



HOW MANAGEMENT INFORMATION SYSTEMS MIGHT ADD VALUE TO THE DECISION-MAKING PROCESS IN ORGANIZATIONS

Como os sistemas de informação de gestão podem agregar valor ao processo de tomada de decisões nas organizações

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ABSTRACT

The management information systems are a fundamental issue of the decision-making process in any organization. So, the main motivation for this study was to understand how management information systems might or might not add value to the decision-making process within organizations. To carry out this study, authors have mainly focused on key concepts such as “Management Information System (MIS)” and “decision-making process” through an extensive review of bibliography and papers seeking to delimitate the state of art regarding the identification of their theoretical frameworks. The literature review confirmed that the main mechanism in which management information systems might add value to the decision-making process goes beyond the process itself, helping organizations to make better decisions based on data not on guesses. Another conclusion is that, while strengthening and improving the managers’ decisions, it facilitates and improves communication and collaboration. They seem to play a crucial role in enhancing the decision-making process having impact in the organizations’ performance at all levels. Finally, for suggestions of future studies, researchers should analyze more deeply the effectiveness of the three performance indicators for measuring such contributions of MIS to the decision-making process: speed, precision, and complexity.

Keywords: Management Information System, Decision-Making Process, Added Value.

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COMO OS SISTEMAS DE INFORMAÇÃO DE GESTÃO PODEM AGREGAR VALOR AO PROCESSO DE TOMADA DE DECISÕES NAS ORGANIZAÇÕES

How management information systems might add value to the decision-making process in organizations

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RESUMO

Os sistemas de informação de gestão são uma questão fundamental do processo de tomada de decisão em qualquer organização. Assim, a principal motivação para este estudo foi compreender como os sistemas de informação gerencial podem ou não agregar valor ao processo de tomada de decisão dentro das organizações. Para a realização deste estudo, os autores centraram-se principalmente em conceitos-chave como “sistema de informação de gestão” e “processo de tomada de decisão” através de uma extensa revisão de bibliografia e artigos que procuram delimitar o estado da arte no que diz respeito à identificação dos seus referenciais teóricos. A revisão da literatura confirmou que o principal mecanismo pelo qual os sistemas de informação gerencial podem agregar valor ao processo de tomada de decisão vai além do processo em si, ajudando as organizações a tomar melhores decisões com base em dados e não em suposições. Outra conclusão é que, ao mesmo tempo que fortalece e melhora as decisões dos gestores, facilita e melhora a comunicação e a colaboração. Parecem desempenhar um papel crucial na melhoria do processo de tomada de decisão, tendo impacto no desempenho das organizações a todos os níveis. Por fim, para sugestões de estudos futuros, os pesquisadores deveriam analisar mais profundamente a eficácia dos três indicadores de desempenho para medir tais contribuições do MIS para o processo de tomada de decisão: velocidade, precisão e complexidade.

Palavras-chave: Sistema de Informação Gerencial, Processo de Tomada de Decisão, Valor Adicionado.

INTRODUCTION

Considering the contemporary business environment, it is clear how the information systems have become necessary in the decision-making process in organizations. However, in many business environments, it is still not possible to identify an effective gain from the use information systems in their decision-making processes. Despite the use of information systems in the management of these organizations and in the process of information sharing, it is still challenging to ensure that information guarantees successful decision-making by managers (Fakeeh, 2015).

In this context, it is reasonable to suspect that information might be a crucial element for the management process; however, how this information generated depends on the processing of consistent data to achieve results able to strength the management and decision-making processes. Furthermore, just using systems and technologies does not guarantee a good decision making and management processes, although given support to a competitive advantage for Organizations. This might happen if there is a relationship between their use and the objectives to be achieved. At this point, the question that this work intends to address arises: How might management information systems add value to the decision-making process in organizations?

This study aims to analyze how management information systems might add value to the decision-making process of organizations. In this sense, the output of this essay is to develop an analysis model that can contribute for practical applications, for future research and to help the answer to the essay's question.

This research justify itself because some organizations seem to be unable to use efficiently the management information systems to add value to the decision-making process. Furthermore, the major challenge faced by contemporary organizations have always been the lack of interaction and relationship between the financial, administrative, and academic sectors. Information systems tend to bring sectors closer, facilitating communication and generating consistent reports for managers in their decision-making processes.

This article is structured based on a theoretical framework which is subdivided into 6(six) themes: Section 1 – Introduction; Section 2 - Concepts on Management Information Systems; Section 3 – The Process of Decision-Making; Section 4 - MIS Adding Value to the Decision-Making Process; Section 5 - Methodology and Section 6 - Final Conclusions.

1 GENERAL CONCEPTS ON MANAGEMENT INFORMATION SYSTEM

According to O'Brien (2010), the conceptual basis of management information systems must consider its initial concept. This concept is linked to a group of interrelated components directed towards a single goal. According to Oliveira (2018), the system is a set of parts that interact with each other, with the aim of achieving a common objective, receiving inputs, and producing results in an organized transformation process. Beal (2004) understands a system as a set of organized parts or elements that interact to achieve a target and adds to those systems input, processing, output, and control functions. Expanding the author's concept, the input functions receive the data that will be treated by the processing function, so that it can be sent to the output function in the format of information.

In the same scenario, Serafim *et al.* (2021) demonstrate that the management information system is fully integrated and contributes to the company's strategy and to the organizational efficiency. In this context, it can be argued that information systems are valuable instruments for storing, transmitting, and manipulating information to bring efficiency to organizational processes. Rodrigues, Meirino and Paula (2020) expand the concepts, observed by Laudon and Laudon (2010) and Serafim *et al.* (2021), and established that the actions of Management Information Systems implement the process of capturing, storing, joining, and presenting information, in a precise and timely manner to achieve positive results in organizations.

Therefore, we might conclude, at this point, that the preliminary concepts of systems, information and information systems are fundamental for the formation and understanding of management information systems and their role in strengthening the decision-making process and management in organizations. In this sense, in the next topic, a discussion will be held on the composition and activities of Management Information Systems and the information generation process.

1.1 Components and Activities of Management Information Systems

For Gonçalves (2017), the composition of management information systems is related to the interaction between software, hardware, human resources, and the organization. The hardware resources are related to the physical part and software resources are linked to the logical part of management information systems. Furthermore, people are also fundamental components in this process, as they are the ones who will manipulate the resources. In this case, there are two types of users: expert users, the one who develop the applications; and end users, those who use the systems and applications developed by expert users.

O'Brien and Marakas (2013) reinforced the concept of Gonçalves (2017) and highlighted that information systems, in addition of being an organized combination of software, hardware, people, computer networks and data resources, execute procedures of storage, restore and the transformation of data into information. So, a well-designed and adapted hardware, software, computer network, data and human resources provide efficiency to the generation of information management process.

Therefore, the operational model of the management information systems is linked to all components or resources such as hardware, software, data, networks, people, and the activities of input, processing, output, control, and feedback, in addition to the user's motives that led him/her to the development of such system.

The input of an information system has been related to the capture and processing of data which translates the transformation of raw data into elaborated outputs, which are the information (Beal, 2004). Management information systems process those data and generate information (O'Brien, 2010). Silva and Razzolini Filho (2018) argued that data are considered raw material of information; thus, in isolation, they do not carry any meaning.

Now, it is reasonable to argue that the functioning of any management information systems is conditioned to the performance of its components and resources (hardware, software, people, networks, and data) as well as the execution of its activities (input, processing, output, control, feedback, and objective) of information generation.

1.2 Classification of Management Information Systems

Nowadays, different information systems operate at all organizational levels. Hikage (2011) argued that the classification of the several types of Information Systems enable a systemic view of the variables and functionalities that characterize these systems. According to O'Brien (2010), information systems are classified into: (a) Operational Systems, which support the execution of tasks at the operational level. They optimize activities, reduce bureaucracy in processes and procedures, and control data that circulates in organizational sectors; (b) Management Systems, which support decision-making at the managerial level; and (c) Strategic Systems, which support decision-making at the strategic level of organizations.

Oliveira (2010) suggests that Management Information Systems (MIS) transform data into information so that it can be used in the decision-making process. The MIS summarizes data obtained through transactions conducted by the Operational Systems and presents them through reports (Silva, Barbosa and Córdova, 2018).

In this sense, Serafim *et al.* (2021) argued that managers need solid information to leverage the decision-making process. Thus, management systems provide condensed information about the "health" of the company, so that the decision-making process, as the part of managers' duties, might reach increasingly high levels.

The Enterprise Resources Planning (ERP) or Enterprise Information Systems is a classic example of Management Information Systems. Integrated systems, as the name suggests, have the function of integrating different sectors of the company (Laudon and Laudon, 2010). The integration of sectors can provide positive results to the process of developing activities as well as to the management for those companies who adopt it.

Another type of MIS is related to the decision-making process at the strategic level of companies. According to Turban, Rainer, and Porter (2004), the use of a strategic information system may facilitate the achievement of business objectives. For Gonçalves (2017), systems that operate at the strategic level provide information for planning and help to reach business goals and objectives. Agreeing to the authors, Strategic Information Systems are not part of decision-making daily situation that occur in companies. Its use provides a strategic vision for the top management of organizations, filtering crucial information for the planning and decision-making process in organizations.

So, we can learn from this topic, that management information systems are classified according to organizational levels. Thus, there are information systems acting and strengthening all the management process and at every level of an organization, with benefits from cost reduction and increase of productivity at the operational level, to improve access to precise and reliable information at the strategic one.

1.3 Implementation of Management Information Systems

The implementation of a Management Information System is the start point that is related to the integration of systems into the organizational environment (O'Brien, 2010). From another perspective, the implementation of a management information system is linked to organizational changes and such changes must be connected to the companies' objectives (Locatelli, 2013; Gomes, 2021).

Given the approaches taken on management information systems, by the most referenced authors in research in the various academic works that bring this theme, nationally and internationally, for the purposes of this study, the concept of management information systems will be delimited in the context of organizations, understood as tools used by companies to optimize processes and procedures when carrying out activities, with the aim of providing accurate information to strengthen the decision-making process and organizational management.

In this sense, considering that the functioning of information systems involves activities and components or resources of these systems, it is essential that organizations can manage these variables in the best feasible way to achieve better results in the various aspects of management.

To accomplish this objective, it is important to understand the mechanism of data input, processing, information output, control and feedback. Furthermore, hardware, software, computer networks, data and people resources impact the performance of activities management information and therefore need to be monitored and properly managed too.

The delimitation of the concepts for this study was illuminated by some authors, such as O'Brien (2010). Laudon and Laudon (2015) and Serafim, Ceolin, Souza, Silva, and Mota (2021). For these authors, management information systems are tools that capture and process data with the aim of presenting information in an accurate and timely manner to achieve positive results in organizations.

Considering the point that addresses the classification of management information systems, they are classified according to the organizational level. In this context, there are systems that support the decision-making and management processes at an operational level, offering operational information; in the tactical, they offer management information; and in the strategic level, they provide sophisticated business information.

In this sense, the Enterprise Resources Planning (ERP) is one of the most used MIS in the management of contemporary organizations. It is crucial that organizations know their needs to understand which system can best suit their scenario.

For the purposes of this study, the point related to the benefits of management information systems brings indicators that reflects the benefits promoted by these systems at all organizational levels. Thus, all business stakeholders shall be positively impacted using MIS.

Therefore, it can be concluded from this topic that the process of implementing a management information system is an extremely important phase to obtain positive results from the use of these systems. It is worth mentioning that all the people involved (expert users and end users) play a fundamental role in this context. Considering the challenges, trends and use of management information systems, the general aspects of the decision-making process and its impact on organizations will be discussed in the next topic.

2 THE PROCESS OF DECISION-MAKING

The decision-making process is presented on people's daily and professional lives as well as on simple and complex decisions made every day. This topic addresses the main aspects related to the decision-making process, with a focus on organizations.

According to Simon (1963), the decision-making process is the key point to explain human behavior in organizations in the context of choices. It is a systematic set of steps given certain alternatives in which individuals may choose from. Bourdieu (2009) indicates that the decision-making process, conducted in each scenario, is

conditioned by the routine or customs of the decision makers in that circumstance. According to Bazerman (2004), behavioral patterns may influence managers' choice of decisions. For Moritz and Pereira (2015), the origin of the decision-making process was marked by centralizing characteristics, different from what happens today, where the decision-making process began to have a decentralized and democratic configuration.

The idea of a certain manager with autocratic and centralizing characteristics, who does not consider the opinion of others, is losing ground in the contemporary business context. Mações (2017) argues that the decision-making process is related to the responses attributed by managers to threats and opportunities, which are parts of the organizational scenario.

Opportunities come up when managers bring answers about how to leverage company's performance and respond to unusual situations, which can be major threats.

In view of what authors have exposed, decision-making may or may not improve organizational performance. The success of the management and decision-making process depends on the experience, skills, competencies, and strategic vision of decision-makers.

2.1 Types of decisions

Mações (2017) argues that, based on the level of managers' performance over the characteristics of existing problems, decisions are also classified into: Operational, Administrative and Strategic. The author also argues that, regardless of the types of decision, the level of the function performed or even the essence of the problems and the quality of the information, there are two types of decisions: programmed and non-programmed ones.

Daily basis decisions are the ones already known by management; in other hand, non-routine decisions are those to be considered as something new and may change the decision-making process (Falume, 2021). In view of what was exposed, it can be said that, in organizations, the frequency with each programmed decisions are made is much greater than non-programmed decisions, as most of the problems are a sort of routine and already have a pre-solution script. Furthermore, despite this high frequency of programmed decisions, the decision-making process is not a purely rational mission, as managers will not always have precise answers to all the problems.

2.2 Phases of the Decision-Making Process

According to Choo (2003), the steps of the decision-making process are associated with identifying needs, developing a solution to the problem, and choosing the path to follow.

For Simon (1963 *apud* Rocha, Calazans, Araújo, & Ferreira, 2016), there are some primary parameters such as:

- ✓ Decision maker – Individual who chooses an alternative given some choices.
- ✓ Objective – What will be achieved, given the choice made by the decision-maker.
- ✓ Preferences – Parameters observed to make the choice.
- ✓ Strategy – Path chosen by the decision maker to achieve the objective.
- ✓ Situation – Variables and unusual situations, which are part of the organizational environment, and which interfere in the decision process.
- ✓ Result – Consequence or outcome of a strategy of decision.

The phases of the decision-making process are linked to decision models adopted by managers. Therefore, it is essential to hold a discussion about the models that can be used in such process.

2.3 Models of decision-making process

Lousada and Valentim (2011), in their studies, conducted an analysis tracing a relationship between the models (rational, procedural, anarchic and political), proposed by Choo (2003).

According to this researcher, procedural decision-making behavior is established through distinct phases, characterized by many interruptions and repetitions; however, the mechanism brings a general aspect of development, which begins by identifying the problem, analyzing all alternatives and solutions. It ends with the

evaluation and selection of an alternative that must be authorized or approved by participants (Choo, 2003 *apud* Lousada, & Valentim, 2011).

Silva *et al.* (2021) highlighted that the anarchic decision model involves four elements, and its algorithm does not consider any previous structure or bureaucracy, as it happens unexpectedly (Lousada, & Valentim, 2011).

In this sense, it can be argued that, given a lack of structured characteristics and procedures, the anarchic model does not have any close relationship with the other models (Rational and Procedural). According to those authors, the model uses politics as an instrument in the decision-making process.

No matter what, rational, procedural, anarchic, and political decision models shall be selected according to the current scenario and type of problem. Regardless of the type of model chosen, information is the crucial point in bringing support to the decision-making process. Such indicators shall be verified in the field.

3 MIS ADDING VALUE TO THE DECISION-MAKING PROCESS

O'Brien (2010) highlights that MIS is a system that connects users and machines in the process of supplying information to support operations, general management, and the decision-making process at all organizational levels. He emphasizes that management information systems provide information in the form of pre-determined reports, with the aim of strengthening managers' decision-making process.

Such information, generated in the form of reports and accounting statements, in addition to add value to the managers' decision-making process, is important for planning organizational routines and controlling the activities.

Also, for the author, management information systems generate packages of information that shall be disseminated across an organizational network, with the aim to support the needs of managers' decision-making process. According to Leite, Barros and Silva (2019), feeding management information systems with accurate data is essential to reinforce the consistency of reports that provide solutions for the existing organizational problems.

The use of these systems provides, at the operational, tactical, and strategic levels, benefits through optimizations, de-bureaucratization of activities and provision of information to strengthen the decision-making process for the end users at these levels.

Those reports generated by the MIS provide information on progress, and performance that guarantees improvement in the decision-making process and, consequently, brings positive results for the whole company.

Considering the different environments of contemporary organizations, it is seen to be clear how management information systems have become an important and necessary element in the decision-making process, whether in small, medium, or large companies, public or private.

The use of management information system daily in the diverse companies is physiological. For Brito, Abreu, and Pereira (2019), organizations must adopt the management information system that fit with the company's profile and scenario. Whether it is a grocery store in the neighborhood, a higher education institution or a large industry, the presence of management information system (simple or robust) is essential for providing support to the management process.

Given the different approaches taken on adding value from MIS in the decision-making process, by the most referenced authors in the various academic works that bring up this topic, nationally and internationally, for the purposes of this study, the concept of adding value from Management information systems in the decision-making process will be delimited in the context of organizations, understood as a mechanism through which management information systems strengthen the management process, adding value to managers' decision-making. To measure the value-adding process, three indicators were selected that served as parameters for this analysis, they are: speed, precision, and complexity. The choice was directly related to the absence of a study that qualifies these selected indicators, enabling the development of an unprecedented model to measure the object of this study.

In this framework, the speed indicator will determine added value in the context of the speed of the decision-making process, that is, verifying whether the decision-making process will be faster with the use of management information systems, bringing faster responses to decision makers. Regarding the precision indicator, the objective is to measure how management information systems add value by bringing accurate results to the decision-making process. Finally, the choice of the complexity indicator is related to the study of adding value from the use of

management information systems in the context of complex decisions, aggregating more variables in the decision-making process.

4 METHODOLOGY

The methodology used for this study establishes the path adopted in the investigation to fulfill the proposed objectives. According to Gil (2010), the research is related to different objectives and pursues different goals. For the author, it is essential to seek his classification and characterization of according to the purpose and methods adopted. This research involved a qualitative perspective which according to Silva and Saccol (2012), is of fundamental importance in directing the selection of the method definition.

The present study carried out bibliographical research in areas such as information systems and decision-making processes mainly, which allowed the construction of theoretical foundations, adopting the methodological structure based on reviews of literature and documents. The sources used considered books, dissertations presented in postgraduate programs, articles in national and international journals, in addition to consultations on websites.

CONCLUSION

Management Information Systems play a crucial role in enhancing the decision-making process within organizations. Firstly, MIS helps in collecting, organizing, and processing vast amounts of data efficiently. Then, this set of data can be transformed into meaningful information and insights, which enable managers to make better decisions. Through data analytics MIS provides decision-makers with real-time and historical data, helping them identify trends, patterns, and anomalies that are essential for strategic planning and operational improvements. Secondly, MIS facilitates and improves communication and collaboration within an organization. By centralizing data and making it accessible to various departments and levels of management, MIS breaks down information silos. It ensures that everyone within the organization has access to the same accurate and up-to-date information. This transparency and collaboration lead to more cohesive decision-making processes, as teams can work together with a shared understanding of the organization's performance and objectives.

Furthermore, MIS contributes to the efficiency and effectiveness of decision-making. By automating routine tasks and processes, MIS reduces the burden of manual data entry and report generation. This not only saves time, but also minimizes the risk of human error. Moreover, MIS can incorporate decision support systems and data analytics tools, which assist in scenario analysis, predictive modeling, and "what-if" simulations. These capabilities enable managers to evaluate different decision outcomes, assess risks, and select the most favorable course of action, ultimately adding substantial value to the decision-making process within organizations.

Management Information systems are a fundamental part of the decision-making process in any organization. The benefits extracted from the application of MIS are linked to the improvement of decision-making processes with impact on the organizational performance and results. Finally, according to literature, the main mechanism in which management information systems might add value to the decision-making process goes beyond the process itself, having impact in the organizations at all levels.

While strengthening and improving managers' decision-making processes, it also reinforces the connections between them with direct impact on companies' performance and results.

The main contribution of this study was to gather some of the most important researches about MIS to understand how it can add-value to decision-making process within organizations. Finally, for future studies, researchers suggest to analyze more deeply, the effectiveness of the three performance indicators for measuring the contributions of MIS to the decision-making process: speed, precision, and complexity.

REFERENCES

- BAZERMAN, M. H. Processo Decisório [M]. 5th edition. Rio de Janeiro: Campus, 2004.
BEAL, A. Gestão Estratégica da Informação: Como transformar a informação e a tecnologia da informação em fatores de crescimento e de alto desempenho nas organizações [M]. São Paulo: Atlas, 2004.

- BRITO, I.I.N., ABREU, J.S., & PEREIRA, T.J. A influência do Sistemas de Informação Gerencial no processo decisório nas organizações [M]. Centro de Ensino Superior dos Campos Gerais – CESCO-GE, 27th Edition. 2019: BOURDIEU, P. O senso prático [M]. 2nd edition. Vozes, 2009.
- CHOO, C. W. A Organização do Conhecimento: Como as Organizações Usam a Informação Para Criar Significado, Construir Conhecimento e Tomar Decisões [M]. São Paulo: SENAC, 2003.
- FAKEHH, K. Decision Support Systems (DSS) in Higher Education System [J]. International Journal of Applied Information Systems (IJ AIS). Foundation of Computer Science FCS, New York, USA, Jun. 2015, 9(2):32-40
- FALUME, A. C. Processo de Tomada de Decisão – Decisões de rotina e não rotina numa empresa de consultoria [J]. RECIMA21 - Revista Científica Multidisciplinar, 2021, 2(7):e27595.
- GONÇALVES, G.R.B. Sistemas de informação [M]. Porto Alegre: SAGAH, 2017.
- GOMES, D.C., SOUZA, L.F.G., OLIVEIRA, P.J.S., & ALVES, A.O. O uso de sistemas de informações gerenciais em empresas de diferentes portes: um estudo realizado em Currais Novos/RN [J]. Recital - Revista de Educação, Ciência e Tecnologia de Almenara/MG, 2021, 3(2):33-55.
- HIKAGE, O.K. Planejamento da evolução de sistemas de tecnologia da informação: estudo de casos múltiplos em empresas de manufatura [M]. PhD Thesis, 142f. Universidade de São Paulo. São Paulo, 2011.
- LAUDON, K., & LAUDON, J. Sistemas de Informações Gerenciais [M] 9th. edition. São Paulo: Pearson Prentice Hall, 2010.
- LEITE, E.D., BARROS, J.M, & SILVA, A.W.A. Sistema de Informação Gerenciais para tomada de decisões: Um Estudo de Caso no Sindicato dos Bancários de Brasília [J]. Revista Livre de Sustentabilidade e Empreendedorismo, nov-dez, 2019, 4(6):5-36.
- LOCATELLI, R. Governança de TI em projetos de Sistemas de Informações Gerenciais: Uma aplicação de caso [M]. MBA Dissertação, 73f. Universidade de Taubaté, São Paulo, 2013.
- LOUSADA, M., & VALENTIM, M.L.P. Modelos de tomada de decisão e sua relação com a informação orgânica. Perspectivas em Ciência da Informação, [S.l.], dez. 2011, 16(1):147-164.
- MAÇÃES, M.A.R. Planejamento, Estratégia e Tomada de Decisão [M]. vol. IV. Lisboa: Conjuntura Actual Editora, 2017.
- MORITZ, G. O, & PEREIRA, M.F. Processo decisório [M]. 3rd edition. Florianópolis: Departamento de Ciências da Administração/UFSC, 2015.
- O'BRIEN, J.A. Sistemas de Informação e as decisões gerenciais na era da internet [M]. 3rd edition. São Paulo: Saraiva, 2010.
- O'BRIEN, J. A., & MARAKAS, G. M. Administração de sistemas de informação [M]. 15th edition. Porto Alegre: AMGH, 2013.
- OLIVEIRA, D.P.R. Sistemas, organização & métodos: uma abordagem gerencial [M]. 19th edition. São Paulo: Atlas, 2010.
- OLIVEIRA, D.P.R. Sistemas de informações gerenciais: estratégias, táticas, operacionais [M]. 17th edition. São Paulo: Atlas, 2018.
- ROCHA, F.A.F., CALAZANS, D.L.M.S., ARAÚJO, A.G., & FERREIRA, L. Decisão multicritério como apoio à avaliação de desempenho de fornecedores na gestão de serviços públicos de alimentação coletiva [J]. Contextus – Revista Contemporânea de Economia e Gestão, 2016, 14(2): 87-110.
- RODRIGUES, F.G.M., MEIRINO, J.C., & PAULA, C.G. Sistemas de Informações Gerenciais como ferramenta para Gestão de Recursos Humanos [J]. Rio de Janeiro, Revista RH Visão Sustentável, jan/jun.2020, 2(3):115-128.
- SERAFIM, A.O., CEOLIN, A.C., SOUZA, I.G.M., SILVA, L.L.O., & MOTA J.S.O. Sistemas de Informações Gerenciais e Eficiência Organizacional: Estudo de caso na Controladoria de uma empresa Multinacional do Setor Automotivo [J]. Revista de Gestão, Finanças e Contabilidade, mai./ago.2021, 11(2):40-59.
- SILVA, K.C.N., BARBOSA, C., & CÓRDOVA, R.S. Sistemas de informações gerenciais [M]. Porto Alegre: SAGAH, 2018:
- SILVA, R.F., & RAZZOLINI FILHO, E.R. O papel da informação sobre sustentabilidade nos processos de tomada de decisão [J]. São Paulo, Revista Metropolitana de Sustentabilidade - RMS, jan/abr. 2021, 11(1):50-70.
- SIMON, H.A. A capacidade de decisão e de liderança. 1st Edition. Rio de Janeiro. Fundo de Cultura, 1963.
- TURBAN, E., RAINER, R.K., & POTTER, R.E. Administração de tecnologia da informação [M]. Rio de Janeiro: Campus, 2004.