

THE IMPORTANCE OF THE INFORMATION SYSTEM IN THE COMPANY'S ADMINISTRATIVE PROCESSES

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ABSTRACT

This study intends to understand the perceptions of supervisors, employees and trainees about the importance of the information system for practical application in the administrative processes of a company, it also aims to solve specific problems, such as the failures that occur in the administrative routine affecting directly in the processes, and the lack of immediate support to solve the presented problem, it also aims to verify the important factors of the information system. The work was carried out through a single case study in a financial sector company, which offers auto financing services, where 15 interviews of qualitative and exploratory nature were carried out, and the data collection was obtained through questionnaires intended for stakeholders. It was observed that the main results were the recognition of the existing faults between the system and support, being evident the lack of agility in the resolution of the problems, and the need for improvement in this aspect. In view of the above, the most relevant implications were the indications of creating a new tool to improve communication between the areas of information technology and administration.

Key-words: Support. Technology. Communication. Provider.

RESUMO

Este estudo se propõe a compreender as percepções dos supervisores, colaboradores e estagiários, sobre a importância do sistema de informação para a aplicação prática nos processos administrativos da empresa, visa também solucionar problemas específicos, no caso em questão são as falhas que ocorrem na rotina administrativa e que afetam diretamente nos processos, e a falta de suporte imediato para solucionar o problema apresentado, e tem como objetivo verificar os fatores importantes do sistema de informação. O trabalho foi realizado por meio de estudo de caso único, em uma empresa do setor financeiro, que oferece serviços de financiamento de automóveis, onde foram realizadas 15 entrevistas de natureza qualitativa e exploratória, sendo a coleta de dados efetuada por meio de questionários destinados aos *stakeholders*. Observou-se que os principais resultados foram o reconhecimento da falha existente entre o sistema e suporte, ficando evidente a falta de agilidade na resolução dos problemas, e a necessidade de melhoria neste aspecto. Diante do exposto as implicações mais relevantes foram as indicações de criar uma nova ferramenta para melhorar a comunicação entre as áreas de tecnologia da informação e administração.

Palavras-chave: Suporte. Tecnologia. Comunicação. Fornecedor.

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1 INTRODUCTION

The information system plays an important role in the company's processes, especially in the administrative area, where the proposal is to facilitate the routine and help in the processing of information effectively so that there are no flaws in the routine process. This study addresses the importance of the information system in companies, and the way it is used to meet the needs, creating an improvement in productivity, because it is through a system that the activities are developed in a safe and fast way, it is important to highlight that providing quality support to the system when unforeseen events occur in the process makes all the difference.

Stair (2002) has been analyzing the research object, as pointed out in the literature review, in its different levels of understanding and application to the organizational context. Definitions for the information system can be found in the literature; and administrative processes, which demands the construction of a theoretical / empirical / managerial model that explains how these different concepts are articulated and can contribute to the understanding of proposals for organizational development. How can the information system improve the administrative processes of the company? What are the characteristics of the information system that improve the performance of administrative processes?

Conducting a survey of the important factors of the information system in the company's administrative processes; analyzing the information system in the administrative processes that can improve the organizational routine. The companies use an information system to improve their administrative process, and this article presents the importance that this tool has to improve the performance of these activities and what to do to solve system-related problems that can occur in the day-to-day business, according to the perceptions of those involved in the processes.

For the development of the research, in methodological terms, the qualitative approach will be adopted. According to Collis; Hussey (2005), regarding the procedures interviews will be conducted. Research of this type is characterized by the direct interrogation of the people whose perception one wishes to know. Basically, it is necessary to request information through questionnaires to a group of stakeholders about the question/problem studied and then, through analysis, obtain the conclusions corresponding to the data collected. The population interviewed was composed by 15 people from different hierarchies and the samples were analyzed empirically.

2 THEORETICAL BACKGROUND

The theoretical background starts with information systems.

2.1 Information System

Based on the concept of Cortes (2008), information system has elements or components that are interconnected in a specific order (input, processing and output), providing feedback of the captured data; This is why it is extremely important in the organization, because it is directly linked to the routine process and decision-making, besides

improving the time spent in administrative processes, since the intention is to process information quickly.

Stair (2002) states that, the information system assists the company in achieving the objectives, providing a view of control, organization and planning; because it involves several areas, such as finance, accounting, collection, commercial, credit, and others, due to a link between sectors, through a common database, assisting in the support processes, which can also be denominated "support".

According to O'brien (2004), the information system is an organized set of people, software, hardware and communication networks with data resources that improve the performance of management processes, since the activities that are handled automatically through the system improve the time spent when applied correctly, seeking to progressively improve the availability of information through management processes, which aims at innovation as a whole.

The purpose of an information system is to enable each employee of an organization to obtain the information necessary to improve the quality of their work, whether it is for the mechanic to repair a vehicle or for the president to choose a particular plan (OLIVEIRA, 2000, p.178).

Based on Baltzan's reflections; Phillips (2012), the information system serves to solve business problems, involving people, technology and procedures; so that the data is converted into a useful and meaningful context for the organization. From the routine systems, it is possible to cite the systems of register in general, that includes consultations, alteration of data; sales systems; and, control systems; in relation to the administrative process they can improve the resources in an organized way.

It should be noted that Oliveira (2010) says that the information system is a process that transforms data into information; as the data are obtained it facilitates the understanding of who will use the information to complete the necessary procedures, since they relate to each other in the communication, with the objective of easily flow the information to different parts of the company and in the management of the administrative processes, continuously raising the level of performance of the results.

In the vision of Gomes; Gomes (2012), for an automated decision, the information system allows responsible employees to have access to the oldest and most recent data at any time; as long as the tool is applied with quality, the information will be generated quickly, being developed based on a valid objective, and as a result, the administrative processes will be integrated in a logical and organized way.

As for Araujo (1995), the purpose of the information system is to carry out communication processes; but when there are differences in administrative procedures or lack of communication between areas, work can be compromised, so it is so important to have quality support to help in these situations, with the aim of reducing the flaws in the processes and eliminating rework.

According to Laudon; Laudon (2004), organizations use various types of information systems; which can be used in several departments and activities: Management Information Systems (MIS); Decision Support Systems (DSS); Executive support systems (ESS); Integrated systems (ERP); Supply Chain Management Systems (SCM); Customer

relationship management (CRM) systems; Knowledge management systems (KMS) and Transaction Processing Systems (TPS).

2.2 Administrative Processes

According to Rebouças (2007), process is a set that has an intuitive structure of the functions of planning, direction, organization and evaluation of sequential activities; so it is important to follow a pre-established schedule to carry out the proposed activities and to achieve success in the results, and the information system is associated to the processes to leverage business success, since it contributes to the optimization of the same.

Maximiano (2007) states that to manage is to seek the achievement of the goals themselves or third parties; as well as perform the quality functions to achieve the goals that are established for each employee, so it is important to define the processes that will be applied in a correct way and it is possible to emphasize the great importance that the information system has to improve the administrative processes in the company, mainly in the facility of generating information.

As for Rummler; Brache (1994), process is a creation of steps that has the purpose of producing a product or service; because through these steps it is possible to complete the final objective, and the company is in charge of defining the steps that will be applied, always aiming at improving procedures so that there are no failures. Still on the concept of processes, Araujo (2009), presents the term as the introduction of inputs in an environment formed by procedures, norms and rules; as the activities are carried out, the results will appear.

Fayol (2003) affirms that administrative process is to make decisions, and this process can be defined in five categories: to plan, to organize, to command and to coordinate; but also makes the company's management more efficient by following these steps, since they are basic concepts that every organization must put into practice, and it is worth noting the importance of having adequate support to meet the expectations and problems that may occur in the routine.

Process can be defined as any activity that receives an input, adds value to it, and generates output for an internal or external client. The processes make use of the resources of the organization to generate concrete results (HARRINGTON, 1993, p.10).

The administrative process is an organizational management practice that involves the administration and culture of business processes; because the administrative procedures become increasingly essential in the routine of the company, and the union of the processes with the technology becomes essential for the survival, continuity and maturity of the organization, being of great value for the control, integration, quality and productivity of internal processes. (Rosemann and Bruin, 2005).

Oliveira et al. (2008) affirm that understanding an administrative process would be to observe the organization from an internal and external perspective; not only focusing on customers, but also thinking about the needs and expectations of the company in general, always seeking continuous improvement and the information system can improve organizational functions, providing integration, control and monitoring of data in their decision-making.

In the conception of Gonçalves (2000), administrative process in a company represents the sequence of tasks with beginning, middle and end; the author also states that the processes can be divided into three types: Organizational, which are centralized in the company for proper functioning of existing subsystems in the organization, in pursuit of overall performance and process support; business, which characterize the performance of the company, being supported by other internal processes, resulting in the service or product that is offered to the customer; which focuses on the managers and relationships that involve the actions and performance of the company.

3 METHOD

This section deals with the research strategies that were adopted to conduct the research, according to the proposed objectives. In the methodology it was used field research with qualitative approach and as research technique, interviews.

In order to reach the proposed objectives, an exploratory and descriptive research was delineated. The exploratory study seeks to understand the phenomenon in its complexity, (GIL, 2008), the exploratory research should provide greater familiarity with the phenomenon by involving specific techniques, such as the bibliographic survey. According to Almeida (2011), the exploratory research has the purpose of searching for relationships between concepts, characteristics and ideas.

In the descriptive research, the study, recording and interpretation of the facts of the physical world is carried out without the interference of the researcher. In this type, after the data collection an analysis of the company, production system or product is made, due to that it can also be understood as a case study (CERVO, 2007).

The company is a financial institution that provides vehicle financing services, it was founded in 2008 and is located in Guarulhos / SP, has about 70 employees, and serves a large number of customers through dealerships throughout Brazil. The target audience is varied, because the products and services are intended for different social classes. The objective of the company is to offer financial services that are profitable and competitive, in order to meet the expectations of those involved.

The detected problem was that the information system that is used presents several failures during the administrative routine, for example, to be overloaded, and the activities of different areas end up interfering in the performance of the system, since there is no adequate support on the part of the vendor because there is a delay in the return and the information technology area of the company does not meet the expectations promptly, as it also depends on the supplier's return.

When an error occurs in the system it is necessary to open a call to the area of information technology through the helpdesk management system, and the area is in charge of checking and contacting the supplier to solve the problem presented, and subsequently communicate the administrative area through the same call, whether or not the problem was solved. Only the information technology department has direct contact with the supplier.

Based on Ishikawa's (1993) diagram, which is a tool that helps in identifying the root causes of the difficulty, it is possible to verify that the described problem is linked to the method, since the way to solve the errors that come up in the system does not occur

immediately, and the method that is currently used does not meet the expectations, because according to the authors of the literature review, an information system is important in the decision-making process, as well as improving the performance of administrative activities, and for this reason it is important to establish adequate support in the area of information technology.

As for the research approach, the qualitative one was used, which is a means to explore and understand the meaning that individuals or groups attribute to a social or human problem. The research process involves the questioning and procedures that emerge from the data collected in the interviewee's environment, the analysis of the data is inductively constructed from the particularities to the general themes and the interpretations made by the researcher about the meanings of the data (CRESWELL, 2010).

The qualitative research explores the set of opinions, which in this study seeks to perform a survey of the important factors of the information system in the company's administrative processes, analyzing the problems that may occur in the routine when there is no adequate support, in order to identify the better way to improve processes that contribute to the information system and administrative processes

As for the procedures, the research is configured as a field study. Field research, according to Fonseca (2002) is the one in which the researcher should do a data collection, but because the universe is too large, it makes impossible a total collection. This will be done from a sample, determined scientifically. This form of consultation is done by means of a questionnaire, interviews with those involved, interviews for this work were carried out individually in the workplace, with stakeholders from different hierarchical levels. Some of the interviewees gave more than one testimony, collaborating significantly with the research, allowing the analysis and considerations, according to previously established objectives. This research is based on observing the facts as they occur.

Regarding the techniques, they refer to the procedures that were used to collect the empirical data during the research, besides the direct observation, in which the data collection is carried out using sense making and meanings constructed by the researcher in relation to certain aspects of the observed reality. Data collection took place during the month of October 2017, through interviews, guided by a semi-structured script, elaborated from the proposed objectives.

4 RESULTS AND DISCUSSION

The results described below are based on the information gathered from the interviews, information was also obtained from the organization's websites that contributed to the study. The results sought to answer the importance of the information system in the company's administrative processes. The present discussions seek to translate the researcher 's interpretation, constructed from the analysis of the answers obtained, as well as the data obtained from in loco observation. The information was elaborated in order to present the perceptions of the stakeholders with the purpose of elaborating actions that contribute to the information system in the administrative processes.

Interviewees	Research data	Solutions
Supervisors (3)	Supervisors understand that the information system is extremely important to carry out daily activities and does not delay the processes, especially when it involves several areas that depend on the information extracted from the system, and emphasize that there is a high cost to maintain an information system and are aware of the failures that occur daily, but it is not possible to change supplier, since it is present from the beginning of the company.	It is necessary to do more frequent maintenance in the system, and to improve the way of communication with the supplier by establishing fortnightly meetings with the it, in order to verify and clarify the presented problems, reinforcing the importance of the correction of failures.
Collaborators (7)	According to the observation of the employees who use the system in question (back office, collection, accounts receivable, accounts payable and accounting), to carry out routine procedures it is important that the company presents a quality information system, since the administrative process relies heavily on the information contained therein, and there are currently many process failures, and all have pointed out the delay in resolving such a failure, and the calling channel that is currently available does not meet expectations.	Improve communication between the administrative area, information technology and supplier through a new support tool that is easy to access and offers more agility to solve the issues of failures that are presented during the administrative routine.
Interns (5)	Trainees from the areas pointed out that the basis of administrative processes is an information system that works perfectly, because it operates in a fast way, facilitating the day-to-day work, bringing results. It has been verified that there is a delay in support service and oftentimes the problem is not solved.	Check with the supplier or area of information technology for a new way of communicating between areas when problems that need to be solved quickly crop up, so as not to hamper productivity.

Table1 – Perceptions about the Importance of Information System in Administrative Processes Source: Research data

Based on the interviews, the identified convergences demonstrate that the information system has great importance for the administrative area and its processes, and the biggest problem in the case of the company is the communication between the areas of information technology, administrative and system provider, because it was clear that there is no adequate and immediate support for the employees who use the same, and this failure has a great impact in obtaining the expected result, there is also a great highlight for the improvement or creation of a new support system.

On the other hand, the differences that have been pointed out, even in limited numbers, show that some groups prefer to solve problems without creating a new system, because the helpdesk management tool already exists, while others prefer more support adequate and responsive in order to meet the needs of administrative processes.

Some respondents believe that it is necessary to maintain the system more frequently in order to mitigate the current flaws, in addition to informing the supplier of the

errors presented, through biweekly meetings with the representatives, and the author Fayol (2003), affirms that in the administrative process it is necessary to make decisions, and this process can be defined with planning, organization, command and coordination.

Others stress the importance of communication between the areas involved, and to improve the administrative process, the ideal would be to create a new support tool, where users of the system have easy access to carry out the calls, and are reciprocated quickly and with the solution of the problem, since according to Stair (2002), the information system helps the company achieve the objectives, providing a view of control, organization and planning.

One group emphasizes the importance of a new form of communication between areas, with the objective of improving productivity, and to reach this goal it is necessary to check with the area of information technology or supplier, according to Oliveira et al (2008)), which state that an administrative process would be to observe the organization from an internal and external perspective; thinking about the needs and expectations of the company in general, always seeking continuous improvement.

The creation of a new support tool, because it is not possible at the moment to change supplier due to the high cost of the system license, and the implementation of a new communication tool will be useful to streamline the processes in which a failure occurs, since through this new medium, the contact with the system supplier would be faster, and thus it is easier to obtain a response regarding the occurrences made, since according to Baltzan; Phillips (2012), the information system serves to solve business problems, involving people, technology and procedures; therefore it is necessary to invest in this solution to achieve the company's objectives in its administrative processes.

After doing a company needs analysis, the maintenance solution was rejected because of the length of time these problems have occurred and so far there has not been an adequate solution, and the fact that meetings with the supplier will not help in the moment the process, failure occurs. awareness of the situation to seek improvement has been raised. The solution to improve communication was not clarified as to how this procedure would be, and only with this information there is no way to proceed to solve the problem, therefore it was rejected.

According to the data in Table 1, it was observed that the perceptions of the stakeholders who answered the questionnaire demonstrate the importance of the information system in the company's administrative processes, it has helped to identify the best option for improvement.

According to O'brien (2004), the information system is an organized set of people, software, hardware and communication networks with data resources; therefore all these items must remain in tune to obtain the expected result. In the processes, it is worth to emphasize the concept of Maximiano (2007), in which he affirms that to manage is to seek the achievement of the own objectives or of third parties; as well as performing quality functions to achieve the goals that are set for each employee.

Eliminating the current procedure for opening system-related calls, and the information technology department will be responsible for eliminating this process. Access to the system that is currently in use will be disabled for this system failure option, and the time frame for this procedure is three to six months. According to Filho (1994), the proper use of the information system generates an organized structure to achieve the objectives of the company.

Reducing the number of occurrences until the implementation of a new support tool so as to try to solve the errors with more agility, so far the place used is the system of management of helpdesk, the estimated time is of three months, with the possible extension till the implementation of the new system in production, being that the responsibility of the area of information technology, which has direct contact with the supplier. It will be done in the current way until the new system is implemented. Mitello (1990) emphasizes that the adoption of a quality system brings the end of parallel controls.

Raising the most important factors in the administrative processes, and for this it is necessary to highlight the activities, with the intention of improving the daily procedures, being done in the own system that is in force, and the time can vary, since it depends on the implantation in production of the new support tool. The administrative area and the information technology department are responsible for collecting the necessary information. According to Batista (2004) it is necessary to filter every set of data to separate what is relevant and transform into quality information.

Creating a new support tool to support the administrative areas when system failures, to improve administrative processes and streamline the demand. It will be a new service portal that aims at a fast and practical return with focus on the solution of the presented fault, and the new tool will be created by the sector of information technology in conjunction with the system supplier, and the tool will be done through a system online, with a stipulated time frame of three to six months to be implemented in production, according to the author Cassaro (2003), the information system should be destined to meet objective data in the organizational scope.

Despite the limitations of the research, the first one is related to the analyzed sample and its non-probabilistic character that prevents the results generated by this research are generalized for the whole segment or for all the companies, and the second, because it is a a single case, does not allow comparison with other companies in order to identify existing convergences and divergences.

5 CONCLUSION

The objective of this study was to perform a survey of the important factors of the information system in the company's administrative processes, to analyze the problems that may occur in the routine when there is no adequate support, and thus to identify the best option to improve the organizational routine, and for this purpose, a case study with a qualitative approach was conducted through interviews at a company located in Guarulhos, in the administrative and financial sector. Among the important factors of the information system it is possible to highlight communication, support, agility in service and quality. The literature review suggests that there is a relationship between the information system and administrative processes, according to Araújo (1995), the purpose of the information system is to carry out communication processes; and as a consequence the improvement of procedures.

The main results demonstrate that the lack of support has a great impact on the organization, as everyone agrees on the importance of having a quality system, and there should be a more effective communication between the areas of technology and administration, especially the contact with the supplier, which currently only the area of

information technology has, and according to the interviewees, the solution of the problem would be the improvement of this communication.

In a certain way the objective was achieved, because it was possible to identify the failures in communication between the areas, mainly by the information technology sector and the system supplier, according to respondents' answers, being evident the importance that the system has for business, but the suggestion of implementing a new support tool will be put into practice for cost reasons.

The information system can improve the company's administrative processes through a quality support tool, which offers immediate assistance to users. The information system in the company's administrative processes is important for several reasons, among them is the concept of Gomes; Gomes (2012), emphasizing that in an automated decision, the information system allows responsible employees to have access to the oldest and most recent data at any time, streamlining the daily processes. The factors of the information system that improve the performance of administrative processes according to Stair (2002) is the aid in achieving the objectives, providing a vision of control, organization and planning, as well as the importance of communication, as highlighted in the interviews.

At first, there was a fear that the questioning about the subjects of this research would not be well taken by the stakeholders during the interview, however, their understanding about the matters dealt with was surprising, it is believed that this is due to the network of information that is part of their daily lives.

In view of the above, the most relevant implications are of an empirical / managerial nature, since during the research the need to improve communication between the areas of information technology and administration emerged, those of which are empirical and managerial axes more in line with the needs organization in the current context of the company. (FLEURY; FLEURY, 2001).

As a suggestion for future studies, it is necessary to extend the sample to other literature reviews, extend the time period to allow a more comprehensive view of the use of research methods, which may contribute significantly, such as allowing new methodological contributions in the area and expanding the analysis of the results and, finally, conducting future researches that link the research object to the information system and administrative processes, with the methodological choices that would prove relevant in order to verify trends and research opportunities, so that the professionals and managers of the area have more clarity on the subject.

6 REFERENCES

ARAUJO, L. C. G. **Organização, sistemas, métodos e as tecnologias de gestão organizacional.** 4. ed. São Paulo: Atlas, 2009.

ARAUJO, V. M. R. H. de. **Sistemas de informação: Nova abordagem teórico-conceitual**. Vol 24, n. 1. Brasília: Ciência da Informação, 1995.

BALTZAN, P.; PHILLIPS, A. **Sistemas de Informação**. Brasil: Mcgraw Hill Brasil, 2012, p. 9.

BATISTA, E. O. Sistema de Informação: o uso consciente da tecnologia para o gerenciamento. São Paulo: Saraiva, 2004.

CASSARO, A. C. **Sistema de Informação para tomada de decisões.** São Paulo: Pioneira Thomson Learning, 2003.

CERVO, A. L.; BERVIAN, P. A.; SILVA, R. **Metodologia científica**. 6. ed. São Paulo: Pearson Prentice Hall, 2007.

COLLIS, J.; HUSSEY, R. Pesquisa em Administração: um guia prático para alunos de Graduação e Pós-Graduação. Bookman, 2005.

CORTÊS, P. L. Administração de sistemas de informação. São Paulo: Saraiva, 2008.

CRESWELL, J. W.; CLARK, V. L. P. **Pesquisa de métodos mistos**. 2. ed. São Paulo: Penso, 2010.

FAYOL, H. Administração Geral e Industrial. São Paulo: Atlas, 2003.

FILHO, M. P. C. Os sistemas de informação e as modernas tendências da tecnologia e dos negócios. Revista de Administração de Empresas. São Paulo: 1994.

FLEURY, A. C. C.; FLEURY, M. T. L. Estratégias empresariais e formação de competências. São Paulo: Atlas, 2001.

FONSECA, J. J. Metodologia da pesquisa científica. Fortaleza: UEC, 2002.

GIL, A. C. Como elaborar projetos de pesquisa. 4. ed. São Paulo: Atlas, 2008.

GONÇALVES, J. E. L. As empresas são grandes coleções de processos. RAE Revista de Administração de Empresas, v. 40, n. 1, p. 6-19, jan./mar. 2000.

GOMES, L. F. A. M.; GOMES, C. F. S. **Tomada de decisão gerencial: enfoque multicritério.** 4. ed. São Paulo: Atlas, 2012.

HARRINGTON, H. Aperfeiçoando processos empresarias. São Paulo: Makron, 1993.

ISHIKAWA, K. Controle de qualidade total: à maneira japonesa. Rio de Janeiro: Campos, 1993.

LAUDON, K. C.; LAUDON, J. P. **Sistemas de informação gerenciais.** São Paulo: Prentice Hall, 2004.

MAXIMIANO, A. C. A. Fundamentos de Administração. São Paulo: Atlas, 2007.

MITELLO, K. Quem precisa de um ERP?. Info Exame, 1990.

O'BRIEN, J. A. **Sistemas de informação: e as decisões gerenciais na era da Internet.** 2. ed. São Paulo: Saraiva 2004, p. 6.

OLIVEIRA, A. A., et al. Contabilidade de custos: temas atuais. Curitiba: Juruá, 2008.

OLIVEIRA, D. de P. R. de. **Sistemas, organização e métodos: uma abordagem gerencial.** 19 ed. São Paulo; Atlas. 2010, p. 36.

OLIVEIRA, J. F. Sistema de Informação: um enfoque gerencial inserido no contexto empresarial e tecnológico. 1. ed. São Paulo: Érica, 2000.

REBOUÇAS, D. P. Planejamento estratégico. 24. ed. São Paulo: Atlas, 2007.

ROSEMANN, M.; BRUIN, T. Application of a holistic model for determining BPM maturity. 2005.

RUMMLER, G.; BRACHE, A. **Melhores Desempenhos das Empresas**. 2. ed. São Paulo: Makron Books, 1994.

STAIR, R. M.; REYNOLDS, G. W. **Princípios de sistemas de informação.** 4. ed. Rio de Janeiro, 2002.