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## USES OF ERP SYSTEMS AND THEIR INFLUENCE ON CONTROLLERSHIP FUNCTIONS IN BRAZILIAN COMPANIES

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### ABSTRACT

Controllershship and Information Technology provide ways for companies to adapt to the competitive context of business environments. As such, the aim of this research is to identify and analyze the impacts of ERP systems on Controllershship functions, verifying the relationships between the use of solutions and possible improvements in such functions. The need for management control and operations control were observed. This research is descriptive and exploratory of the survey kind. The subjects mentioned in this research are managers involved in Controllershship activities in large companies from the Auto Parts sector in the State of São Paulo. The data obtained through a questionnaire by non-probabilistic samples were analyzed with the use of descriptive statistics. According to the subjects, ERP systems modify Controllershship functions and better serve the control needs of the operations. The results showed problems to be overcome in management control.

**Keywords:** Operations control, Management control, Information systems, Car industry.

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## 1. INTRODUCTION

Managing companies in uncertain and dynamic business environments is a constant challenge. To some extent, the life cycle of many products and services has been increasingly shorter due to the fact that technologies have changed and evolved. Companies in such environments need to identify and adapt to a new reality; thus, many of them regard Controllershship as a partner in the necessary search for development. Part of a successful adaptation lies in the use and application of Information Technology (IT). Through the observation of how organizations use IT, in many circumstances it is noticed that companies which do not adapt to a solution used by other players from the same sector will be at a competitive disadvantage (Saccol, 2004).

In order to accomplish its mission, Controllershship may improve its business efficacy and operational efficiency through the use of IT. Among the available alternatives, ERP (Enterprise Resources Planning) systems stand out, which are also called business management integrated systems, widely used since the 1990's.

The implementation and the use of ERP systems represent a change in relation to previous technologies, as business processes are associated by an automated flow of work and a single database (Brazel & Dang, 2008). It is not only about a simple implementation of systems, this is a complex process whose success needs the efforts all the people involved in it (Muscatello & Chen, 2008).

The implementation and the use of ERP systems arouse the interest of scholars. Saatçioğlu (2009), Helo, Anussornnitisarn and Phusavat (2008), Pries-Heje (2008) and Crisostomo (2008) have analyzed implementation processes, changes occurred and results obtained through the use of these systems. Davenport (1998), Wood Jr. and Caldas (1999), Neves (1999), Bergamaschi & Reinhard (2000), Saccol (2004), Mendes & Escrivão Filho (2002) have studied the influences of ERP systems on organizations.

According to Davenport (1998, pp. 124), ERP systems impose their logic on the strategy, on the culture and on the organization of the company; they are a general solution and their design reflects a number of hypotheses concerning the operations of the organization and they are developed to show good business practices; nevertheless, companies which use them must define such practices. The changes in the processes and in the culture of the organization are part of the interest scholars have in ERP systems (Davenport, 1998; Bergamaschi & Reinhard, 2000; Hwang, 2005).

Controllershship is an administrative area in business management. One of its assignments is the provision of information for the decision making process to take place, helping managers in their search for management efficiency (Borinelli, 2006; Peleias, 2002; Catelli, 2001). As it plays its role, the meeting of the demands imposed by management control and operations control is observed among its different assignments (Peleias & Parisi, 2001). Meeting control demands requires information technology. It is then possible to conclude that the implementation and the use of ERP systems may contribute to and influence Controllershship functions.

In this context, an answer is searched and given to the following question-problem: **What is the relation between Controllershship functions and ERP systems?**

The general goal is to identify and analyze the impacts of ERP systems on Controllership functions, aiming at the existence of relations between the use of the solution and the possible improvements in such functions. The specific goals are:

- a) To identify and catalog the theoretical foundations of the functionalities in ERP systems which are related to Controllership.
- b) To identify and analyze by means of field research:
  - which functionalities in ERP systems influence the functions of Controllership;
  - whether ERP systems impose their logic on Controllership functions, changing them.

The relation between the use of ERP systems and the improvements in Controllership is verified. The purpose of this work is to contribute to a better understanding, identification and analysis of the impacts caused by ERP systems (benefits or problems in Controllership functions), verifying and showing the existence of limitations yet to be overcome.

## 2. THEORETICAL FRAMEWORK

### 2.1 Controllership and its Functions

Business environments are complex. Companies aim to improve their business processes in order to ensure the execution of their plans. In this context, Controllership is inserted into the company system, receiving internal and external influences, especially influences concerning technological changes and globalization processes in interconnected markets.

According to Roehl-Anderson and Bragg (1996), Controllership is developed with the inclusion of the global operations of the company, providing information to be communicated to its managers. Thus, it must be capable of analyzing information obtained from a variety of areas, developing and offering projections in a timely fashion so that decisions are made. The demands imposed on Controllership by organizations inspired Borinelli (2006) to study it, based on three different perspectives, shown in

Figure 1 below:

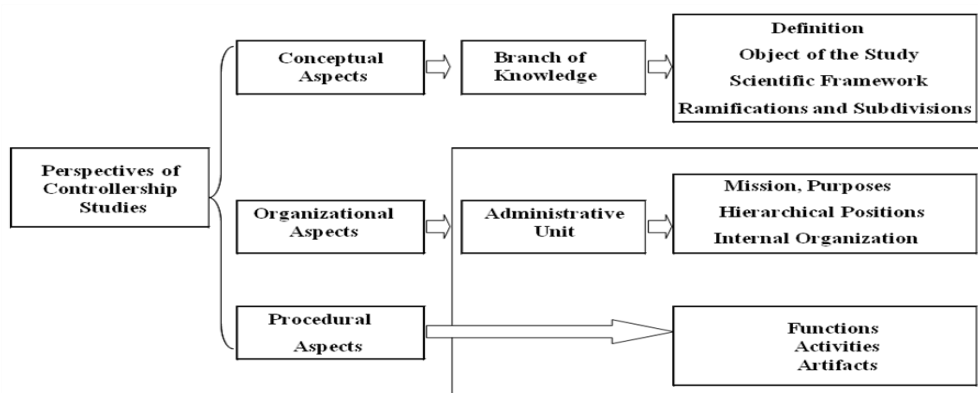


FIGURE 1 – A View of the Perspectives in the Study of Controllership  
Source: Adapted from Borinelli (2006)

In an integrated manner, the author explores the study of Controllershship as: a) branch of scientific knowledge (conceptual perspective), b) administrative unit, presenting Controllershship in the context of the organizational model of the companies; and c) the study of its procedural aspects, exploring the functions, activities and artifacts promoted and used by Controllershship.

This research is structured from the perspective of procedural aspects, by designing the “Controllershship functions” variable, which enabled Borinelli (2006) to propose the following functions: information management, managerial and strategic, protection and control of assets, costs, risk management, accounting, tax and internal controls. Performance appraisal was classified by him as an activity and, in this research, it is classified as a function (Almeida, Parisi and Pereira, 2001), and control of assets is classified as an activity in the accounting function.

This option is in line with the proposition of Padoveze (2003, pp. 36-37), when the author states that Controllershship is composed of two major areas: the first, accounting and fiscal, which handles corporate and fiscal information and functions related to the custody of assets; the second, planning and control, in charge of budgets, projections, simulations, costs and accountability.

Other authors have been studying Controllershship functions. The variety of indentified sources demanded a summary of these functions.

The obtained result is in chart 1, below:

<b>Controllershship Functions</b>	<b>Definitions as per theoretical framework</b>	<b>Theoretical Framework</b>
<b>Information Management</b>	Design, construction and maintenance of such information systems as management, strategic, accounting, economic, financial, equity and costs in order to meet information needs in the management process.	1/2/3/5
<b>Managerial and strategic</b>	To make and keep an integrated plan for the operations, compatible with short and long-term goals, which supports the management process.	4/5
<b>Performance Appraisal</b>	To measure the company's efficacy against the performance achieved through the goals and objectives established for financial and non-financial factors, offering the necessary support to the continuous improvement process.	4/5/6
<b>Costs</b>	Definition of a method for cost analysis, measuring and control, management and strategic analyses as to the feasibility of product and service launch, results from the products and the services of business lines and of the customers/clients.	5/6
<b>Accounting</b>	To develop corporate accounting, to manage accounting activities, to process and keep accounting records (accounting processing), to prepare accounting statements, to assist stakeholders and to develop accounting and control policies and procedures, including asset control and protection.	5/8/12
<b>Tax</b>	To comply with all legal, tax and accessory obligations established by law as well as with tax norms (Tax Accounting), to record, analyze and control taxes and levies, to make the tax planning	5/8
<b>Internal Controls</b>	It is a set of activities, methods, measures, guidelines, procedures and instruments adopted to achieve, restrict, monitor, inspect, govern and verify all the organizational activities in order to safeguard assets and protect the company's interests.	9
<b>Risk management</b>	To generate information to identify, measure, monitor and control risk as well as their possible effects on the business.	1/10/11

**CHART 1 –Controllershship Functions**

Source: Written by the authors

Legend: 1 – Catelli (2001, p. 344); 2 – Almeida Parisi, Pereira (2001, p. 344); 3 – Possebon, Freitas (1996); 4 – Martins (2001); 5 - Borinelli (2006, p. 146); 6 – Padoveze (2003); 7 – Padoveze (2003, p. 74); 8 - Mcgee, Prusak (1994); 9 - Koontz, O'Donnell, Wehrich (1995); 10 - Guimarães (2006); 11 - Marshall (2005); 12 - Peleias (2002)

Controllershship is supposed to meet all the control needs of organizations. Peleias & Parisi (2001) identify two groups of needs: **a) For management control:** they aim to ensure business efficacy; in order to achieve this aim, a structured management process is needed, composed of such stages as planning, execution and control; **b) For operations control:** they aim to ensure the efficient execution of operational activities resulting from the decisions made, through the optimal use of resources, promoting the safekeeping of assets.

Through the adoption of these definitions, it is possible to classify Controllershship functions into these two groups. Due to the scope of some functions, such as tax, they may be classified simultaneously as needs for management control (tax management) and operations control (tax accounting). By taking the purpose of this work into account, which is to verify the influences of ERP systems on Controllershship functions, a proposal to classify the functions is offered; that is, management of information and costs, classified as management control, and tax classified as operations control.

The adopted classification results in Figure 2, below, which shows Controllershship functions:

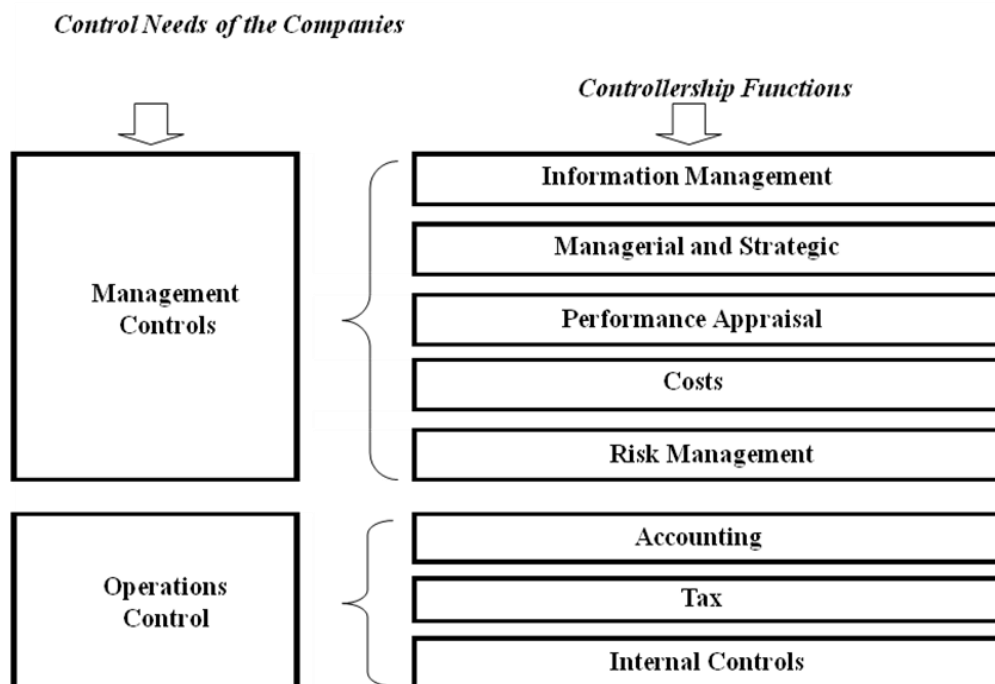


FIGURE 2- Control needs and Controllershship Functions

Source: Developed by the authors

## 2.2 ERP systems and their functionalities

An ERP - Enterprise Resource Planning - is a business software solution which proposes the integration of processes, functions and elements of the organizations, representing the evolution of the MRP - Material Requirements Planning

– systems and MRPII , developed in the 1960's (PELEIAS, PARISI, 2001; BIANCOLINO, 2010).

As stated by Momoh, Roy & Shehab (2010), the ERP system implementation is suitable for organizations when they are in search of the benefits of integrations and good practices for their information systems, adding a large number of functionalities. Nevertheless, when the authors (Correa, Giancesi, Caon, 2000; Peleias, & Parisi, 2001; Biancolino, 2010) research the state of the art of ERP implementations, they concluded that only 10% of them are successful and that it is necessary to research critical factors which are neglected by organization in order to better understand this context, such as: lack of the management of change, lack of commitment from the company's top management, excess of customization, and a misalignment of the business strategy with the ERP solution, among other factors.

These works dedicate to solely research and understand the ERP functionalities related to Controllershship previously discussed. Functionality is the overall set of functions embedded in an ERP system as well as its characteristics and different possibilities of use (Valente, 2004). The composition of the functions creates the transactional system which supports business processes. According to Hypolito and Pamplona (1999), management integrated system modules take into account the functionalities related to areas whose operations are specific. Thus, Controllershship modules would include general accounting functionalities, billing, accounts receivable, accounts payable, accountability and management of assets. Chopra & Meindl (2003) identify important points in the architecture and functionalities of ERP systems. The functionalities would be a general solution as to how companies operate in general. In order to make its use flexible by companies from many different sectors, ERP systems are developed so that the general solution is customized. As explained by Zancul (2000), most ERP systems offer similar functionalities and the most advanced and complete ones possess additional functionalities.

ERP functionalities are grouped by modules related to functional areas and to the companies' business processes. Jetly (apud Zancul, 2000) highlights the variations in the adopted nomenclature by providers for similar functionalities and modules, which makes it difficult to perform comparisons between two or more ERP systems. Comparisons must be based on a neutral classification which shows the main modules and functionalities of these systems. Frezatti and Tavares (2003) proposed a systematic manner for the classification and choice of information system.

A summary-chart was developed for the bibliographic review, adding characteristics and functionalities of these systems. The characteristics and/or functionalities contain a summary of the main definitions, proposing a list of ERP functionalities. According to chart 2, below, the grouping of the main ERP functionalities is presented as well as the probable impacts on Controllershship functions of the companies which use this technology:



Functionalities of ERP systems which may influence Controllership functions		
Functionalities		Probable impacts on Controllership
<b>Integrated Accounting</b>	General Accounting	Shorter timelines in month-end financial closing processes, promptness in obtaining accounting statements and reliability in the analysis of taxes payable or to rebate. Compliance with external agents. Functional and geographic coverage. (1)
		Accounting entries, registration of chart of accounts, cost allocation, cost centers, issuance of reports and fiscal logs, transactions of various companies, establishments, business units and currencies. (1)
	Consolidation of the results by companies and branches	Control of multi-company transactions. Easiness to track accounting information for auditing purposes. (3)
	Management of assets	. Efficiency and accuracy in transactions involving the fixed assets flow. Accounting classification and registration in the fixed assets log. Accounting control and registration of depreciations. (2)
	Control of inventories	Control of inventories of various companies, branches and those controlled by third parties, control by product, inventory (4)
<b>Cost Control</b>	Cost analysis	Accuracy in manufacturing cost control. Support for the control of costs, standard costs, analysis of variations, costs by activity, control of the shop floor associated with costs. (2)
<b>Fiscal Management</b>	Fiscal Process Support	Issuance of report and fiscal logs, transactions of various companies, establishments, business units and currencies (2)
	Management of Fiscal Risks	Compliance with legal requirements involving levels of complexity and conformity, in a more agile manner. (5)
<b>Financial planning and control</b>	Tools: accounts payable, accounts receivable, cash flow, bank reconciliation, treasury	Benefits for groups which do business in various units, possibility of the online consolidation of financial data of the operations performed, even outside the country. (10)
<b>Budget</b>	Support to the business budgetary processes	Promptness in the budgetary process, performance monitoring. Cost control estimated by product, family/group of materials, based on standard costs, final cost of acquisition/manufacturing, and average cost of the inventory or quotes at suppliers, multiple currencies. Control of expenses by cost center, projection of results. (6)
<b>Payroll</b>	Process Control - payroll and HR	Control of personnel, cost center allocation, promptness in controls, vacation scheduling, training programs, assessments. (6)
<b>Performance Appraisal</b>	Support to the performance management processes	Improvements in business processes. Easiness in the BCS implementation process. (6)
		It reflects and reproduces the integrated unit of a company, which promotes the MBC. (7)
		Performance management by means of department and/or individual goals, using the functionalities in HR Modules. (6)
		Monitoring of the ROI by monetary and non-monetary parameters. (6)
<b>Standardization of the database</b>	Single entry of information into system	Management information quality (1/6)
<b>Internal control process</b>	Process control in an integrated way (workflow)	Delimitation of the functions and activities of the various areas, regrouping or redistribution, in case changes in the organization structure occur, or even complex restructuring. (1)
	Redesign of processes	Standardization of routines and processes. It enables a review of the processes based on good models, tested and operating in several companies. (8)
<b>Integrated Management</b>	Integrated management: such as finance, accounting, fiscal, commercial, supplies and HR, information integration	Integrated management of operations, elimination of rework, reduction of administrative costs, higher operational efficiency in the execution of the phases and stages which compose the flows. (9)
<b>Information system support</b>	Organization integration, single database, non redundant, better information quality	It creates a comprehensive set of detailed, updated, consistent and complete data, to be used in the management information system. (7)



**CHART 2 - Functionalities of ERP systems which may influence Controllershship functions.**

**Legend:** 1 – Peleias and Parisi (2001), 2 - Oliveira (2006), 3 - Tavares (2005), 4 - Rodrigues (2002), 5 - Souza (2003), 6 - Riccio (2001), 7 - Kale (2000), 8 - Souza (2000), 9 - Wood Jr. and Caldas (1999), Souza and Zwicker (2007), Albertão (2005), 10 - Neves (1999)

Source: Developed by the authors.

Momoh, Roy & Shehab (2010) researched the state of the art in the ERP implementation. They identified, in the papers analyzed, various benefits resulting from the implementation and use of these systems by organizations, ranging from positive results related to the solution of legacy system problems to the improvement in the processes and management of companies. Sangster, Leech & Grabski (2009) have a more critical view of the potential benefits and argued that the success in the ERP implementation avoids the development of competitive disadvantages in the short term and, in this context, updates in ERP successful implementations and reimplementation occur in organizations. They also state that ERP systems cause a little impact on management accounting, usually in relation to the creation of more time to perform other value-added tasks.

Based on the probable benefits and expected advantages by organizations with the implementation of ERP systems, (Momoh, Roy & Shehab, 2010; Sangster, Leech & Grabski, 2009; Saatçioğlu, 2009; Helo, Anussornnitisarn & Phusavat, 2008; Spathis, 2006) and of the functionalities of these systems, which may influence Controllershship functions, a grouping of the probable effects related to the benefits and to the advantages to Controllershship, through the implementation and the use of ERP systems, was inferred.

Group	Probable impacts on Controllershship Functions	Effects
1	Changes to activities of a function	Elimination of redundancies and incorporation of new management concepts based on the new activities for a function
2	Changes in execution times of the activities of a function	Shorter execution time for the execution of the activities, planning, making of the budget, and accounting closing process, among others.
3	Qualitative aspects associated with the functions	Reliability of information, improvements in the decision-making process (more organized, more integrated)
4	Change to the costs of the function	Cost increase in order to take advantage and benefits from ERP systems or the reduction of the cost in the structure of a function.

**CHART 3 – Classification of probable impacts on Controllershship functions**

Source: Developed by the authors

The theoretical framework of Controllershship functions, defined in topic 2.1, enabled the creation of Figure 03, which represents the ERP system's basic functionalities and the Controllershship functions influenced by these systems. ERP systems impose their own logic on the strategy, on the culture and on the organization of the company (Davenport, 1998); they are a general strategy to assist all types of companies and their design reflects a variety of hypotheses concerning the manner in which organizations operate and are developed to show good business practices; however, the clients, the user companies, are the ones which define their good practices.

Figure 3, below, developed from the general purpose of this research, groups and relates Controllership functions (key-variable depends on the research) and the ERP system functionalities (key-variable does not depend on the research) into two groups, according to the needs of management of control and operations.

Control Needs of the Companies	Key Variable of the Research	Key Variable of the Research Functionalities of ERP Systems
Management Control	Information Management	Integrated Management Information Integration Support to Information Systems Standardization in the Database Single Database
	Managerial and strategic	Performance Management Budgetary Process Planning and Control
	Performance Appraisal	Budgetary Process
	Costs	Cost Control
	Risk Management	Support to all processes
Operations Control	Accounting	General Accounting Consolidation of the results by companies and branches Management of Assets Control of Inventories Payroll
	Tax	Fiscal Management
	Internal Controls	Control by Process(workflow) Internal Controls Integrated to the System Redesign of Processes

FIGURE 3 - Controllership Functions and Functionalities of ERP Systems

Source: Developed by the Authors

### 3. METHODOLOGY

This research is descriptive and exploratory in the auto parts sector, limited to the verification of the relation between the many “Controllership functions” and “functionalities of ERP systems”. It is applied as to the research problem (Cooper and Schindler, 2003) and quantitative as to the research variables (Soares, 2003). A field survey was used as a research strategy (Cooper and Schindler, 2003), in an analytical and empirical manner (Martins, 2002). The data was collected through a closed questionnaire, described in the appendix, at the end of this article (Hill & Hill, 2002).

The questionnaire comprises four aspects: a) question: the question which was made; b) key-variable: the main subject to which the question aims to relate; c) purpose, identification and explanation of the goal supposed to be achieved through the answer for the question made; and d) reference sources of the theoretical framework: the author cites who the idea from which the question was originated. After establishing the points to be developed, an analysis was performed as to how the format and structure of the questionnaire should be. Closed questions were used, which provided possible answers, so that the respondents did not need to spend much time on the survey. The questionnaire structure was established in accordance with the assumptions for the research, associated with the theoretical framework.

The groups and sub-groups defined are described in chart 4, below:

Groups	
Group 1 – Functions for Management Control	Group 2 – Functions for Operations Control
<ul style="list-style-type: none"> <li>• Sub-group 1.1 Information Management</li> <li>• Sub-group 1.2 Managerial and strategic</li> <li>• Sub-group 1.3 Performance Appraisal</li> <li>• Sub-group 1.4 Costs</li> <li>• Sub-group 1.5 Risk Management</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-group 2.1 Accounting</li> <li>• Sub-group 2.2 Tax</li> <li>• Sub-group 2.3 Internal Controls</li> </ul>

**CHART 4 – Groups and Sub-groups for the questionnaire**

A pre-test of the questionnaire was made in October 2009 with specialists from the involved areas (Controllershship and Systems), which presented some improvements: a) not to use a code for the answers, but ticking them on a Likert scale ; b) to reduce the number of questions and the time to answer them; c) as a spreadsheet was sent to all the answers, the use of a search engine was suggested, in which a link was sent by email in order to access the questionnaire. This processed resulted in a questionnaire composed of 34 questions, described in appendix 1.

The population researched is composed of companies which use ERP systems, from the auto parts sector in the State of São Paulo. These companies were chosen due to the complexity of their processes as suppliers in the automotive sector, which promotes the demand for ERP. The end product of the commodity chain, of which the auto parts sector is part, the motor vehicle, is complex.

The production of its components demands a technology of products and processes which are different from one another. A motor vehicle, a car, a light or heavy one, is composed of components from such industries as metalworking, electrical/electronic and chemical (Sindipeças, 2009). Another characteristic of the commodity chain, of which the auto parts sector is part, is its hierarchy of tiers , or supply levels: a) systematic companies are the large transnational ones (in terms of revenues); they supply pre-assembled sets to car companies; b) domestic companies are typically suppliers of tier 2 and tier 3 components.

One respondent per company was chosen, preferably the Controller, the Controllershship Manager, the Administration Controller and the Financial Manager and, in some cases, Specialists in Controllershship. The scope of the functions is justified by the absence of the Controllershship administrative unit in some researched organizations, in which the functions are performed by specialists and analysts related to the financial and administrative area. The research aimed at the Controllershship department, at the Controller or at any other professional in charge of a similar task. When the company did not have the Controllershship department, the research aimed at the financial and administrative area.

The research field was the State of São Paulo, the largest industrial hub in Brazil. In order to classify the size of the companies, the criterion of Law 11,941/2009 (current Law of Publicly Traded Companies) was adopted, for assets of over R\$ 240 million or annual gross revenues of over R\$ 300 million. According to the 2008 base year sectorial performance report, released by the *Sindicato Nacional da Indústria de Componentes para a Indústria de Veículos Automotores* (National Association for Automotive Components Manufacturers, 2009), the State of Paulo is composed of such 339 companies, that is, 71% of the 477 companies classified by them. The information about the companies, users of ERP systems in this sector, was not available. In order for the research to be more assertive, large companies were aimed at, according to the

criteria established by the Law of Publicly Traded Companies. Based on these criteria, the distribution below described on Chart 4, indicates:

Revenue	Number of Companies	Market Share %
Up to R\$ 300 Milhões Million	384	805%
Over R\$ 300 Milhões Million	93	19.5%
<b>Total Brazil</b>	<b>477</b>	<b>100.0%</b>

**CHART 4 – Classification by size of company revenue**

Source: The 2008 base year sectorial performance report, released by the *Sindicato Nacional da Indústria de Componentes para a Indústria de Veículos Automotores* (National Association for Automotive Components Manufacturers)

By taking the 19.5% into account for the companies in the State of São Paulo, a target population of 66 companies was defined. By accessibility, 9 other companies were added, which are not associated with the National Association for Automotive Components Manufacturers, though meaningful to the sector, 75 elements of the population were defined.

For the collection of the data, the starting point was the identification of the respondents by company. Based on the list of companies defined as elements of the target population, the contact was made by telephone, trying to reach the Controller, the Controllership Manager, the Administrative or Financial Manager or, in some cases, Analysts or Specialists in Controllership.

In the contact made by telephone, the purpose of the research was presented as well as the manner in which it would be conducted. 75 emails were sent containing a link to access the questionnaire, formatted in an application (<https://www.google.com/accounts>). After the answers were given, the system would verify the occurrence of questions without answers and would request a conclusion, creating a database with the answers of the research subjects. The application made the whole process easy for the respondent, reducing the time for data collection. The survey was conducted between November 29<sup>th</sup>, 2009 and January 20<sup>th</sup>, 2010. Of the 75 questionnaires submitted, 40 (53%) were sent back and regarded as valid (without errors or incomplete), comprising the research sample. The sampling technique used was the non probability sampling.

#### 4. PRESENTATION AND DISCUSSION OF RESULTS

The results obtained were tabulated and analyzed for each of Controllership functions, correlating them to ERP system functionalities. Next, they were analyzed in relation to what is established in the literature review, as per the table below:

**TABLE 1 – Changes to the activities of the information management function**

Functionality of ERP Systems	Q	Assertions	A - Likert scale										B – Occurrence							
			I disagree		I partly disagree		I partly agree		completely agree		Total		Did not occur		It partly occurred		It occurred		Total	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Integrated Management	1	ERP eliminated redundancies in Controllershship Processes	5	12.5	3	7.5	9	22.5	23	57.5	40	100.0	3	7.5	14	35.0	23	57.5	40	100.0
	2	ERP created opportunities to incorporate new management concepts	2	5.0	0	0.0	10	25.0	28	70.0	40	100.0	2	5.0	11	27.5	27	67.5	40	100.0
Information Integration	3	Management information offered by ERP meets the demands of Controllershship in the management of the Company	4	10.0	0	0.0	7	17.5	29	72.5	40	100.0	3	7.5	7	17.5	30	75.0	40	100.0
	4	ERP allows to develop management reports	3	7.5	3	7.5	20	50.0	14	35.0	40	100.0	3	7.5	23	57.5	14	35.0	40	100.0
Support to Information Systems	5	The formats of the reports offered by ERP meet management needs	8	20.0	4	10.0	17	42.5	11	27.5	40	100.0	4	10.0	17	42.5	19	47.5	40	100.0

According to table 1, 58.0% (complete agreement) of the respondents noticed improvements in the Controllershship process with the elimination of redundancies. According to Peleias and Parisi (2001), ERP systems promote information integration across the organization, mostly developed in real time, with the best quality and without inconsistencies, with standardized procedures.

Standardization eliminates rework and improves processes, affecting Controllershship activities in information management. Wood Jr. & Caldas (1999), Souza & Zwicker (2007) & Albertão (2005) agree when they state that ERP systems allow for the elimination of redundancies and create opportunities to incorporate new management concepts.

When the opportunities to implement new concepts offered by ERP systems are observed, the complete agreement presented in the sample is higher, 70.0%, converging with the findings of Saatçioglu (2009), who considers the improvement in management as the main benefit of the system. It is then assumed that this characteristic of ERP systems is a modifying factor in Controllershship activities. As stated by Wood Jr. and Caldas (1999), organizations have faced more dynamic scenarios than the previous ones, which make them search for the adaptation to the new reality. Authors highlight the fact that there is no option but to change. It is then assumed that companies tend to use the new management concepts incorporated into ERP systems.

As to the creation of management information, 73.0% of the subjects completely agree with the fact that ERP systems meet the demands of Controllershship regarding information integration, at a level of occurrence of 75%. However, when asked about reports meeting management needs, complete agreement drops to 28.0% and the same fact occurs as to the ERP availability to develop management reports. According to Saatçioğlu (2009), ERP report procedures are poor, representing a barrier to the implementation of the solution.

It is assumed that, although ERP systems promote improvements in Controllershship for information management, there are problems to be solved regarding these activities. Correa, Gianesei & Caon (2000) highlight the tendency to clearly indicate that the ERP system structures are used by companies as foundations of their information systems.

**TABLE 2 – Qualitative aspects associated with the information management function**

Functionality of ERP systems	Q	Assertions	A - Likert scale										B – Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%	n	%
Support to information systems	6	ERP reduced the time for the making and obtaining of management	3	8.0	0	0.0	14	35.0	23	58.0	40	100.0	3	8.0	11	28.0	26	65.0	40	100.0
	7	ERP standardized the company's database	1	3.0	0	0.0	9	23.0	30	75.0	40	100.0	2	5.0	7	18.0	31	78.0	40	100.0
Standardization of the database	8	ERP improved information quality	1	3.0	1	3.0	7	18.0	31	78.0	40	100.0	1	3.0	11	28.0	28	70.0	40	100.0
	9	ERP information is reworked in spreadsheets	4	10.0	2	5.0	23	58.0	11	28.0	40	100.0	4	10.0	20	50.0	16	40.0	40	100.0
Support to information systems	10	The spreadsheets are used to generate reports	3	8.0	1	3.0	20	50.0	16	40.0	40	100.0	3	8.0	16	40.0	21	53.0	40	100.0
	11	The integrity of the information is kept after the rework through spreadsheets	4	10.0	6	15.0	17	43.0	13	33.0	40	100.0	4	10.0	20	50.0	16	40.0	40	100.0
	12	The use and maintenance of the spreadsheets require manual work	2	5.0	0	0.0	13	33.0	25	63.0	40	100.0	3	8.0	14	35.0	23	58.0	40	100.0

As shown in table 2, the reduction in time to obtain and produce management information is considered to be a functionality of support for Controllershship (58%). One reason for this is the standardization of the database of the company (Kale, 2000), merging them into a single database, ensuring the integration between the systems and



the end-users. In this research, 78.0% of the respondents completely agree that there was an improvement in the quality of the information.

For Riccio (2001), a centralized and standardized database promotes a change from a function-oriented company into a team-work oriented inter-functional, process-oriented, a more flexible and strongly integrated company. Souza (2000) observes the need for a change in the cultural vision of the owner of the information into a vision of responsibility for the information. When asked about the use of electronic spreadsheets to generate management reports, 40% of the respondents completely agreed and 50% partly agreed with it. As such, they showed manual reprocessing of information by 40% of the companies. This fact confirms the difficulty in developing new management reports, seen in question 4 of the previous item. To reinforce this perception, 63% completely agreed that the use of spreadsheets requires manual work to generate information, Laulkkanen and Sarpola (2006) cite the visibility of information, which assists the management process for decision-making. It is concluded that ERP systems may influence the quality, the integrity, and the shaping of the information that is used by Controllershship in companies which have this technology available.

**TABLE 3 - Qualitative aspects associated with the managerial and strategic function**

Functionality o ERP Systems	Q	Assertions	A - Likert scale										B - Occurrence							
			I disagree		I partly disagree		I Partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	N	%	N	%	n	%
Planning and control	13	The implementation of ERP produced qualitative improvements in the decision- making process	0	0.0	2	5.0	13	33.0	25	63.0	40	100.0	2	5.0	10	25.0	28	70.0	40	100.0

Table 3 shows 63% in complete agreement and an occurrence of 70% in the perception of the subjects that ERP systems affected the decision-making process in qualitative terms. In Neves' vision (1999), as a macro vision, the flow of information for the decision-making process becomes fast and precise, and as an operational vision, the integration ensures higher efficiency and effectiveness in the day-to-day work.

**TABLE 4 - Changes to the activities of the managerial and strategic functions**

Function of ERP	Q	Assertions	A - Likert Likert Scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	n	%	N	%	n	%
Budgetary process	14	ERP supports the budgetary process according to the requirements of Controllershship	7	18.0	3	8.0	18	45.0	12	30.0	40	100.0	8	20.0	18	45.0	14	35.0	40	100.0
	15	ERP allows for the simulation of scenarios (volumes/amounts)	12	30.0	1	3.0	19	48.0	8	20.0	40	100.0	10	25.0	17	43.0	13	33.0	40	100.0
	16	ERP produced improvements in strategic planning	5	13.0	3	8.0	17	43.0	15	38.0	40	100.0	5	13.0	16	40.0	19	48.0	40	100.0

Focusing on the budgetary processes, table 4 shows that the perception of the respondents changes regarding the support which ERP systems provide in order to meet the needs of Controllershship activities. The complete agreement was 30%, and the occurrence was 35%. ERP systems do not meet the needs of Controllershship to simulate scenarios for 30% of the subjects. According to Helo, Anussornnitisarn & Phusavat (2008), one disadvantage of the use of ERP systems is that they do not fit into the management model, for the materialization of their principles occurs exactly by means of management artifacts, such as budgets and business simulations.

As Sacol (2004) points out, there are a few contributions made by ERP systems to the strategic variables such as clients and consumers, rivalry, competitiveness and the market. It concludes that ERP systems seem to add value to the variables like suppliers (relationship and monitoring) and to production (gains in productivity and scale in the use of software). For 38% of the subjects (complete agreement), ERP systems produce improvements in strategic planning.

**TABLE 5 - Changes to the execution time of the activities of the performance appraisal function**

Functionality of ERP Systems	Q	Assertions	A - Likert Scale										B – Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	N	%	n	%	N	%	N	%	n	%	n	%
Budgetary process	17	ERP produces information to measure the results according to the management needs of the company	3	8.0	2	5.0	22	55.0	13	33.0	40	100.0	4	10.0	20	50.0	16	40.0	40	100.0
	18	ERP allows Controllershship to follow up performance by department	1	3.0	1	3.0	11	28.0	27	68.0	40	100.0	1	3.0	12	30.0	27	68.0	40	100.0
	19	ERP allows the use of the budget to quantify operational plans and to gain commitment from the managers	4	10.0	2	5.0	16	40.0	18	45.0	40	100.0	5	13.0	18	45.0	17	43.0	40	100.0

After analyzing the measurement of the results, table 5 shows that the support given by ERP systems is partly verified by the respondents (55%). As for the follow-up of performance by department, complete agreement and occurrence stayed at around 68%. For Riccio (2001), ERP systems encompass several alternatives in programs and methodologies to improve the processes, including the innovation and improvement of the business processes; furthermore, it contains all the means to implement the BSC.

Also, analyzing the budgetary process, when inquired about ERP system functionalities to quantify operational plans and the quest for the commitment from the managers, the complete agreement was 45%, with an occurrence of 43%, in a similar agreement to the previous assertions. In order to gain commitment from the managers, Controllershship may be a channel to facilitate the processes of changes in the organization, by using IT tools.

**TABLE 6 - Changes to the execution time of the activities**

Functionality of ERP Systems	Q	Assertions	A - Likert scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Cost control	20	The requirements for the management of the costs are met according to the needs of the Company	1	3.0	3	8.0	14	35.0	22	55.0	40	100.0	3	8.0	17	43.0	20	50.0	40	100.0
	21	The cost reports are reworked in electronic spreadsheets	12	30.0	3	8.0	21	53.0	4	10.0	40	100.0	11	28.0	20	50.0	9	23.0	40	100.0

Table 6 reveals that ERP systems thoroughly meet the requirements of Controllershship to manage costs in 55% of this sample, and in 35% in partial terms. To face these assertions, the subjects were asked about the rework in the cost reports from the spreadsheets, obtaining a partial agreement of 53%. It is assumed that, for managing costs, ERP systems from this sample do not completely meet the needs of Controllershship.

**TABLE 7 - Changes to the activities of the cost function**

Functionality of t ERP Systems	Q	Assertions	A - Likert scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Cost control	22	ERP allowed for the use of new concepts in managing costs	7	18.0	5	13.0	14	35.0	14	35.0	40	100.0	12	30.0	15	38.0	13	33.0	40	100.0

With complete agreement of 35% and partial of 35% (table 7), the respondents stated that ERP systems allow for the use of new concepts to manage costs, as stated by Riccio (2001).

**TABLE 8 - Qualitative aspects associates with the risk Management function**

Functionality of ERP Systems	Q	Assertions	A - Likert scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Risk Management	23	The standardization of the processes produced by ERP minimizes operational risks	1	3.0	3	8.0	10	25.0	26	65.0	40	100.0	2	5.0	13	33.0	25	63.0	40	100.0
Control by process	24	ERP meets legal requirements minimizing the risks	0	0.0	1	3.0	18	45.0	21	53.0	40	100.0	1	3.0	13	33.0	26	65.0	40	100.0

ERP systems lead to the standardization of routines and processes (Souza, 2003) and allow for the revision of processes through good models, tested and operating in several companies. Table 8 shows that, for 65% of the subjects (complete agreement and 63% occurrence), this standardization minimizes operational risks. The perception of the subjects on meeting legal requirements, which in turn reduce the risks for the company, is 53% at complete agreement and 45% at partial occurrence. Thus, in the majority of the subjects' perceptions, legal requirements are met by ERP systems.

**TABLE 9 - Qualitative aspects associated with the Accounting function**

Functionality of ERP systems	Q	Assertions	A - Likert Scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			N	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Redesign of Processes	25	ERP provides accounting information according to the management needs of Controllershship	2	5.0	0	0.0	17	43.0	21	53.0	40	100.0	1	3.0	18	45.0	21	53.0	40	100.0

Table 9 shows that the needs of Controllershship regarding management accounting information are met for 53% of the respondents (complete agreement and

occurrence), but 43% see these needs partly met. To avoid problems with management accounting information, Padoveze (2003) proposes an approach which he names systemic, where the informational needs would be brought forth beforehand, so that after the implementation of ERP, the information output meets the requirements of the various end-users. In this case, the structure of the chart or accounts is the base which allows the visualization of management information, a situation where Controllershship plays an important role.

**TABLE 10 - Changes to the fixed costs of the Accounting function**

Functionality of ERP Systems	Q	Assertions	A - Likert Scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Redesign of the processes	26	ERP allowed the reduction in fixed costs in accounting processes	4	10.0	0	0.0	17	43.0	19	48.0	40	100.0	6	15.0	14	35.0	20	50.0	40	100.0
	27	ERP reduced the number of personnel in Controllershship	4	10.0	2	5.0	15	38.0	19	48.0	40	100.0	7	18.0	9	23.0	24	60.0	40	100.0
	28	ERP increased the number of personnel in Controllershship	27	68.0	5	13.0	3	8.0	5	13.0	40	100.0	26	65.0	5	13.0	9	23.0	40	100.0

The analysis from table 10 allows concluding that there were changes to the organizational structure of Controllershship, as emphasized by Davenport (1998), Bergamaschi & Reinhard (2000). The needs for changes in the processes and in the culture of the organizations are relevant. The implementation of ERP systems cause changes in the business processes, in the attributions, and in the responsibilities of the organizational structures, in the departments and in individuals.



TABLE 11 - Qualitative aspects associated with the tax functions

Functionality of ERP Systems	Q	Assertions	A - Likert Scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	N	%	N	%	n	%	n	%	N	%	n	%	n	%	n	%
Fiscal Management	29	All fiscal processes are performed according to the current legislation	3	8.0	3	8.0	13	33.0	21	53.0	40	100.0	4	10.0	14	35.0	22	55.0	40	100.0

The respondents completely (53%) and partly agree (33%) that the fiscal processes are performed according to the legislation (table 11). Peleias et al (2009) found that the end-users of the accounting and fiscal modules of an ERP system used in the transportation sector noticed improvements in the processes and in the relationship between areas, improving accounting controls as well as the fiscal area. Nevertheless, they found that the system did not improve the image of accounting in the organization, and that the fiscal module was the one that presented more problems. Thus, it is noticeable that there are problems and improvements in the functionalities of ERP systems regarding fiscal management.

TABLE 12 - Changes to the tax function

Functionality of ERP Systems	Q	Assertions	A - Likert Scales										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	N	%	n	%	N	%	n	%	n	%	n	%
Fiscal Management	30	ERP provides information that contributes to tax planning	4	10.0	1	3.0	20	50.0	15	38.0	40	100.0	5	13.0	21	53.0	14	35.0	40	100.0

According to table 12, in the perception of the respondents, the information provided by ERP systems contribute to the tax planning of the companies by 38% with complete agreement and 50% with partial agreement. According to Souza & Zwicker (2007), ERP systems meet the legal requirements of higher complexity, providing more conformity and more agility in fiscal management.

However, it is seen that, due to the partial agreement of 50% (partial occurrence of 53%) in the sample, it is possible to see that the information provided by ERP systems do not fully meet the demands to support tax planning. This is because, as defined by Borges (2000), it is necessary to project the industrial operations, the commercial businesses, and the provision of services, aiming to know the obligations and the tax charges contained in each pertinent legal alternative, so that through the legitimate means and instruments, the company may adopt an annulment, a reduction, or a delay in the fiscal burden.

**TABLE 13 - Internal controls function: changes to the activities of a function**

Functionality of ERP Systems	Q	Assertions	A - Likert Scale										B - O Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	N	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Redesign of the processes	31	The implementation of ERP improved internal controls	1	3.0	0	0.0	15	38.0	24	60.0	40	100.0	1	3.0	12	30.0	27	68.0	40	100.0
Standardization of the processes	32	ERP reduced the time to execute the routines	1	3.0	2	5.0	14	35.0	23	58.0	40	100.0	2	5.0	11	28.0	27	68.0	40	100.0

According to table 13, the improvement in internal controls was seen in 60% of the sample, indicating that the functionality of ERP systems to redesign the processes may improve internal controls. According to Souza (2000), ERP systems allow to standardize the administrative activities in companies or groups with various locations. Thus, Controllershship improves its monitoring, inspecting, governing, and verification of the organizational activities, to protect the assets and safeguard the organization's interests.

The reduction in the execution time of the routines was seen by the respondents, with a 58% complete agreement. The standardization of the processes increases the efficiency of the organization (Riccio, 2001), eliminating redundancies, repetitions, producing synergies and increasing fluidity (Peleias & Parisi, 2001).

**TABLE 14 - Internal controls function: changes in the time regarding the execution of activities**

Functionality of ERP Systems	Q	Assertions	A - Likert Scale										B - Occurrence							
			I disagree		I partly disagree		I partly agree		I completely agree		Total		Did not occur		Partly occurred		Occurred		Total	
			n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
Control by process	33	The tracking of the information improves the auditing process	2	5.0	0	0.0	8	20.0	30	75.0	40	100.0	2	5.0	7	18.0	31	78.0	40	100.0
Workflow	34	ERP allows decentralizing internal transactions	2	5.0	0	0.0	12	30.0	26	65.0	40	100.0	2	5.0	10	25.0	28	70.0	40	100.0

Table 14 shows that, for 75% of respondents (complete agreement and 78% occurrence); ERP systems have controls by process which allow for the tracking of the information, improving the auditing processes. Thus, Controllershship may obtain a reduction in the time taken for internal or external audits and a better quality of the controls. The decentralization of the transactions was seen by 65% of respondents (complete agreement). Peleias & Parisi (2001) point out that ERP systems allow for distinguishing the functions and activities in several areas, their regrouping or their redistribution, in case of modifications to the organizational structure, or even complete restructuring.

Some companies adopt the same ERP to meet their needs for standardization as defined by the car makers. This trend was seen in this sample: 55% of the researched companies adopt the same ERP. By using the same ERP, it is possible to adopt similar operational processes, improving the controls and the exchange of information with clients. It is deduced that ERP systems tend to standardize the companies' processes.

Since ERP systems have played a reference role for IT, by incorporating good practices, companies are pressured into using them to avoid losing competitive advantages. For Beuren & Muller (2010), many organizations become isomorphic, and consequently, Controllershship functions are influenced by these aspects.

The main impacts found in this field research, relating the functionalities of ERP systems to Controllershship functions, are summarized in Chart 5 below:

Needs	ERP Functionality	Controllership functions	Main impacts on Controllership functions
Management Control	Integrated management	Information management	ERP System created opportunities to incorporate new management concepts
	Support to information systems		The needs for the development of management reports are not met
			Depending on the ERP applied, the management of the information is done by parameters and models which modify the information systems of the companies using the Controllership Function of information management
			ERP improved the quality of the information used by Controllership
			Rework of the information on spreadsheets
	Planning and control	Strategic and Managerial	Qualitative improvements in the decision-making process.
			It is deduced that the support to the strategic planning is changed by the system applied. Since there is an influence by ERP on the management control and on the management of information, the support to the strategic planning is influenced, affecting the strategic managerial function.
			Deficiency in the budgetary process in order to meet the needs of Controllership
			Low level of support for the simulation of scenarios (volumes/amounts)
	Budgetary Process	Performance Appraisal	ERP allows Controllership to follow up performance by department
			Lack of adherence between ERP and the Controllership Function in measuring the results according to the management needs of the company
	Cost Control	Costs	There are improvements in the support for costs management
			ERP allowed the use of new concepts in cost management
	Control by process	Risk management	It is possible to standardize the processes and to reduce costs related to the operations
			Improved adherence to the legal requirements
Operations control	Redesign of processes	Accounting	ERP contributes to the reduction of the number of personnel
	Fiscal management	Tax	ERP provides information which contributes to tax planning
	Standardization of the processes	Internal controls	Reduction in the execution time of the routines
			Improvements in the auditing processes
	Workflow		Decentralization of internal transactions

CHART 5 - Main Impacts on Controllership Functions

Source: Developed by the authors

It was ascertained that the activities of Controllership in the researched companies are influenced by the functionalities ERP systems. This is due to the fact that upon implementing a unique and cohesive database, there are significant improvements

in the management of information (Kale, 2000; Souza, 2000; Peleias & Parisi, 2001). It was ascertained that there was a reduction in the execution time of the routines of Controllershship functions, since ERP systems allowed the elimination of redundancies and the improvement of the processes (Wood Jr., Caldas, 1999; Souza, Zwicker, 2007; Albertão, 2005; Sangster, Leech & Grabski, 2009).

ERP Systems affect the management controls of the companies researched, the improvement in the decision-making process, the availability of information, and the use of new concepts in cost management (Kale, 2000; Souza, 2000; Peleias & Parisi, 2001). Nevertheless, they present limitations in order to comply with the managerial formats when measuring the results, in the development of managerial reports and management tools, like budgeting (Sangster, Leech & Grabski, 2009).

The research points out an apparent contradiction, that is, although they identify these limitations, respondents gave a positive perception of the qualitative improvement of the decision-making process, which is a direct need of Controllershship functions, which are not fully met by ERP systems

Considering the premise that Controllershship (Almeida, Parisi & Pereira, 2001) is by excellence, the coordinator of the information of the economic-financial management of the organizations, the limitations pointed out by the implementation and the use of ERP systems at the respondent companies, as related to the managerial reports, the continuation of the use of electronic spreadsheets, and the support to the budgeting and simulations, are significant for exercising Management Control. These findings corroborate the results of the research by Sangster, Leech and Grabski (2009), on the impact that ERP systems have on managerial accounting. The development of these Controllershship solutions, which materialize the organizations' specific characteristics and are difficult to standardize inside the ERP environment, tends to need high levels of investments in customization, more complexity and more costs in maintenance and updating of the system, maximizing the occurrence of excesses in standardization, a critical factor for the success of the implementation of ERP systems (Momoh, Roy & Shehab, 2010). Nonetheless, if ERP represented an evolution of the MRP and the MRPII systems (Correa, Ganesi & Caon, 2000), in the future, perhaps, its substitute may be even more complex and may also contemplate these functionalities for the total support of Controllershship functions, substituting specialist systems and electronic spreadsheets.

## **5. FINAL CONSIDERATIONS, FUTURE POSSIBILITIES AND LIMITATIONS**

In this paper, the aim was to learn the relationships between Controllershship functions and ERP systems, as related to the needs for management control and for operations control. This field research showed that, in the respondents' perception, ERP systems more adherently meet the needs of Controllershship functions to control operations. As for management control, the main deficiencies found were: a) information management functions for the support of the development of managerial reports; b) managerial and strategic for the support of simulation of scenarios, performance appraisal and budgetary processes; and c) cost function, improvements in the cost management reports.

As for the specific objective of identifying the theoretical foundations of the functionalities of ERP systems, as related to Controllershship functions, the

bibliographical research revealed 20 functionalities of ERP systems, and the description of the probable impacts on Controllership functions. Upon studying these descriptions, the impacts on these functions were grouped into four categories, showing different aspects which influence these functions: changes in the activities of a function, changes in the execution time of the activities of a function, the qualitative aspects associated with the function and the changes to the cost function.

As an objective to identify and analyze which functionalities of ERP systems influence Controllership functions, checking whether ERP systems impose their logic by modifying these functions, in the subjects' opinion, the most relevant aspects observed in this field research were:

**a) Changes to Controllership activities:** ERP systems created the opportunity to incorporate new management concepts, by eliminating redundancies in Controllership processes and by improving internal controls, in particular on the follow-up of the performance by department. The standardization of the processes was considered a factor which minimizes the inherent risks to the operations;

**b) Changes to the execution time of the activities of Controllership functions:** the respondents noticed a reduction in execution time of Controllership routines, generating gains in the execution time of the activities and in the time for obtaining managerial information;

**c) Qualitative aspects associated with Controllership functions:** improvements were seen in the quality of the information used by Controllership, as related to their functions. This is due mainly to the functionalities of ERP systems: Single database and the standardization of the processes through the implementation of the system. On the qualitative aspects, the tracking of the information stood out, improving the auditing process. The standardization of the processes produced by ERP systems minimize operational risks, improving the management of these risks by Controllership, providing better information for tax planning.

**d) Changes to the cost structure for Controllership functions:** there were changes in the organizational structure of Controllership, due to the changes in the processes associated with the use of ERP systems;

**e) Improvements in the decision-making process:** The majority of respondents noticed that ERP was a factor which improved the decision-making process.

Once the main and the specific objectives were defined, the question-problem posed was defined: What is the relation between Controllership functions and ERP systems? The results obtained reveal that ERP systems through their functionalities influence Controllership functions. These are changes in different perspectives and approaches: opportunities to incorporate new management concepts resulting from good market practices incorporated into ERP systems, the reduction in the execution time of the activities, improvements in the decision-making processes, and the qualitative aspects associated with Controllership functions. The impacts on these functions should be the subject of attention when implementing projects, changing ERP systems and updates of versions, as the management of the company could be compromised.

This research did not intend to exhaust this theme, due to the different perspectives in the analysis of ERP systems and of Controllership. Based on the results



described herein, an investigation is proposed as to how Controllershship functions are addressed during the implementation projects of ERP systems, ensuring that the needs of these functions are met, and observing the premises of the management model of the organization.

More in-depth research through case studies will allow for a better understanding as to how the functionalities of ERP systems assist Controllershship functions or not, in particular situations, yet relevant to the research area.

To conclude, the results obtained are limited to the companies and to the respondents who collaborated with the researchers and cannot be generalized. Other limitations are: economic - auto parts sector; geographical range - the State of Sao Paulo; organizational - Controllershship functions; technology and information - ERP system. USP, Brazil.

## REFERENCES

- Albertão, S. E. (2005). *ERP sistemas de gestão empresarial, metodologia para avaliação seleção e implantação*. São Paulo: Iglu.
- Almeida, L. B., Parisi, C. & Pereira, C. A. Controladoria. In: Catelli, A. (Coord.). (2001). *Controladoria: uma abordagem da gestão econômica - GECON*. (2a. ed.). São Paulo: Atlas.
- Bergamaschi, S. & Reinhard, N. (2000). Implementação de sistemas para gestão empresarial. *Anais Encontro Anual da Anpad*. Rio de Janeiro, RJ. ANPAD.
- Beuren, I. M. & Müller, E. T. C. (2010). Evidências de institucionalização da controladoria em empresas familiares. *Faces (FACE/FUMEC)*, **9**: 43-63.
- Biancolino, C. A., (2010). *Valor do uso do ERP e gestão contínua de pós-implantação: estudo de casos múltiplos no cenário brasileiro*. Tese de Doutorado, Controladoria e Contabilidade, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, Brasil.
- Brazel, F. J. & Dang, L. P. (2008). The Effect of ERP system implementations on the management of earnings and earning release dates. *Journal of information systems*. **22**(2): 1-21.
- Borges, H. B., (2000). *Gerência de impostos*. (3a. ed.). São Paulo: Atlas.
- Borinelli, M. L., (2006). *Estrutura conceitual básica de controladoria: sistematização à luz da teoria e da práxis*. Tese de Doutorado, Controladoria e Contabilidade, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, Brasil.
- Catelli, A. (Coord.). (2001). *Controladoria: uma abordagem da gestão econômica (GECON)*. (2a. Ed). São Paulo: Atlas.
- Chopra, S. & Meindl, P. (2003). *Gerenciamento da cadeia de suprimentos – estratégica, planejamento e operação*. São Paulo: Prentice hall.
- Cooper, D. R. & Schindler, P. S. (2003). *Métodos de pesquisa em administração*. (7a. ed.). Porto Alegre: Bookman.

- Correa, H. L., Giancesi, I. G. N. & Caon, M. (2000). *Planejamento, programação controle da produção: MRP II / ERP: conceitos, uso e implantação*. (3a. ed.). São Paulo: Atlas.
- Crisostomo, D. T. (2008). Management attributes of implementing: An erp system in the public sector. *Journal of International Business Research*, **7**: special issue 2.
- Davenport, T. H. (1998, Jul-Aug.). Putting the enterprise into the enterprise system. *Harvard Business Review*, **76**(4): 121-132.
- Frezatti, F. & Tavares, E. S. (2003). Análise da decisão de investimentos em sistemas integrados de informação: possíveis modelos e suas influências no processo decisório. *Revista de Contabilidade do Mestrado em Ciências Contábeis (UERJ)*, **8**(2): 89-107.
- Guimarães, I. C. (2006). *Uma pesquisa de campo sobre a contribuição da controladoria à gestão de riscos nas empresas não-financeiras de capital aberto*. Dissertação –de Mestrado, Ciências Contábeis, Centro Universitário Álvares Penteado – UNIFECAP, Brasil.
- Hallikainen, P., Laulkkonen, S. & Sarpola, S. (2006). Reason for ERP acquisition, department of information systems science. *Helsinki school of economics*, Runeberginkatu: 14-16.
- Helo, P., Anussornnitarn, P. & Phusavat, K. Expectation and reality in ERP implementation: consultant and solution provider perspective. *Industrial Management & Data Systems*, **108**(8): 1045-1059.
- Hill, A. & Hill, M. M. (2002). *Investigação por questionário*. (3a. ed.). Lisboa: Silabo.
- Hwang, Y. (2005). Investigating enterprise systems adoption: uncertainty avoidance, intrinsic motivation, and the technology acceptance model. *European Journal of Information Systems*, **14**: 150–161.
- Hypolito C. M. & Pamplona, E. O. (1999). Sistemas de gestão integrada: conceitos e considerações em uma implantação. *19 ENEGEP*, Rio de Janeiro, RJ.
- Kale, V. (2000). *Implementing SAP R/3: The guide for business and technology managers*. Indianápolis: Sams Publishing.
- Koontz, H., O'Donnell, C. & Weihrich, H. (1995). *Administração*. (15a. ed.). São Paulo: Pioneira.
- Marshall, S. (2005). *Risk and Credit Management: We Have Reached a Turning Point, Credit Management*. Leicestershire.
- Martins, E. (2001). *Avaliação de empresas: da mensuração contábil a econômica*. São Paulo: Atlas.
- Martins, G. A. (2002). *Manual para elaboração de monografias e dissertações*. (3a. ed.). São Paulo: Atlas.
- Martins, G. A. & Pelissaro, J. (2005, Mai-Ago). Sobre Conceitos: Definições e Constructos nas Ciências Contábeis. *Base: Revista de administração e contabilidade da Unisinos*, **2**(2): 78-84.
- Mcgee, P & Prusak, L. (1994). *Gerenciamento estratégico da informação*. Rio de Janeiro: Campus.

Mendes, J. V & Escrivão Filho, E. (2002, Dez). Sistemas integrados de gestão ERP em pequenas empresas: um confronto entre o referencia teórico e a prática empresarial. *Gestão e produção*, **9**(3): 277-296.

Momoh, A., Roy, R. & Shehab, E. (2010). Challenges in enterprise resources planning implementation: state-of-the-art. *Business Process Management Journal*, **16**(4): 537-565.

Muscatello, J. R. & Chen, I. J. (2008, Jan-Mar.). Enterprise resource Planning (ERP) Implementations: theory and Practice. *International Journal of Enterprise Information Systems*, **4**(1): 63-78.

Neves, M. (1999, Nov.) Sistemas integrados de gestão em uma perspectiva estratégica. *XIX Encontro Nacional de Engenharia de Produção-ENEGEP*. Anais eletrônicos. Rio de Janeiro – UFRJ, Brasil.

Oliveira, L. S. (2006). *Um estudo sobre os principais fatores na implantação de sistemas ERP*. Dissertação de Mestrado, Engenharia, Universidade Tecnológica Federal do Paraná, Paraná, Brasil.

Padoveze, C. L. (2003). *Controladoria estratégica e operacional, conceitos, estrutura e aplicação*. São Paulo: Thompson.

Peleias, I. R. & Parisi, C. (2001). Contribuições e limitações dos sistemas integrados às funções de controladoria no novo ambiente de negócios. *13th ed. Asian Pacific Conference on Internacional Accounting Issues*. Rio de Janeiro, Brasil.

Peleias, I. R. (2002). *Controladoria: gestão eficaz utilizando padrões*. São Paulo: Saraiva.

Peleias, I. R., Trevizoli, J. C., Côrtes, P. L. & Galegale, N. V. (2009). Pesquisa sobre a percepção dos usuários dos módulos contábil e fiscal de um sistema erp para o setor de transporte rodoviário de cargas e passageiros. *Revista de Gestão da Tecnologia e Sistemas de Informação (Online)*, **6**: 247-270.

Possebon, M. & Freitas, H. M. R. (1996, Out-Dez.). Construindo um EIS (enterprise information system da (e para a) empresa. *Revista de administração*, **31**:19-30.

Pries-Heje, L. (2008, Jul-Sept.) Time, Attitude, and User Participation: How Prior Events Determine User Attitudes in ERP Implementation. *International Journal of Enterprise Information Systems*, **4**(3): 48-65.

Riccio, E. L. (2001). *Efeitos da tecnologia de informação na contabilidade, estudos de casos de implementação de sistemas empresariais integrados – ERP*. Tese de Livre Docência, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, Brasil.

Roehl-Anderson, J. M. & Bragg, S. M. (1996). *Manual del Controllers: funciones, procedimientos y responsabilidades*. Barcelona: Deusto.

Rodrigues, E. (2002). *Um estudo dos aspectos comportamentais da implantação do ERP Enterprise Resource Planning às áreas de orçamento e planejamento financeiro*. Dissertação de Mestrado, Ciências Contábeis, Centro Universitário Álvares Penteado – UNIFECAP, São Paulo, Brasil.

Saatçioglu, O. Y. (2009). What determines user satisfaction in ERP projects: benefits, barriers or risks? *Journal of Enterprise Information Management*, **22**(6): 690-708.

- Saccol, Z. A. (2004, Jan-Mar.). Avaliação do impacto dos sistemas ERP sobre variáveis estratégicas de grandes empresas no Brasil. *Revista de Administração Contemporânea*, 8(2): 09-34.
- Sangster, A., Leech, S. A. & Grabski, S. (2009). ERP implementations and their impact upon management accountants. *Journal of Information Systems and Technology Management*, 6(2): 125-142.
- Silva, N. N. (1998). *Amostragem probabilística, um curso introdutório*. São Paulo: Editora da Universidade de São Paulo.
- Sindipecas. (2009). Relatório de desempenho setorial ano base 2008. *Sindicato Nacional da Indústria de Componentes para a Indústria de Veículos Automotores*, São Paulo, Brasil.
- Soares, E. (2003). *Metodologia científica: elementos de lógica formal e teoria da argumentação*. São Paulo: Atlas.
- Souza, C. A. (2000). *Sistemas integrados de gestão empresarial: um estudo de casos de implantação de sistemas*. Dissertação de Mestrado, –Administração, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, Brasil.
- Souza, L. C. (2003). *A controladoria e a implantação de sistemas de gestão integrada – ERP*. Dissertação de Mestrado, Ciências Contábeis, Fundação Escola de Comércio Álvares Penteado - FECAP, São Paulo, Brasil.
- Souza, C. A. ; Zwicker, R. (2007). Capacidades e Atores na Gestão de Sistemas ERP: um estudo exploratório entre usuários corporativos do ERP da SAP. *Revista de Gestão da Tecnologia e Sistemas de Informação*, 4: 197-216.
- Spathis, C. (2006). Enterprise systems implementation and accounting benefits. *Journal of Enterprise Information Management*, 19(1/2): 67-82.
- Tavares, A. L. (2005). Implantação de ERP e seus impactos na geração da informação contábil um estudo de caso em uma empresa de distribuição de energia elétrica. *Anais do Congresso USP de Controladoria e Contabilidade*, São Paulo, Brasil. Disponível em: <http://www.congressousp.fipecafi.org/artigos52005/345.pdf> , acesso em 11 de 2009.
- Wood Jr., T. & Caldas, M. P. (1999). Modismos em gestão – pesquisa sobre a adoção e implementação de E.R.P. *Anais II Simpósio de Administração da Produção, Logística e Operações Industriais*, Fundação Getúlio Vargas, São Paulo, Brasil.
- Valente, Z. T. N. (2004). *Implementação de ERP em pequenas e médias empresas: estudo de caso em empresa do setor da construção civil*. Dissertação –de Mestrado, Controladoria e Contabilidade, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, Brasil.
- Zancul, S. E. (2000). *Análise da aplicabilidade de um sistema ERP no processo de desenvolvimento de produtos*. Dissertação –de Mestrado, Engenharia, Escola de Engenharia de São Carlos da USP, Brasil.

## Appendix – Questionnaire applied to the research subjects

Column "A" - Likert Scale					
Based on your experience, and using this scale from 1 to 4, indicate in column "A" in the table below, your opinion regarding the following statements					
1	2	3	4		
I agree	I partly agree	I partly disagree	I completely agree		
Column "B" - Occurrences or Specific Application					
Based on your perception, and using this scale from 1 to 3, indicate in column "B" in the table below, your opinion regarding the occurrences of the following statements.					
1	2	3			
Did not occur	Partly occurred	Occurred			
#	Table of Assertions			A	B
1	ERP eliminated redundancies in Comptrollership Processes				
2	ERP created opportunities to incorporate new management concepts				
3	Management information offered by ERP meets the demands of Comptrollership in the management of the Company				
4	ERP allows to develop management reports				
5	The formats of the reports offered by ERP meet management needs				
6	ERP reduced the time for the making and obtaining of management reports systems				
7	ERP standardized the company's database				
8	ERP improved information quality				
9	ERP information is reworked in spreadsheets				
10	The spreadsheets are used to generate reports				
11	The integrity of the information is kept after the rework through spreadsheets				
12	The use and maintenance of the spreadsheets require manual work				
13	The implementation of ERP produced qualitative improvements in the decision-making process				
14	ERP supports the budgetary process according to the requirements of Comptrollership				
15	ERP allows for the simulation of scenarios (volumes/amounts)				
16	ERP produced improvements in strategic planning				
17	ERP produces information to measure the results according to the management needs of the company				
18	ERP allows Comptrollership to follow up performance by department				
19	ERP allows the use of the budget to quantify operational plans and to gain commitment from the managers				
20	The requirements for the management of the costs are met according to the needs of the Company				
21	The cost reports are reworked in electronic spreadsheets				
22	ERP allowed for the use of new concepts in managing costs				
23	The standardization of the processes produced by ERP minimizes operational risks				
24	ERP meets legal requirements minimizing the risks				
25	ERP provides accounting information according to the management needs of Comptrollership				
26	ERP allowed the reduction in fixed costs in accounting processes				
27	ERP reduced the number of personnel in Comptrollership				
28	ERP increased the number of personnel in Comptrollership				
29	All fiscal processes are performed according to the current legislation				
30	ERP provides information that contributes to tax planning				
31	The implementation of ERP improved internal controls				
32	ERP reduced the time to execute the routines				
33	The tracking of the information improves the auditing process				
34	ERP allows decentralizing internal transactions				