Review: Change management model to consolidate the success of information technology (IT) projects in higher education institutions (HEI)

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Abstract. With the objective of referencing the relevant aspects for the elaboration of a change management model, an investigation was made focused on the revision of bibliographic databases related to the processing of technology and information projects; The researchers sought to know the success factors of this type of projects and how they affect the transition process of the companies. The construction of the reference frame is sectioned by the following compilations: The historical, the conceptual, the contextual, the theories and the legal, and its development makes it possible to clarify the conceptions of other works that glimpse the subject in a practical and enlightened way; It also provides access to information for the good pleasure of other researchers and positions the project in a general framework of science, technique and technology. The contents of this article detail the important aspects of the study.

1. Introduction
In the present, university contexts are impacted by the appropriation and use of information technology (IT); the construction of new scenarios is directly related to the breadth and variety offered by this type of technologies; However, in some environments it is denoted the implementation of IT as an activity that demands a considerable consumption of resources, that could be counterproductive or being in favor of the competitiveness of the organizations [1]. Today every company belonging to the global business system is linked proportionately to the knowledge society, which proposes an interrelation between knowledge management, science, technology and innovation, and plays a central role in the strategic planning of every organization [2]. Organizations should take advantage of knowledge management as a fundamental aspect of change management programs, as a new and inevitable idea for business management; The change management is considered a doctrine not fully consolidated but necessary for the continuous improvement of the processes; change management is determined, such as the program that applies driving ideas, travel or navigation in the development schedule of the process; being for this research, the regency that is stipulated in the IT projects that significantly impact the organizational processes [1]. According to [3] the leaders of some organizations have expressed that business processes are significantly affected by the introduction of new IT; what makes it necessary to establish tools that allow transitions in a controlled and organized manner.

Nowadays, the digitalization of processes has overcome the treatment of stockholders, generating an organizational transformation that demonstrates processes with intangible characterizations [4]. There is evidence of IT implementation that does not meet the requirements of the client or IT little
Some IT projects have not been successful because the projects have not generated the desired impact, being the product of inadequate management of changes in IT projects. Although there are methods for managing change in IT projects, the authors of other investigations determine that there is no clear focus [4]; [5] mentions "Some IT projects have not been successful because the projects have not generated the desired impact", being the product of inadequate management of changes in IT projects. On the other hand, researchers from Spain warn the importance of identifying and analyzing the factors associated with the intensive use of information and communication technologies (ICT), this in order to better appropriate this type of technologies [6]. From Chile, some critics recommend that the implementation of IT must be accompanied by a knowledge management program, being that the changes are related to the use of new information technologies; they also mentioned that in the environments of Chilean companies, it is necessary to address organizational change under a model or methodology that allows to measure their efficiency and effectiveness [7].

The companies vary considerably in their ability to assimilate, integrate and generate added value through technology, it is important to implement strategies that help stakeholders understand the importance of using IT; those interested should differentiate the processes of adoption of a technology and its implementation, thus achieving the successful development of IT projects [7]. In Colombia, the higher education institutions (HEI) of Norte de Santander such as: Francisco de Paula Santander University (Cúcuta and Ocaña section), The University of Pamplona, among others, are exhibited as organizations that constantly strive to improve the capacity of their processes. In [8] investigated those characteristics in HEI specifically on the needs, coverage and complexity of the environment, the user and technology with the perspective of processes, people, roles and services, identifying the need for establish relevant methods of service management that involve, among other aspects, the management of change and knowledge.

2. Methodology
For the development of the research it is relevant to define a research model, the researchers chose to use the descriptive methodology, supported by the method of analysis, the descriptive methodology seeks to characterize the object of Study, pointing out their attributes and properties [9].

2.1. Structuring the results for further analysis and discussion
The researchers focused on conducting a review of the historical scenario of change management regional, national and international background, also selecting appropriate concepts for the development of the model, these concepts are framed under the previous choice of theory related to the subject of study; For the researchers it was essential to contextually frame the research, as well as to consider some regulatory aspects belonging to IT management.

3. Analysis and discussion
As results of this review, the researchers state the following:

3.1. Historical scene

3.1.1. International Background. The project called: "IT risk management framework for business continuity by analysis of information System Change", developed by experts in Japan, focuses its investigative aspects on knowing how to mitigate IT risks and how to ensure business continuity. They point out that today organizations manage large volumes of information and the information system changes create IT risks that in some cases are inherent. The researchers of this thesis propose to focus on a risk management framework through analysis of change that allows to reduce the possible risks [10].

The project titled: "Integrating IT management standards by MIN-ITs", focuses its efforts towards structuring an integrated framework of IT management standards. This framework aims to create a
process reference model based on the processes (ISO/IEC 15504-5, ISO/IEC 20000-4 and ISO/IEC 27002), as well as an integrated management system aligned with the requirements of the management systems. Proposed by ISO 9001, ISO/IEC 20000-1 and ISO/IEC 27001; Researchers consider implementing it as a fundamental support in managing organizational change, since IT is one of the components that have transformed the ways of business [11].

3.1.2. National antecedents. About the national antecedents, it should be mentioned that the Colombian State has been promoting practices for the elaboration of a new model for the management of IT, this in order to maximize the benefits and provide better services to people and institutions in a more efficient and transparent way [12].

The project called: "Government and IT management in public entities", proposes to align IT management in the Colombian State towards international dynamics of access, use and appropriation of IT for the socio-productive development of territories and regions. In the environments of the different public entities, methodologies, practices, models and tools for managing resources are being proposed and adopted; The project suggests that it is necessary to understand the differences and relations between government and IT management and the roles played by the actors of public entities, as a basis for the optimal use of the technological resources and activity needed for the transformations [13].

The project entitled, "IT Management in the garment sector of Medellin, Colombia", presents a series of considerable aspects that facilitate change in the framework of IT management. The following are: The knowledge of the strategy allows to maintain the coherence in the activities, regarding the variables culture and government; from the variables strategy, culture and government; the coordinators constitute a channel of natural and effective communication with the group of analysts, the level of leadership and management; analysts have a high level of training and experience. Besides, the researchers of the thesis point out that there are other aspects that hinder change such as: the supply difficulties towards the attention of a request, the bad estimation of time, the loss of agility towards an answer, the lack of alignment towards a change policy [14].

3.1.3. Local history. An investigation called "A good practice approach of IT corporate governance" is published, which is emphasized in planning strategies for the information technologies management in companies of different sectors of the municipality of Ocaña, Norte de Santander, this thesis proposes the structuring of a model of corporate governance based on the principles of responsibility, strategy, acquisition, performance, conformity and human behavior; The above aims to mitigate IT risks generated by the different transformations of the business model, directly to those types of transformations aligned with the use of IT [15].

The investigation called: "Consolidation of institutional indicators using Data Warehouse", it emphasizes the importance of establishing sources of information to be consulted later. It is described that the use of IT is essential, for loading, transporting and transforming data; the primary source of information consultation comes from its information systems and that a remaining 30%, is facilitated by other technological resources or physical records; the author of the work expresses that the establishment of information sources improves the construction of indicators; This is essential for the Balanced Scorecard (BSC); for the author it is significant to ensure that the treated data is complete, reliable and available, and describes the relevance of the actors involved in the context of the HEI, focusing on how they should appropriate the role they have in the registration and management of institutional information through the use of IT [16].

According to [17] in the development of IT projects, several aspects related to the change that generate problems are usually presented, which are shown below in Table 1.

3.2. Concepts to consider

Next the researchers teach some fundamental concepts for the development of the model:
change management, it is described as the program established to modify the form transforming and innovating optimally its performance, making it more productive or generating value added to its clients, the change should not affect the quality of the service [18]; process of change, are all the activities that lead the organization to successfully welcome new positions, new technologies and new ways of doing business. The process of change must be effectively managed; it must reorient the organization to reach its objectives, maximize its performance and ensure improvement. [19]; project, is a provisional organization that is conceived to deliver one or more products according to the agreed Business Case [20]; resource management, estimation process and allocation of sufficient and necessary resources, works as a supply of services and satisfies the needs of the customer [20]; the life cycle, is defined as the phases that point the start and end of an IT project. The life cycle for an IT project is composed of successive phases such as: initial phase (ideas and concepts), intermediate phases (Organization and development) and final phase (delivery and completion) [21]; IT services, are functions or benefits that organizations play and are supported by the use of information and communications technologies [22]; good practices, allow you to tackle management in a simple and quick manner, proposing the basic requirements of it [23]; the government, guarantees the evaluation of the needs, conditions and options of the stakeholders, focuses on achieving the corporate goals in an agreed and balanced way; It establishes the direction through prioritization and decision-making[24]; management, focuses on planning, building, executing and controlling management-aligned activities, which are established by the governing body to achieve corporate goals [24]; knowledge management, focuses on facilitating and managing knowledge-related activities such as creation, capture, transformation and use. Its importance lies in the use of knowledge as an instrument of planning, implementation, operation and management activities [24]; IT ,it refers to those elements that help to improve people's quality of life, these technological means allow access to information and in turn, through practice, allow it to be transformed into knowledge [25]; risk management, risk is the likelihood of an unexpected loss, the risk management concepts allude to the program or plan to mitigate and control risks [25].

| Number | Issues |
|--------|--------|
| 1.     | Corruption of the scope and the difficulty of learning to estimate |
| 2.     | Lack of communication |
| 3.     | Inadequate support of the stakeholders and, in particular, the sponsor of the project |
| 4.     | Department management versus project management |
| 5.     | Always try to apply a single methodology |
| 6.     | Finish the project even if it cannot be justified |
| 7.     | Do not review lessons learned from previous projects |
| 8.     | Limited cohesion of project team and absence of management by exception |
| 9.     | Focus excessively on time and cost, neglecting the scheduling of tasks |
| 10.    | Lack of capacity in the project team and poor management of competencies |
| 11.    | Neglecting risk management |

3.3. Contextual limit
This research focuses its efforts in analyzing the context of HEI in the department of Norte de Santander, Colombia; for the researchers it has been important to know the components that constitute them and how their implementation impacts their business model. HEI are public or private organisms that are characterized by promoting development in different regions, in Colombia the HEIs work so that the country is identified as a territory of peace, prosperous with a society where it primes equality; its inhabitants enjoy the same rights and opportunities, peacefully coexist and have the conditions that allow their formation [26].

The missionary processes of HEI, such as the academic, research and extension, allow them to consolidate as agents of development [26]; During the course of the investigation, the activities will focus on the study of the progress in these processes, directly regarding the introduction and use of it;
For this, the research will deepen in relevant aspects of administration in expert areas of IT governance. The IT use give to the business sector new ways in the provision of its services, and everything seems to indicate that its paradigms have become tendency [27]. In the Table 2, the public HEIs of Norte de Santander are listed.

| Institution | Number of processes | Source |
|-------------|---------------------|--------|
| Universidad de Pamplona, Pamplona | 20 | process map - Integrated Management System |
| UFPS Cúcuta | 16 | process map - Integrated Management System |
| UFPS Ocaña | 14 | process map - Integrated Management System |

According to the Ranking Web of Universities (2018), public institutions of higher education in Norte de Santander is ranked between 288 HEIs at the national level and 11998 worldwide, as described in Table 3 taught below.

| National Number | International Number | Higher education institutions | Presence | Impact | Opening | Excellence |
|-----------------|----------------------|-------------------------------|----------|--------|---------|------------|
| 36              | 4151                 | Universidad de Pamplona       | 3110     | 7943   | 2583    | 4440       |
| 57              | 5011                 | UFPS Cúcuta                   | 3924     | 9172   | 4665    | 4875       |
| 106             | 9209                 | UFPS Ocaña                    | 5794     | 11382  | 6879    | 5984       |

According to the "center of Change Theory" talking about change is referring

3.4. Estimated theories

The theory of change emerges from the field of program theory and evaluation at the end of the 20th century in the 1990s, Carol Weiss, Austin and Bartunek made the term "theory of change" popular. This theory is based on the analysis of a situation that needs to be changed, considering achieving an effective change. Its perspective is part of the understanding and intervention of a vision of success and identifies a set of primary, secondary and tertiary outcomes, among others; that allow to achieve the desired change [28]. According to the "center of Change Theory" talking about change is referring
to a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It focuses on mapping or "perfecting" what has been described as the "lost medium" between the program and initiative of change (Center for Theory of Change).

IT governance, it is framed in two fundamental aspects: the governance and IT management, this specialty is broken down from the discipline "Corporate Governance" and focuses on systems corresponding to Information Technologies and the management of its performance [23]. According to [29] “Today a clear distinction is established between government and management. These two disciplines encompass different types of activities, require different organizational structures and serve different purposes”

3.5. Normative and legality

For the development of the research it is important the legal framework around the development of IT projects. The following aspects of regulation are listed in the Table 4.

4. Conclusions

The creation of the referential framework allowed us to characterize some aspects that are relevant to a change management model. Researchers express that, based on the study of different authors, most converge to determine that without the proper management of IT, business processes are seen affected, that the governance of IT directly affects corporate governance; they also state that the public HEIs of Norte de Santander are advancing in best practices for the proper management of their business model. At present it is indisputable that IT is a transmissive, active and interactive means of data, the management and use of information through IT should be subject to national and international regulations, for which it is important that the management model of the change consider the legal actions indicated for any IT project. On the other hand, theories such as the governance of IT and the theory of change, according to the researchers are the ones indicated to generate scientific force to the thesis, since IT governance proposes the appropriate strategies about the implementation and use of IT, and the theory of change dimensions the aspects of change such as: speed, imperatives, nature and the process.

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