

**ALIGNMENT BETWEEN ORGANIZATIONAL AND INFORMATION SYSTEMS  
OBJECTIVES: MULTIPLE CASE STUDIES**

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**Abstract:**

This paper presents an exploratory study on the alignment between organizational objectives, as formalized in the business plans, and the information provided by Information Systems (IS) in order to monitor these objectives. The research was based on multiple case studies and meta-analysis, and tried to verify the existence of IS strategic information that supports the organizational objectives. The aim of the study was the identification of a set of variables that represents the relationship between organizational and IS objectives defined in the strategic plan, which configure the informational integration element described in the operational model of strategic alignment of Brodbeck and Hoppen [4]. The main results indicate that alignment promotion will be intensified if the companies establish an informational model, representative of the business management, that integrates the organizational objectives and the IS information in several levels (infra-structure and processes).

**Keywords:** strategic alignment; information systems; strategic planning.

## 1. Introduction

The impact of Information Technology (IT) on business performance has fueled many discussions during the past ten years. Researchers have examined the needs and benefits of aligning IT with business [1, 6, 8, 16, 23]. A survey on 117 large Brazilian companies, carried out by the magazine InformationWeek Brasil January-2003, under the title “An overview of IT – the technology of corporations in 2003” (“Panorama da TI – A Tecnologia das Corporações”), revealed a primary preoccupation of business executives with the informational content of Information Systems (IS) derived from the organizational strategic objectives. The study of business goals related to the information provided by the IS has appeared constantly in the field of IT strategic planning [2, 11, 12, 13, 25]. More importantly, it has been considered critical to executive information systems, the present information providers to management. The appropriate use of such information should help organizations understand their global strategies, allowing them to monitor their organizational goals throughout the planning horizon.

Strategic alignment is the connection between the components of the strategic business plan (SBP) and the components of the IT strategic plan (ITSP). Therefore, the key to promoting strategic alignment is the identification of the set of organizational objectives defined for a given planning horizon and of the set of information to be modeled into the IS. The latter set should allow the monitoring of pre-established goals for each organizational objective, throughout a given process [4, 12, 14]. This involves the two stages of a planning process – formulation and implementation. During formulation, the IS information for each strategic objective is defined, while, during implementation, the information is controlled and adjusted to the established goals, a task that is accomplished through the adequate use of management tools and that allows a continual promotion of alignment, from the operational to the strategic levels [4].

Herein, the term *organizational strategic objective* is used to designate a result that is pursued by the organization, being, therefore, a necessary component of the strategic plan. The first activity in the strategic planning process is focused on the definition of the business and of the mission, whereas the second is focused on the set of organizational strategic objectives, which can be seen as an effort to convert strategic intentions into results, i.e. the answers to “what” and “how”. IS objectives must be considered as the IS information resulting from the operations of a given business that provide information on the evolution of the organizational objective achievements [21]. The IS information must

consider both internal and external business aspects, allowing business redirection and gains from competitive advantages [22].

Based on meta-analysis, the present work is an empirical investigation on the relationship between organizational and IS objectives defined in the strategic plan, looking for variables that represent the informational integration element from the operational model of strategic alignment of Brodbeck and Hoppen [4]. This element was based on the set of business and IS objectives and its relationship presented in Zviran's study [25]. The text is organized as follows. Firstly, there is a discussion on the essence and importance of organizational and IS objectives, and on the need of their alignment as part of the integral alignment between business and IT. Secondly, key concepts to the operationalization of the informational integration element present in the base model used herein and in the methodology are presented. Concluding the work, comes a discussion on the results obtained in many case studies and a presentation of suggestions for future research.

## **2. Strategic Alignment**

Alignment can be found in organizations in various stages or levels [4, 9, 17]. In organizations that pursue the alignment, two levels are worth mentioning. The first is operational integration, for which there is a need of business and IT operational plans. During implementation the ITSP is formulated following the definitions in the SBP, and, subsequently, both plans are formulated simultaneously. This level is characterized by the specification of requisites and functions of the IS and of the business at an operational level, involving processes and structures that use IT as a supporting tool [7, 11].

The second level of strategic alignment displays the idea of integration in a higher hierarchical level of management, where integration occurs via the adequacy of IS information to the strategies, objectives and fundamental competencies of the business. Here, redirecting of business through IT can be seen [24]. In this level, SBP and ITSP should be integrated through the mapping of systems and strategic information directly related to the business strategies, supporting the organizational objectives and contributing to the identification of new opportunities based on IT solutions and to the achievement of competitive advantages [12, 20].

### **2.1. The Alignment Model and Its Elements**

The strategic alignment model underlying this study is the operational model of Brodbeck and Hoppen [4], based on Henderson and Venkatraman's model [11]. This model incorporated some alignment variables from others researches [6, 7, 21], new knowledge originated from the studies of

methodologies of implementations of IS strategic plans of Lederer and Sethi [13, 15] and integrated information systems (ERP) methodologies concepts of Brown and Magill [5]. The model contains the principle that strategic alignment is not an isolated event, but a process of continuous adaptation and change, stressing the importance of continuous reviewing processes (evaluation) as a means of promoting alignment [2, 17].

The operational model of the strategic alignment has two dimensions: strategic planning and strategic alignment [4]. The **Strategic Planning Dimension** (SP) is composed of two elements. The first element encompasses the business and IT **plan items**. The business items are strategies, objectives, actions and goals, whereas the IT items are infra-structure, systems and processes, and skills. The second element is formed by the **stages in the SP process**, which are diagnosis, formulation, implementation and evaluation. Those stages occur in a short, medium or long-term planning horizon. There are two basic assumptions: (a) the diagnosis stage of the current business and the future business formulation must occur simultaneously, and (b) the evaluation stage and the various implementation stages must be concomitant, providing continuous adjustment of the goals and objectives defined in the previous stage.

The **Strategic Alignment Dimension** must consider functional and informational adequacy between the components of the business and IT plans during the stages of SP and throughout its horizon. In the base model adopted, the dimension applies to the formulation and implementation stages. The elements that promote alignment during the formulation stage are: (a) **strategic fit** between the IT and business components; (b) **functional integration** through the business model representation in the IIS; and (c) **informational integration**, that is, consistency between planned objectives and IS information used to monitor an objective's execution. In the implementation stage, besides the three previously cited elements, four others must be added as alignment promoters: (a) **implementation methodology**, to boost the continuous adequacy of the items planned in the previous stage; (b) **commitment** from the part of people, towards objectives and goals; (c) **resource synchronization** between business and IT actions; and (d) **management instrumentation**, i.e. the use of tools that are appropriate to provide functional and informational integration, directed towards efficient monitoring and continuous adjustment of processes, objectives and goals previously planned.

Two other elements, implicit to the model, can strengthen the promotion of alignment. First, an organizational context favoring a culture of corporate management, a proactive decision making attitude, an incentive program and a business model that is well represented in the integrated IS. Second, a SP

model possessing a higher degree of formalism. The latter is formed by the methodology of the SP process (stages, participation and commitment, meetings) and by the division of objectives and goals into the various stages of horizon planning, a fact that allows a more effective monitoring and redirecting.

Informational integration is the element in the alignment model that is operationalized in this study. Informational integration is represented by the set of information in the IS derived from the organizational objectives defined in the SP, a fact that allows the monitoring of these objectives during their implementation. This is also responsible for the degree of informational integration among organizational levels (operational, managerial and strategic), determining the speed of information access and, consequently, the efficiency in the adjustment of organizational objectives. Therefore, it improves the decision making process and the synchronization between the parties to be aligned – business and IT.

## 2.2. Relationships between Organizational and IS Objectives

Zviran [25] studied the relationships between the generic organizational objectives integrating the strategic plan and the information that are present in the IS and contemplate these objectives. The studied aimed at measuring achieved results, and was pursued in 131 Israeli industrial, commercial and service companies of similar size. IT and business executives were interviewed, identifying the respective business and IS objectives. The first analysis served to identify the most frequent objectives and it was followed by a regression analysis and a correspondence analysis that aimed at identifying the degree of relationship between the business and IS objectives. The author identified eight generic organizational objectives related to sixteen information groups in the IS, therefore called objectives of the IS (cf. Frame 1). For each organizational objective there is at least one IS objective. The consistency degree among the objectives was measured using a High-Partial-Low scale and determines the degree of strategic alignment in the organization, and was named business IT integration by the author.

<b>Organizational Objectives (OO)</b>	<b>Information Systems Objectives (ISO)</b>
(1) Control and reduction of Costs	(1) Inventory, procurement and replacement, (2) Distribution and logistic, (3) Human resources, (4) Industrial cost, (5) Investments
(2) Increase in results (revenue)	(6) Clients' requests, (7) Sales forecast, (8) Clients' accounts, (9) Cash flow, (5) Investments (equipment and buildings)
(3) Efficiency	(7) Sales forecast, (9) Cash flow, (1) Inventory, (3) Human resources, (4) Industrial cost and (10) Resource allocation
(4) Services	(6) Clients' requests, (10) Resource allocation, (11) Improvement in services offered by the IT

(5) Supply Chain	(6) Clients' requests, (7) Sales forecast, (1) Inventory, procurement and replacement
(6) Competitive advantages	(12) Competitiveness of products and services, (13) Market, (11) Improvement in services offered by the IT
(7) Product Quality	(14) Product quality control, (15) IS no PCP
(8) Productivity	(16) Optimal Purchase Order, Optimal Production Order (1) Inventory, procurement and replacement

Frame 1 – Relationships between organizational and IS objectives [25]

The studies of Reich and Benbasat [21], Sabherwal [22], Tallon and Kraemer [23] and Chan et al. [6] reinforce the idea of relationship between organizational and IS objectives, adding to Zviran's list [25] with organizational objectives directed towards the external environment, namely competitive advantage, aggressiveness, aversion to risk and minimization of external effects.

The studies of Zviran [25] and Reich and Benbasat [21] present a classification for the IS information derived from the organizational objectives, resorting to two categories. One formed by information that measures objectives that are common to many companies, such as payments due at a given date, and cash flow (more permanent operational and managerial information). The second category is formed by the measures of organizational objectives that are defined in the strategic plans (specific strategic information). Both categories must be strongly integrated, producing the informational resources needed for the monitoring of the organizational objectives defined in the SP, forming a guide for the development of future activities.

### 2.3. Organizational Objectives and Organizational Levels

The alignment model hereby presented has many hierarchical levels of organizational objectives. Corporate objectives can be separated in division or unit objectives, and later in area or department objectives, a process can continue to even more elementary levels of control of activity, process or product. Such integration is called vertical. Likewise, the planning horizon can be divided in shorter periods of time, implementation stages. These provide a more punctual monitoring of actions to be executed towards the achievement of each organizational strategic objective. Moreover, the focus of the strategic planning process is maintained. This integration is called horizontal [4, 17].

Adequate informational modeling is necessary for the effective monitoring of the organizational objectives throughout the planning horizon. The modeling should stem from the organizational objectives (strategic information), from the department or area objectives (managerial information) and from the objectives defined for the activity, process or product (operational information), and should be made

available through managerial tools that help the evaluation of actions and the continual review of the goals established for the objectives in all organizational levels. This is called continuous alignment [4,17].

### **3. Research Method**

This exploratory research is a continuation of the studies of Brodbeck and Hoppen [4] on alignment operationalization, complementing the informational integration element in the base model with variables and results from the studies of Zviran [25], Reich and Benbasat [21] and Chan [7].

This research used multiple case studies to identify the main objectives defined in the SP of the studied organizations and the correspondent IS information to monitor the goals during the implementation stage of the SP process. Data were acquired in different manners (interview with business and IT executives, content analysis of documents), with the aim of creating a broader picture of the context under study. Similarly others researches [4, 7, 10, 21], the approach to this research was chosen due to the specificities of the present research: the study of organizations in their natural environment as a source of data, the description of the situation observed and the conceptual founding of the main elements and variables.

#### **3.1. Research Design**

This work is a meta-analysis combining data of three individual research works from where the results for the operationalization of the informational integration element were extracted [3, 18, 19]. These works have adopted a similar conceptual frame and methodology – case studies and information gathering from multiple sources.

The selection of organizations tried to maintain the compatibility characteristics with previous research [1, 7, 21, 25]. Eight (8) companies were grouped in three (3) business sectors: 3 large multinationals from the industrial sector – metallurgy, agriculture factors of production, automotive parts; 4 national companies from the health sector- 2 large and two medium size; 1 multinational in the retail sector, possessing 3 large divisions in South America. Herein, large size means more than 1,000 employees, revenue above US\$ 100 million/year, formal planning processes, automated business processes from tip to end, IT area structured, and existence of a CIO (*Chief Information Officer*). These companies were selected because they offer easy access of researchers, and constitute, therefore an intentional sample. The two medium size companies qualified to take part in the research because they were similar to the others, apart from their revenue and number of employees.



Research protocols included an interview template and a structured questionnaire. The latter included the list of organizational objectives and of the related IS extracted from Zviran's proposition [25] and from the studies of Reich and Benbasat [21] and Chan [7]. Moreover, the addition of new objectives by the respondents was allowed. In order to reinforce the legitimacy of the results, the participants were selected according to their knowledge of the planning process; they were all high rank executives (president and vice-president, directors and their immediate subordinates). Forty-one (41) interviews were carried out with: the main business executives – industry (12), hospitals (8) and retail (21); and twelve (12) interviews were carried out with the CIOs – 5, 4 and 3, respectively. The total number of respondents was sixty-three (63).

Data could be triangulated due to a data gathering strategy that employed many sources. Data from in-depth interviews and from questionnaires were primary sources. Secondary sources were the analyses of content from two types of documents: the planning ones and those containing managerial information generated by the IS and used in the management process. It is important to stress that 100% of the questionnaires, an extension of the in-depth interview, were returned.

### **3.2. Research Stages**

The research was divided in three major stages; the first two were developed in the individual researches. During the first stage, the base conceptual models were reviewed and the elements and variables in the research identified. There was no pre-test of the questionnaire since it had already been used in previous research [25]. In the sequence, a work agenda was elaborated with the main executive of the participating companies.

The second stage was the undertaking of the eight (8) case studies. Each interview took 2 hours on average and some questionnaires were answered together with the interview; others were mailed later. The following sequence was designed to increase the trustworthiness of the results: (a) the participants exposed their ideas on alignment through interviews, identified the presence of IS information for each organizational objective (according to the questionnaire), and proposed a complementary list of objectives; (b) The researchers analyzed the documents obtaining complementary information and objectives and creating a new list; (c) The list of objectives and information from the IS was sent back to the interviewees for an evaluation of the degree of agreement with the set of objectives and with the relationships among them. The interviewees also assigned a degree of importance to the perceived alignment, using a High-Partial-Low scale.

The third stage was a meta-analysis of the data collected in the 8 companies in order to obtain the convergent objectives (alignment elements) shared by theory and case study elements and are most significant to the findings presenting herein. In order to make the data compatible, an analysis protocol was established. In order to increase the validity and confidence of the results, two procedures were undertaken: (a) content analysis, performed by the 4 researchers and by part of the interviewees; it used data from interviews, secondary sources and from lists of converging objectives and information from individual researches; it aimed at identifying similar sets of alignment operationalization variables; and (b) frequency analysis, used in the verification of the intensity of alignment promotion in each company during the individual researches (convergence of CEO and CIO answers), in each sector (convergence among results of case studies) and in the identification of the alignment operationalization variables (convergence among results in each sector).

#### **4. Observed Alignment between Organizational and IS Objectives**

Initially, the results of alignment promotion between organizational and the IS objectives found in the 8 case studies are showed. Secondly, the alignment operationalization variables (IS information) are presented for each organizational objective. Finally, there is a discussion about the informational integration (vertical and horizontal) required among the organizational levels, in order to promote the operationalization of the strategic alignment.

##### **4.1. Alignment Intensity**

The intensity analysis of alignment promotion was performed in two steps. In the first, during the individual researches, the frequency of convergence of CEOs and CIOs answers was calculated for each case study, and for the cases grouped by sector (Tables 1a-1b, cols. 3-4-5). Whenever the frequency of variables is larger than 70%, the alignment is considered High; between 50% and 70%, it is considered Partial; and below 50%, considered Low.

In the second step, the convergence frequencies of results obtained for the IS information related to the organizational objectives were calculated. This considered the 8 case studies, but grouped in sectors (Tables 1a-1b, col. 6). Next, the calculation of convergence frequency of the IS information for a given organizational objective was performed (Tables 1a-1b, col. 7).

The results show the intensity of alignment promoted by the companies herein studied, for the element informational integration. It also shows the list of main converging organizational objectives and the respective IS information, necessary to the monitoring of the objectives. Only the most frequent IS

information was considered. There is greater preoccupation with the promotion of alignment between organizational and IS objectives generated for the more operational levels of the business, as it can be noticed by the frequencies obtained - High promotion of alignment for: reducing costs (84,6%), increasing results (72,7%), administrative efficiency (100%), supply chain (83,3%) and productivity (100%). Alignment appeared Low for those objectives directed towards the external environment: competitive advantage (44,4%); commercial aggressiveness, risk aversion and minimization of external effects display 33,3% each.

**Table 1a – Frequency of Relationships between Organizational and IS Objectives**

Organizational Objectives	IS Objectives	Intensity of Observed Alignment			Frequency	
		Industry (3)	Hospital (4)	Retail (1)	Information	Objectives
<b>Reducing Costs</b>	Inventory	High	High	High	100,0%	<b>84,6%</b>
	Logistics	High	Partial	High	66,7%	
	People	High	High	High	100,0%	
	Costs	High	High	High	100,0%	
	Investments	Low	Null	Null	0,0%	
<b>Increasing Results (Revenue)</b>	Clients and Accounts	Low	Low	Null	0,0%	<b>72,7%</b>
	Sales	High	High	High	100,0%	
	Cash Flow	High	High	High	100,0%	
	Investments	High	Low	High	66,7%	
<b>Administrative Efficiency</b>	Sales	High	High	High	100,0%	<b>100,0%</b>
	Cash flow	High	High	High	100,0%	
	Inventory	High	High	High	100,0%	
	People	High	High	High	100,0%	
	Costs	High	High	High	100,0%	
	Resource allocation	High	High	High	100,0%	
<b>Services</b>	Clients	Low	High	Low	33,3%	<b>66,7%</b>
	Resource allocation	Partial	High	High	66,7%	
	Service Improvement/IT	High	High	High	100,0%	
<b>Supply Chain</b>	Clients	High	High	Partial	66,7%	<b>83,3%</b>
	Sales	High	Partial	High	66,7%	
	Inventory	High	High	High	100,0%	
	Logistics	High	High	High	100,0%	
<b>Competitive advantage</b>	Products and Services	Low	Partial	High	33,3%	<b>44,4%</b>
	Markets	Partial	Partial	Partial	0,0%	
	Service Improvement/IT	High	High	High	100,0%	
<b>Quality</b>	Quality	Partial	High	High	66,7%	<b>66,7%</b>
	Planning	High	High	Partial	66,7%	
<b>Productivity</b>	Optimal Order	High	High	High	100,0%	<b>100,0%</b>

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	Inventory and Logistics	High	High	High	100,0%	
	Service Improvement/IT	High	High	High	100,0%	
<b>Commercial aggressiveness</b>	Competition e Markets *	Partial	Low	High	33,3%	<b>33,3%</b>
<b>Risk Aversion</b>	Financial Markets *	Partial	Low	High	33,3%	<b>33,3%</b>

**Table 1b – Frequency of Relationships between Organizational and IS Objectives (cont.)**

Organizational Objectives	IS Objectives	Intensity of Observed Alignment			Frequency	
		Industry (3)	Hospital (4)	Retail (1)	Information	Objectives
<b>Minimization of External Effects</b>	Financial Markets *	Partial	Low	Partial	0,0%	<b>0,0%</b>
<b>Client Fidelization</b>	Satisfaction *	Low	High	Partial	33,3%	<b>33,3%</b>

Some results deserve special attention, namely:

- (a) The preoccupation with the monitoring of efficiency and productivity objectives (100%);
- (b) The absence of information on Investments on the monitoring of the objective Reducing Costs (hospital and retail) and of information about Clients and Accounts to monitor the objective called Increase in Results (retail). In the latter case, the executives stressed that, since they are in the retail business, more specifically supermarket, there is no tracking of values per client-consumer; instead, the objective is followed by other variables (sales volume per business category – butcher, drinks, etc.);
- (c) The High alignment intensity obtained for the objectives named Services and Client Fidelization in the companies of the hospital sector. The interviewees argued that the preoccupation with services offered to clients (patients) is extremely high because life is the “good” at stake. As for the fidelization, the concern is to keep the system running well, by offering a good service to the personnel involved in its maintenance, namely doctors and ancillary services (laboratories, health care, drugstore, etc.). The interviewees involving the other companies agreed that the recently cited objectives are very important, but because they are very recent they had no IS information associated to their monitoring.

IS information marked with an asterisk in Tables 1a- 1b were uncovered during the case studies, from the organizational objectives defined by Reich and Benbasat [21] and Chan [7]. The interviewees agreed with the relationship between the organizational objectives and IS information; likewise they agreed on the terminology used in the studied. However, frequency analysis reveals that the presence of these variables in the IS are still sporadic and isolated.

#### **4.2. Alignment Operationalization**

In order to achieve a deeper understanding of the informational integration element in the operational model of strategic alignment adopted here, discriminated lists of information and indices for

each IS information were produced (Tables 1a-1b) during data collection for the individual researches. Lists and variable names were kept without alteration, according to the interviewees and the results of content analysis.

The intensity analysis of alignment promotion, which used information collected from all companies, was performed observing the following steps: (a) content analysis, equalizing the information among the case studies, grouped per sector and based on the nomenclature in Zviran [25], Reich and Benbasat [21] and Chan [7]; (b) content analysis, equalizing the information among the sectors (Tables 2 to 9, col. 2); and (c) calculation of frequency of information convergence (Tables 2 to 9, col. 3). The scale used for the intensity of alignment promotion is that used for the intensity of alignment, in the previous section.

The results show convergent information for the IS information of each organizational objective in the companies that had a frequency coefficient above 50% when the variables that presented Partial and High alignment intensity were incorporated. This procedure was adopted for many biases may have occurred due to the diversity of the sectors involved. Each company has its own peculiarities about the business, management, and internal and external environments. Yet, similarities were found in the set of IS information responsible for the monitoring of the organizational objectives in the 3 sectors and 8 companies investigated.

The lists do not contain information for those sets that resulted in Nil or Low alignment, such as: investment information related to cost reduction objective; and general information to monitor aggressiveness, risk aversion, minimization of external effects, and fidelization objectives. The general comment from the executives and CIOs interviewed can be put as: “we are in a phase of process integration, of structuring a single IT platform, of adjustments in the implementation of the integrated IS, and we are worried with the improvement and efficiency of internal processes and the impact of their information output in a efficient management of the business. Obviously, we are worried with the market ...”.

It is important to stress that some detailed information was found for all Low level alignment intensity in all case studies in Table 1a – Services (66,7%), Competitive advantage (44,4%) and Quality (66,7%). The Low level alignment intensity found does not imply that the objectives are not achieved. The results only indicate that information for the monitoring of the objective was not found.

**Table 2 – Frequency of Converging information for the objective Reducing Costs**

<b>IS Information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Inventory</b>	Inventory Turnover	100,0%
	ABC Curve	87,5%
	Inventory information (based on due date)	50,0%
	Consumption items per cost center	50,0%
<b>Logistics</b>	Average Receiving/Attending period	100,0%
<b>People</b>	Expenses with personnel (salaries + benefits)	100,0%
	Overtime (%)	100,0%
	<i>Turnover</i>	100,0%
	Absenteeism	100,0%
	Internal and external turnover	100,0%
<b>Costs</b>	Average material/product cost	100,0%
	Average cost per productive cost center	100,0%
	Average cost per client	100,0%
	Product profitability	100,0%
	Average cost per employee	87,5%

**Table 3 – Frequency of Converging information for the objective Increasing Results**

<b>IS Information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Clients and Accounts</b>	Average revenue per client	<b>50,0%</b>
<b>Sales</b>	Total revenue	100,0%
	Revenue per product/service	100,0%
<b>Cash Flow</b>	Expenses with clients	100,0%
	Expenses with sales force	100,0%
<b>Investments</b>	Building (m2)	100,0%
	Acquisitions/fusions (average payback and increase of total profit)	50,0%
	Market (average payback from applications)	50,0%

**Table 4 – Frequency of Converging information for the objective Services**

<b>IS information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Clients</b>	Average cycle time	100,0%
	Volume of returned items / client	100,0%
<b>Resource allocation</b>	Average time	100,0%
	Inventory Turnover	100,0%
<b>Service Improvement/IT</b>	Web Requests (list of products, prices, payment)	100,0%

**Table 5 – Frequency of Converging information for the objective Supply Chain**

<b>IS information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Clients</b>	Average client request	100,0%
	Average cycle time	50,0%
<b>Sales</b>	Revenue per product/service	100,0%
<b>Inventory</b>	Inventory Turnover	100,0%
	ABC Curve	87,5%

<b>Logistics</b>	Average Time for Receiving/Attending	100,0%
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**Table 6 – Frequency of Converging information for the objective Administrative Efficiency**

<b>IS Information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Sales</b>	Revenue volume / client	100,0%
	Total Revenue	100,0%
	Revenue per product/service	100,0%
	Average value of revenue/employee	87,5%
	Average value of revenue/process	50,0%
<b>Cash flow</b>	Total Revenue	100,0%
	Total Expenses	100,0%
	Profitability per operation (CC)	100,0%
<b>Inventory</b>	ABC Curve	100,0%
	Inventory Turnover	100,0%
	Average Receivables period	100,0%
	Average cost per productive cost center	87,5%
<b>People</b>	Expenses with personnel (salaries + benefits)	100,0%
	Overtime (%)	87,5%
	<i>Turnover</i>	87,5%
	Absenteeism	87,5%
	Dismissals	87,5%
<b>Costs</b>	Current Ratio	100,0%
	Net Margin	100,0%
	Debt	100,0%
	Breach of Contract	50,0%
<b>Resource allocation</b>	Average attending period	100,0%
	Inventory Turnover	100,0%
	Average overtime	50,0%

**Table 7 – Frequency of Converging information for the objective Competitive advantage**

<b>IS information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Products and Services and Markets</b>	Comparisons to market prices	100,0%
	Comparisons to market buying prices	100,0%
<b>Service Improvement/IT</b>	Web Requests (list of products, prices, payment)	100,0%

**Table 8 – Frequency of Converging information for the objective Quality**

<b>IS information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Quality</b>	Number of requests	100,0%
	Degree of client satisfaction	100,0%
	Index of returned items	100,0%
	Rastreability of replacement items	100,0%
	Index of complaints	50,0%
<b>Planning (operation)</b>	Occupation index (machines, beds, etc)	100,0%
	Average receivables period	100,0%

**Table 9 – Frequency of Converging information for the objective Productivity**

<b>IS information</b>	<b>Converging Information</b>	<b>Frequency</b>
<b>Optimal Order</b>	Index of product turnover	100,0%
	Index of Product obsolescence	100,0%
	Occupation index (machines, beds, etc)	100,0%
	Index of internal/external turnover of people	87,5%
	Index of client turnover	87,5%
<b>Inventory and Logistics</b>	Average Time for Receiving/Attending	100,0%
<b>Service Improvement/IT</b>	Index of Process automation	100,0%

### **4.3. Informational Integration and Organizational Levels**

The results show that the companies under study keep there is information related to the organizational objectives (Tables 1a-1b). Moreover, it was possible to identify IS information for each IS objective (Tables 2 to 9), information that converges among the companies, indicating the importance of informational modeling for the monitoring of goals established in the business plan, throughout the planning horizon. The results show the operationalization of the alignment through the informational integration element.

Analyzing the informational model resulting form this research, one can identify hierarchical levels in the information that should meet the established organizational objectives. In the case of the objective Increase of Results, at a strategic level, one can identify the necessary consolidated information, such as managerial level information on Clients, Sales, Cash Flow and Investments. Each of the informational sets identified above possesses a group of information at the operational level, which provides the detailed data, necessary to the consolidation of the data in the superior levels. Sales Information is generated together with each invoice and then grouped in the total revenue of the period, classified per product, per client, etc. Such association is named vertical integration.

The analysis of the continuous information supply from the IS information related to the organizational objectives showed a periodic cycle and a comparative and evolutive analysis between the planned and achievement goals throughout the planning horizon. When questioned, the interviewees referred to periodic meetings for the analysis and evaluation of the goals and objectives established in the business plans; the meetings had periodicities varying from a fortnight to a trimester. In this case, information consolidated per departmental/organizational objective is needed. Such association characterizes a horizontal integration.

In the relationship among detailed and monitoring information performed by the interviewees, a hierarchy is identifiable. It is established between the organizational and informational levels. Each organizational objective at a strategic level needs information that allows the measurability of the degree of its achievement (strategic information) during a given evaluation period. The information needed is composed by information consolidated from various areas or departments (managerial information) measuring the degree of achievement of the objective of that area or department. Managerial information is consolidated from detailed information from lower levels of business operation (operational information).

For illustrative purposes, Figure 1 presents vertical integration among objective and information levels (top to bottom and vice-versa); horizontal integration is also depicted among areas, departments, projects and activities (left to right and vice-versa). In the reference model of strategic alignment, these integrations are present in the informational integration element and contribute to the continuous and cyclic alignment promoted by the element of management instrumentation.

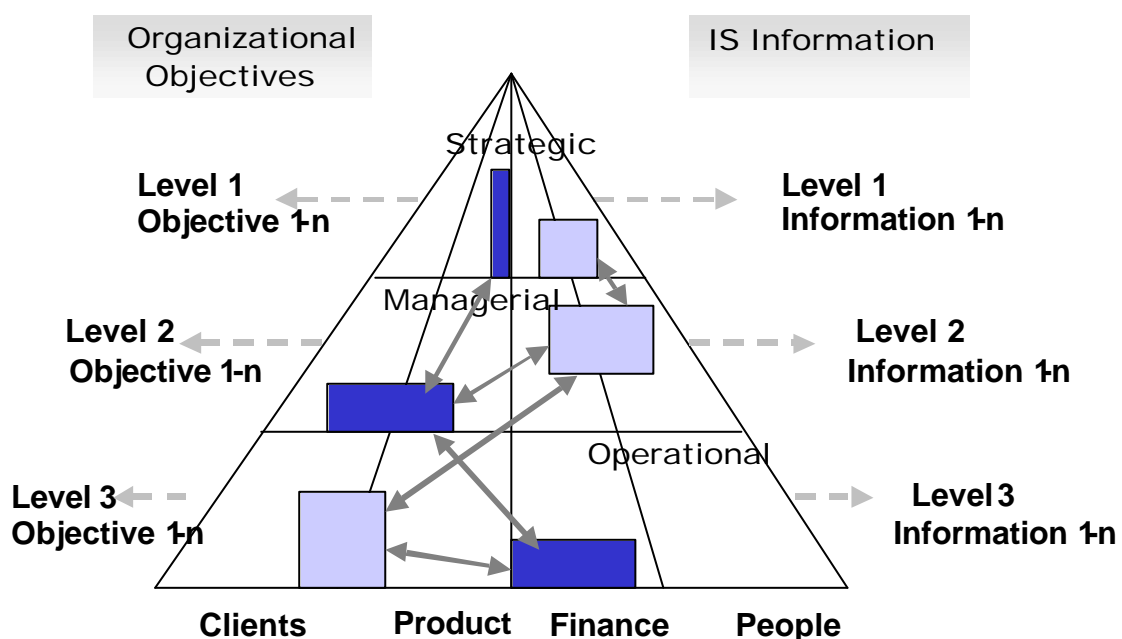


Figure 1 – Relationships among the levels of organizational objectives and the IS information

The determination of organizational objectives of level 1 and their byproducts in level 2 and 3, must allow the specification of the information set for each level, providing measures for the control of each objective. Since integration can be either vertical or horizontal, the adjustments of these objectives imply a different informational model. For example, if there is any disfunction in the finance area at the

base of the pyramid (operational level), it can affect managerial level areas such as Client and Product (horizontal integration), causing an adjustment in the organizational strategic objective from where they originate, and a possible redirecting of business. The effective change in the organizational objectives produces changes in all levels of the informational model and vice-versa. The adjustments can be frequent throughout the planning horizon, creating continuous alignment.

The example shows the importance of the informational integration element for the promotion of integral and continuous alignment. In order to be fast and safe, IT must provide informational integration in real time or almost so. This implies that companies should adopt an informational model (IS objectives) representative of their business needs (organizational objectives), and integrated to all their technological levels (infra-structure, systems and processes).

## **5. Conclusion**

This study tried to develop a broad analysis of the informational integration element [4] as a promoter of the strategic alignment, unifying empirical and conceptual points-of-view. The results present a set of variables that represents the relationship between organizational and IS objectives during the formulation and the implementation stage of the strategic planning process. During the case studies, variables for the operationalization of alignment promotion were explored. It is impossible to generalize these results on the face of the size and type of sample studied herein. However, the sample complements the elements and variables that resulted from previous researches and suggests new directions for further researches.

The analysis of the results has shown similarities between the set of organizational objectives, formalized during the strategic planning, and the related informational sets. It reinforced the results of previous researches [25, 21, 7]. Two important contributions were added to the elements of the base model: the first one relates to the operationalization of the alignment through the gathering of detailed convergent information; the second contribution is related to the presence of the informational integration element in all organizational levels and throughout the planning horizon.

The results also embody some significant contributions to the strategic planning process of the organizations. Such contributions were made possible by the confirmation of the importance of promoting the strategic alignment between business and IS objectives, and by the creation of an integrated informational model during the formulation stage which allows the monitoring of the goals that

were established from the objectives during the implementation stage, therefore reinforcing the concept of operationalization of the strategic alignment presented in Brodbeck and Hoppen model [4].

The results of this research show that companies are promoting horizontal, vertical and continuous alignment with certain intensity. However, the same results do not show “how” the companies do it, nor “why” the alignment presents higher or lower degrees of intensity with respect to some variables. The answers to those questions are related to the element called methodology that also belongs to the operational model of strategic alignment and that will be the object of further research.

It is also important to emphasize the existence of a set of IS information that can be named as permanent since it was present in a lower or higher degree within all studied companies. Such information is fundamentally directed towards the organizational efficiency of the internal environment. The results shown a non significant convergence for information of the external environment, which didn't allow to establish a more comprehensive model. The already adopted views proposed by Kaplan and Norton [12] can be a path to be followed in order to implement an informational model of this nature, a possibility that demands deeper investigation.

Finally, this study equips managers and professionals with knowledge concerning business strategic planning and information technology through the identification of detailed and consolidated information to monitor the organizational objectives, such as cost reduction, revenue increase, administrative efficiency and productivity and, mainly, through the verification of the need for management instrumentation to integrate the information levels.

We believe that the greatest challenge faced by researchers and managers resides in the operationalization of the alignment. During the individual researches, the researchers were questioned about “what would be the best way of promoting the alignment”. The obtained results allow us to believe that the variables found in this study are some that are necessary to promote the operationalization of the alignment. The informational integration allied the management instrumentation [4], could be the key elements for the operationalization of the strategic alignment. They should operate as an instrument of evaluation and integration among organizational levels, continually improving the strategic alignment between organizational and IS objectives [12].

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