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IMPLEMENTATION OF AN ERP IN A METALLIC STRUCTURES COMPANY: AN ANALYSIS BASED ON STRUCTURING THEORY AND ITS INSTRUMENTATION

IMPLEMENTAÇÃO DE UM ERP EM UMA EMPRESA DE ESTRUTURAS METÁLICAS: UMA ANÁLISE COM BASE NA TEORIA DA ESTRUTURAÇÃO E EM SUA INSTRUMENTALIZAÇÃO

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Abstract

As an objective, the research identifies difficulties faced during the implementation of a proprietary ERP in a metal structures company. The literature addresses how these difficulties intertwine with the structuring theory and the technology structuring model through dimensions of each of the theoretical models and the concept of structure duality. Methodologically, the research involves a literature review, in-depth interviews, and analysis of results in relation to theoretical models. The procedural impacts suffered by the strategic, tactical, and operational sectors are revealed, highlighting challenges, benefits and interactions, given the relationships between agent/structure and agent/technology.
Keywords: ERP. Structuring theory. Technology. Duality. Agent.

Resumo

Como objetivo, a pesquisa identifica dificuldades enfrentadas em meio a implementação de um ERP autoral em uma empresa de estruturas metálicas. A literatura aborda como essas dificuldades se entrelaçam com a teoria da estruturação e o modelo de estruturação da tecnologia através dimensões de cada um dos modelos teóricos e quanto ao conceito de dualidade da estrutura. Metodologicamente a pesquisa envolve uma revisão da literatura, entrevistas em profundidade e análise de resultados com relação aos modelos teóricos. Revela-se os impactos processuais sofridos pelos setores estratégico, tático e operacional destacando desafios, benefícios e interações, perante as relações entre agente/estrutura e agente/tecnologia.
Palavras-chave: ERP. Teoria da estruturação. Tecnologia. Dualidade. Agente.

Introduction

The manufacturing and installation of metal structures sector in Brazil has become increasingly encouraged, especially when it comes to aluminum as a raw material for the manufacture of frames and related infrastructures. This rise can be justified by the durability, versatility, and cost-benefit of the material. Freitas (2022) points out that, according to data from the civil construction industry union in the State of Rio Grande do Sul (Sinduscom/RS), civil construction activity for the year 2022 closed with an increase of approximately 6%, referring to the possibility of a favorable future for investments and, therefore, a considerable increase in demand for metallic structures.

However, the wave of investments also indicates a relationship between the industry and the construction sector, related to developments resulting from the growth of the civil construction market, highlighting the increase in the flow of information on the processes to be managed by the organization. Therefore, to optimize the process in general, companies opt for the adoption of integrated information systems, known as Enterprise Resource Planning (ERP), capable of integrating all sectors of an organization. ERPs are considered an evolution of information systems, formerly responsible for taking care of the planning of productive resources, thus, the positive points of their acquisition are complete integration of data and processes, improved decision-making, improved management, financial productivity and scalability and easy adaptation to organizational needs.

However, the organizational implementation of an integrated information system is complex, especially about structural, and cultural aspects of the organization. The simple process of adapting the software does not generally match that of its user, difficulties such as these can be seen in Bellini et al. (2010, 2012, 2016, 2018), Pereira Junior; Schroeder; Dolci (2019) and Pereira; Pereira Junior (2022), both articles based on the concept and dimensions of the theory of digital limitations.

In this sense, given the problems presented, it is still necessary to understand the reasons and nuances that impact the implementation of an ERP in companies. This research departs from the theoretical path proposed by Legemann (2019), where the author uses the structuring theory (GIDDENS, 2009), as a basis for carrying out her study to understand objective and subjective factors, of how the administrative process electronic technology changes the actions of public servants, as well as influencing the use of technology and how it influences the context of organizations. The author also articulates the model proposed by Orlikowski (1992), based on the assumption that structure and human agency constitute a relationship of duality, in which while the structure facilitates or limits human action, this action produces or reproduces social structures.

It is in this scenario that the structuring theory of Giddens (2009) and the technology structuring model of Orlikowski (1992) can present a perspective where we seek to understand the extent to which the difficulty the user has with implementing the ERP it is something voluntary and not just a result of the structure in which it is found.

For the sake of greater detail, both the theory of Giddens (2009) and Orlikowski (1992) are based on the concept of duality of structure, with the model proposed by the author being a practical instrumentation of the theory of structuring. In this way, the joint relationship between the two works allows us to analyze, from a social and structural perspective, the impact of difficulties on users of the ERP system.

Given this scenario, the following research problem arises: What are the difficulties faced by users during the process of implementing an ERP system in an organization in the manufacturing and installation of metallic structures in the city of Rio Grande/RS? To this end, the general objective is defined as: surveying the difficulties faced by users during the process of implementing the authorial ERP in a company in the manufacturing and installation of metallic structures.

ERP (Enterprise Resource Planning)

During the period comprising the last two decades, the role of globalization in modern society is revolutionary, impacting everything from the social sphere to organizational systems. The impact on organizations' ecosystems demands constant investment, especially in the sector responsible for technological innovations, responsible for keeping companies competitive and capable of adapting to constant changes in their environment.

The evolution of information technology (IT) is an important milestone in terms of advances in the integration between organizational management and production. In this way, integrated tools such as ERP (Enterprise Resource Planning), the well-known integrated information systems, have gained strength and have become a key piece for organizations that seek a balance between agility and efficiency during their numerous daily processes.

The use of an ERP system is synonymous with integration, where sectors provide feedback, keeping themselves updated. However, the implementation of an information system like this triggers a series of changes in the routine processes of each integrated sector and, consequently, difficulties when users use the technology are constantly reported. Therefore, the process of getting used to the tool tends to take longer, requiring patience and dedication on the part of the organization, offering the tool and support to make it active, and on the part of the employees, seeking to become interested in learning the way correct use of the system and bringing it into your daily routine based on the information added daily.

Structuring Theory

Social life, in many respects, is not an intentional product of its constituent actors, although day-to-day conduct is chronically conducted deliberately (GIDDENS, 2009). The author develops the perception that the environment acts on the individual in the same way as the individual on the environment. In this way, even individual routine and conduct are results of the context in which one is inserted. This relationship between the environment and its actors is presented during the construction and presentation of the structuring theory. Giddens (2009) was concerned about trying to understand how the practices of a member of society affected it and how this affected each person there. Giddens' (2009) research questions directed him from a set of sociological bases, so that he had because of his research what became the main concept of structuring theory: society is structured, but the structure is full of dynamism (GIDDENS, 2009).

The dynamism presents a social relationship between what Giddens (2009) defines as the agent and structure. The agent is the member of society, the one who acts on the structure and conducts assets in the process of transforming reality. The concept of structure, on the other hand, is presented as a composition of everything that forms a society, bringing together its minimum particularities and being the place where the individual performs an action and transforms reality. Giddens (2009) seeks to explain that the concept of structure is abstract, as it depends on agents to exist and undergo changes.

This statement is based on another concept from Giddens (2009): duality. The duality of structure presents the idea that social systems and the structure itself are built and shaped based on the actions of each agent, thus shaping a space for future actions to take place. This is constructed unconsciously and involuntarily, as the agent is not able to fully perceive the influence of their actions, being limited by their own social and rational nature. In this way, duality is constituted as a simplified mode of representation, in which the agent directly affects the structure and somehow ends up receiving its

influence.

In the meantime, the structuring theory seeks to analyze the relationships that exist between the structure and the agents with the aim of explaining whether the actions, whether routine or not, are the result of collective thinking in the environment or whether the agent does what he does. why you want to and to what extent your individual conscience can understand this and not submit to collective pressure. To do this, the agent's actions are studied based on a deeper analysis, which seeks to understand beyond the rational discourse. The analysis is subdivided into three main dimensions: cognoscibility, discursive awareness, and practical awareness. Explained individually, cognoscibility is defined as the conception that the social action of each agent tends to be guided by the knowledge of the world that they possess. Giddens (2009) believes that cognition is not an individual process but a social construction, obtained from the social interactions of each agent and the assimilation of norms, values and rules considered socially accepted.

The author further understands that it is not that the structure is not capable of coercing, but rather that the agents, the action, and the interaction, are coerced by the structural dimension of social reality, although they also engender it (COHEN, 1999). In other words, Giddens (2009) argues that individuals are coerced by social reality, but at the same time, they are active in creating and maintaining the social structure, which is formed by the actions and interactions of each agent, which, in turn, , have actions and interactions shaped by the social structure itself. Therefore, the theory presents reflexivity as a fundamental point, as it is from this that individuals will be able to reflect on each of their actions and on the social world of which they are part. This makes it possible for the lived reality to be subject to change, causing the structure to be directly and constantly modified.

Discursive awareness is defined as the awareness that the agent has about his actions, the intention he has with each of them and the impact he believes exists each time he performs them. Giddens (2009) argues that limited understanding of activities and actions is a result of the complexity of social life and human interactions, which can be difficult to predict and control for the most part.

Therefore, structuration theory reports that: human agents always know what they are doing at the level of discursive consciousness, under some form of description. However, what they do may be entirely unknown to them under other descriptions, and they may know very little about the ramifying conditions of the activities in which they are engaged (GIDDENS, 2009), since people have a limited understanding of the activities they carry out., despite knowing what they are doing at a level only considered conscious and discursive. Therefore, the agent is aware of the action he is performing and the reason he is performing it, however, he does not have a complete understanding of the implications that his actions have on the structure and everything that surrounds it.

When defining practical consciousness, Giddens (2009) advances, presenting this concept as hidden consciousness, considered the real one responsible for the agent's action, passive of different origins and responsible for reaching the structure, having a return from it. The notion of practical consciousness is fundamental to structuration theory. It is that characteristic of the human agent or subject to which structuralism has been particularly blind. But it has happened with other types of objectivists thinking. Only in phenomenology and ethnomethodology, within sociological traditions, do we find detailed and subtle treatments of the nature of practical consciousness. [...]. I do not intend that the distinction between discursive consciousness and practical consciousness is rigid and impermeable (GIDDENS, 2009). For the author, practical awareness is acquired through socialization, that is, through the learning process that occurs during the social life of each agent. This construction process happens by learning the norms, values, and cultural practices of their social environment, where individuals develop skills that allow them to act in the world effectively.

The author also makes a point of emphasizing the power of human beings as they conduct actions without having to think consciously about each step taken, once again emphasizing the power of

routinization in the social environment. In this way, practical consciousness goes through a process of refinement, due to the temporal dimension of social life, that is, as each agent acquires experience, their practical skills tend to become more complex.

Technology Structuring Model

Orlikowski (1992) takes advantage of a view of technology as a physical attribute, to present a theoretical model, in which technology is conceived as a product of human action and with structural properties. This reinforces the concept presented by Anthony Giddens of duality of structure, but from a theoretical view with a structuration's opinion, thus making the model a sub theory that instrumentalized the British sociologist's concept. In this way, the human aspect is put on the agenda again, where the premise of a duality model of technology is addressed, similar to that presented by Giddens (2009) in the theory of structuring, the concept that technology is created and modified by human actions and thus, it is shaped by an agent and ends up evolving and shaping the structure in which it finds itself.

For Orlikowski (1992), technology is created and shaped by human action, and is also used by humans to complete some actions, since interaction with technology happens based on the agent and the context and social reality in which they and the technological structure addressed meet. This construction presents another concept described by the author as interpretative flexibility, responsible for presenting the interpretative flexibility of technology, where there is no single meaning that defines it, but rather, countless meanings and uses that present themselves, emerge and update themselves. based on the individuality of each agent and the relationship they establish with technology during its use or development. However, it is possible to consider this flexibility also as a limited and finite aspect, based on the physical limitations that the technology has and the institutional contexts and levels of power and knowledge that affect agents during use.

In this way, the author subdivides the individual particularities of each agent into three dimensions considered capable of influencing interpretative flexibility, namely: the characteristics of the material artifact addressed (for example, software or hardware analyzed), characteristics of the human agents (for example, example, user experience, learning capacity) and the characteristics of the context (assignment of tasks to be performed, allocation of resources involved and available).

Each of the three dimensions mentioned above serves to present the idea that technology is passive to change, and a concept never seen as absolute truth but rather momentary, enabling the emergence of a model for structuring technology. This model provides a theoretical framework for understanding how technology is structured and structures social and organizational models and each of their processes, being divided into three components: human agents, institutional properties, and technology. Given the conception presented by the model, human agents are considered as creators, users and developers of technology; institutional properties relate to organizations in terms of dimensions, organizational culture, ideology, planning, know-how, division of labor, structural arrangements; As for technology, it considers the devices used to carry out the necessary activities and tasks.

The relationship and interaction between the fundamental components are formulated based on the duality of interactions between technology and the organizational environment, so that technology has influence on organizations and human agents are influenced and capable of influencing the adopted technological structure. In other words, for Orlikowski (1992), human agents are established as those who develop the technology, its users and those who make decisions regarding its use; technologies are established as tools that help carry out activities and tasks in the workplace; and the institutional properties of the organization appear as different organizational aspects, which may be: organizational structure, organizational culture, strategies used, hierarchical distribution of tasks and even the strength

of external influences on the organizational chart.

Orlikowski's model (1992) thus makes it possible to analyze the nature of interactions, dividing them between four main influences: technology as a product of human action, technology as a means of human action, institutional conditions of interaction with technology and the institutional consequences of interaction with technology.

In the approach to technology as a product of human action, technology is modified by the action of the agent, both when it is structured or when it is used and modified. However, it remains constant unchanged and devoid of any operability without human action on it. From "technology as a means of human action," technology is conceptualized and presented as incapable of determining social attributes and practices. In this way, it can condition these practices and actions of the agent based on established difficulties, norms, or constructions capable of blocking interactions. Santos, Peixoto and Xavier (2008), explain that, in Giddens, norms present themselves as boundaries in social life over which various manipulative attitudes are possible, since the reasons that actors provide for what they do may go against the rationalization of actions that involve themselves in behavioral processes.

All attributes considered institutional properties of the organization or environment are capable of implicitly or explicitly influencing or conditioning the use of technology by the agent and the way in which it is offered to him for use. In the same way that institutional and cultural properties can act on the agent, he presents himself as capable of acting on the structure, reinforcing or modifying what is established in its meaning, the aspect of domination and legitimation presented. It is worth mentioning that it is the Agent's non-compliance that directly and indirectly results in structural impacts.

Methodological procedures

Regarding the purpose, this is diagnostic research. According to Roesch et al. (2015), the approach model aims to raise, define, and analyze problems in each environment. Thus, the research aims to survey the difficulties faced by users in the process of implementing a proprietary ERP in an organization in the economic sector of manufacturing and installing metallic structures, based on the support of structuring theory (Giddens, 2009) and its instrumentalization based on the technology structuring model (Orlikowski, 1992).

As for the analysis technique, this work uses interpretive analysis, which takes place through taking one's own view of the ideas stated, is to overcome the strict message of the text, is to read between the lines, is to force the author to a dialogue, is to explore all the fruitfulness of the ideas exposed, is to compare them with others, in short, is to dialogue with the author. This last stage of analytical reading is the most difficult and delicate, since the risks of interference from the reader's subjectivity are greater, in addition to presupposing other cultural instruments and specific training (SEVERINO, 2007).

In this study, the research approach is qualitative. Flick (2009), understands that qualitative research aims to describe, justify, and analyze social manifestations based on experiences lived by users. Therefore, the choice for a qualitative approach is the result of the search to understand users' difficulties during their interaction process with the newly implemented ERP system, supported by structuring theory and the technology structuring model.

The research uses the case study as a tool for analyzing a specific social phenomenon, relating the theory of structuring and its instrumentalization during the use of the aforementioned information system. The case study is seen as the most appropriate design for investigating a contemporary phenomenon within its context (YIN, 2001). Thus, the aim was to explore the relationships between

users and the dimensions of structuring theory and the structuring model.

To obtain data to be analyzed, a case study was conducted based on information from the so-called Alpha organization. It is a business institution manufacturing metal structures in aluminum and PVC (Polyvinyl Chloride), located in the city of Rio Grande, in the state of Rio Grande do Sul, with a single headquarters and where the administrative and financial offices are located. , projects, commercial sector and production sector, in addition to having installation teams for manufactured structures, residing in the headquarters city itself and in Pelotas, a neighboring city.

The selected organization has been operating in the market for 45 years, being one of the most significant in the southern region of the country, has sixty registered employees and is considered a small-medium company. In 2022, the construction of its own system began, authored by a collaborator, with knowledge in information systems and programming. The system itself has the function of gathering crucial information from all functional levels of the company, they are financial administrative, commercial, order system, project and purchasing sector. In this way, the system interconnects all sectors of the organization investigated for better internal communication, enabling the visualization of financial flow controls, preparation, production, and delivery of orders, in addition to a budget proposal that will be delivered directly to the potential client.

Regarding data collection, they were obtained through interviews, using a semi-structured interview guide with twenty open questions to guide the researcher during the collection of information. The interviewees were people from the strategic, tactical, and operational levels of the company (classification developed according to the organization's "cultural" organizational chart), with in-depth interviews being conducted with five employees of the organization, chosen for convenience. Data collection was conducted between October 1, 2023, and October 17, 2023. Each interview lasted an average of 30 minutes. The data relating to the interviewees are described in Table 1. It is noteworthy that the gender of the interviewees was not made flexible to maintain their anonymity.

Table 1: Respondent data

Id	Level	Age	Sector	Tempo*	Gender	Education	Duration***
Est1	Strategic	50 years	Financial administration	25 years	F	Full upper	27 min
Tat1	Tactical	30 years	Construction and production supervisor	2 years	M	Fundamental	29 min
Op1	Operational	61 years	Trade Representative	nine years old	M	Full medium	30min
Op2	Operational	55 years	Trade Representative	26 years	M	Incomplete upper	28 min
Op3	Operational	45 years	Trade Representative	12 years	F	Full medium	30min

* Time in function
** F = Feminine; M = Masculine
***Interview duration
Source: survey data (2023).

The data was recorded, with the permission of the interviewees by signing a confidentiality agreement and using the recording tool on the iPhone XR cellular device operating under version 17 of its IOS operating system. The responses obtained were transcribed in a denaturalized way, adjusting colloquial and informal expressions, as pointed out by Nascimento and Steinbruch (2019) and subsequently analyzed considering the constructs proposed in this research.

Analysis and Discussion

Regarding knowledge, interviewee EST1 considered the process of getting used to the system easy, precisely because it was a simplified access system, in its conception. He also highlighted that he learned to use the functionalities with the constant help of the developer and by simply maintaining the use of the ERP, as EST1 explains: "I learned with the help almost always of the developer, but everything is very clear in the system itself, I discovered it little by little." TAT1, on the other hand, reported that his process of getting used to the ERP as very simple, being a process characterized as smooth, like TAT1: "I had no difficulties, I can follow the orders, what is in production, what is in the painting, what it will be delivered, so for me the process is this, simple (laughs)". Regarding learning how to use functionalities, the tactical level reported having learned based on their use and with the constant assistance of the developer. The following statement from TAT1 stands out: "basically, how I work up there (3rd floor), and I stay next to the developer, I always bother him and poke around (laughs)".

Interviewee OP1 understood the process of getting used to the system in a contrary way to the other two levels, reporting that: "as I don't understand much about computing, the process was quite slow, the others already understood more than I did", in addition, OP2 and OP3 reported the process as difficult and laborious, making it difficult to adapt to the system, highlighting the following excerpt from OP2: "there were a lot of shortcuts in the interface, I didn't understand much of what was happening there". Regarding learning to use the system's functionalities, the interviewees report in their entirety that they learned based on their own use, answering questions among themselves, with other colleagues and by contacting the developer directly.

Based on this assumption, regarding cognoscibility, Giddens (2009) defines it as the way in which human beings understand and interact with social structure and technology that surrounds them. In this way, a differentiation can be seen regarding the levels of understanding and interaction experience of each user of the ERP system. Based on responses obtained, all levels firmly reported that their familiarity with the system and learning using functionalities only happened due to existing interactions within the organizational environment, whether between agents (system users and developer) or between agents and the structure (ERP).

When conducting an analysis that follows the perspective of structuring theory, each of the interactions mentioned previously serves as a direct influence on the ability to learning and perception of human agents about the ERP. Giddens (2009) indicates that the cognoscibility applies to the ability to interpret, understand, and manipulate available resources, thus, the physical presence of the developer in the development process implementation served as a crucial aspect and generator of a leap in confidence during the user learning process. Thus, the premise of interactions between agents is reflected humans (system users and developers) and the technological structure that surrounds them (ERP).

Regarding discursive awareness, EST1 considered that the system's functionalities affected the work of the sector and the collective in an extremely positive way. EST1 reports that: "it has improved a lot, now we have more clarity, we know all the processes, where to look", in addition, EST1 also stated that seeing his colleagues using the system had a positive influence on himself, as he realizes that the

process and the use are being taken seriously, giving credibility to their work, not being left aside, as a way of reporting, it states that: "we believe in the system and its functionalities, we are using it and we will continue, without leaving it behind".

Respondents who belong to the tactical level believe that the features positively affect the collective as everyone can access the necessary information in an easy, quick, and organized way, regardless of their role. In this sense, TAT1 reports that: "if the purchasing guy needs to buy something for the customer, and the customer calls the salesperson who sold it, the salesperson himself can access the system and know the status of the parts to pass on to the customer". When reporting on how the use of colleagues influenced his use, the level interviewee reported that the advantages of the system automatically induce you to use it, from the moment that colleagues can feed it correctly, as stated by TAT1:

> In my case, as I am responsible for production, placement and a few other details, there were times when I passed something on to the buyer and it got lost before the system. Now, with him feeding correctly, it registers, "pulls me" and encourages me to do it correctly.

Already interviewed at the operational level, they understand that during the ERP implementation process, the functionalities negatively affected themselves and the group. OP2 reports that:

> [...] It impacted more negatively than positively at the beginning, mainly because it was a heavier system, it helped with order processing, but it was difficult to conduct customer registrations there and then quickly issue a quote without leaving the customer waiting.

OP3 says that: "in the beginning it took a long time to work well, the processes took too long, when we had a receipt and paper, everything was much faster, and we were less stressed (laughs)". Regarding the way in which seeing colleagues using the ERP influenced their opinion and use of the system, the operational level states that the influence was great, but with a duality of point of view. OP2 reports that: "the influence on a certain extent was bad, the difficulty in accessing the new program generated a lot of prejudice towards the program and this really demotivated me", however, OP3 reports that: "despite the initial difficulties, the set was very important, because while we used, we supported each other and even complained about the problems together".

The data presented by the interviewees are related to what Giddens (2009) presents in his work regarding the discursive consciousness dimension. The author defines it as the awareness that the agent has about his actions, the intention he has with each of them and the impact that you believe exists each time you execute them. In this way, regardless of the impact of their actions whether positive or negative, users indicate that they clearly understand the power of their interactions with the ERP and how they affect perception and use of the system by you and your colleagues, regardless of whether they are for or against the system usage.

Therefore, they clearly notice the impact that their actions and interactions between agents and structure have on the formation of opinions regarding the ERP, in addition to proving that all These aspects affect your usage and your next usage actions. Additionally, members of the strategic and tactical highlights the importance of being in favor of the development of ERP from its beginning, because, according to them, "believe in the system" and its ability to provide positive changes in the organization's routine, was fundamental for the obstacles of negative influence on the part of some initial system functionalities were defeated. This belief demonstrates the crucial and constructive role of engagement with the cause of ERP implementation, also being a primary source for improving usage and access to information.

Previously, interviewees at the operational level and EST1 highlighted that "home time" of colleagues

helps a lot in the credibility transmitted when reporting their experiences amid daily routine. Respondents indicate that this happens because they have known each other for a long time and consequently, be familiar with their respective temperaments, personalities and even work methods.

Regarding practical awareness, EST1 considered the opinion of other colleagues with little influence on his opinion and began to use the ERP. However, EST1 reveals that a former employee had influence and a decisive role in supporting and adhering to the system:

> The (former employee) spoke very highly of the program, she said many times that it was fundamental and that it would change the way we worked, so, for others, it's not that the system is bad, it's that the (developer) is still improving it- o, because he didn't know what we wanted.

Regarding the way in which the climate and relationships between people in the company influenced the opinion and use of the system, the interviewee at the strategic level stated that he was extremely surprised by the reception, despite certain repulsions on the part of the operational level, it is It is possible to see this surprise in the following report from EST1: "from what I know of people, I was very surprised, because if they reacted well, despite constant obstacles, it is because the program really is good and they see a future in it, but people always It's going to get complicated, right?! (laughter)".

Regarding the interviewees at the tactical level, regarding the way in which the opinion of other colleagues influences their opinion and use of the system, TAT1 reports that he did not feel influenced at any time by his colleagues, but considers himself a structuring element, configuring as a relevant institutional actor in this process. The following excerpt from TAT1 stands out: "in fact, I was one of those who perhaps had a lot of influence on others, records on paper can get lost, crumpled, torn, we have to have everything on a computer and with many accesses". Thus, the interviewee also reports that regarding the climate and the way in which relationships between people in the company influenced his opinion on using the system, relationships between workers and processes improved communication between people and levels, making it known exactly who to look for each demand, influencing and motivating usage much more. TAT1 stands out when reporting that: "each person knows their responsibility and what is up to them or not to do, there is no more "he said it to me", everyone knows what theirs is".

Interviewees at the operational level consider themselves to be influenced by the opinion of their colleagues when they first started using the system. OP2 reported being very boring and afraid of the new and seeing his colleagues' inability to initially master the use of the ERP, made him create a "bitterness" and a fear of the new, but which served as fuel to help his colleagues even without knowing much. OP1 states that

At first, because I did not really know what I was doing, the opinion of a colleague influenced me a lot and I started to feel angry at the system. On the other hand, as I learned, I realized that it is much simpler than it seems, despite being complex and that the colleague is just a boring old man (laughs).

With regard to the climate and the way in which relationships between people in the company influenced their opinion on using the system, interviewees reported that despite certain resistance and attempts to boycott the system by senior colleagues, the climate of optimism internal among other ERP users played an important role so that they could see with "other eyes" (reported by OP1), the role of ERP in their sector.

The perspective through the work of Giddens (2009) defines that practical consciousness as hidden consciousness and considered the real responsible for the agent's action, being developed across diverse backgrounds and with the responsibility to achieve the structure. Therefore, the process of forming

practical awareness takes place by learning the norms, values, and practices cultural aspects of their social environment, where individuals develop skills that allow them to act effectively, always highlighting the power of routinization, capable of being influential indirectly. Thus, interviewees EST1, OP1, OP2 and OP3 agree with what is proposed the dimension analyzed, as the opinion of colleagues and the relationships existing between members of the company were able to "hiddenly" influence opinion about the system and the way in which each of the interviewees and levels "saw" the ERP and its usefulness for themselves and the company. organization. Going further, the tactical level interviewee believes it is important to be a positive influencer during the implementation process, as this was how, in theory, managed to reduce complaints from colleagues and make the socialization experience more pleasant, considering itself fundamental for an indirect adjustment of practical consciousness of other users. However, only interviewee OP1 reports the significant role of colleague TAT1, it is not possible to verify the impact of TAT1 amid the process of implementation of other colleagues. This brings to light, according to Giddens (2009), the ability to practices considered "hidden", such as culture and organizational structure, in influencing indirectly the ERP implementation process and users' opinion about it.

In relation to human agents, the strategic interviewee understands that when difficulties or possibilities for improvement were perceived when starting to use the system, the organization of levels and the team in relation to their individual responsibilities evolved a lot. EST1 reports that: "from the beginning I thought that this would be the main point to be improved (organization), you know what you are doing, you are seeing the bigger picture, if someone or something is missing, we know how and where to find it". As for the complaints and suggestions to the developer having had an effect, EST1 states that he was always heard and had his needs heard, which were always prioritized, as it is a key and crucial level of the company. We can see this statement in EST1's report: "he (developer) is super open to suggestions and always helpful with what we ask, especially when it's us here in the office (laughs)".

The member interviewed at the tactical level stated that he noticed the main difficulty being the fact that he was unable to "view" the payment status information for his order, with this information being restricted to the strategic level. TAT1 reports that: "I think that this way, everyone who has access to the system should be able to access this information, this would make it easier in times of need when the financial directors are not at the company". Regarding the complaints and suggestions about the ERP, made to the developer, the interviewee states extreme surprise with the system, precisely because it was able to meet the level much higher than expected, thus, there were no complaints or suggestions reported to the developer. TAT1 reports that: "look, I am a guy who is "poorly gifted" with technology, I was much more surprised by the program, and it served me much better than I really expected".

OP1, OP2 and OP3 report numerous possibilities for passive improvements to be implemented in the ERP system, in the process of preparing proposals and budgets for the client, which, in the opinion of those interviewed, should be more agile and simple to conduct. Another improvement reported by OP2 is: "they could see the implementation of an inventory, which, despite being somewhat complex, would help to provide more correct and precise control of deadlines, but it is very difficult". Regarding complaints and suggestions about the ERP, made to the developer, the interviewees at this level reported that all their problems, adjustment needs or even suggested improvements were accepted and implemented by the developer, OP3 also reports that: "despite some moments, it takes a while to return, it always comes back better and with the improvements we need".

Thus, about the conception presented by the structuring model of technology, human agents are considered as creators, users, and technology developers. Thus, the three levels relate to the theoretical framework, because since the ERP implementation process in the organization, human agents (members of the interviewed levels) are creators, system users and developers indirect, as it is from them that suggestions for improvements and problems to be fixed by the developer. Previously, in

addition to what is presented in the theoretical basis, the levels report the clear importance in being users with the power to visualize the process structure in a general. Therefore, knowing who to turn to in case of any need is highlighted as essential for the ERP to evolve according to the organization's needs. In short, the continuous process of interaction of human agents is necessary for the development and adaptation of ERP in the organizational structure, reinforcing the perspective of duality of structure and technology, according to Giddens (2009) and Orlikowski (1981).

Regarding technology, the interviewee at the strategic level understands that if he had better quality internet and a computer with higher performance, he could achieve much more. However, EST1 reports that: "even though I want these things to be better, I kind of foresee the mistakes that could happen and run ahead to avoid them, I know how far the quality limits of the internet and the machine I have go (laughs)".

TAT1, understands that the quality of the internet and computers used suits you, but it could be much better and at certain times it is uncomfortable and generates some discomfort and unnecessary irritation. TAT1 reports that: "he answers me, but, if I talk to you from a collective perspective, everything is far from what was expected (quality of the internet and the machine), I sometimes get unnecessarily irritated with things because of the stress that comes from not being able to get more than one tab in browsers, for example."

Operational level members are the ones who most report and point out problems with computers and the quality of the internet offered to provide their services to the organization. OP1 and OP3 complain emphatically about the quality of their computers, which are slow and require higher quality internet to offer just the basic/minimum they need. OP2 follows the complaints from colleagues but points out: "my performance has improved since I changed computers, everything was very terrible during use, now the only thing that makes it more complicated is the internet quality."

Thus, about the conception presented by the structuring model of technology, technologies are established as tools that help in conducting activities and tasks in the workplace. Thus, the three levels agree with what is presented by Orlikowski (1992), as computers in interviewed and the internet package they use are tools capable of effectively make it difficult to carry out the tasks and activities carried out by them in the workplace, such as can be seen from the answers obtained during the research. As another aspect reported, at the commercial level, there is the emotional exhaustion generated by the bad functioning of the technology itself. Thus, interviewees report the negative impact caused in the organizational routine and the weight that technological malfunction has on its power of action in the organizational structure and reaction to what the structure presents to you.

Regarding institutional properties, EST1 understands that the company's guidelines on the need to use the system immensely affected its use due to: "the company's need for process control", according to EST1. Regarding the process of removing the order book for the mandatory execution of orders in the ERP, EST1 reports that: "we were a little afraid that something would go wrong and we would have to start over and lose everything we did during the progress, without knowing where to return from", in this way, the interviewee provides an empathetic opinion towards colleagues at the operational and tactical levels, as he is constantly fed by requests made by these two.

TAT1, regarding the company's guidelines on the need to use the system, reports that he did not feel affected, as it is considered the level that most supported the introduction of the ERP. TAT1 reports that: "I felt like a real influencer (laughs), I tried to communicate as much as possible to all my colleagues about the benefits we would have with this process, after the transition". Regarding the withdrawal of the order book, the interviewee did not feel affected at any time and really hoped that everything would go well. TAT1 reports that it did not actively participate in the transition process, as it only started to prepare orders after the program was fully active.

Members at the operational level, regarding the company's guidelines on the need to use the system, consider themselves to be the most affected. OP2 reports that the guidelines made him more "afraid of the new" and a huge repulsion towards the system. OP3 reports that he was intensely worried about not being able to cope, mainly because he considered the system to be "raw" at that time. Regarding the transition after the withdrawal of the order book, the level reported extreme difficulty and immense insecurity. OP1 reports that: "honestly, I thought I wouldn't be able to do it, at that moment, I started to think about whether that was really what I wanted in life, even after 45 years at the level". OP2 reports that it was a moment and period: "very traumatic and difficult, it became kind of like 8 or 80". OP3 mentions that: "it was very complicated, but as time goes by, you realize that it is just a matter of habit".

Thus, regarding the conception presented by the structuring model technology, institutional properties relate to organizations based on their dimensions, organizational culture, ideology, planning, know-how, division of labor, structural arrangements. Thus, it can be seen that the three levels meet Orlikowski (1992), as the guidance received from the company on the need to use the system and the process of removing the paper order book directly affected each of the levels and its processes, thus being responsible for changes in the organizational culture, in the division of work, in the way planning was carried out and mainly in the arrangements structural, presenting greater clarity of responsibilities in the organization's hierarchy. Furthermore, all interviewees highlight the power of impact of "fear of the new" on their routine and institutional properties, as it made the renewal process difficult organizational culture and interviewees' custom towards ERP, therefore, indicators that institutional properties are influencing factors in the interaction of human agents with ERP and their acceptance of the change process within the company.

Final considerations

Based on the literature and its relationship with the analysis constructs obtained through the responses from the interviewees, this research aimed to survey the difficulties faced by users during the implementation process of the authorial ERP in a company engaged in the manufacturing and installation of metallic structures. Using yourself as a lens theoretical and supporting structuration theory (Giddens, 2009) and its instrumentalization from the technology structuring model (Orlikowski, 1992), with the dimensions presented in each of the theories with reports obtained at each level of the company. It is important to highlight that the difficulties faced by users during the process of implementation of an ERP system are listed based on data obtained through interviews conducted with each user.

Regarding the results obtained, following the perspective of the theory of structuring of Giddens (2009), it can be analyzed that: regarding the strategic level, there is a smooth transition process for the users' cognitive system regarding the implementation of the ERP, with gradual and continuous learning. The features had a positive impact awareness, providing clarity in processes and inspiring confidence through peer observation. Furthermore, initial peer influence was limited, but a former employee played a crucial role in praising the program. Despite some resistance at the operational level, the positive surprise suggests an optimistic outlook for regarding the program and its future potential. The implementation of the system, in accordance with the ideas of Orlikowski (1992), also resulted in notable organizational improvements, despite some technological challenges. Institutional guidelines and an organizational culture focused on process control positively influenced the adoption of the system. A transition to ERP generated concerns, highlighting the empathy of the level in in relation to operational and tactical levels and their limitations.

Thus, regarding the results obtained at the strategic level, the structuring theory de Giddens (2009) points out how sector decisions are shaped and shape the structure organization of which they are part,

directly impacting the implementation process of the ERP and reinforcing the ideal of duality of the structure. As for the structuring model of the technology by Orlikowski (1992), the relationship presents itself as ERP being the product of human interactions present in the environment, as well as practices that structure the organization and strengthens its strategic capacity, despite its challenges during the process.

As for the tactical level, it is possible to observe, according to the ideas of Giddens (2009), the adaptability of cognitive systems, gradual learning, and continuous use of ERP with help from developers. The implementation of ERP had a positive impact, increasing process clarity and inspiring confidence through peer observation. As for transition to ERP, the level considers it to be simple, requiring practice and learning continuous and being influenced by the close relationship with the developer. O level considers ERP as beneficial and capable of providing efficient access to information. Furthermore, the tactical department highlighted the positive impact of use by colleagues, emphasizing the importance of accurate record keeping and the motivation generated by correct data insertion. Undeterred by the opinions of his colleagues, the tactical department has become an active influencer on ERP, advocating the transition to computerized records. Improved relationships between users and processes facilitated communication, strengthening the understanding of individual responsibilities, and motivating more use of the system. Previously, the information presented by the interviewees makes it clear how much they consider themselves to be fundamental members for the structuring of the ERP, as well as how they are constantly structured based on their evolutionary process. In this way, the main concept of the work of Giddens (2009) is instrumentalized amid the process of implementation of the system and interaction with users, which in themselves, evolve it and evolve themselves.

Regarding the implementation of the system, according to the ideas of Orlikowski (1992), the tactical level considers itself a great supporter of the introduction of ERP and did not feel influenced by the company's guidelines regarding the need to use the system. Acting directly as an influencer and widely communicating the benefits of post-transition process, without realizing the negative impact on organizational guidelines. How much to the withdrawal of the order book, the operations department always stated that it was not affected and expressed optimism regarding the success of this process, even though he was not actively involved in the transition and only preparing orders when the program was fully active.

Thus, regarding the results obtained at the tactical level, the theory of structuring Giddens (2009) presents himself through the duality of the structure, where the representative member acts as a positive influence on the use and implementation process of the ERP, serving as an inspiration to colleagues and as a facilitator in the process. As for the model of structuring technology by Orlikowski (1992), the relationship is presented as the tactical level being considered an ERP structuring agent. This is justified based on direct interaction with the tool, whether in personal use, helping in the implementation process, defending actively using the system and not being affected by the cultural change perspectives of the organization.

About the operational level, it is possible to observe, according to the ideas by Giddens (2009), an initial negative impact on ERP functionalities difficulties in processing orders. The level indicates a certain complexity of the system, in addition to of constant delays in its efficiency. Regarding the impact of co-workers, there is a negative initial perspective, generating negative emotions in users, in addition to emphasizing the importance of mutual support. Furthermore, the level is strongly influenced by opinions of their colleagues since the beginning of using the system, despite its members initially felt bored and scared, the level transformed those feelings into motivation to help during the process. Regarding the implementation of the system, according to with the ideas of Orlikowski (1992), the operational level was strongly affected by the adoption of new organizational guidelines on the system by the company and was considered the most affected. He expressed repulsion and fear of the system, linking these guidelines to a feeling afraid of the new. In addition, he experienced intense

worries and insecurities, initially seeing the system as "raw." The transition from the order book to digital It turned out to be extremely challenging for the level. The department describes this period as "traumatic and difficult," presenting an extreme view and emphasizes that over time the transition has become a matter of habits, emphasizing the changes perceived throughout the time.

Thus, regarding the results obtained at the operational level, the structuring theory by Giddens (2009) also applies to the perspective of duality of structure, situation in which members representing the operational sector report numerous problems and difficulties in the ERP implementation process but end up developing and resolving issues based on the influence of use and behavior of colleagues, being thus influenced by the structure that surrounds them. As for the structuring model of the technology of Orlikowski (1992), the relationship presents itself as the operational level being an agent structuring technology, based on its use and the contribution of its feedback to improvement. However, the presence of Orlikowski's (1992) perspective can also be seen in the constant complaints about ERP technical development hardware problems, in addition to candid reports on the impact of institutional properties, based on fear of change and fear of the new.

Based on the relationships established between the dimensions of structuring theory (Giddens, 2009), Orlikowski's technology structuring model (1992) and the organizational levels analyzed, this work presents the idea that the agent can act and influence the social structure in which it finds itself, as well as being able to develop technology and shape its respective function according to its needs. Likewise, he feels the impacts of his actions, contributions, and choices on the part of the social structure affected by himself and other agents, as well as using technology and becoming affected by it and the function it establishes now.

Therefore, Orlikowski's (1992) technology structuring model serves as a tool for the practical application of Giddens' (2009) structuring theory in this case study, based on the representation of the concept of duality, in which ERP system users during the implementation process, are influenced by their colleagues, by the limitations presented by the system and even by the organizational culture in which they are involved at the same time that they are able to act under the technology, presenting improvement proposals, having an active voice during the process and even being positively or negatively influencing the continued use of the ERP.

As it is a company with a family base and structure, the possibility of action by agents using technology during the ERP implementation process occurs due to the break in behavior patterns and disruptions in the organizational culture applied since the early years of existence of the organization, a fact that serves as a trigger and influence of the environment (technology) towards users and their reactions.

As limitations to this research, it is noted that not all practical users of the ERP were interviewed, members being chosen for convenience at each level. Users responsible for the prior development of the system before its implementation were not used. Furthermore, another limitation may be the use of a sampling of experts also for convenience, since the number of respondents who volunteered and were available to conduct the research were only five.

As a suggestion for future studies, it is recommended to repeat the research interviewing a larger base of system users or even repeat it in organizations with well-established levels and that are going through a similar ERP implementation process, to generate a comparison of results and data obtained. And finally, a third and another suggestion could be to apply the research to companies of the same level to also generate a comparison of results and data obtained.

REFERENCES

Bellini, C. G. P. (2018). The ABCs of effectiveness in the digital society. *Communications of the ACM, 61*(7), 84-91. http://dx.doi.org/10.1145/3205945

Bellini, C. G. P., Giebelen, E., & Casali, R. D. R. B. (2010). Limitações digitais. *Informação & Sociedade: Estudos, 20*(2), 25-35. https://periodicos.ufpb.br/ojs2/index.php/ies/article/view/4393

Bellini, C. G. P., Isoni Filho, M. M., de Moura Junior, P. J., & Pereira, R. D. C. D. F. (2016). Self-efficacy and anxiety of digital natives in face of compulsory computer-mediated tasks: A study about digital capabilities and limitations. *Computers in Human Behavior, 59*(1), 49-57. http://dx.doi.org/10.1016/j.chb.2016.01.015

Bellini, C. G. P., Isoni Filho, M. M., de Araújo Garcia, D., & de Faria Pereira, R. D. C. (2012). Limitações digitais: Evidências teóricas preliminares. *Análise – Revista de Administração da PUCRS, 23*(1), 58-70. https://revistaseletronicas.pucrs.br/ojs/index.php/face/article/view/11493

Cohen, I. J. (1999). Teoria da estruturação e práxis social. In A. Giddens & J. Turner (Eds.), *Teoria social hoje*. São Paulo: Ed. UNESP.

Flick, U. (2009). *Desenho da pesquisa qualitativa*. Porto Alegre: Artmed.

Freitas, A. (2023). Sinduscon-RS projeta crescimento de 6% no ano e otimismo para 2023. *Portal Guaiba.com.* https://guaiba.com.br/2022/11/16/sinduscom-rs-projeta-crescimento-de-6-no-ano-e-otimismo-para-2023/

Giddens, A. (2009). *A Constituição da Sociedade*. São Paulo: Martins Fontes.

Legemann, T. D. (2019). Adoção do sistema eletrônico de informações em universidades: uma análise a partir da teoria da estruturação. *Dissertação de mestrado, Universidade Federal do Rio Grande.* https://bdtd.ibict.br/vufind/Record/FURG_a1d9cfde4669f904397124edb1164ae4

Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science, 3*(3), 398-427. https://doi.org/10.1287/orsc.3.3.398

Pereira Junior, E. F. Z., Schroeder, E. A., & Dolci, D. B. (2019). Limitações digitais, causas e consequências na efetividade do uso do site Trello no planejamento estratégico de uma secretaria de educação a distância de uma universidade federal. *EmRede-Revista de Educação a Distância, 6*(1), 69-85. http://dx.doi.org/10.13140/RG.2.2.23787.28964

Pereira, G. G. B., & Pereira Junior, E. F. Z. (2022). Limitações Digitais na implementação de um ERP: o caso da ALUMAR esquadrias metálicas ltda. In *XXI Mostra da Produção Universitária da Universidade Federal do Rio Grande / XXXI Congresso de Iniciação Científica – MPU-FURG/CIC* (pp. 1-4). Retrieved from http://dx.doi.org/10.13140/RG.2.2.29832.29443

Roesch, S. M., Becker, G. V., & de Mello, M. I. (2015). *Projetos de estágio e de pesquisa em administração: Guia para estágios, trabalhos de conclusão, dissertações e estudos de caso.* São Paulo: Atlas.

Severino, A. J. (2007). *Metodologia do trabalho científico* (23a ed.). São Paulo: Cortez.

Santos, M. F. R. F. D., Peixoto, H. A. A., & Xavier, L. D. S. (2008). Integração das práticas sociais a partir das normas ISO 9000, 14000 e 16000. *Revista Pensamento Contemporâneo em Administração - RPCA, 2(3)*, 34-41. https://doi.org/10.12712/rpca.v2i3.11062

Yin, R. K. (2015). *Estudo de caso: Planejamento e métodos* (5a ed.). Porto Alegre: Bookman.