups: Hybrid Groups; Static Members, Dynamic Members and Nested Members; (iv) Hybrid Group- Not related with any other existing group. Can consist of Static Members; Dynamic Members; Nested Members; (v) Group Subscription- Rules Based (Example: with or without superior approval). Subscription rules are based groups used for employees and costumers to join special interest groups.

6.2.1.11 Standards

The standard requirements are the set of standard methods and rules used to develop, produce and maintain IS/IT systems. There are many examples of standards requirements, as for example XML and EDI are communications standard format files. They allow the communication between two systems in a universal standard script language, understood by different types of Hardware, Operation Systems or Software Package. The standards of International organization for

Standardization (ISO) ISO 9000 Series represent other good example. They are international standards that can be applied to quality systems in all types of organizations, including those performing design, manufacturing, distribution, testing, and service functions.

6.2.1.12 Times/Schedule

Time and schedules are needed to the development, production and deliver of an IT (or IS) solution. This includes Evaluation and Support Maintenance to have time's response available in Hardware and Software suppliers.

6.2.2 IT Capability Requirements

6.2.2.1 Alignment

This study defends that Business Processes and IS/IT must be aligned. So, the first step is to align IT with IS needs. For example we can't have an operation system that doesn't give a good support to the IS technology.

6.2.2.2 Capacity

The production and the development of a system support capacity in every moment and in every Business Process. For example: (i) Amount of data that has to be stored; (ii) Amount of simultaneous user access in every moment; (iii) Computers and other peripherals interfaces; (iv) Amount of On-Line and Batch processing routines, and how much data is involved in each.

6.2.2.3 Design

Computer Systems make part of human existing work environment. All office furniture, chairs, tables and so on are created by furniture's designers, with the main concern to integrate computer systems in the office environment in order to allow an easy use and to turn them the main working office tools.

As office appearance can influence work environment it can also represents Competitive Advantage. For example when there is a direct contact with costumers and suppliers. So, this study defends that Computer Systems Design it's definitely an important factor that can influence the acceptance of end-users, marketing and sales personal, top managers and even by organizations shareholders.

6.2.2.4 Ergonomics

A good user interface design can make a product, easy to understand and use, which results in a greater user acceptance. The importance of a good user interface design can establish the difference between product acceptance and rejection by end-users. If end-users feel that it is not easy to learn, not easy to use or too heavy, the product could fail. So, this study defends that Simple Human-Computer Interaction (HCI) can influence the end-user acceptation like the use of mouse, menus systems and icons, screen colors, etc.

Other type of ergonomic problems like system messages and complex procedures to operate the system can also influence negatively the product acceptance.

6.2.2.5 Reliability

This requirement measures the work service reliability in IT hardware, support software and maintenance of personal support to end-users. There are two main important signals that can be relate with IT Reliability: (i) Frequent systematic or random operation errors, causing delays or even obstruct systems operations; (ii) The final user's confidence in maintenance personal skills and competences can be a good measure of reliability, just because if the system is bad, the teamwork can't do miracles with it.

6.2.2.6 Save Costs

One of the main concerns of IS/IT and business managers is to save money in all areas with the use of the minimum resources needed to provide the necessary contribution in the Value Chain.

As Information Technology (IT) doesn't make part of "core business" enterprise (in traditional organizations), and it's an expensive economic resource, IT managers always have "Saving Costs" as a main goal in IT acquisitions policies.

6.2.2.7 Speed

The speed requirement represents the time needed to complete a set of information transactions in an IT system. This requirement is directly related with the hardware amount that is needed to support IS and correspondent Business Process strategy alignment.

7 Prevent Major Risks and Mistakes in the Survey of the User Requirements

In this chapter this study identifies the four main topics that business and IS/IT managers must follow, in order to prevent major risks and mistakes in the survey of the User Requirements as part of the Phase 2 of the proposed Business Process & IS/IT Strategy Alignment Life Cycle model. They are: (i) See Deeper to Go Farther; (ii) Listening-to-Learn and Learning-to-Learn; (iii) The Importance of the Organizations Stakeholders Home Work; and (iv) Changing Ideas and Requirements Constantly. These four main topics are described as follow.

7.1 See Deeper To Go Farther

As Theron & Cook (2002) enhanced, it's not enough to obtain the stakeholders requirements once and assume that they are correct. By so doing, the risk of giving the stakeholders exactly what they ask for, rather than what they really need, is increased. What Theron & Cook (2002) intended to say is that, the survey of the User Requirements responsible have to see deeper and to be able to learn with users and with the development team, in order to determine exactly their major needs and their best expectations.

As Courage & Baxter (2005) claimed, in the very beginning IS/IT managers can get away with being naïve: but with time, stakeholders will expect them to understand what they are talking about. So, IS/IT managers can't forget that the main goal of this survey is not to test stakeholders capabilities but to produce a IS/IT solution that has to cover not only immediate needs but also a set of explicit and tacit knowledge that IS/IT managers have to transform into Competitive Advantage (go farther), in order to correspond to end-users desires, and respond to the stakeholders and project sponsors best expectations.

7.2 Listening-to-Learn and Learning-to-Learn

Another important fact that usually contributes to the User Requirements Survey failures is to transform User Requirements Surveys work into a stand-alone task, where the use of pragmatism can fix all existing problems without listening or learning (Listening-to-Learn) to anyone else.

Business and IS/IT managers must listen to business stakeholders, sponsors, end-users, development team, etc, and learn, perceive and understand the entire organization "Core Business". So, IS/IT managers must adopt skills and knowledge competences "Core Competences" to take advantage of all available information, using if necessary analysis tools and learn faster and with less efforts an expenses. So, IS/IT managers must develop Learning-to-Learn capabilities in order to transform this learning activity into a competitiveness factor.

7.3 The Importance of Organizations Stakeholders Home Work

" -I never thought someone might just change her name, unless she married. I don't reminder you telling me about this possibility when we talk about the system. Phil said...

-I assumed that you knew that people could legally change their name anytime they like. Maria responded...

-It's not a bug! I never knew you needed this capability. Phil protested..."

(Font: Weigers, 1999)

In fact the quality of the User Requirements Survey depends not only of IS/IT responsible competences and skills but also of end-users, stakeholders and sponsors contribution quality.

There are stakeholders that don't understand the importance of their contribution to a new software development or product implementation, so they simply adopt the

worse attitude they can. Once a IS/IT outsourcing customer argued with this incredible single sentence:

"We are very busy to spend our time working with IS/IT analysts and developers on requirements. We pay the bill, so you should do all the work."

This study defends that this type of statement is wrong, because the User Requirements are part of the organization "Core Competences", although the rest of the IS/IT processes can be included or not in the organization "Core Competences". So, just because no one gives "Core Business" functions to outsourcing, implementing a new business strategy can only be done with organizations stakeholders and sponsors contributions in an unconditional way.

With this type of attitude, the stakeholders are not only boycotting the development team work, but also putting in danger all project results. So, with this type of attitude, the organization stakeholders aren't defending the organizations interests. In fact they really have the big responsibility of making their *Homework* and give their best contribute to the survey of the User Requirements, in order to facilitate the IS/IT developers team job.



Figure 19: The Worst Cooperating Stakeholder

(Font: Dilbert, United Feature Syndicate, 2002)

The Dilbert cartoon presented in Figure 19 has become a classic example about a bad cooperating stakeholder. In fact organization project sponsors must have the authority needed to balance and solve this type of less cooperation attitudes.

7.4 Changing Ideas and Requirements Continuously

Behind a good idea there is, in most cases, another one. Sometimes, despite organizations business stakeholder have sign off the user requirements survey documents, they change their minds later and want to modify or to add new User Requirements, in order to benefit of new emerge opportunities with the new business process or IS/IT alignment implementation.

But like good ideas, behind a new user requirement, there is in most cases another one. So IS/IT managers have to pay attention and be aware of all changes in the User Requirements, despite those changes may appear to be simple, they can hide big problems to the final results.

This study defends that it's very danger to change or to introduce a new User Requirement without a deep evaluation of the present and future implications of those changes, especially in the development time.

8 Business Concepts Analysis

In this chapter this study proposes three new models in order to allow the incorporation of Business Concepts, Knowledge and Skills in the User Requirements survey of the proposed Business Processes & IS/IT Strategy Alignment Life Cycle Phase 2 model. The proposed models are: (i) BCOTS Business Concepts off-the-shelf; (ii) Knowledge Model for Atomic Decisions; and the (iii) Iterative Analyzing & Learning Processes model (IALPM).

8.1 Business Concepts off-the-shelf (BCOTS)

Figure 20 introduces a new Business Concept model, named "BCOTS- Business Concepts off-the-shelf" (adopted from the expression COTS-Commercial off-the-shelf).

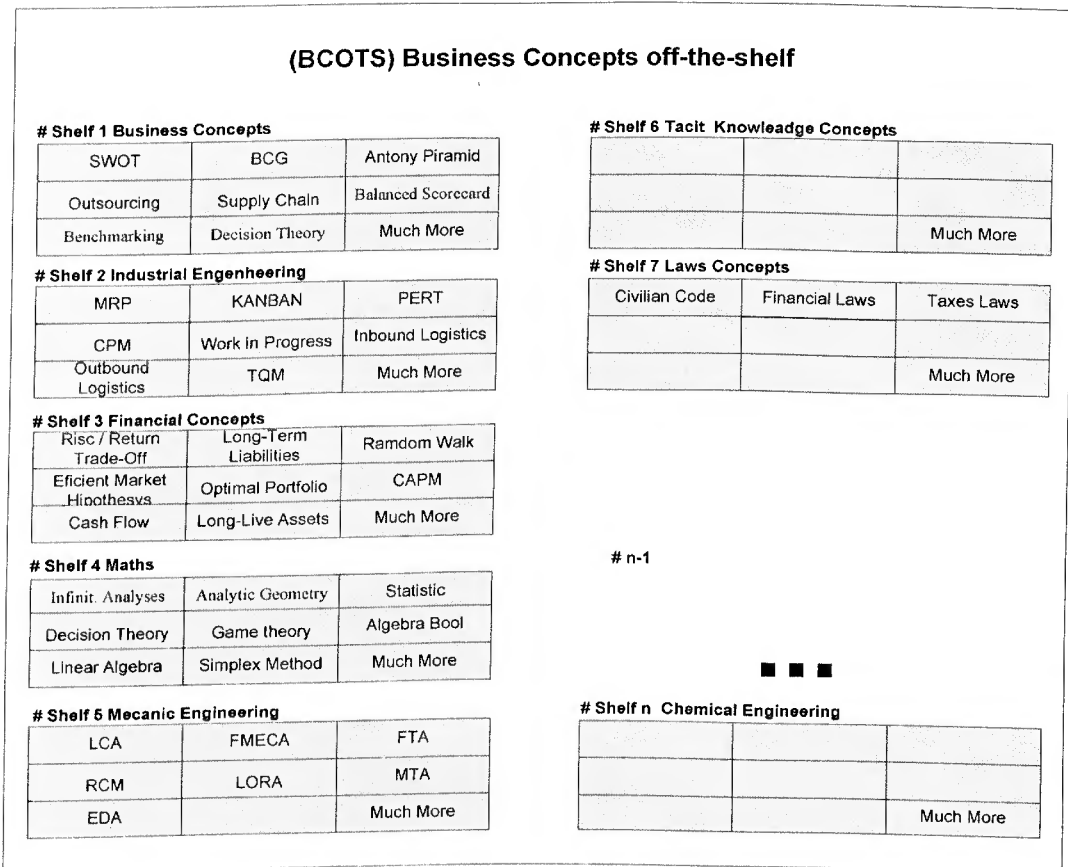


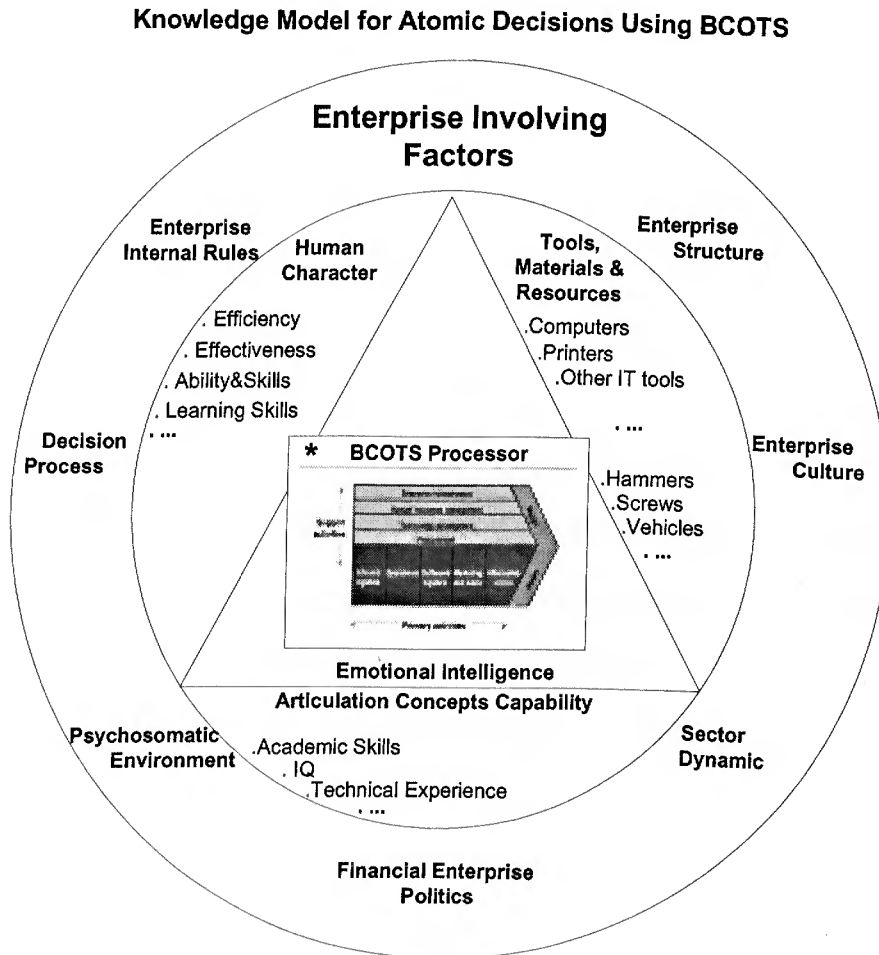
Figure 20: Business Concepts off-the-shelf (BCOTS)

The presented model represents the human active memory in a long and short term, as a BCOTS *warehouse* representing the main tool used to preserve Business, Scientific, Technological and Tacit Concepts.

This model defends that Business Concepts can be guarded in human memory in many different ways and supports, including books; technical and scientific articles, and others scientific and technological tools used to knowledge support *since they are accessible and tacitly or explicitly understood by the subject (human analyst) himself.*

8.2 Knowledge Model for Atomic Decisions Using BCOTS

The presented model, showed in Figure 21 defends that human analysis can be represented by a Knowledge Model for Atomic Decisions using BCOTS.



* BCOTS (Business Concepts off-the-shelf)

Figure 21: Knowledge Model for Atomic Decisions Using BCOTS

This Knowledge Model for Atomic Decisions allows decision makers and knowledge workers to go deeper in tacit and explicit Information Requirements needs. The presented model is composed by a first involving layer zone containing the organizations environment main factors that can constraint business decisions. The internal zone is divided in four main subjects, represented geometrically by three existing zones between the involving enterprise circle and the triangle. The

Knowledge Model for Atomic Decisions model is described as follow: (i) Enterprise Involving Factors zone representing the internal and external organizations environment main factors that can constraint business decisions; (ii) Human Character zone representing the foundations of human personal character. It includes for example: efficiency; effectiveness; abilities & skills, learning skills, and more; (iii) Tools, Materials and Resources zone representing all scientific and technological tools, materials and equipment used to complement physical and mental human personal capabilities; (iv) Articulations Concepts Capability zone basically involves all the factors that influence human capability to articulate Business Concepts, like for example: academic skills, IQ, technical experience, and more; (v) Emotional Intelligence. The triangle in the centre of Figure 21 represents the Emotional Intelligence (EI) zone. EI was broken down in four domains by Goleman (2003): (i) Self-awareness (Emotional Self-Awareness. Accurate Self-Assessment and Self Confidence); (ii) Self-management (Emotional Self-Control. Transparency (Trustworthiness). Adaptability. Achievement Orientation. Initiative. Optimism. Conscientiousness); (iii) Social awareness (Empathy. Organizational Awareness. Service Orientation).; (iv) Relationship management (Inspirational Leadership. Influence. Developing Others. Change Catalyst. Conflict Management. Building Bonds. Teamwork and Collaboration. Communication).

The presented model proposes that Emotional Intelligence (EI) is the deeper and perhaps one of the most important knowledge contributors to every human final decision.

8.3 Iterative Analyse & Learning Process Model

The proposed model graphed in Figure 22, represents an extension of the DIKAR conversion model, with the introduction of an Iterative Analyzing & Learning Processes model (IALPM) using the Business Concepts of The Shelf (BCOTS) warehouse model (represented in Figure 20), the Knowledge Model for Atomic Decisions (KMAD) (represented in Figure 21) and the SECI Nonaka & Takeuchi model (represented in Figure 7).

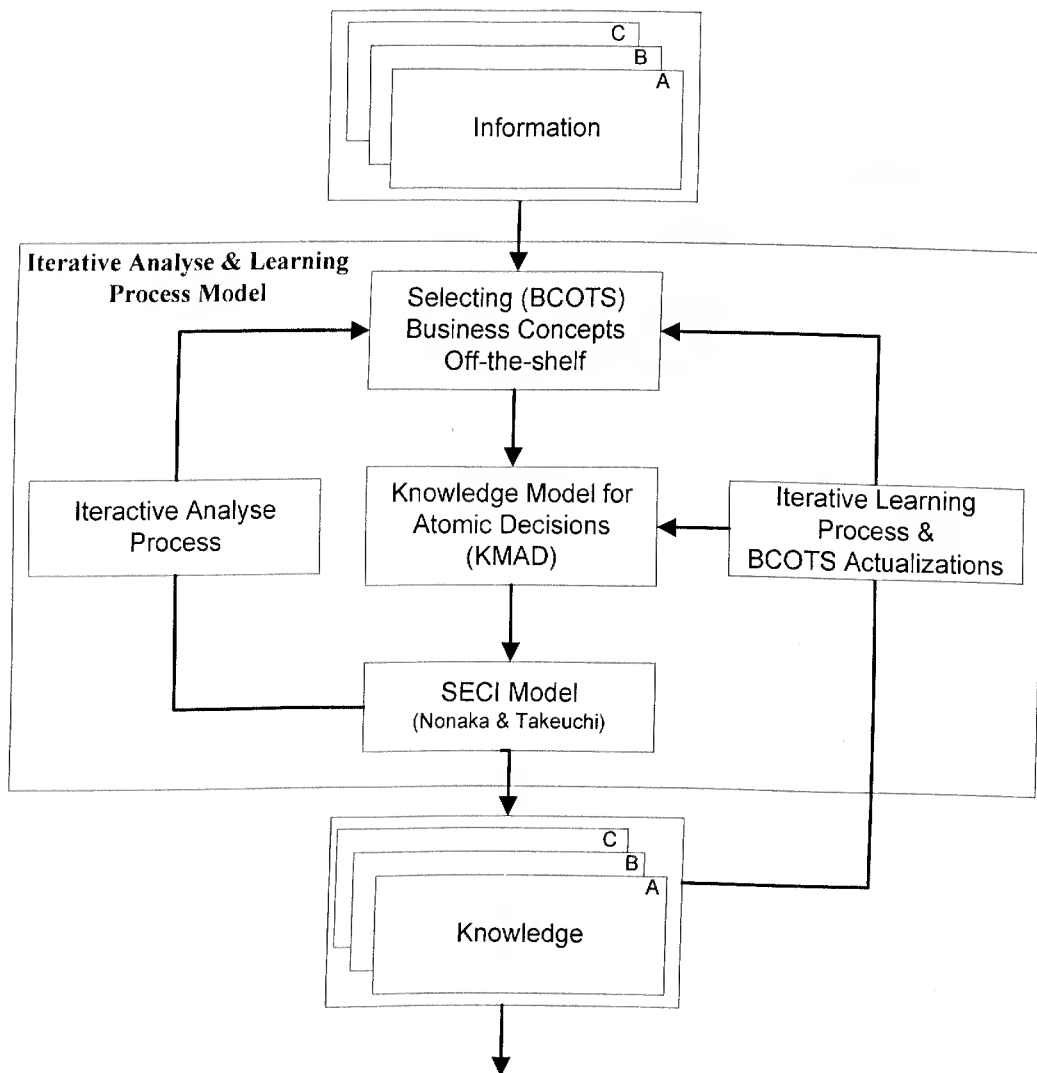


Figure 22: Iterative Analyse & Learning Process Model

The SECI model outcomes is composed not only by the knowledge conversions, resulting from the conjugation process of tacit and explicit types of knowledge, but

also as part of a learning process, through the improvement of KMAD model and by the BCOTS *warehouse* actualization.

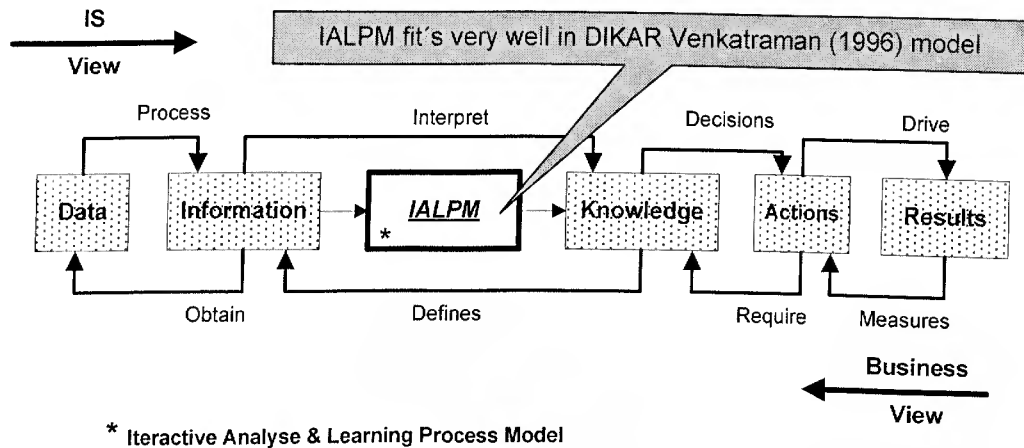


Figure 23: DIKAR model with IALPM Adoption

In Figure 23, this study defends that the proposed Iterative Analyses & Learning Process Model (IALPM) (represented in Figure 22), fits well in the DIKAR (left to right approach) Venkatraman (1996) model, in order to “Interpret” results, or in the reverse RAKID (right to left approach) model in order to “Define” information needs.

9 User Requirements Analysis Using Business Concepts

Each Business and Technological area has its own skills and consequently its own Business Concepts, and if IS/IT is transversal to all organization; IS/IT must incorporate all Business Concepts Knowledge needed to reach organization goal strategies.

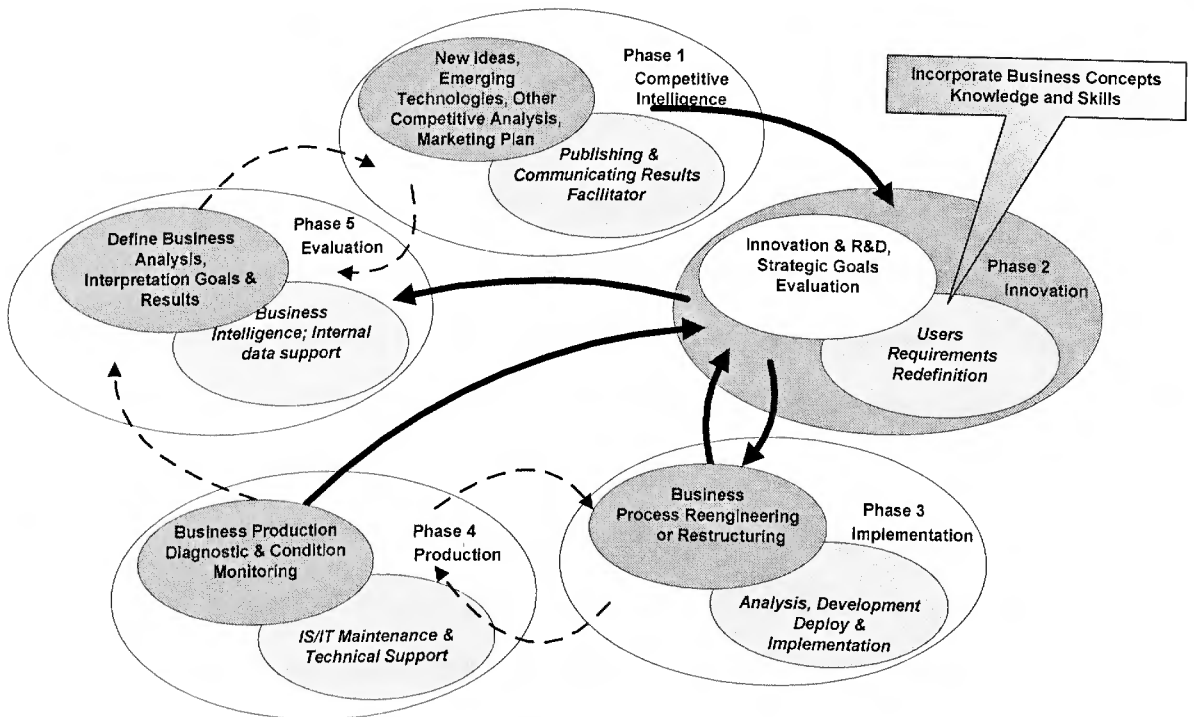


Figure 24: Incorporate Business Concepts Analyses in Phase 2

This study defends that despite the use of Business Concepts in all Business Processes & IS/IT Strategy Alignment Life Cycle Phases, (just because they are part of the knowledge and skills of all managers and technical engineering “Core Competences”) in the IS/IT point of view, it’s in Phase 2 where basically business and IS/IT managers need to incorporate them, in order to expand their value-added to all the following Business Processes & IS/IT Strategy Alignment Life Cycle phases.

9.1 IS/IT User Requirements Redefinition Model

Figure 25 describes the interconnection between Business Processes & IS/IT Alignment Strategy Life Cycle Phase 2 with other phases, with the main focus in the Strategic Business Goals Evaluation (Business Processes part) and in the User Requirements Redefinition (for the IS/IT part). This graphic presentation also includes all Phase 2 predecessor and successors phases as well as the feedback links from phases three and four, according to the heavy arrows graphed in Figure 24.

The deeper Phase 2 graphic presentation represented in Figure 25 supports the relationship of one to many, between the Iterative Analyze & Learning Process Model (IALPM), the Critical Success Factors (CSF) and the User Requirements (UR). This presentation also anticipates the possibility of the existence of repeated elements in CSF and UR that in practice can be deleted.

This study defends that the User Requirements Redefinition in Phase 2, must anticipate and support all internal data needed to produce Business Intelligence required in Phase 5. As result of the immediate link from Phase 2 to Phase 5, the proposed model defends tacitly that organizations can save a lot of money and work time in the analysis and developments needed to support Phase 5 IS/IT activities.

So, this Phase 2 graphic presentation model has adopted some standard Data Warehouse concepts in order to support Phase 5 IS/IT activities like: (i) Data Granularity, (ii) Dimensions, (iii) Facts, (iv) Sharing Dimensions Across the Value Chain; and (v) Measure Facts by Dimensions.

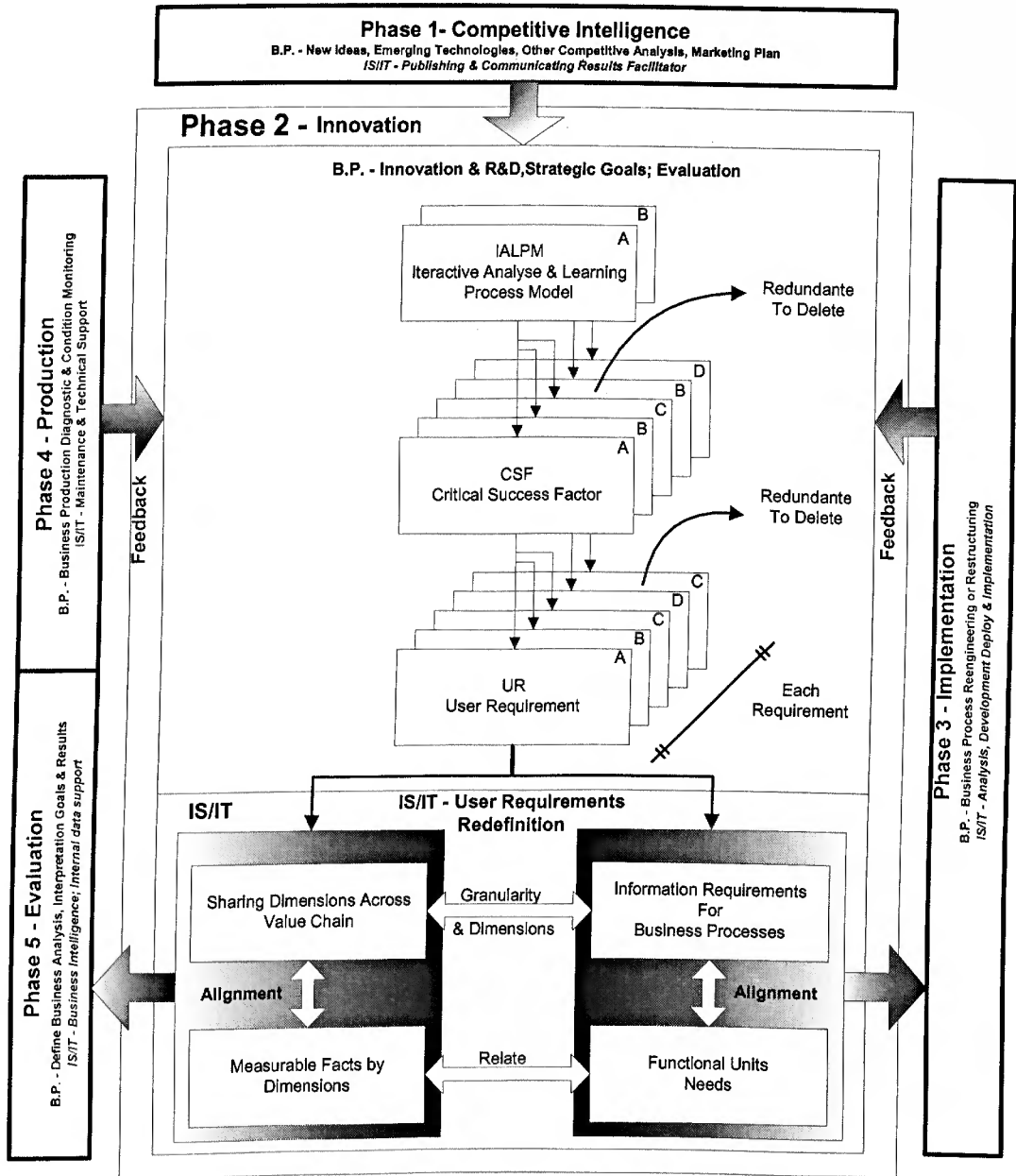


Figure 25: User Requirements Redefinition Model

For Phase 3, the main Phase 2 IS/IT contribution is in the User Requirements definition. Each User Requirements Redefinition claims for a set of changes in Business Process Information Requirements needs. This is the most important fact in order to support Phase 3, Business Processes Reengineering (BPR).

9.1.1 Information Requirements for Business Processes

According to Winter & Strauch (2004), information requirement is defined as the type; amount and quality of information that a decision maker or knowledge worker needs

to do his job. In most cases, information requirements cannot be specified exactly because they vary with different tasks, vary in time and depend of the decision makers / knowledge workers frame of mind.

In fact every Business Process needs a set of information requirements to be processed in order to support “Core Business” activities. So the first step is to identify which Business Processes (information to support Phase 3) and which Dimensions across the Value Chain (information to support Phase 5) are needed to support each User Requirement.

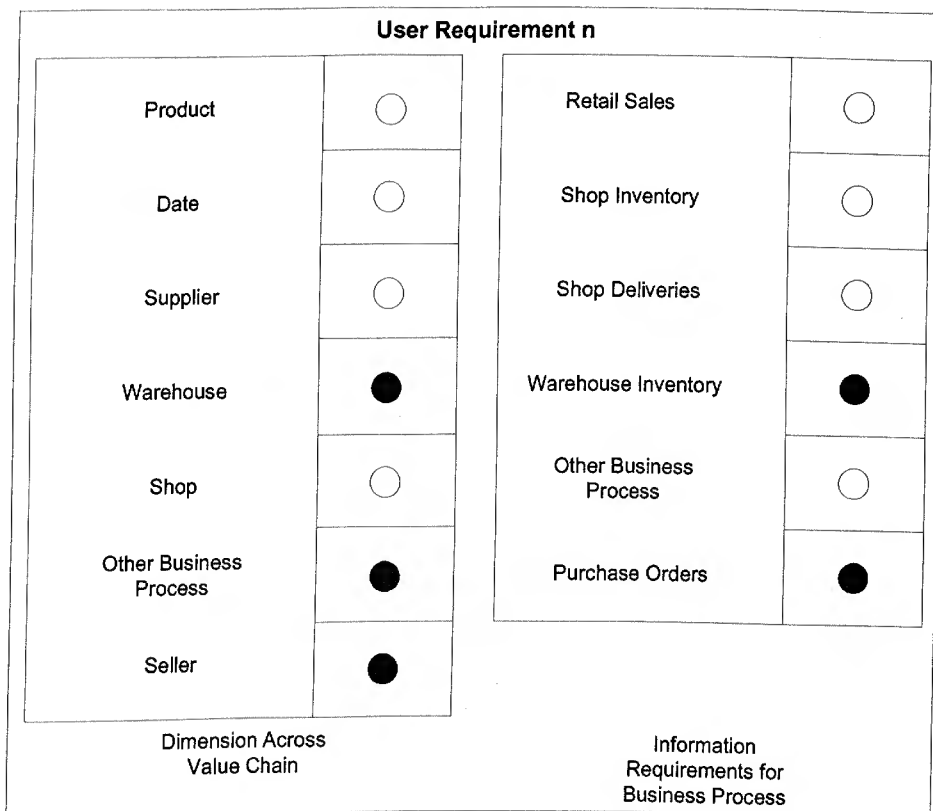


Figure 26: Phase 2-IS/IT User Requirement Redefinition Process

Figure 26 is an exemplification of a possible relation between User Requirements, Dimensions across the Value Chain and Business Processes. Following, for the actualization of Dimensions across the Value Chain and Business Processes needs, this study will proceed with Phase 2 IS/IT evaluation, in four main steps described as follow.

9.1.2 Functional Units Needs

Functional Units are composed by a set of mechanical, electrical or by other type of equipment controlled by human resources with related knowledge and expert skill in order to respond to "Core Business" organization business processes.

Functional Units are created according with Business Strategy needs and existing human resources internal policy.

<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Retail Sales	Business Processes
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Shop Inventory	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Shop Deliveries	
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Warehouse Inventory	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Other Business Process	
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Purchase Orders	
Production	Marketing	Procurement	Logistic	Other	Sales	Functional Units	

Figure 27: Functional Units & Business Process Relation

According to Porter (2002), in many diversified firms, the business unit autonomy is a longstanding policy that has been carefully nurtured and emphasized as key to success. While autonomy does indeed play an important role there is a strong tendency to carry it too far and ignore changing competitive circumstances.

As result Business Units tends to be more and more efficient in Business Process executing as time goes by. Meanwhile what looks to be a very positive characteristic of Business Units, can represent as well an obstacle in the implementation of business process strategy changes, by turning business processes alignment with strategy in a very difficult problem.

9.1.3 Sharing Dimension across Value Chain and Business Processes

The following step is to decide which business processes are involved in each particular User Requirement and to understand the combination of Business Process and the Sharing Dimension across the business value chain.

Once business processes have been identified, business or IS/IT managers have to decide the data granularity that represents the atomic information needed in order to support each business process. This means that, business or IS/IT managers need the most detailed information possible; from where data can't be subdivided furthermore.

This analysis can evaluate the "dimensions" needed to support the system, as for example; Product; Date; Warehouse; Shop, Supplier, Seller and more...

●	●	○	○	●	●	Retail Sales	Business Processes
●	●	○	○	●	○	Shop Inventory	
●	●	○	○	●	○	Shop Deliveries	
●	●	○	●	○	○	Warehouse Inventory	
○	○	○	○	○	○	Other Business Process	
●	●	●	●	○	○	Purchase Orders	
Product	Date	Supplier	Warehouse	Shop	Seller	Sharing Dimensions	

Figure 28: Sharing Dimensions & Business Processes Value Chain

9.1.4 Measuring Facts by Dimensions

The following step is to make a careful determination of which “facts” are involved in the organization “Core Business”.

Facts are for example: sales in euros a week, sales quantity for item, amount of warehouse space occupied by a family product, competitor financial results, and the number of human resources involved, current exchange with dollar, and more.

This study defends that facts are the quantitative explicit *Business Representation* in numbers. For this propose, business or IS/IT managers can use the grain declaration, in order to help them in facts definition.

So the main problem is to determine which facts are needed in order to clarify the necessary information grain for each particular User Requirement.

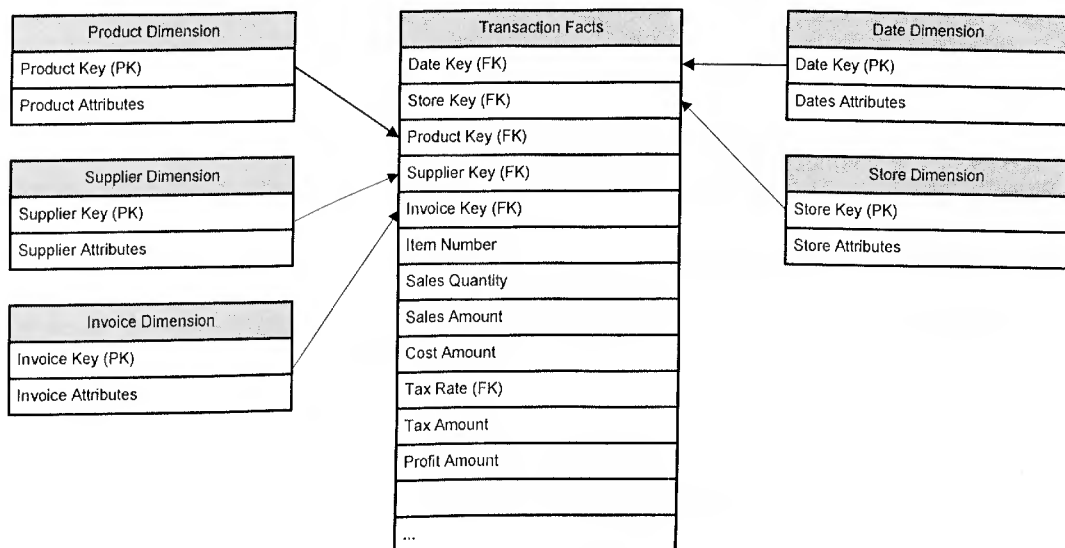


Figure 29: Measuring Facts by Dimensions

9.1.5 Measurable Facts by Dimensions and Functional Units Needs

If it's true that *Facts* are *Measurable by Dimensions*, it's also true that Functional Units must be responsible by Facts results.

<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Sales in Euros Week
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Sales Quant. Item
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Amount of Shop Deliveries
<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Warehouse Available Space
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Other Business Process
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Amount of Purchase Orders
Production	Marketing	Procurement	Logistic	Other	Sales	Facts by Dimensions
Functional Units						

Figure 30: Functional Units & Facts Results

So it's fundamental to know which Functional Units are involved with existing explicit Facts in order to know their real importance. This information can be very important in order to determine the user interfaces needed to support the Functional Units activities.

9.2 Prototyping and Specifying the User Requirements

According to European Space Agency ESA (1995) a prototype is a concrete executable model of selected aspects of a proposed system.

This study also defends that if the user requirements are unclear or incomplete, it can be useful to develop a prototype based on tentative requirements to explore what the user requirements really are. This is usually called "exploratory prototyping". Hands-on experience can be an excellent decision tool in order to support what is really needed.

So, this study defends the use of Business and Management Concepts to define the best Critical Success Factors, in order to support the User Requirements of the IS/IT in the organization.

To proceed with the prototyping process, this study also defends that the proposed presentation model graphed in Figure 25, representing the Phase 2 of the Business Processes & IS/IT Alignment Strategy Life Cycle, turns explicit the Phase 2 internal composition: (i) Functional Business Processes Information Requirements; (ii) Functional Units Needs; (iii) Sharing Dimensions across the Value Chain; (iv) and Measure Facts by Dimensions.

So, the proposed model can be used to support the prototyping of screens, menus and paper reports according to the Functional Units, the Business Processes information requirements needs, Facts and Dimensions.

It is important to enhance that the proposed model doesn't intend to take the place or ignore traditional methods like: (i) Mathematical Formalism; (ii) Natural Language; (iii) Decision Tables; (iv) Spreadsheets; (v) Structured English; (vi) Time Lines; (vii) and Context Diagrams. This study defends that those methods can be used as well as a complement, if necessary, in order to facilitate the prototyping work and the specification of the User Requirements Redefinition of the Business Processes & IS/IT Strategy Alignment Life Cycle Phase 2 proposed model.

10 Conclusion

This study defends that the power of a full technological alignment of the IS/IT resources with the business strategy can influence the organizations business goals and competitive advantage. So, the IS/IT Strategy Alignment become an essential ingredient for all business strategy. The Business Processes & IS/IT Strategy Alignment Life Cycle proposed model, enhance the high importance of this alignment, in order to reach business strategic goals and results. So, the presented model is composed by a set of Business Processes and related IS/IT sequence phases, showing where and how strategic decisions can influence and subject to conditions all administrative and operational decisions.

Applying to existing common models like MacFarlan Strategic Grid, Oliveira's IS/IT Information System Costs Evaluation Model, Ward & Peppard IS/IT Benefits Management Model and others, the IS/IT Costs and Alignment Phases Contribution Model as well as the ISC Report Presentation Model allow business and IS/IT managers to have a new approach to this important matter and intends to represent an important tool to the Business Processes & IS/IT Alignment evaluation within the organizations.

This study also proposes a new model called Iterative Analysis and Learning Process Model, based on two other new proposed models named Knowledge Model for Atomic Decisions (KMAD) and the Business Concepts off-the-shelf (BCOTS) in order to describe the information into knowledge transformation.

This study proposes that the set of User Requirements of a Information System is the base of the sustainability of any new business strategy and the only IS/IT activity that business and IS/IT managers can declare for sure, that is totally included in organizations "*Core Competences*". So, if doesn't make sense to give to outsourcing or to contract facilities management to do "*Core Business*" functions or activities, it's

essential to involve the best internal organizations skills and competences in this fundamental activity.

This study defends that it's not enough to obtain the business manager's and stakeholder's requirements view and assume that they are correct, without incurring the risk of giving them exactly what they ask for, rather than what they really need. So, IS/IT managers have to go deeper and be able to learn with stakeholders and business managers in order to determine exactly their major needs and their best expectations. For Phase 2 of the Business Processes & IS/IT Alignment Strategy Life Cycle model, this study proposes a new *User Requirements Redefinition* approach in order to proceed to the analysis and survey of the User Requirements, in a language understood by business and engineering managers and others stakeholders, based in the Business and Management Concepts importance.

With the Business Processes & IS/IT Alignment Strategy Life Cycle Phase 2 presentation model this study defends that the User Requirements Redefinition (IS/IT of Phase 2), must determinate Business Intelligence (IS/IT of Phase 5) initial needs. As outcome organizations can save in IS/IT and business resources work time and expenses, in the analyses and development of Phase 5- Evaluation.

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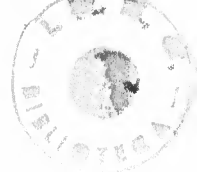
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