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Critical Success Factors of Risk Management with the Advent of ISO 31000 2018 - Descriptive and Content Analyzes

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Abstract

Academic interest in risk management research has increased in recent years. What was previously treated in isolation, nowadays, is essential to be addressed throughout the organization. Thus, the steps that make up the company's risk management processes must be continuously studied in order to achieve the strategic objectives proposed by top management. In this context, it should be noted that the Critical Success Factors (CSF) to the implementation of a risk management process, as areas in which the results, if satisfactory, will ensure a successful competitive performance for the organization, should be analyzed systematically. One way to achieve this analysis in relation to CSF is through the use of globally recognized standards such as ISO 31000: 2018. Therefore, this article aims to identify the insertion of the study on CSF in scientific productions focused on the ISO 31000: 2018 Risk Management standard. In order to reach the aim, a descriptive and content analysis was carried out with samples of documents extracted from the Web of Science Core Collection and the Scopus database, from 2008 to 2018. After the analyzes, it was possible to identify the evolution of the number of publications, the diversity of journals and authors interested in the subject, the most influential articles, and finally, the relevance of the public-private partnership and the influence of ERP systems on performance management business.

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1. Introduction

The decision-making process involves risk, which may appear as a threat to planning or an unplanned opportunity [1]. Thus, there is a need to perform risk management, which is an activity that aims to increase the probability of success in the complex, multidisciplinary and challenging activity of managing projects and developing products [2]. In the meantime, academic research on the subject grew in importance leading to the introduction of risk management as a discipline in many business and engineering schools, being a significant object of study and application [3]. Later, risk management became more mature as a discipline and risk management frameworks were developed, helping the adoption of common best practices by organizations around the world [4].

Risk management best practices evolved over time leading to the development of specific norms, standards and frameworks based on accumulated research and experiences [5]. One of the most important and recognized standards is the '31000 series - Risk Management' from the International Organization for Standardization (ISO), which is composed by four main standards periodically reviewed and already implemented in companies throughout the world [6]. The 2018 review of the ISO 31000 standard presents a more comprehensive and strategic view to managers, detailing the principles and methodologies used in risk management [7]. However, which critical success factors must be carry out under the risk management implementation is still a topic little studied in the literature[8].

Therefore, there is an important gap not addressed in the literature regarding the interdisciplinary aspects of risk management and critical success factors, and both academia and industry may benefit from this debate. In order to address such research gap, we reviewed, analyzed and identify the insertion of the study on CSF in scientific productions focused on the ISO 31000: 2018 Risk Management standard, which would be incorporated into the organization's system.

The present article was structured in four further sections to better address the current research goal. In the following section, a theoretical framework is presented to introduce the main definitions and outline the current debate regarding the researched topic. Section 3 describes the methods used to search, collect, analyze and synthesize the data collected. Section 4 presents the results of the bibliometric analysis conducted and discusses the main findings uncovered by it during the analysis. Finally, section 5 presents some conclusions, implications, limitations of this article and some suggestions for further research.

2. Theoretical framework

2.1 Risk management

One of the first texts to present a definition for the term risk was the text Risk, uncertainty and profit, published by Frank Knight in 1921. In it, the author defines risk as being a measurable probability, that is, it can be quantified through establishment of an acceptable level of trust. This is one of the seminal works on the subject, mainly because it establishes concepts, defines principles and outlines a primitive systematization[9]. The various definitions of risk over time are essential to verify how durable and complex the subject is. According Power (2004), defining the concept of risk is fundamental to initiate a consistent discussion on the subject.

Risk management is an activity that aims to increase the likelihood of success in the complex, multidisciplinary and challenging activity of managing projects and developing products [2]. Thus, it is indispensable to any business environment, since the risk affects the results of the processes and is fundamental to guarantee the achievement of the strategic objectives [4].

It should be noted that risk management is not intended to completely eliminate the business risks of an organization. For possible impacts to be minimized, the focus of the process is to identify, measure and control risks [11]. Thus, risk management is an important tool for managers to make the most appropriate decisions in their companies, which is why organizations adopt policies aimed at the implementation of risk management[1].

In this sense, risk management should be seen as a practical approach, inserted in a strategic plan that managers actually execute [6], taking into account the specificities of the internal and external organizational environment and remaining vigilant in monitoring.

2.2 ISO 31000:2018

The first edition of the ISO 31000 Risk Management Guidelines was published by the International Organization for Standardization in 2009. It is a framework that standardizes risk management through its framework, concepts and terminologies. However, to date, the standard is not certifiable; there was a notable acceptance in the corporate world. It is also emphasized that it is a norm that covers all types of organization, not being directed to a specific sector[12].

Due to its popularization and the natural evolution of the research on the subject, in February 2018, a new version of ISO 31000 was presented. The current version presents a more comprehensive and strategic vision to the managers, detailing the principles and the methodologies used in the management of risks[7].

The methodology focuses on establishing strategies, achieving objectives and making informed decisions. Therefore, risk management should be part of corporate governance, be an interactive process and consider the internal and external contexts of the organization. The scope of the model aims at creating and protecting the institution's value.

In order for risk management to be efficient, effective and consistent, ISO 31000 guides the organization to be based on three fundamental pillars: principles, structure and process.

The principles are considered basic for any type of risk management, being essential to establish the structure and processes related to risk management activities in organizations. They represent the characteristics that a risk management must have in order for the company to manage the effects of uncertainty on its objectives.

ISO 31000 also features 05 components for a risk management framework: integration, design, implementation, evaluation and improvement. These components should work together and align with the organizational culture of the company. This structure enables the current practices to be evaluated and any gaps, which make optimal risk management impossible, to be met.

The third and final pillar in relation to risk management based on ISO 31000:2018 is the process. It involves the systematic application of policies, procedures and practices to communication and consultation activities, establishment of context and evaluation, treatment, monitoring, critical analysis, recording and reporting of risks.

In practice, it is an iterative process, and can be applied at the strategic, operational, program or project levels. It is also worth noting that the process should be tailored to the particularities of each organization, in order to add value, to assist the manager in decision-making and to help achieve the strategic objectives previously planned [12].

2.3 Critical success factors

In the mid-20th century, the understanding of Critical Success Factors (FCS) was presented to the academic community by researcher Ronald Daniel (1961)through the article Management information crisis, published by the Harvard Business Review. For the researcher, information management based on success factors would reduce the effects of a crisis due to rapid organizational change.

Later, in 1979, John Fralick Rockart honed Daniel's ideas and in the same Harvard Business Review, published the article Chief Executives define their own data needs, which described the FCS at the organizational and industrial level; and defined them as areas in which the results, if satisfactory, will ensure a successful competitive performance for the organization. They are considered key areas in which activities should work to make the business flourish [14]. The role of FCS should be restricted to activities that make the difference between business success and failure, so that managers can actually focus their attention on these processes [15].

Following the same line of reasoning, Freund (1988) defines FCS as key areas of performance that are essential for the organization to fulfill its mission and necessary to reduce the flow of information to managers and make them realize what the important to run your business. For the author, FSCs are more than just guiding principles; are important components of a strategic planning that must be followed in order to achieve the goals and objectives of the organization.

It should be emphasized that a planning that takes into account the FSC, encourages the exploration of more appropriate implementation strategies, helping organizations to manage their resources in an effective way [17]. According to Sanchez and Robert (2010), the FSCs are the places where managers must concentrate their efforts to maintain the company's competitiveness in the market in which it is inserted. The focus on them explicitly explains the variables in which those responsible for business management must direct the actions, in order to fulfill the organizational mission.

3. Methods

Bibliometry is a technique that has the aim of obtaining a better understanding of the literature of a given subject [19]. Thus, it begins with a search in the main databases, composed of three distinct stages (planning, revision and results) and later a bibliometric analysis is performed based on the results obtained [20].

Starting the planning phase, the bibliographic portfolio is constructed. The proposal is to identify with a bibliometric analysis the main trends in the literature regarding risk management related to critical success factors.

For the construction of the bibliographic portfolio, the database of the Web of Science Core Collection and the Scopus database were consulted. Both bases have a digital collection that covers the most cited publications in the literature and allow the complete extraction of data, increasing the spectrum of journals to be analyzed individually.

In the research platforms, the following criteria were used as filter criteria: articles as the type of document, since they represent more quickly the tendency of study in the areas of knowledge; the categories Accounting, Business, Economics, Engineering, Finance and Management, for the direct relationship with the researched topic and finally the fields of research that encompass essential items in the selection of articles, such as title, abstract and author keywords. The timespan used was from January 2008 to October 2018, that is, the last 10 years before the publication of ISO 31000:2018. The general structure of the search strings has 02 (two) main identifiers: one of risk management and another of critical success factors. Thus, in order to extract the most appropriate publications for the research, we present the union and intersection used in the searches: "risk" OR "risk management" AND "critical success factors".

Table 1. Bibliographic portfolio inclusion criteria

Planning	**Bibliographic portfolio**
Database	Web of Science Core Collection and Scopus
Document type	Articles
Period	January 2008 to October 2018
Category	Accounting, Business, Economics, Engineering, Finance and Management
Search string	"risk" OR "risk management" AND "critical success factors
Processing of data	Descriptive and content analyzes

After completing the planning stage, the bibliographic portfolio review began with the first results obtained through the search performed in the databases. Initially, the Web of Science Core Collection presented 135 articles and Scopus, 113. When inserted in Mendeley® software, it was verified that 24 articles were in both bases, being necessary the exclusion. Thus, after this first filter there were 224 articles. Then, the titles and abstracts of all articles were analyzed. Those who did not address the relationship between risk management and critical success factors were eliminated, not discussing engineering, business, management, economics, finance, and accounting. An example of such excluded articles is a study of the risk analysis of spontaneous combustion of coal in a mixture rich in methane and prone to combustion. There were thus 177 articles, which is the final sample.

Table 2. Filtering process

Web of Science Core Collection		135 articles
Scopus		113 articles
	partial sample	248 articles
1st filter: duplicity articles		24 articles
	partial sample	224 articles
2nd filter: articles outside the studied subject		47 articles
	final sample	**177 articles**

Initially, descriptive analysis was developed to identify aspects such quantity of publications per year, periodicals with greater amount of publication, most cited articles, authors and countries that published the most. After that, a content analysis was done by reviewing the full texts of all documents in the dataset, in order to group them by topic area, identify the main definitions and understand how critical success factors were was applied in the context of risk management systems defined in ISO 31000:2018.

4. Findings

4.1 Descriptive analysis

A descriptive analysis was conducted with the 177 articles in the dataset to identify the most relevant journals, the total publication per year during the timespan selected and the most cited documents in that period. Regarding the most cited journal, the Journal of Construction Engineering and Management was the main source of documents addressing the topic discussed in this document, with a total of 13 published documents discussing the relationship between risk management and critical success factors.

Table 3. Journal information

Journal	Quantity	Qualis CAPES ENGINEERING III 2016	JCR (2017)
JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT	13	A2	2.201
INTERNATIONAL JOURNAL OF PROJECT MANAGEMENT	12	A1	4.328
JOURNAL OF MANAGEMENT IN ENGINEERING	7	-	2.282
BUSINESS PROCESS MANAGEMENT JOURNAL	5	B3	1.308
ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT	5	-	1.613
INDUSTRIAL MANAGEMENT & DATA SYSTEMS	5	B1	2.948

This is a widespread theme among the various types of publications, since the 177 documents are published in 94 different sources. Table 3 highlights information about the journals that published at least 5 articles of the selected sample, thus serving as reference for researches.

The number of documents published between January 2008 and October 2018 is illustrated in Figure 1, allowing to identify an expected trend towards an increasing volume of academic documents regarding critical success factors as an integral part of risk management.

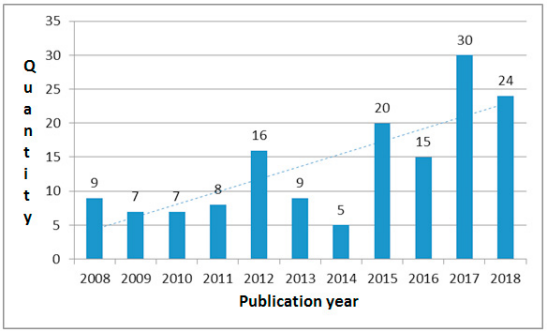


Fig 1. Distribution of documents published between 2008 and 2018

It is possible to note that from 2008 to 2011 the number of annual publications remained practically constant. There was a significant increase in 2012, three years after the publication of ISO 31000: 2009 - Risk Management, possibly articles from Master's dissertations or PhD theses. In the biennium 2013-2014, there was a significant drop in the quality of the product and, after 2015, after the publication of ISO 9001: 2015 - Quality Management (where the main change was the mentality based on risk management), there was an increase in the quantity of articles published on the subject.

From 2008 to 2017 the number of publications more than tripled, which characterizes the real academic interest on the subject. Finally, the 54 publications in the biennium 2017 - 2018 represent 30.5% of the sample in question, demonstrating solid research on the subject in the literature.

In order to identify which documents of the sample were most influential in the literature, Table 4 was developed to illustrate the five most cited documents during the period considered.

Table 4. Most cited documents.

Authors	Title	Journal	Year	Citation	Average
Osei-Kyei R., Chan A.P.C.	Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013	International Journal of Project Management	2015	74	24,67
Meng, Xianhai	The effect of relationship management on project performance in construction	International Journal Of Project Management	2012	108	18,00
Hwang, Bon-Gang; Zhao, Xianbo; Gay, Mindy Jiang Shu	Public private partnership projects in Singapore: Factors, critical risks and preferred risk allocation from the perspective of contractors	International Journal Of Project Management	2013	62	12,40
Ke, Weiling; Wei, Kwok Kee	Organizational culture and leadership in ERP implementation	Decision Support Systems	2008	114	11,40
Chou, Jui-Sheng; Pramudawardhani, Dinar	Cross-country comparisons of key drivers, critical success factors and risk allocation for public-private partnership projects	International Journal Of Project Management	2015	30	10,00

First, it is interesting to note that four of them were published in the second periodical highlighted in Table 3 (International Journal of Project Management), emphasizing that there is a direct relationship between the number of documents published by the journal and the number of citations per document. Subsequently, it is possible to verify, through the specificity of the journals of the most cited documents, that the researched topic permeates several areas of knowledge, being therefore a multidisciplinary subject.

The descriptive analysis of the dataset allowed us to identify and understand how critical success factors were discussed in academic research on risk management with the advent of ISO 31000:2018, showing that it is recent topic that is attracting the interest of researchers in such areas.

4.2 Content analysis

Content analysis is a technique of textual analysis through the codification of information, aiming to analyze the content of documents in a systematic, objective and reliable way [21]. Therefore, the analysis developed in this article categorized studies into themes related to critical success factors, ISO 31000:2018 and its application in risk management processes. As a result, three main categories were identified, namely: performance management, the pertinence of public-private partnership and the influence of enterprise resource planning.

Performance management

According to Otley (1999), the word performance was initially used as the evaluation of the yield of machinery and equipment of the industries; however, with the evolution of research and new applications, its most common definition is the application of human resources in search of organizational development [23].

Thus, performance management can be considered as a managerial practice aimed at improving the organization's results [24]. It should be understood as a process that brings together the activities related to the planning and monitoring of workers' performance, encompassing the strategic, administrative and developmental scopes [25].

Performance management has the purpose of recognizing the critical factors that may hinder its achievement, such as: delegation of tasks incompatible with employee qualification, lack of integration among the sectors of the organization and lack of definition of corporate governance [26]. However, in addition to defining the general ideas of performance expected by the institutions, performance management has the function of identifying the factors that jeopardize its execution [27]. Although these factors are present in the literature, there is a need to relate them to the critical success factors for risk management, since both issues are related to the strategic objectives of organizations.

The research conducted by Almarri and Boussabane (2017) aimed to investigate which FCS are good performance indicators in Public-Private Partnership (PPP) projects. The results demonstrated that the technical feasibility of the project, social support and the evaluation of the local financial market contribute significantly to the performance over time. The cost / benefit assessment contributed significantly to the quality performance. Finally, adequate risk allocation and multiple benefit objectives of all stakeholders were considered to be significant indicators of service performance.

Akhtar and Sushil (2018) present a survey that addresses implementation aspects and critical success factors to performance management. According to the authors, globalization and modernization created an uncertain business environment with associated risks, which required the incorporation of various types of performance, such as strategic, technical and operational.

For this, they proposed a business performance management system model that incorporates critical success factors and implementation aspects. We have identified factors that affect the model's effectiveness based on research in an Indian oil industry, namely: strategy planning, implementation of information systems, learning and performance feedback. They conclude that such factors need to be in the proposed model so that business uncertainties are minimized.

The pertinence of Public-Private Partnership (PPP)

Public - Private Partnerships (PPPs) are cooperative institutional arrangements between public and private sector actors [30]. The concept of PPPs is supported by a desire of the government to solve financial constraints in the provision of public services, using private management skills to increase the efficiency, effectiveness and quality of service delivery [31]. The idea is for the private entity to offer a certain asset and be rewarded financially for performance, exposing itself to insignificant risks and having administrative responsibilities.

Academic research demonstrates cases of success and failure with respect to PPPs. The fact that there is no consensus on the efficiency of PPPs fosters in the academic environment uncertainties about the essential peculiarities that this type of partnership should have [32]. Such uncertainties stimulate the development of research on the risks that private enterprise is subject to in signing this partnership, the real characterization of public services [33] and the regulation to which the actors of these agreements [34].

Osei-Kyei and Chan (2017) explore in their study the factors that contribute to the successful management of PPP projects. They conducted a quantitative survey conducted with PPP experts selected from the private, public, and academic sectors. The results of the research show that the three groups consider as the most important FCS an efficient and structured payment mechanism. However, each stakeholder group considers an FCS to be the second most important. Private sector experts consider effective operational risk management; the public sector, open and constant communication between stakeholders and academics, a structured legal dispute resolution mechanism.

Ullah and Thaheem (2018) looked at how academia and industry perceive and evaluate the critical success factors (FCS) of granting PPPs. Both sectors highlighted inadequate allocation of resources and misguided decision-

making. The authors conclude that there is a need to develop a policy structure that assists top management in decision making and highlights the need for effective management of resources by PPP actors.

It is also necessary to consider the study developed by Du et al (2018) that discusses the impact that the distribution of profits has on PPP projects. The influence of the private sector on the distribution of profits from PPP projects can not be ignored because the private sector is the PPP project implementer and responsible for the life cycle performance and PPP project management. Thus, the research aimed to investigate the factors that influence the distribution of PPP project profits from the private sector perspective and to analyze the relationship between the factors and the distribution of profits.

Enterprise Resource Planning

The Enterprise Resource Planning (ERP) systems are systems that aim to coordinate the information that relates to the operational, administrative and management processes present in the organizations [38]. Through integrated resource management, automated process mapping, and continuous improvement of information flow, they collaborate to make institutions effective [39].

The adoption of the ERP by the organizations is due to the fact that they are dissatisfied with the use of several isolated systems, require information in a short period of time, increase the competitive advantage among the competitors and require a tool to support decision making [40]. These demands directly reflect the success of organizations, as they act directly in their business structure and increase communication and responsiveness to stakeholders [41]. However, because it is a complex system and information is centralized in the same database, the integration and flow of all information is a challenge to be faced by the ERP [42]. On the one hand, this necessary capillarity throughout the organization is advantageous, since it integrates the main management functions of the company, on the other hand it requires that the ERP be an agile, reliable and uninterrupted operations platform [43].

Chugh et al. (2017) conducted a paper to explore and document the lessons learned in ERP system implementations, since many failed globally and resulted in millions of dollars wasted. Through a unique case study at an Australian natural resources firm, researchers categorized the risks of failure into four categories: people, strategy, technology, and management. They concluded that if organizations make efforts in these four areas, the chances of success of an implementation will increase. However, they suggested expanding the type of research to other sectors, in order to mitigate possible biases.

The research carried out by Reitsma and Hilletofth (2018) was aimed at evaluating the FCS to implement an ERP system from the perspective of the user. After reviewing the literature, the authors collected the data through a questionnaire and later classified the FSC in order of importance, namely: project team, technical possibilities, strategic decision making, training and education, minimal personalization, test software and performance measurement.

5. Conclusion

In order to address the literature gap concerning the interdisciplinary aspects of of risk management and critical success factors, the present research aimed to review, analyze and identify the insertion of the study on CSF in scientific productions focused on the ISO 31000: 2018 Risk Management standard, which would be incorporated into the organization's system.

A bibliometric analysis composed of a descriptive and content analysis was used as method to address the research aim. The articles were extracted from the Web of Science Core Collection and Scopus databases. The final sample that served as the basis for the descriptive and content analysis was composed of 177 documents published between 2008 and 2018, that is, the last 10 years before the publication of ISO 31000:2018.

In the first part of this research, a descriptive analysis was carried out to obtain an overview about the relationship between ISO 31000:2018, risk management and critical success factors themes in the literature. It has been found that the subject is widespread in 94 academic journals, showing that there are fields for research and publications. The association of critical success factors in scientific productions on risk management appeared as a topic for discussion with promising perspectives given interdisciplinary and growing interest, since between the years 2012 and 2017-2018 the number of documents published more than tripled, confirming a growth trend.

Another relevant aspect was the relationship with other areas of knowledge, a characteristic highlighted by the subjects discussed in the most cited documents of the sample. In the final part of the research, the review mapped the main topics discussed in the academic literature after the critical success factors of risk management with the advent of ISO 31000:2018. When categorizing the studies, three thematic areas became evident regarding critical success factors and its application in risk management processes, namely: performance management, the pertinence of public-private partnership and the influence of Enterprise Resource Planning.

Based on the findings and conclusions, it can be argued that the field would benefit from further research on topics concerning ISO 31000: 2018 and quality management. In addition, students and researchers need to do more research and publications on the relationship between risk and performance management. Moreover, it would be interesting to analyze how managers are dealing with the advent of public-private partnership and how the Enterprise Resource Planning can contribute to the achievement of their strategic objectives.

Despite of the findings uncovered, this article has some limitations regarding its method and nature. For instance, this is only an exploratory study, in which the descriptive analyzes of the documents are of subjectivity by nature. Given the limitation presented, further research is suggested to continue the conversation regard the topic. For instance, in addition to applying a quantitative methodology, we suggest to explore the shared role of ISO 31000:2018 and its application from different perspectives.

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