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Workforce agility: how to management knowledge and innovation in a remote work environment

ABSTRACT

The current pandemic context has highlighted the importance of telework in companies. Associated with administrative work, telework can also be applied to several other areas, namely innovation. This is a little explored topic. Through a quantitative study, by means of a questionnaire survey to a sample of 115 individuals, we analyzed the causality relationship of the variables according to the conceptual model elaborated, and tested using structural equations. Thus, the results confirm the importance knowledge management process in a teleworking environment, and how these constructs, individually and together, influence organizational innovation. It was also found the mediating effect on the stages of the knowledge management process (knowledge acquisition, exploration and sharing). The results also reveal that organizational culture promotes communication and union, so that all other practices are successful in a business context, and how telework is effectively a practice with a growing trend over time.

Keywords: Teleworking, Knowledge Management, Innovation; Organizational culture

1 INTRODUCTION

The innovation in organizations is recognized by Shumpeter as being determinant to generate competitiveness, and allows the consolidation of companies inserted in various markets, since the current society of innovation is perceived as a form of knowledge and job opportunities (Schumpeter, 1934). Knowledge is directly related to innovation since this intangible asset is a support for the economic growth and welfare of organizations (Arias, 2019).

It is through the constant improvement and innovation of production processes and products that the competitive advantage is achieved. Thus, knowledge emerges as an

organizational resource to the company that leads to the development of improvement and innovation activities (Grant R. , 1996; Torugsa & O'Donohue, 2016). Knowledge being a "(...) combination of experiences, intuitions, judgments, values and beliefs that acts as a system that evolves and changes when it interacts with the environment in which it is involved", in the words of Nonaka and Takeuchi (1995) then this knowledge needs to be managed by the company when inserted in this context (Cuellar & Aguilar, 2012).

Knowledge Management (KM) emerges as a continuous process of acquisition, storage, distribution and use of knowledge, as quoted by Chen, Huang, Siao and Gonzalez, Martins (2010; 2014; quoted by Gonzalez, Martins & Melo, 2018).

Since Telework is a current reality, the importance of Information and Communication Technologies (ICT) rises. These promote a link of knowledge transfer, diminish the existing obstacles in relation to communication, promote the interaction between individuals and the management of knowledge that benefits the relationships in organizations (Fernandes & Abreu, 2014).

The literature already has in mind the study of the relationship between Knowledge Management and innovation, but it suffers from gaps regarding the clarification of this theme, added to the component of telework, and regarding the role of variables. In this context, the need arises based on this theme to analyze the relationship of Knowledge Management, in the context of telework, and how this influences the innovation of organizations. Since knowledge is considered a competitive factor, this leads organizations to make even more use of employees with greater intellectual capital and thus innovate their processes and products. By investing in knowledge intensive, they achieve great results.

In the current context of change, knowledge sharing is essential to gain productivity, time and also encourages the development of new projects (Silva, Pereira, Santos, Jesus, & Toledo, 2019).

In the course of this study, it is our goal to answer several questions: Does knowledge management in the context of telework influence the innovation of organizations? How do the variables of Organizational Culture, Knowledge Acquisition, Knowledge Assimilation, Knowledge Exploitation and Knowledge Sharing delimit the innovation of organizations?

The general objective of this research is to find out in the context of telework, how companies generate knowledge and what the impacts are on their innovation.

In this field, and as a specific objective arises the need to apply this study to a random sample, using as variables: Innovation, Telework, Organizational Culture, Knowledge Acquisition, Knowledge Assimilation, Knowledge Exploitation and Knowledge Sharing, which separately influence the innovation of organizations.

In another context, and defining a second specific objective, it is interesting to relate all the variables together and thus perceive the effects with respect to innovation, in the context of teleworking.

2 LITERATURE REVIEW

2.1 Concepts

2.1.1 Teleworking

Since 1950, work has been carried out at a distance, with more predominance between the 1960s and 1970s, since there were conditions for carrying out work at home in functions associated with the textile industry, footwear, packaging tasks and assembly of electrical components. In 1970 the concept of remote work in the context of Information and Communication Technologies (ICT) emerged, with influence on the energy crisis, popularization of use and the reduction of the price of ICT (Rocha & Amador, 2018).

The development of technologies has made possible, over the years, the constant change in terms of man-work relations. Globalization has evidenced a greater and current dependence of the individual in what concerns digital technologies and the fact that everything happens in a short period of time and in a very fast way, as Bauman states (2001; cit. by Araújo, França, Cavalcante, Lima, & Medeiros, 2019), we observe new behaviors of professionals, in a perspective of the labor market, when they have functions interconnected with the sector of information technologies.

Alves (2018) states that developments in the labor market dictate good results to organizations in terms of productivity since, on the workers' side, they perceive real satisfaction at work and, from the employers' point of view, they have higher levels of social responsibility, jointly achieving the objectives influenced by globalization.

Also the emergence of new organizational and management models develop new forms of flexibility in relation to working arrangements, and the employment relationships themselves (Hau & Todescat, 2018).

Thus, a need for redefinition of time and space arises (Estrada, 2014) New ways of working are now available. Thus, the perception of the concept of telework is important, a subject that shows itself to be quite heterogeneous. Thus, telework is defined, according to the International Organization of Telework (ILO) cited in Silva (2018) As the form of work carried out in a distant place from the headquarters of the organization, and which includes a new technology that authorizes the separation and assists the communication.

The possibility of teleworking has its advantages and disadvantages. Both workers and companies themselves have their perspectives, benefits and obstacles as to the execution of this modality. The ILO (2013; cit. by Araújo et al., 2019) refers, as advantages for the worker, to the existence of greater hourly flexibility in professional and personal terms, greater personal satisfaction, benefiting the balance of professional and personal life, since the daily agitation becomes less evident at the level of travel. For the employer, there is greater savings in terms of relocation costs, energy consumption, space rental and material goods, and not only that, there are also studies that reveal lower levels of turnover when companies opt for teleworking.

Society and governments also have advantages with the practice of telework, at the level of traffic flow in cities, excessive energy consumption and pollution levels, are some factors that are diminished with the realization of telework (Hau & Todescat, 2018).

Not enough, there are obstacles with the practice of telework. For the worker it is the case of social isolation, difficulty in balancing professional and personal life, effort at the level of organizational methods and self-discipline. For the employer there may be a lack of regulation, investment in specific technologies for the execution of telework and the vulnerability of data and resources existing in the company. (Hau & Todescat, 2018) even if it becomes equally difficult to control the workers, causing a loss in their integration and bond with the company for which they work (Rocha & Amador, 2018).

Since this modality constitutes a great adaptation on the part of organizations to existing changes, advantages and disadvantages, it can be said that teleworking is beginning to be viewed as a strategy for retaining young workers who are looking for flexibility and also the development of competencies in organizations (Aderaldo, Aderaldo, & Lima, 2017). It should be noted that the perception of the teleworking regime will become more and more a trend and, according to Estrada (2014) This modality is the one that comes closest to the demands of globalization.

2.1.2 Organizational Culture

Change is constantly present in the work context, especially where good adaptation by individuals to each condition can be central to achieving good performance and development of organizations, thus creating a good working environment, paraphrasing (Acar, 2012). Dias (2008; cit. by Malheiros, Wegner, Barcellos, Anklam, & Tontini, 2020) states that these mutations, when constant, also determine transformations in production, practices and routines, as well as beliefs, aspects that make up the so-called organizational culture.

Alverson (2007) compares culture to a slightly cohesive system of symbols and meanings, where social interactions are present, thus articulating the members of a community. Therefore, it is suggested that culture has a set of normative and social expectations that, in turn, dictate the behavior of employees (Hartnell, Ou, & Kinicki, 2011).

The organizational culture is fundamental to perceive the behavior of individuals, their satisfaction, and their commitment in organizations. This is essential to manage and execute new strategies and changes that aim the constant improvement of the organization's performance, as Russo states (2010; cit. by Luís, 2016) , being important to perceive the characteristics of each culture, since companies must be efficient in the context of dynamic and competitive markets.

The evolution of the concept happened with the passing of time, having passed for three moments, according to Barbosa (2002; cit. by Luís, 2016). The first phase, at the beginning of the sixties, where there was the interconnection of the organizational culture with the development of the organization and with the conception of its values, became considered as a tool for the improvement of the companies. Already in the eighties, the organizational culture was presented as being relevant in the economic and entrepreneurial space, with the emergence of new models in organizational theory and strategy. Finally, in the nineties, it started to consider the organizational culture as an intangible asset of organizations, something associated with strategy, with the assumption that leadership would be interconnected with the concept, at the level of its definition, maintenance and internalization (Russo, Tomei, Linhares, & Santos, 2012).

Organizations have different organizational culture models, due to the characteristics that distinguish them linked to the elements that form them, their functioning and existing behavior changes. These elements allow the understanding and interpretation of the generality of the organization in question, passing through all hierarchical levels, allowing the

perception of the changes that may eventually occur in the market and in the people themselves, since the learning process is inserted through the process (Malheiros et al., 2020).

Thus, Freitas (2007) and Hogan and Coote (2014) mention the existence of six elements that allow this perception of the organizations and recognition of each model according to the elements in which they are supported: Values are considered to be a fundamental element for the success of the organization, according to the authors, since it is perceived as the heart of culture. Their good definition allows a good assimilation of them to the workers; The beliefs express the truth transmitted in the company, eliminating any doubt that exists; Rites, rituals and ceremonies are elements that bind individuals, being that rites and rituals constitute the consistent side of the organizational culture and the ceremonies are made special that allow the sharing between members of the organization; Sagas and heroes are based on the history of the company, referring to obstacles and victories achieved; Taboos are elements that have the role of guiding behavior, enabling resistance to change; and finally, the Norms, composing the normative structure of the company, at the level of its operation, such as laws, regulations, among other aspects.

2.1.3 Knowledge Acquisition

Organizations are looking for new ways to restructure themselves, permanently and following the changes in the market due to globalization. Knowledge emerges, in this sense, as a resource that generates competitive advantage for companies that take this path, (Davenport & Prusak, 1998; Foganholo & Kuniyoshi, 2016; Silveira, 2015; Stewart, 1997).

The constant search for knowledge and information in the current Information and Knowledge Society leads people to need to learn more, in a diversified way, due to the existence of a new learning culture (acquisition of knowledge) and, not being enough, the new way of conception and management of knowledge at a cognitive or social level (LLarena, Duarte, & Lira, 2016).

Terra and Gordon (2002; cit. by Correa, Ziviani, & Chinelato, 2017) allude that the people who make up organizations are the main competitive advantage of organizations, a fact associated with the individual knowledge they possess, knowledge that adds value to the organization and, in turn, essential for building organizational knowledge (Cuellar & Aguilar, 2012). Thus, and as Nokata and Takeuchi (1995) They cite, it is through the capabilities of the company in its capture, storage and transmission of new organizational knowledge, that this is built from tacit knowledge, such as beliefs, values and individual experiences, as well as

something informal, in explicit knowledge, i.e. collective, structured, as documents, manuals, i.e. formal.

Nonaka and Takeuchi (1997; cit. by LLarena et al., 2016, p.39) expose that knowledge management is, then, a "(...) ability that a company has to create knowledge, disseminate it in the organization and incorporate it into products, services and systems", where the acquisition of knowledge is the starting point of this process. Zahra and George (2002) They also state that this phase is essential for the operational side of the company.

Since this process is linked to the initiative and importance that the organization gives to employee learning (Silva et al. , 2019), it can be considered a stimulating tool to obtain competitive advantages, when inserted in this organizational context, since the GC can even be considered a tool allied to the promotion and support of the organization's strategies (Gonzalez & Martins, 2017).

Still, and according to Daghfous (2004)The process of knowledge acquisition depends on some factors, such as different levels of investment priorities, capacity to strengthen new connections, the pace of companies in the process of acquiring external knowledge, and the direction of the same in a strategic component.

The capabilities of individuals, especially in Information Technology, allow the organization to achieve better results in terms of knowledge acquisition since individuals have easier and more access to information (Cardoso, Santo, & Frade, 2017). The goal is to take advantage of systems that, in turn, use current knowledge to acquire future knowledge, such as narrate Lin and Lee (2005)Thus, the environment is susceptible to develop its internal and external competencies (Silva et al. , 2019).

2.1.4 Assimilation of Knowledge

Also called Knowledge Storage, this is a phase that dictates the construction of organizational memory, where its poor management can compromise the results of the organization and add costs unnecessarily (Mattos, Silva, Barboza, Dias, & Silva, 2019). This knowledge is held informally in the context of values, norms and beliefs, thus associating itself to the culture and organizational structure (Martins & Meyer, 2012; Corfield & Paton, 2016).

Walsh and Ungson (1991) refer that the organization processes the assimilation of knowledge in five ways. The first form is associated with the fact that the individuals that

make up the organization are based on their individual experiences and direct observations. Another form is associated with culture, since it defines the way people think and feel their problems. The third form is linked to the transformation phase, after the stage of development, selection and analysis of new work tools, with the aim of being socialized in the future. The fourth form concerns the structure, since it stores the set of rules, hierarchies and attributions, aspects that dictate the functional model of the organization. Finally, ecology, because it helps in the sharing phase within the organization.

Lin (2007) It also mentions that the process of knowledge assimilation includes a conversion phase, through the involvement of the company, structuring, storage and combination of knowledge, in order to simplify its future use, by the eventual interested parties.

At this stage of the GC process it is essential to mention the importance given to individuals in their constant ability to retain tacit knowledge, so that later on they may have a greater capacity to store knowledge and, in turn, a greater accumulation of knowledge, as Madsen et al. state. (2003) and Gonzalez et al. (2014).

Not enough, the role of organizations in this phase is super important, especially with regard to their organizational structure and culture as a path for knowledge retention. Grant (1996) It calls the process of institutionalization of knowledge, considering the structure important since it moves part of the knowledge through the existing norms, routines and hierarchies, as cited by Martins, Meyerr and Levy (2012; 2011; quoted by Gonzalez et al., 2017). The importance associated with the culture of the company is linked to the fact that it takes part of the knowledge through values, beliefs and actions, factors that have to be validated by the individuals who make up the organizations and their groups.

Not least, Information Technologies (IT) are also associated with the process of assimilation of knowledge, since they have a support function in this process, and knowledge has an explicit part, susceptible to codification and IT emerge as a database.

Lin, Chang and Tsai (2016; cit. by Mauro et al., 2017) even state that when an organization has greater capacities to assimilate knowledge, these tend to be more dynamic, that is, they acquire a greater ability to examine new opportunities, regardless of their current performance. In the opposite case we have a greater reactive capacity on the part of organizations, where development patterns are not sufficient to advance at the technological level.

2.1.5 Exploration of Knowledge

This stage of the process dictates the use of knowledge through the structuring of information that has already been previously organized and distributed, with the ultimate goal of achieving positive results. It is important that the knowledge be available so that other collaborators can have access to it and use it, either through training provided by the organization, *internet*, manuals, meetings, among other sources (Silva et al. , 2019).

It is our knowledge that the existing knowledge in the company can be used in two ways: exploitative or explorative. According to Cohen and Levinthal (1990) It can be exploited, in a reactive way, since knowledge is an intermediary for decision making or improvement, using the same knowledge base, or it can be exploited, in an innovative way, when the knowledge base is used as the main knowledge for the creation of new knowledge, as mentioned by Cohen and Levinthal, Ganzaroli et al., and Nooteboom et al. (1990; 2016; 2007; cit. by Gonzalez & Martins, 2017).

This difference is due entirely to the strategy that each company adopts, being this reactive or innovative. Magnier-Watanable and Senoo (2008) They state that when a company has a reactive strategy, it tends to use only the existing knowledge in order to make a defined strategy feasible. On the other hand, when there is an innovative strategy in the organization, it uses the explorative model to distinguish itself in terms of competitiveness, whether in the current market or in new markets.

Thus, we verify the existence of two fundamental models for organizational learning: the one that is linked to the company's behavior focused on research, discovery and experimentation, and the one that is characterized by efficiency, implementation, production and selection (Gupta, Smith, & Shalley, 2006; March, 1991). According to March's perspective, organizations that exploit new knowledge have a greater ability to achieve greater variations in performance, while exploitation leads to stability in organizational performance, since there are more variable and long-term returns, rather than in exploration the returns are short-term and more accurate (Gonzalez & Melo, 2018).

These strategies are effectively basic for organizations to maintain competitive advantage (Eisenhardt & Martin, 2000). This requires quite different structures, processes, strategies, as well as capacity and culture, as stated by Holmqvist (2004; cit. by Gonzalez & Melo, 2018).

March (1991) refers to some tensions between exploration and exploitation, as the company's adaptation to the environment can lead to inertia and a reduction in the capacity to appropriate new opportunities, while trying other paths can reduce the speed of improvement of existing skills.

Even so, organizations must be able to balance their strategies, taking into account the same end: competitiveness. The focus on exploitation leads to a closing of horizons that hinders innovation in organizations, and excessive exploitation can lead to a vicious cycle in organizations of constant failure, research and change. Organizations that manage knowledge in a balanced way tend to be more innovative and institutionalize individual learning which, as we saw before, is the basis for creating organizational knowledge (Gonzalez & Melo, 2018).

In short, the success of organizations encompasses the fundamental use of both strategies, so that they can have a competitive advantage over the others, since the combination of these strategies is implied in current affairs with a focus on the organization's dynamic capabilities (Eisenhardt & Martin, 2000).

2.1.6 Knowledge Sharing

This is a process that seeks the sharing of new information, coming from various sources, thus enabling the creation of new knowledge, understanding and information (Van Dijk, Hendriks, & Romo-Leroux, 2016). This process requires, on the part of the organization, the creation of a sharing environment, according to Lee and Yan (2000, p.790; cit. by Gonzalez & Martins, 2017), thus referring: "*The most effective way to disseminate knowledge and best practices is through systematic transfer. This is, to create a knowledge sharing environment [...]*".

The sharing of knowledge and experiences, among people in the company, is considered increasingly important as it promotes integration among individuals, work groups, but also enables the improvement of services provided by organizations, since they increasingly need agility in this transformation of knowledge to generate profitable products and services in the markets where they operate, as noted by Agarwal and Islam (2015; cit. by Curbete, Sartori, & Machado, 2020).

Levine and Prietula (2012) describe four different ways of sharing knowledge. First the self-learning, which concerns the knowledge acquired through reports and manuals that

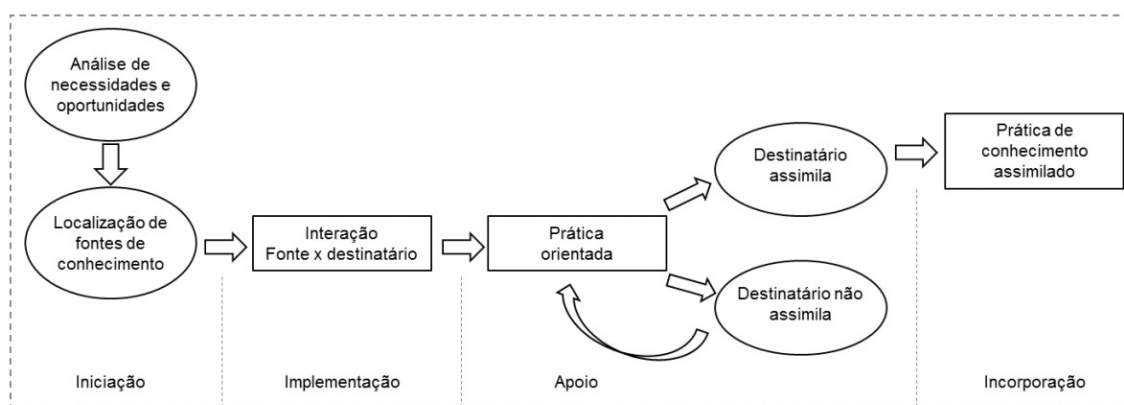
the companies have internally, where it contains in them important information. The exchange of knowledge, *per se*, refers to the daily contact that is established between individuals that enables the sharing of knowledge in a social context. Thirdly, through performative relationships it is possible to transfer specific knowledge of a group, coming from communities of practice, given that there is mastery over a certain knowledge and common language, citing Brown, Duguid (2001) and Wash (1998). Last but not least, the exchanges carried out with other companies, which are associated with the knowledge coming from external environment and that the organization acquires.

It is then verified that the different modes of knowledge sharing are directly associated with their tacit and explicit state, as is the case of self-learning which is based on explicit knowledge and the other modes concern tacit and explicit knowledge (Gonzalez & Martins, 2017).

Davenport and Prusak (1999) allude to the fact that there is a direct relationship regarding people's proximity to the culture of knowledge being transferred in relation to their sharing, i.e., the closer, the easier the sharing process is, even if it depends on the recipient's ability to assimilate and the motivation of individuals to accept new knowledge, so that the latter aspect will eventually provide passive behaviour when using and implementing the knowledge that was once received (Tonet & Paz, 2006).

Tonet and Peace (2006) have made known a model of knowledge sharing (*see* Figure 1), which aims to understand how knowledge sharing is carried out in a working context, with the focus on improving results. Thus, the context base is the organization's own and has as assumptions the following: companies have two processes, that of importing resources and raw materials to the environment, and the acquisition of information obtained in internal and external environment; there are three systems that satisfy the communication needs in knowledge sharing, being them the operational communication system, the communication regulatory system and the *feedback* system associated to people or communication channels; there is the possibility that communication in the organization may be hindered by individual and interpersonal barriers; communication is like a circular and non-linear process, so it needs source, receiver, message and vehicle; the behavior of the source influences the communication process and, in turn, the result.

Figure 1- Knowledge Sharing Model



Source: Tonet and Paz (2006)

In view of the description of this scheme, there are four phases present in this model, from which we can draw some fundamental elements for this process of knowledge sharing; the source of knowledge, who possesses it and the importance given to the mastery of skills with regard to communication; the recipient, who needs the knowledge and the person who also needs abilities in the field of communication, since they have to receive the information in the best possible way and be able to incorporate it in the new knowledge; the knowledge, the message in this case that must be understandable, valid and useful; and, finally, the environment in which the sharing of knowledge takes place, with great influence on the process.

In short, it is important to perceive the relevance of the source and the receiver for good communication and, consequently, its result, using different types of communication, as Barreto (1998; cit. by Arias, 2019), whether oral, written or electronic. Any obstacles present in the organizations, such as lack of confidence, lack of time to meet with colleagues, inability to absorb information and knowledge from the recipient and even the belief that knowledge is only created by the managers, are aspects that lead to the rupture of the process and, in turn, the loss of results of the organizations concerned, therefore, loss of competitiveness.

2.1.7 Innovation

Schumpeter, the main author who defends innovation, says that this is a way to generate competitiveness, in business environment, and that it generates new and better products. Not being enough, it can configure the consolidation among the organizations present in the several markets, given that the innovation society of today is seen as a form of knowledge and market opportunities. (Schumpeter, 1934).

Shumpeter defines this concept as "(...) the introduction of a new product or an improvement to an existing product, the introduction of a new production method or improvement to an existing method and the opening of a new market (...)" (Davila, Varvakis, & North, 2019, p. 240). All these definitions lead to the same destination: a new economic environment, as for companies to be competitive in globalized markets, they need to be increasingly innovative (Arias, 2019).

In order for organizations to have sustainable *performances*, the innovation factor links directly to this end, as previously mentioned. The capacity of organizations to manage their innovations depends on several aspects, among them the acquisition of new knowledge, that is, the absorption capacity, as Cohen and Levinthal (1990) mention, as being at the level of technology, market and regulation. By acquiring new knowledge, the objective is to add value to the organization through new knowledge bases and, thus, use them in favor of an improvement of products and processes or even of application for new goods and methods. Another way is related to the ability to develop and operate the set of habits indispensable to manage innovation, that is, the knowledge about the innovation process itself (Davila et al., 2019).

Thus, the literature considers innovation to be a disruptive process since the traditional ways of performing tasks, processes, products, are discontinued in order to proceed with new methods of work organization or even associated with management practices (Malerba & Nelson, 2008).

According to the Oslo Manual (2005), innovation must be a continuous process based on international standards so that companies can survive in the markets, having knowledge as support for economic growth and organizational welfare (Arias, 2019). Therefore, organizations that have this ambition increasingly need to act as agents of innovation, being able to add value to each other and share information, strengthening themselves as a group (Bueno, John, Lyra, & Lenzi, 2016).

2.2 Theoretical Framework

2.2.1 Telework and Innovation

This modality of work is increasingly present in organizations, as mentioned above in point 2.1.1. The influence of globalization and ICT has allowed companies to adopt this

modality of work, although with this practice there are benefits and disadvantages, both for organizations, employees and also for society and governments.

It is clear that research is beginning to increase on the benefits of teleworking for the innovation of organizations. Bae and Kim (2016) and Melo e Silva (2017) affirm that there is an evolution towards teleworking in organizations over the years and the trend is growing. Studies have shown that organizations that have innovative methodologies in their processes are the ones with the greatest teleworking practice. Data from these studies prove that in 1995 there were 8.5 million teleworkers, compared to 2008, that more than 100 million were identified (Coenen & Kok, 2014).

Today, and as a consequence of this growth, telework is considered a relevant instrument for the business innovation strategy, leading to greater efficiency and competitiveness of organizations, adding value to the economy, people (information society), or even the planet (Karia & Asaari, 2016). Or authors also perceive teleworking as an emerging innovation in the provision of services based on telecommunications, information and multimedia technologies, with the aim of connecting teleworkers. This modality has been recognized as an organizational innovation, since it is a way to overcome the problem of scarcity of human resources, lack of facilities, operational and transport costs and also the quality of service (Karia & Asaari, 2016).

Notwithstanding, the company's ability to innovate by teleworking is largely dependent on the technological capacity, the accessibility of the *software* and the availability of information. All these factors add value to the company, when present in it, and help to its competitive and sustainable advantage (Karia & Asaari, 2016). This way, we put the first hypothesis:

H1 - Telework positively influences Innovation.

2.2.2 Organizational Culture and Innovation

The organizational culture can be seen as one of the determinants of innovation, alluding to Ahmed (1998) It has constituents that reinforce or inhibit it.

Knox (2002) states that the organizational culture supports an innovative organization, since the ability to innovate lies in the skills and attitudes of the individuals who make it up, so by adopting cultural behaviors that promote innovation, organizations inevitably achieve success.

Culture must generate open and autonomous organizations, allowing the creation of flat structures, so that the commitment of workers can be triggered and individual skills and knowledge promoted. There is also the thought that the existence of knowledge and experience is enough to be innovative, and that changes in the way we work are not necessary. Redefining strategies aimed at innovation and implementing a new culture is the focus to change this reasoning, as Hernandez and Gutiérrez (2010; cit. by Arias, 2019) point out.

Understanding the characteristics of an organization's culture is the main step towards the perception of the best strategies and necessary changes that promote the improvement of an organization's performance, as stated by Russo (2010; quoted by Luís, 2016).

Bessant (2009) mentions some habits that are part of a culture that generate innovation, such as continuous communication, constant updating of strategic objectives, anticipation of trends, multidisciplinary work teams, effective use of resources, organizational planning techniques, constant flows of information and learning at the organizational level.

From another perspective, Zornoza, Alcamí, Ciprés, and Navarro (2003) claim that innovation is born by itself or by conditions imposed by the environment outside the organization. Mancebo (2005) mentions some disadvantages that impact the initiation or improvement of an innovation process, such as low flexibility in the organization, low sources of funding, lack of public policies, failures in the use of technologies and, finally, the existence of human capital without capacities.

Manuel de Oslo (2005) complements, in this follow-up, with several factors, including the type of culture, which provide positive or negative results in relation to innovation processes. The development of technical capabilities aimed at reaching more complex markets, the limitation imposed on relations with customers and the organizational capacity to adapt to changes in the market and its reaction to them, are positive aspects. On the other hand, communication failures lead mainly to failure in innovation processes (Arias, 2019).

In short, it is important that organizations consider the management of their workforce, with due recognition of the capabilities and knowledge of each individual according to their functions. Complementing all these factors, it is also fundamental to always remember which sources can generate innovations. Drucker (2002) defends as sources the internal opportunities to the organizations, at the level of change in the market, in the

processes or even unexpected changes, and the external opportunities, alluding to new knowledge, demographic changes and new perspectives of the client.

Thus, an environment conducive and favorable to innovation is always fostered, through the proximity of top management, flexibility, autonomy and also training for employees.

To test the veracity of the facts, we can put the following hypothesis:

H2 - Organizational Culture positively influences Innovation.

2.2.3 Knowledge Acquisition and Innovation

Innovation, in general, is directly related to the effectiveness of the entire Knowledge Management process of the organization, especially when they are technological environments. Nonaka and Takeuchi (1995) and Roman et al. (2012) argue that the competitive advantage of organizations is dependent on the relationship between innovation and knowledge.

Innovation is associated with the interaction between individuals and between organizations, thus fostering the elimination of existing barriers, whether commercial, political or cultural, in addition to producing great capabilities for renewal and overcoming crises through the so-called Knowledge Management (Vasconcelos, Castro, & Brito, 2018).

Thus, and taking into account the existing connection with the Knowledge Management process, it is appropriate to mention that it is from the knowledge acquisition stage that value is generated for the organization (Arias, 2019).

Ikujiro Nonaka defends that "(...) the knowledge-creating company has to do with both ideals and ideas, which helps innovation". (Arias, 2019, p. 43). Organizations see their capabilities and processes improved when they develop new knowledge based on the individual knowledge of each employee and through the experiences common to all, thus fostering new behaviors, citing Jiménez and Sanz (2011) The development of learning, information and knowledge flows between all (Stable, 2011).

Tidd and Bessant (2005) argue that the ability to manage innovations can be improved through the acquisition of knowledge in order to achieve stable business performance. Thus, acquiring new knowledge about technology, market, regulations, will be advantageous to add to the existing knowledge base in the organization and to use it in the process of producing

new goods and services or improving production methods and practices, thus achieving higher levels of innovation.

Regarding technology, this is one of the aspects that drives the company's performance and, in turn, the competitive advantage. Technological skills may bring advantages when acquiring knowledge, since individuals have greater ease in accessing certain information and, thus, this type of skills improves organizational knowledge (Tanriverdi, 2005).

In short, the acquisition of knowledge can be considered as a practice that stimulates the obtaining of competitive advantages, when using systems that use the current knowledge to obtain new knowledge (Lin & Lee, 2005).

In this follow-up, we elaborate the third hypothesis as follows:

H3 - Knowledge Acquisition positively influences Innovation.

2.2.4 Assimilation of Knowledge and Innovation

Cohen and Levinthal (1990) Taking into consideration their view on the subject, they indicate that the organization's ability to assimilate knowledge is related to the ability to recognize the value that external information can have, with the aim of assimilating and applying it in a commercial manner. This whole process leads to the fundamental path for innovation.

The importance of knowledge assimilation is due to the fact that this stage of the process dictates the long-term survival of the organization, when well used by the company. Developing and maintaining this capacity is fundamental since it is here that there is reinforcement, complementarity and reorientation of the already existing knowledge base, citing Lane, Salk and Lyles (2001).

Studies already conducted dictate that the relationship between assimilation of knowledge and innovation dictates the ability of organizations to respond more effectively to environmental changes, as stated by Zahra and George (2002) and Chao et al. (2011) thus accelerating innovation in the organization, from the point of view of Cohen, Levinthal (1990) Fosfuri and Tribó (2008).

This is because the ability of organizations to absorb knowledge is considered to be a major determinant to acquire new knowledge intensive practices through its acquisition and especially through assimilation. It is through the assimilation of knowledge of each

individual, and the good capacity of companies to explore these aspects, that organizations develop organizational knowledge and, in turn, foster competitiveness as a whole, as advocated by Daghfous (2004).

The ability of organizations to absorb knowledge requires of them the ability to exploit information, making the most of the capacity that each individual has to assimilate knowledge. In this way, the competitiveness of organizations depends on the internal communication structure and the external environment of the organization. Communication since it is an element that enhances the sharing of knowledge and skills, and the environment since it is the environment where it is allowed to align capabilities with external information, otherwise the levels of absorption by the organic structure are low (Cohen & Levinthal, 1990).

In order for there to be influence in the conception and sustaining of competitive advantage, Zahra and George (2002) have created a model where the conditions that the capacity of assimilation of knowledge can generate are described, being them the Potential Absorption Capacity (CAP) and Realized Absorption Capacity (CAR). The CAP refers to the organization's receptivity in acquiring and assimilating external knowledge, while the CAR is related to the transformation of the company's exploitation capabilities.

Still in the line of thought of these authors, when organizations have high knowledge capabilities, they transform and exploit CAP, thus achieving a greater probability of becoming competitive through innovation and product development. When they benefit from these same capabilities, they acquire and assimilate CAP, becoming more likely to sustain a competitive advantage (Padilha, et al., 2015).

Both internal and external factors can influence this capacity for knowledge assimilation, affecting innovation equally. As internal factors, Daghfous (2004) refers to the organizational structure, organizational dimension, previous knowledge base and also the organizational responsibility. External factors refer to the external knowledge environment, as companies are not isolated but are competing in various markets, and the position of organizations in knowledge networks.

Thus, it can be seen how this stage has such a high degree of importance, since it is a capacity that is made possible through existing relationships with suppliers, individuals working in the organization itself, customers and other economic agents, relationships that are

fundamental to foster the competitive advantage of the organization, quoting Saenz et al. (2014; cit. by Figueiredo, 2017).

Thus, for the fourth hypothesis and its mediating hypothesis, we have to:

H4 - Knowledge Assimilation positively influences Innovation;

H4a - Knowledge Assimilation measures the relationship between Knowledge Management and Innovation.

2.2.5 Exploration of Knowledge and Innovation

The connection between knowledge exploration and innovation is quite direct. As mentioned in point 2.1.5, when organizations explore new knowledge, they have greater variations in performance, with short-term returns. When they exploit knowledge, it shows stability in the performance of the organization and returns in the long term (Gonzalez & Melo, 2018).

Therefore, innovation can be equally explorative or exploitative, according to the proximity existing with technologies, goods, services and processes (Patterson & Ambrosini, 2015; March, 1991).

It is desirable that there is a balance between the knowledge base already present in the organization (exploitation) and the new knowledge coming from external sources (exploitation), according to the perspective of March and Zack (1991; 2002; cit. by Lucena, Correia, Clemente, Filho, & Popadiuk, 2016). Thus, the innovations present in goods and services require, in the field of knowledge management, certain policies and actions that benefit the so-called processes of exploitation and exploitation, in order to generate and disseminate innovations.

When the organization has the conditions to find a balance between these sources of knowledge, thus taking advantage of skills and exploring new opportunities, in the view of Raisch et al. (2009), there is ambivalence in the use of knowledge. Thus, there is already an organizational capacity to develop new goods and/or services through the improvement of existing ones, in the words of Silveira-Martins and Rossetto (2014).

Depending on the strategy of each organization regarding the way knowledge is used, whether through the present bases or through change, and with the necessary tools to share it, this will result in the competitiveness of the organization and, in turn, in its innovation.

To validate the literature on this topic, we have built the following assumption:

H5 - Knowledge Exploitation positively influences Innovation.

2.2.6 Knowledge Sharing and Innovation

The interconnection of these concepts is quite strong, just like all the previous ones. It is known that the innovation of companies is influenced by the level of knowledge of the individuals who constitute them and, not enough, the sharing of this knowledge, as mentioned by Armbrecht et al. (2001) and Yu et al. (2013).

Given that this is an essential phase to achieve competitive advantage in organizations, and in order to achieve good results, they should stimulate employees through actions that promote knowledge sharing, through commitment to an open scope, involvement of leaders (Cabrera & Cabrera, 2002) and grant autonomy to employees (Srivastava, Bartol, & Locke, 2006).

Wang and Wang (2012) They also mention that the sharing of knowledge enables a reduction in production costs, greater efficiency in project development, innovation capacity and performance of the organization, at the level of increased sales or return on goods and services.

It is from the existing communication between top management and the other levels of the hierarchy that we must promote the creation of a culture of collaboration that facilitates the sharing of knowledge in order to contribute expressively to the improvement of the innovation capabilities of organizations (Le & Law, 2019).

To achieve this capacity, the organization must be able to manage its internal knowledge *stock*, that which is incorporated in different people, leading to the sharing of it through people, in order to establish new routines and mental models (Chen, Huang, & Hsiao, 2010).

This will involve collective learning, through collaboration among employees, combining common experiences and knowledge, skills and different perspectives, having a positive impact on the organization's capacity for innovation, since companies with effective practices of knowledge sharing and cooperation will be more likely to achieve higher levels of innovation (Welchen, Mukendi, & Larentis, 2020).

Thus, the role of knowledge sharing is increasingly important in the creation of innovation in companies since that knowledge that is shared generates more and new ideas, added to the ability to implement processes, goods and services, paraphrasing Ordaz, Cruz and Ginel (2010) leading to better levels of customer satisfaction (Michna, 2018).

Finally, to analyze the truthfulness of the facts exposed, we make the following hypothesis:

H6 - Knowledge Sharing positively influences Innovation.

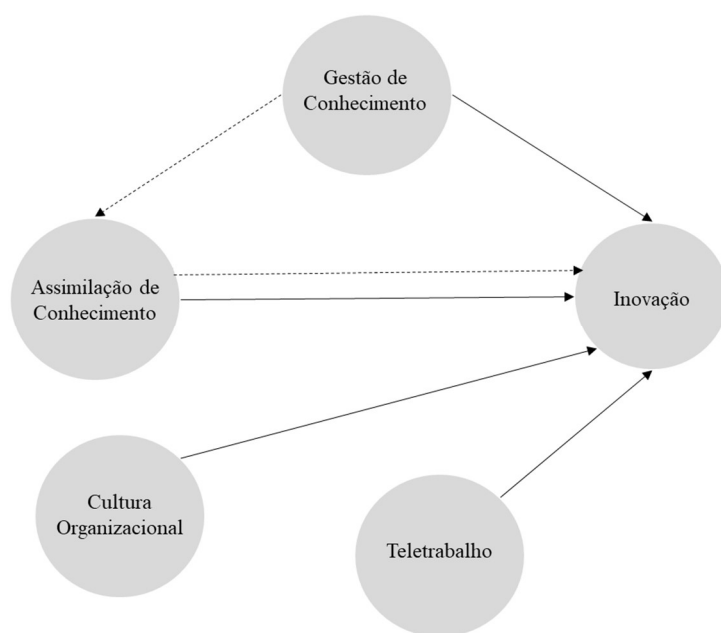
2.3 Concetual Model

As far as the Concetual Model is concerned, and since an experimental study will be addressed in this study, it is based on the following independent variables and dependent variables that we will analyze the whole problem.

To test the hypotheses of this study, it was based on the literature review of the seven variables under analysis: Innovation, Telework, Organizational Culture, Knowledge Acquisition, Knowledge Assimilation, Knowledge Exploitation and Knowledge Sharing.

As the figure below shows, the objective is through the independent variables to analyze their causality relationship and, in the end, to perceive their influence with the dependent variable (Innovation).

Figure 23- Variables Model



Source: Own Elaboration

3 METHODOLOGICAL FRAMEWORK

This section identifies the methodology used, characterizes the participants who contributed to the study and, finally, presents the instrument and procedures that constituted all this analysis.

3.1 Methodology

For the present study, the objective was to use a type of quantitative study, i.e., where the researcher directs his work from a plan established *a priori*, aiming at an objective measurement and quantifying the results, as stated by Godoy (1995; cit. by Proetti, 2017).

An attempt was also made to conduct a correlational investigation which, according to Hill and Hill (2012; quoted by Martins, 2015), makes it possible to verify the existence or otherwise of the correlation of two or more quantifiable variables.

It should also be noted that this study was based on data collected previously, thus being a research of a secondary nature, where the information was once studied by other researchers, in other fields and with other objectives, and that they should be valid, reliable and applicable to the subject in question, citing Robson (2011; quoted by Martins, 2015).

3.2 Participants

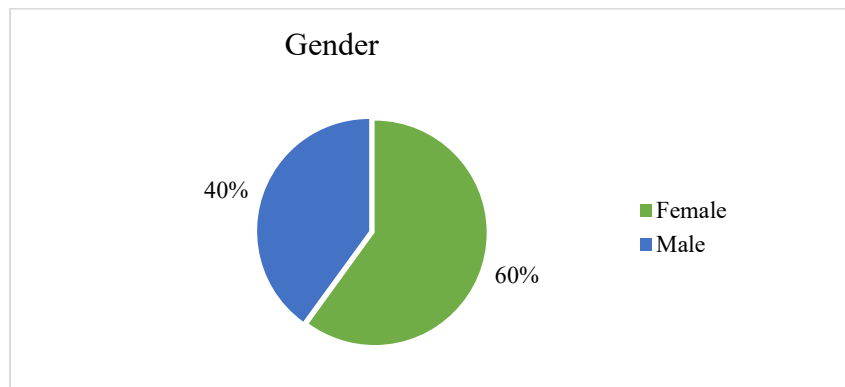
Within the scope of the study, the method chosen for the data collection was the experimental study method, where the objects of study are subjected to the influence of certain variables, with the aim of observing the results that the variable produces in the object of study, under conditions controlled by the environment and the researcher. The statistical method was also used, which has the advantage of determining, in numerical terms, the probability associated with a certain conclusion and the respective associated margin of error.

Thus, the use of two or more methods makes the orientation of the procedures easier, with regard to the good development of research. This phenomenon is called data triangulation.

As far as the participants in this study are concerned, they comprise a probabilistic/random sampling, i.e. the probability is the same for all the elements that make up the sample. It will be a simple random sampling, since all the elements are selected completely at random, and independent, since they have no relation between all the elements that compose the sample.

In this context, the study has a sample of 115 individuals, and it can be seen that 60% of the sample is female, which corresponds to 69 women, and the rest are male (40%; 46 men), *see chart below*.

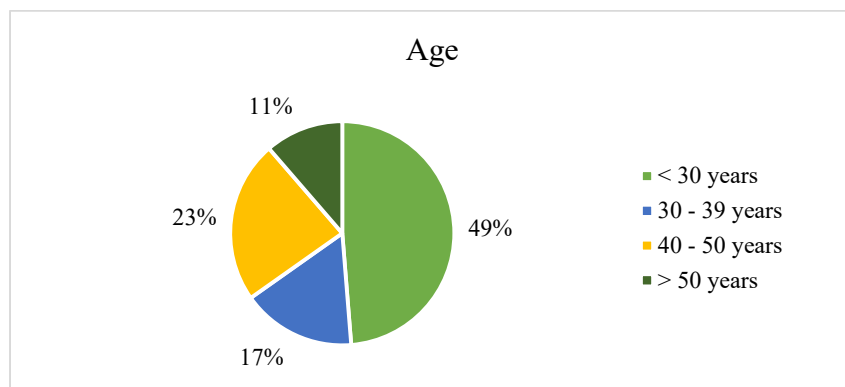
Chart 1- Gender of the sample



Source: Own Elaboration

Regarding the age factor, and as we can see in the chart below, almost half of the sample (49%; 56 respondents) is under 30 years old. With ages between 40-50 years we have a margin of 23%, corresponding to 27 individuals, the second highest percentage. Finally, about 19 individuals are aged between 30-39 years and 13 respondents aged over 50 years, corresponding to 17% and 11% respectively.

Graph 2- Age of the sample

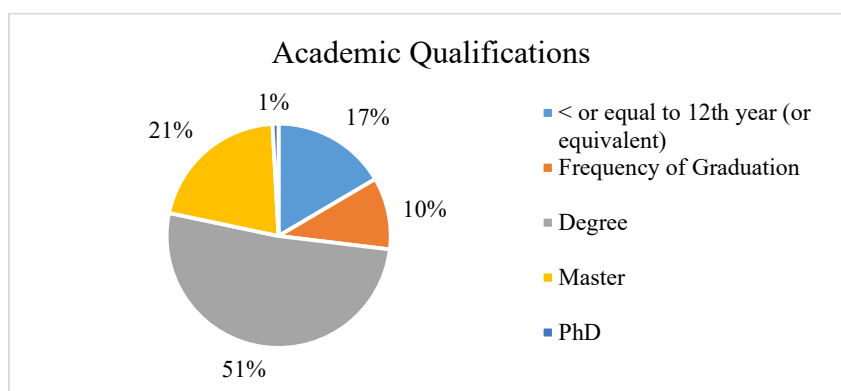


Source: Own Elaboration

Regarding the Respondents' Academic Qualifications, *see Chart 3*, 51% of the sample has a Degree, which refers to 59 respondents, followed by a Master degree with 21% of respondents, more precisely 24 individuals. It should also be noted that 10% of the sample is attending the degree of Licenciatura and 17% of them have only a degree below or equal to

12th grade, and may still include equivalent courses. In the sample it is also possible to verify a respondent with a PhD degree, which corresponds to 1% of the sample.

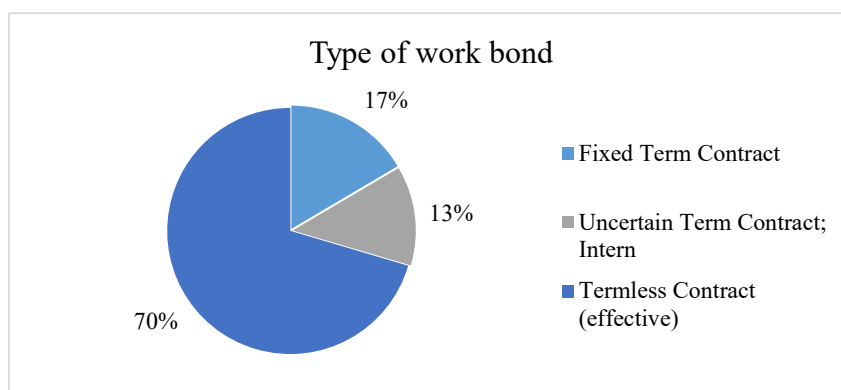
Chart 34- Academic qualifications of the sample



Source: Own Elaboration

Regarding the type of employment relationship that respondents have with their respective employers, it was also important to ask this question in order to know their connection with their organization, thus allowing us to conclude that 70% of the sample has a Termless Contract, corresponding to 81 respondents. Next, with 17% are the percentage of respondents who have a Fixed Term Contract, more precisely 19 individuals, and the remaining 10% have contractual regimes of uncertain character, and may be inserted as trainees in the current organizations where they perform their work (Graph 5).

Graph 5- Type of Sample Labor Link

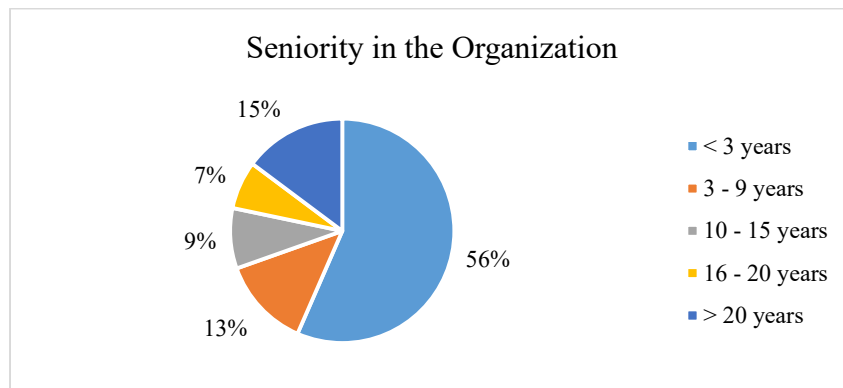


Source: Own Elaboration

Last but not least, the perception of the level of seniority of respondents in their respective organizations. In the Graph 6 can be seen that most of the employees have been working in the current organization for less than 3 years (56% of the sample; 65 respondents), and only 7% of the respondents are inserted in the current employer between 16 and 20 years,

that is, 8 individuals. With years of more than two decades, only 17 people inserted in the sample have this particularity, about 15% of the respondents.

Graph 67- Seniority (in years) of the sample in your organization



Source: Own Elaboration

3.3 Data Collection Tool

The Questionnaire Survey, present in **Erro! A origem da referência não foi encontrada**, was chosen to collect the necessary data for the study in question and in order to analyze all the variables in question. It should be noted that all the answers are anonymous and all the respondents were informed and gave their permission to collect the respective information required in the questionnaire.

As far as the survey is concerned, it is organized in six sections. The first one concerns the socio-demographic data of the sample, so that we can obtain more precise data taking into account variables such as age, gender, educational qualifications and also seniority in the organization, as well as the contractual relationship that the employee has with the company.

In the second section, and according to the Likert Scale defined where 1 says "Totally Disagree" and 7 matches "Totally Agree", it is important to gain all the variables related to Knowledge Management in the organization, which are Knowledge Acquisition, Knowledge Exploitation and Knowledge Sharing. 19 questions were grouped to evaluate these variables, based on *papers* from authors such as McShane (2010)Gonzalez (2017), Oliveira, Maçada and Nodari (2015) that analyzed the measurability of these three variables.

In the third section it is important to specifically evaluate the Knowledge Asylliation, through 7 questions that will be answered based on the Likert Scale, based on the authors Han and Erming (2012) and by Xie, Zou and Qi (2018).

In the fourth section the variable associated with Organizational Culture was grouped through 7 questions and based on the authors Schaufeli and Salanova (2007) This aspect may also influence the other variables mentioned.

The variable concerning Innovation is analysed in the fifth section, and the sample's opinion on this subject can be obtained through 6 questions, based on the author Iddris (2016) under the same scale of evaluation present in all other sections.

In the sixth and last section we get the opinion of the sample regarding the Telework variable, following the idea of the authors Grant, Wallace, Tramontano and Charalampous (2018) The first question to be answered is the Likert Scale, which was set at the beginning.

3.4 Procedures

In order to collect data it was necessary to carry out a questionnaire survey based on the Likert Scale, which was fundamental to analyse the data in a more precise and quantitative way so that a more objective database could be created which would allow a better analysis and discussion of the results.

To carry out this survey by questionnaire, the first phase consisted in conducting a detailed search of scientific articles in databases such as *Be-on*, RCAAP and Google Academic, which had reliable and measurable bases for each variable under study, so that it was possible to extract the questions for each of the variables for insertion into the survey by questionnaire. Afterwards, all the measurable questions were aggregated and already analyzed by the respective authors in the questionnaire, so that we could analyze the respective variables and the relationship among them.

After the survey was designed, it was reviewed by third parties in order to check for spelling mistakes and other faults that might exist. It was then shared through the *Google Forms* platform, and was in circulation between October 12, 2020 and November 4, 2020 in several platforms where the sample could be present - *LinkedIn*, *Facebook*, *Whatsapp* - thus exposing the objective of the study and other information present in the questionnaire, as well as the questions that serve as a purpose for conducting this study. In it were also the contacts through which they could clarify their doubts regarding the questionnaire or other subject related to it.

The information retained from the questionnaires was later inserted and analyzed in the SmartPLS 3 *software*, for a better data management and treatment, in order to achieve the results we aspire to and discuss the respective ones.

4 RESULTS

According to the stipulated objectives, this section concerns the analysis of the collected data related to the dependent variables Telework, Organizational Culture, Knowledge Acquisition, Knowledge Assimilation, Knowledge Exploitation and Knowledge Sharing, which individually influence the independent variable Innovation, also exposed for data analysis purposes. For data analysis purposes, the variables Knowledge Acquisition, Knowledge Exploitation and Knowledge Sharing have been aggregated into one called Knowledge Management.

Thus, through the analysis of data presented, it is our goal to realize if there is an application of this conceptual model in the business context and, in turn, if the dependent variables influence the innovation of organizations, in a teleworking environment.

4.1 Descriptive Statistics

Regarding the test of the conceptual model of the study, a modelling technique of structural equations based on deviations was used, through the SmartPLS3 software. Thus, the Structural Equation Modelling (SEM) and, more specifically, the Partial Least Squares (PLS) were used to generate this analysis (Ringle, Wende, & Becker, 2015).

The process of analysis and interpretation of results followed a two-phase approach. Firstly, the reliability of the measurement model and its validity were evaluated, through the analysis of individual indicators of reliability, convergent validity, reliability of internal consistency and also discriminant validity (Hair, Hult, Ringle, & Sarstedt, 2017). Subsequently, the structural model was evaluated.

Thus, the results exposed standardized factor loads higher than 0.6 (with a minimum value of 0.63 and a maximum of 0.95) of all variables and were all significant for a $p < 0.001$, allowing to verify the reliability of the individual indicator (Hair et al., 2017). The reliability of internal consistency was also confirmed as all *Cronbach* and *composite reliability (CR)* values exceeded 0.7, see Table 1.

Regarding the convergent validity, this was validated for three reasons, which can be seen in Table 1. The first reason is based on the fact that all items were positively and significantly loaded in their constructions. Secondly, because all the constructions had CR values above 0.70. Finally, the *Average Variance Extracted (AVE)* for all constructions exceeded the limit of 0.50 (Bagozzi & Yi, 1988).

Two approaches were used to evaluate the discriminating validity: the Fornell and Larcker criteria, and the hetero-retractmonotrato relationship (HTMT) criterion. The first criterion dictates the requirement that the square root of the EVA of a construction is greater than its greatest correlation with any construction, the root being present on the diagonal with values in bold (Fornell & Larcker, 1981). Thus, and in view of the data analysis, the criterion was satisfied for all the constructions. Regarding the second criterion, its validation requires that all HTMT ratios be below the limit value of 0.85, a requirement that is found in the Table 1 (Hair et al., 2017; Henseler, Ringle, & Sarstedt, 2015). In short, the validation of both criteria dictates additional evidence of discriminant validity.

Table 1- Discriminant validity of the constructs

Latent Variables	Cronbach's Alpha	CR	AVE	1	2	3	4	5
(1) Organizational Culture	0.950	0.959	0.772	0.879	0.742	0.438	0.586	0.534
(2) Innovation	0.934	0.948	0.752	0.703	0.867	0.496	0.774	0.696
(3) Knowledge Management	0.959	0.963	0.582	0.424	0.487	0.763	0.738	0.609
(4) Assimilation of Knowledge	0.898	0.920	0.621	0.549	0.721	0.698	0.788	0.698
(5) Teleworking	0.941	0.946	0.526	0.555	0.712	0.587	0.669	0.726

Source: Own elaboration by SmartPLS3 software

In the Table 2 we can now visualize the structural model, second phase process of analysis and interpretation of results. This model was evaluated using the signal, magnitude and significance of the structural *path coefficients*, as well as a predictive accuracy measure of this model, that is, based on the magnitude of the R² value for each endogenous variable. It was not enough to use the measure of predictive relevance of the model, i.e., the Q² values of Stone-Geisser (Hair et al., 2017).

Table 23- Structural Model

	Path coefficient	Standard Deviation (STDEV)	T Statistics	P Values
Organizational Culture Innovation→	0.360	0.077	4.687	0.000
Knowledge Management Innovation→	-0.138	0.089	1.546	0.123
Knowledge Management Knowledge Assimilation→	0.698	0.077	9.056	0.000
Assimilation of Knowledge Innovation→	0.403	0.095	4.266	0.000
Telework Innovation→	0.323	0.084	3.832	0.000

Source: Own elaboration by SmartPLS3 software

However, prior to the evaluation of the structural model, the collinearity was verified, so that the VIF values ranged from 1.00 to 2.60, so they were below the critical indicative value of 5 (Hair et al., 2017). Thus, the existence of collinearity was not proven.

The coefficient of R2 determination for two endogenous variables of Knowledge and Innovation Assimilation was 48.7% and 70.6% respectively. Thus, the values exceeded the threshold value of 10%. (Falk & Miller, 1992).

Regarding the values Q2, respectively 0.30 for Knowledge Assimilation and 0.51 for Innovation, it was obtained that as these are higher than zero, it indicates the predictive relevance of the model.

On the results of the Table 2, we can see that the Organizational Culture has a significantly positive impact on organizational Innovation ($\beta=0.360$; $p<0.05$) and the Assimilation of Knowledge has exactly the same effect on Innovation ($\beta=0.403$; $p<0.05$). These two results incite the validity of H2 and H4, respectively.

It should be noted that Knowledge Management, which encompasses the three variables Acquisition, Exploration and Sharing of Knowledge as a whole, has a positive impact on Knowledge Assimilation ($\beta=0.698$; $p<0.05$), but as a whole does not influence the Innovation of organizations ($\beta= -0.138$; n.s). Thus, it is concluded that H3, H5 and H6 are refuted by the results.

Regarding the Teleworking variable, it has a significantly positive effect on business innovation ($\beta=0.323$; $p<0.05$), leading to the validation of H1 through the verified results.

After this analysis there were interesting results regarding mediation hypotheses, according to Hair et al. (2017; p.232). For this purpose, a *bootstrapping* procedure was used to test the meaning of the indirect effects through the mediator (Preacher & Hayes, 2008) So we can see the respective results in the Table 4.

Table 45- Results of the effects of mediation

	Original Sample (O)	Standard Deviation (STDEV)	T statistics	P Values
Knowledge Management Assimilation of \rightarrow Knowledge Innovation \rightarrow	0.282	0.083	3.388	0.001

Source: Own elaboration by SmartPLS3 software

Thus, and since we had corroborated the hypotheses 3, 5 and 6, which dictated the positive influence of the variables Acquisition, Exploration and Sharing of Knowledge on organizational innovation, the above results show the existence of an indirect influence of this group of variables, on Innovation, through the Assimilation of Knowledge ($\beta=0.282$; $p<0.05$), thus showing that organizations do not achieve innovation only through the acquisition,

exploration and sharing of knowledge, individually, but through the relationship and mediation of knowledge assimilation, validating Hypothesis 4a.

5 DISCUSSION OF RESULTS

After the analysis of the data through Structural Equation Modelling (SEM) and, more specifically, Partial Least Squares (PLS), we will move on to the discussion of the respective results exposed in the previous section.

It is important to emphasize initially that, according to the perceptions of the individuals who participated in this study, we verified that not all the variables are significant for the innovation of the organizations and we determined effectively direct and indirect links of causality with the innovation variable, results that validate certain theories and others that corroborate others.

Regarding the Hypotheses, the results will be discussed below:

The first hypothesis intended to analyze the relationship of telework with the innovation of organizations. Given the results, it is concluded that the variable influences innovation positively, going according to what Coenen and Kok (2014) Bae and Kim (2016) and Melo e Silva (2017) who have defended and proved in their investigations the evolution of teleworking worldwide, and with the statements of Karia and Asaari (2016) about the growing importance of telework in organizations and how this practice effectively brings positive results, adding value to the economy, people (information society), or even the planet and is also considered as a business innovation strategy, leading to greater efficiency and competitiveness of organizations, and an increasing stimulus on connectivity between all. Thus, the first hypothesis was validated.

Regarding the second hypothesis of the study, which aimed to investigate the influence of organizational culture on business innovation, we found that there are results that validate the assumption, as is the case of the study of Ahmed (1998) He defended the organizational culture as one of the determinants of innovation, since it can reinforce or even inhibit it. It also validates Knox's theory (2002) It states that the support of an innovative organization is a consequence of its organizational culture, since the skills of individuals and their attitudes are the essential pieces to foster the ability to innovate in companies and thus achieve organizational success. These results are also in line with Bessant's (2009) In order to generate innovation in companies, they must take into account the habits of each type of culture. On the other hand, it corroborates the statements of Zornoza et al. (2003) when they say that innovation is born by itself, by factors external to organizations. Thus, and in light of the above, the second hypothesis was confirmed.

However, the third hypothesis that assumed the relationship between knowledge acquisition and innovation was not validated. This study corroborates Nonaka's studies (2007) One of the references of the theory of knowledge creation, which states that it is right at this stage that the organization generates value. There are factors that, when not applied in a business context, do not dictate the good results of the company, as may be the case and as the investigation of Nonaka and Takeuchi (1995) gains, when they emphasize that there are aspects that stimulate or not the acquisition of knowledge. Tidd and Bessant (2005) They also confirm the direct link between the acquisition of knowledge and its influence in generating more and better innovations, a research that contradicts the results exposed in this study. Thus, these results may indicate to us that the organizations are not applying the proper techniques to foster this phase of Knowledge Management, so if there is no such adequate definition, the path of knowledge is not fostered, thus refuting the hypothesis.

With regard to the fourth hypothesis, which analyzes the influence of knowledge assimilation on the innovation of organizations, and in view of the validation of the assumption after the analysis of the results of this study, these are in line with the theories defended by Cohen and Levinthal (1990). The authors related the ability to assimilate knowledge with the ability to recognize the value that external information can effectively have in an organizational context, and how it can lead the way to innovation. The results also validate the theory of Lane et al. (2001) which consider the assimilation of knowledge important for innovation because this is a process that dictates the survival of the organization in the long term, when there is reinforcement, complementarity and reorientation of the already existing knowledge base. The studies of Zahra, George (2002) and Chao, Lin, Cheng and Liao (2011) and Cohen, Levinthal, Fosfuri and Tribó (1990; 2008), since these dictate that when this assumption exists, there is more organizational effectiveness, since individuals acquire new knowledge intensive practices. Thus, given the present theory, the hypothesis is validated.

On the relationship between knowledge exploration and innovation, present in the fifth hypothesis, the results refuted the assumption. The literature review that validates the link between these two constructs, in a direct way, is now invalidated by this study. The results contradict the thesis defended by Gonzalez and Melo (2018) As they have stated a greater variation in performance, with short-term returns when organizations exploit knowledge, but through exploitation, there is greater stability in performance and returns only in the long term. However, the research Raisch et al. (2009) and Silveira-Martins and Rossetto (2014)

may explain this nullity and the cause of it since, and as they state, if there is a balance between the existing knowledge base and the new knowledge coming from the external environment, there will be a greater capacity for innovation, assuming ambidexterity. In this way, the hypothesis is refuted since there are inequalities in the way organizations use knowledge, resulting in bad results for the organization's innovation.

The sixth hypothesis intended to observe the positive influence of knowledge sharing on organizational innovation, but the results of the study saw this assumption refuted. The results of the study contest the theory defended by Wang and Wang (2012) This confirmed the stimulus of knowledge sharing in the organization's capacity for innovation and performance. They also refute the research of Ordaz et al. (2010) which mention the important role of this variable on the creation of innovation in companies since shared knowledge generates new and more ideas, enabling the ability to implement new processes, goods and services. The theory is not on this assumption, and can conclude that organizations are not fostering communication between people, between hierarchies, leading to the existence of a culture of collaboration and, in turn, knowledge sharing, leading to the validation of the theories of Le and Lei (2019) and Cheng et al. (2010) which demonstrate some of the causes for this refutation.

Finally, on the hypothesis that analyzes the effects of mediation, in the case of hypothesis four a), which measures the relationship of the three variables (acquisition, exploration and sharing of knowledge) on innovation, through the variable assimilation of knowledge, this assumption was validated by the present results, and we can denote several interesting aspects. The direct link between each individual variable and the innovation was contested, as already explained above. However, and in line with the theory defended by Daghfous (2004) This leads us to the fact that, in order to acquire new knowledge intensive practices, it is not enough just to acquire knowledge, but above all to assimilate it. And it is this capacity to absorb knowledge, added to the good capacity of companies to exploit it, that shows extremely positive results in terms of competitiveness and organizational innovation. These results also confirm the statements of Cohen and Levinthal (1990), since the assimilation of knowledge requires the ability to exploit information, so communication is an essential part to foster this ability which, in turn, is empowering to generate effective knowledge sharing, otherwise the levels of knowledge absorption are reduced. The results also confirm the model created by Zahra and George (2002) which dictates the capabilities of knowledge assimilation through the acquisition, use and transfer of knowledge. In short, there

is no innovation in organizations if individuals only acquire, exploit or share knowledge. There will be competitiveness and innovative capacity if they assimilate knowledge.

Thus, and in view of the hypotheses placed for the elaboration of this study, their analysis allows us to confirm the importance given to the practice of certain phases of the process of Knowledge Management in a teleworking environment, and how these aspects, individually and together, influence the organizational innovation, some with greater influence than others, as is the case of the role of knowledge assimilation in the remaining stages of the knowledge process (acquisition, exploration and sharing of knowledge). The hypotheses also reveal how fundamental it is for an organization to have a favorable organizational culture, so that all other practices are successful in a business context, and how telework is effectively a practice with a growing tendency over time.

6 CONCLUSION

6.1 Theoretical and practical contributions

The main objective of this study was to analyze the influence of Knowledge Management on the innovation of organizations in the context of telework. Thus, this research aims to gain the impact of independent variables teleworking, organizational culture, knowledge acquisition, knowledge assimilation, knowledge exploration and knowledge sharing, on the independent variable innovation. However, after the test of the model present in this study, not all variables were valid.

The literature defends that organizational knowledge is an asset that generates competitive advantage that leads, in turn, to the development of improvement and innovation activities, as Grant defended (1996) Torugsa and O'Donohue (2016). In this follow-up, knowledge management involving the acquisition, assimilation, exploitation and sharing of knowledge, is important to add value to the organization that manages them. However, contrary to what the literature defends, the different phases of the process have different levels of measurability in relation to innovation.

As far as the acquisition of knowledge is concerned, we have found that the assumption has not been valid with regard to investigations already carried out, i.e. the acquisition of knowledge in itself does not influence organizational innovation, as Nonaka stated (2007).

However, the results that consequently supported the refutation of this variable, can be based on the reasons that Nonaka and Takeuchi (1995) defended, given that there are aspects that stimulate or not the acquisition of knowledge that, in this case, can be justified by the non-applicability of appropriate techniques to foster this initial phase and, in Nonaka's view (2007) The most important phase for the organization to generate value. Tanriverdi (2005) explained the importance of technological skills as fundamental to develop the acquisition of knowledge, since employees have greater ability to access information and thus these skills generate value to improve organizational knowledge. These results may indicate a high dependency in organizations as being the weak investment, the reduced strengthening of connections and, also, the rhythm that exists in organizations regarding the process of external knowledge acquisition and its direction at a strategic level (Daghfous, 2004).

In this follow-up, also described by the literature that there was a direct link between knowledge exploration and innovation, the results contested the opposite. Thus, we verify inequalities in the business context in the way organizations use knowledge, originating, consequently, bad results for the innovation of the organization.

According to the theory of Magnier-Watanable and Senoo (2008) and relating to the data here, we verify a greater adoption of reactive organizational strategies, where only the existing knowledge is used to make a certain strategy viable and, in this way, there is no link with innovation. These results can also be explained by the research of Raisch et al. (2009) and Silveira-Martins and Rossetto (2014). In order to have a greater capacity for innovation, organizations must establish a balance between the existing knowledge base and new knowledge from external sources, which is not verified in this study and, therefore, is not the current practice.

Not being enough, the refutation of this hypothesis may be associated with the fact that the organizations do not make available materials and training in order to foster the knowledge exploitation stage and, in this way, will effectively bring negative impacts (Silva et al., 2019).

The non validity of the influence of knowledge sharing on innovation, contradicts several defended theses that confirmed, until then, the stimulus of this variable in the performance of the organization and the capacity to innovate. Even so, the refutation of this assumption may be related to the absence of use of practices defended by Le and Law (2019) and Cheng et al. (2010) where effectively the sharing of knowledge in organizations can be a stimulus to achieve innovation, provided that the organizations work to promote a culture of sharing among employees, stimulating communication and involvement among individuals and different hierarchical levels, combining distinct experiences, common knowledge, skills and also multiplicity of perspectives, which lead to collective learning and, in turn, the positive impact on innovation.

It may also be related to the lack of effective and efficient practice of the four phases of the knowledge sharing process, defended by Levine and Prietula (2012). These consist of self-learning through internal documentation in the organization, the exchange of knowledge *per se*, fostered by daily communication between colleagues in a social context, performative relationships and exchanges with other companies, which are associated with knowledge coming from an external environment and which the organization acquires.

However, and based on the results obtained, we were able to confirm that the existing literature on the influence of knowledge assimilation on innovation is indeed valid, in which there is this measurable link between the two variables, verifying high levels of organizational effectiveness when individuals and the organization as a whole, recognize the importance of external information and its value when the objective is to assimilate it for strategic purposes. We also validate that it is a fundamental phase for the long-term survival of companies, when well used.

Transversely, the non-validation of the influence of knowledge acquisition, exploration and knowledge sharing, on innovation, allows us to reflect that, individually these variables do not have measurable effects on innovation, but when interceded by the assimilation of knowledge, they present good results, and the theory defends this assumption. To acquire new knowledge intensive practices, it is not enough just to acquire knowledge, but above all to assimilate it, and this capacity to absorb knowledge requires the capacity to explore information, above all through communication which, as mentioned above, is a fundamental piece to foster knowledge sharing. Through greater proximity, the process of sharing will be easier, even if it depends on the recipient's ability to assimilate and the motivation of individuals to accept new knowledge, the ultimate factor that influences the exploitation of knowledge, as advocated by Davenport and Prusak (1999). Thus, the three variables have a positive impact on organizational innovation when there is assimilation of knowledge, a hypothesis confirmed by the study and which follows the reasoning of Zahra and George (2002) when they developed the model where they describe the valences of knowledge assimilation, through the acquisition, use and sharing of knowledge.

As far as telework is concerned, we reveal above all a growing trend for the practice of this modality in organizations, since it is the one that comes closest to the demands of globalization, and that effectively influences their innovation.

This is not enough, it is a practice that, according to the ILO (2013; cit. by Araújo et al., 2019), brings the majority of advantages to workers, such as the level of conciliation of personal and professional life, personal satisfaction and greater flexibility. For employers, we also see advantages in terms of financial savings. Thus, this reality makes us understand, through the results extracted from the study, the existence of these advantages in organizations, since they can effectively impact positively the innovation of organizations.

We thus validate the hypothesis, according to the theories that defend this issue that Coenen and Kok (2014) Bae and Kim (2016) and Melo e Silva (2017).

The influence of the organizational culture on the innovation of the companies was also verified, a fact that validates the theories of Ahmed (1998) and Knox (2002) They say that organizational culture is one of the determinants of innovation and is also considered the support for it, since innovation is fostered by the skills and attitudes of individuals, and stimulated by the practice of continuous communication, collaborative culture and flexibility between hierarchical levels. The evolution of the concept has also determined the link between this intangible asset and organizational strategy (Russo et al. , 2012). In fact, with this study we confirm that the organizational culture is a key piece to stimulate the innovation of organizations, thus proving the theory of Russo (2010; cit. by Luís, 2016) when he mentioned that this is a key piece for the management of new strategies that drive the success of the organization.

In short, we can conclude and answer the starting question, does knowledge management in the context of telework influence the innovation of organizations? Organizations that have an organizational culture favorable to communication and linked to sharing, even in telework, and that, in turn, manage their knowledge appropriately, through an innovative strategy and simultaneous practice of the different phases of the process, become innovative in relation to others. In this way, the conclusion validates the existing literature in which knowledge management is in fact a practice that impacts innovation (Torugsa & O'Donohue, 2016; Grant R. , 1996).

As a theoretical tribute, we were able to help fill the gaps present regarding the interconnection of this theme with telework practice and its influence, through the reflection of the concepts and themes presented.

6.2 Management Implications

This study allowed us to draw certain implications for managers that will be effectively favorable according to the current situation in which we live. It is our goal to consider changes in their management models through this research, including and especially in the knowledge management of their companies and their impact on innovation.

Teleworking is, as we have seen, a common practice and beneficial not only for workers, companies, but also for the government and society, but it is a reality these days.

Companies need to accompany this change, the role of management needs to be changed in order to walk the present evolution. To manage the expectations, the communication between all those that compose the organizational bosom, to promote a culture of sharing, of union, is the beginning to foment all the remaining questions associated to the management of knowledge.

Contrary to what the theory argued, the individual influence of the variables that make up knowledge management is not enough to achieve good results, so it is important to focus on knowledge management as a whole, since it is through the interconnection of all stages of the process that significantly positive effects are produced in organizations. As we have seen, the assimilation of knowledge is the key piece for all the other phases to be impacting and, in this way, it should be a key point to connect the remaining stages of the process.

Managers should also focus on a good organizational culture that stimulates communication among all, the commitment of all, and allows the sharing among people of experiences, experiences, knowledge, linking the different hierarchical levels. These factors, when practiced properly and present in a collaborative culture, influence the success of certain phases of the knowledge management process, such as the exploration and sharing of knowledge that, through the assimilation of knowledge, positively influence innovation, since communication and collaboration stimulate this fact. Thus, we propose a redefinition of innovative strategies that, combined with a good culture, will dictate organizational success.

In short, the contribution of this study is to provide indicators regarding the most important practices to be implemented in an organizational context so that the whole process of knowledge management is carried out successfully, in a challenging context of telework, resulting in the innovation of organizations.

6.3 Limitations and future investigations

During the course of this study some limitations were identified that become opportunities for future research in the area, for a better perception of the subject and better application of practices.

First of all, and regarding the methodology used, the quantitative study, there is hardly any interaction between the investigator and the study sample, which may compromise the interpretation of the results given the lack of contact with the object of study. It is not enough,

for future opportunities and analysis, to ensure a larger sample and representative character, to ensure a generalization of the results of more reliable character (Günther, 2006).

On the other hand, we see a scarcity of existing literature on telework, and how this influences the practice of knowledge management, so this study may allow a greater focus and analysis on this theme, especially in the days in which the situation and way of working, for some remotely, has changed radically, and it may be necessary to explore new ways of managing knowledge, not forgetting the practicality and convenience of being in telework.

Thus, and given the limitations of this analysis, it will be important to continue the theme in future studies and research, leaving open the reflection on the challenges of telework in organizations and how they are managing their knowledge among themselves and with others present in the same market. Thus, it is our goal to contribute with more and better information in order to assimilate it in an organizational context, improving knowledge management in the context of telework, always aiming at good results for the innovation of organizations.

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