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# Digital Maturity Level of a B2B Company: Case Study of a Brazilian Complex Manufacturing Company

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## Abstract

*This paper aims to analyze the digital maturity level of a large Brazilian B2B packaging company and the main challenges this company faces on its digital transformation journey. To this end, the authors conducted a case study and took a hybrid (qualitative and quantitative) approach to data analysis. The main findings include the B2B company's low digital maturity level and its difficulty in transitioning from an operational efficiency-focused culture to a digital one. It can be inferred from the findings that there is a low degree of concordance among the organization's executives regarding their understanding of digital resources and digital leadership capability. It is also plausible to assume that employees are unfamiliar with digital transformation concepts because the organization is not successfully informing all its staff about the subject. This study points out that digital technologies add another dimension to the challenges faced by traditional businesses, and shows the importance of rethinking traditional corporate culture and organizational boundaries, as well as of exploring new assets, such as data and insights, through a digital lens, thus creating new opportunities to add value to a traditional organization in a digital world.*

**Keywords:** B2B industry, Digital transformation, Digital maturity, Digital technologies.

## 1. Introduction

According to Clark (2019), quoting *Double-Digit Growth* author Michael Treacy, “we are at the dawn of a revolution of how businesses do business with other businesses.” Internet 2.0 was a revolution for the relationship between companies and consumers, but “Internet 3.0 is at our doorstep and that will be a business to business revolution”. Agreeing with Treacy, Clark admits that digital transformation in the B2B industry “will not be as easy as what Amazon did to retail sales, but it is going to have the same effect. B2B selling is more complicated, but we are headed toward an Amazon world in the B2B environment.”

According to Westerman, Bonnet and McAfee (2014), few organizations are using digital technologies to generate higher levels of profit, productivity, and performance, despite their enthusiasm for digital transformation. The authors attribute this state of affairs to the lack of the necessary capabilities to make technology work in a different way, and to insufficient development of the skills on which depend the planning, execution, and exploitation of digital strategies.

This paper aims to analyze the digital maturity level of a large Brazilian B2B packaging company which, despite having an innovation DNA in its production process, struggles with the challenges of digital transformation. The results of the qualitative and quantitative data analyses support the inference that there is a low degree of concordance among the organization's executives and employees regarding their understanding of digital resources and digital leadership capability. This study points out that digital technologies add another dimension to the challenges faced by traditional companies. In the case of the company under study, these challenges include low level of digital maturity, capability and leadership; difficulty in transitioning from an operational efficiency-focused culture to a digital one; the employment

of new digital technologies to add value to its business; the fast pace of change; and the shift in how to engage with customers and meet their expectations.

## **2. Theoretical Framework**

### **2.1 Digital Transformation**

According to Liu (2011), digital transformation is defined as “the integration of digital technologies into business processes,” whereas Bharadwaj (2013) defines it as “organizational strategy formulated and executed by leveraging digital resources to create differential value.” For Fitzgerald (2013), digital transformation, defined as the use of digital technologies, enables “major business improvements,” while Lucas (2013) holds that digital transformation is fundamentally altering the traditional ways of doing business, and is redefining business resources, processes, and relationships. According to Vial (2019), digital transformation is defined as “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.” Digital transformation is related to the adoption of digital technologies with different impacts on business strategies. The deployment of such technologies can boost operational efficiency and organizational performance, add value to a business, uncover new ways of engaging with customers, and establish a digital culture.

### **2.2 Difference Between a Digitized and a Digital Company**

According to Ross (2019), digitizing means converting from analog into digital form with the purpose of optimizing existing processes, building an operational backbone, or introducing ERP systems through a standardized process whose final state is known. On the other hand, digital refers to digital value propositions that require continuous and iterative testing and reviewing of market offerings, given that the final state is unknown. Being a digital company involves not only converting physical data to a digital format, but also adopting digital technologies to add value to a business.

### **2.3 Customer Experience**

According to Zolkiewski et al. (2017), “existing measures of customer experience are problematic when applied in a B2B context. Rather than adopting input- and output-based measures, widely used in a business-to-consumer (B2C) context, a B2B context requires a more strategic approach to capturing and managing customer experience.” The authors add that “improving understanding of customer experience in a B2B context should allow organizations to design better services and consequently enhance the experiences” of their customers. According to Pine (2015), “because the Internet has empowered buyers with so much information about sellers, business to business (B2B) companies face the threat of increasing commoditization, a market environment where their customers relentlessly seek to buy physical goods on the basis of price. To get out of the commoditization trap, B2B businesses need to continuously innovate how they attract, engage and excite customers by finding new possibilities for creating value.”

### **2.4 Digital Transformation Maturity**

Before embarking on a digital transformation journey, companies must make a clear picture of their starting point and their current level of digital maturity by comparing themselves with their competitors and with different segments and industries. This stage is key for planning a company’s digital strategy, which consists in determining its digital maturity level, its goals concerning digital transformation, and its digital ambition. Westerman, Bonnet and McAfee (2014) have developed a methodology for identifying an organization’s digital maturity level. According to this methodology, organizations that

are at the beginning of their digital journeys tend to adopt a wait-to-see strategy, in an attempt to obtain certainty before acting.

## **2.5 Digital Transformation Strategy**

According to Matt (2015), “in recent years, firms in almost all industries have conducted a number of initiatives to explore new digital technologies and to exploit their benefits. This frequently involves transformation of key business operations and affects products and processes, as well as organizational structures and management concepts. An important approach is to formulate a digital transformation strategy that serves as a central concept to integrate the entire coordination, prioritization, and implementation of digital transformations within a firm.” B2B companies should prioritize their digital transformation strategies and take advantage of the full potential of digital technologies to find new ways of engaging and communicating with their customers, suppliers, and ecosystem. They should also identify innovations that can lead to increased productivity and competitiveness, with the goal of changing their revenue levels, and make the most of the digital transformation underway to add value to their businesses.

## **3. Objective**

During the research process, a gap was identified in the literature on digital transformation in the B2B industry in Brazil. This prompted the formulation of this study’s main objective, which is to analyze the digital maturity level of a large Brazilian B2B packaging company and the main digital transformation challenges faced by it. The study also aims to somehow contribute to raising awareness in society and companies about the digital transformation challenges, risks and opportunities in the Brazilian B2B industry. For this purpose, an organizational-level exploratory case study was conducted to identify the main digital transformation challenges faced by this century-old complex manufacturing company in the packaging segment.

## **4. Methods**

### **4.1 Case Study**

The case study in this paper is about a B2B complex manufacturing company which is a global leader in the packaging segment. The company’s strategic ambition is to position itself as the go-to, lowest cost supplier in the global market. Although continuously striving to boost its operational efficiency, reduce costs, and ensure product quality, the company is struggling to move from an operational efficiency-focused culture to a digital one. Collis and Hussey (2013) point out that exploratory case studies are appropriate for investigating phenomena that are not well documented in literature, which is the case for the field under study here, with a shortage of empirical research and lack of consensus among authors.

### **4.2 Theoretical review**

The research method was also based on secondary data sources. Relevant peer-reviewed articles on the subject were consulted, in addition to documentation, books, publications by governmental and non-governmental organizations, websites from trusted sources, and previous research in the field of study. This study’s theoretical review was limited to the concepts and data resulting from the field research on the organization that is the subject of this case study. It is therefore assumed that this theoretical review did not exhaust all the concepts and themes related to digital transformation in the Brazilian B2B industry.

### **4.3 Methodology**

This research took a hybrid (qualitative and quantitative) approach to data analysis in order to achieve a better understanding of this case study’s results. According to Merriam (1998), triangulation or a hybrid approach to data collection and analysis enhances data reliability and internal validity.

## **5. Data Collection**

For the case study in this paper, the following data collection techniques were used: semi-structured interviews, online self-assessment survey questionnaires, and document analysis. The semi-structured interviews were the primary form of data collection used to answer the research question, whereas the other techniques were applied with the secondary purposes of context exploration and result validation. The script and questions of the semi-structured interviews and the questionnaire were extracted from the book *Leading Digital: Turning Technology into Business Transformation*, by Westerman, Bonnet and McAfee (2014). These questions were created and validated by the authors to help organizations to understand their level of digital maturity, given that, before setting out on their digital transformation journeys, organizations need to determine their starting point. It is important to highlight that the reliability, stability and results of the practical studies reported by Westerman, Bonnet and McAfee (2014) were key in deciding to apply their questionnaire to this case study.

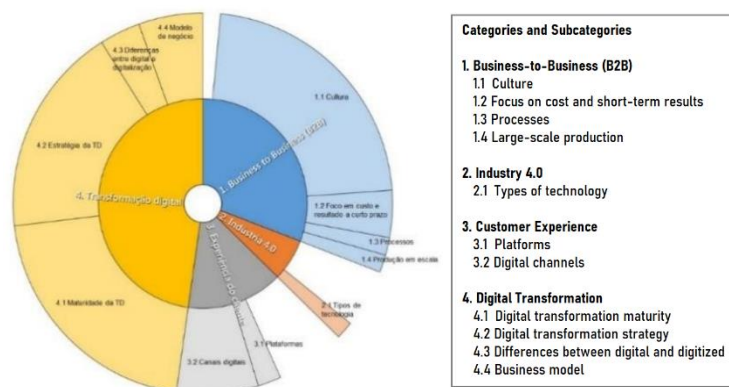
## 6. Results

### 6.1 Analysis of the Interview Data

An initial analysis of the interview data resulted in the establishment of a certain number of categories. Then, the qualitative analysis of the interview content, using NVivo 11 software, started by the volumetric analysis of the interviews' codified segments, which were sorted out into categories and subcategories. The categories *digital transformation*, *B2B*, and *customer experience* were mentioned 74, 62, and 30 times respectively. All the six interviewees mentioned these categories in their interviews. It is worth highlighting that the subcategory *digital transformation maturity* was mentioned 42 times, and the subcategory *culture* of the category *B2B* was mentioned 45 times. All the six interviewees mentioned these subcategories in their interviews. The sunburst chart in Figure 1 shows the hierarchical levels of the categories and subcategories mentioned in the interviews, as well as their respective volumes of segments.

The interviewees varied in their understanding of digital transformation in the organization that is the subject of this case study. According to interviewee E1:

*[...] for the company to move towards digital transformation, we need the company as a whole to have a similar mindset to that we are trying to implement through the actions in partnership with the consultancy firm, that is, how we use these digital tools, this world of artificial intelligence and Big Data, so we can really solve our day-to-day challenges.*



**Figure 1**

(Source: created by the authors using NVivo 11 software)

Interviewee E2 mentioned some cultural changes that the organization is promoting:

*I think the company is promoting cultural changes for digital transformation, doing it in partnership with a university and such; but I think it is not yet investing, not yet training people, for example.*

For interviewee E3, the organization must invest in and prioritize the innovation project of its production process:

*So, Magma (the company's new process for manufacturing glass packages) brings us to Taylorism, to the 1950s, because the glass packaging industry hasn't even arrived there yet. So, I don't think it's a digital revolution or transformation. Now, if you ask me whether I think the company's strategy is correct, I think it is, because I think we have to take this step in order to take the next.*

A point highlighted by interviewee E4 is that people, not technologies, are responsible for digital transformation:

*Digital transformation lies in the mindset, not in technology. And if I'm talking about changing the mindset, I'm talking about changing the behavior. The main pillar is the connectivity mindset, which consists in expanding the decision chain and the value chain. And it's people who are going to manage it and lead it. So that's the point.*

Respondent E5 fears that digital transformation could become another fad:

*We talk about digital transformation, we have invested in digital transformation – there is also the partnership with a university, which is quite challenging. But we may not achieve all the results we are expecting from digital transformation. So, my fear is that this will become just another fad and we will have just wasted money.*

Interviewee E6 points out that the organization's culture is focused on improving performance and reducing costs, and not necessarily focused on its end customer:

*I think we have developed some technologies to improve performance, we have been working a lot on cost reduction. I have seen great effort by the company in this respect. Now, I do think we need to increase performance and added value, but I think we still have a... how can I express this? It is very much up to us to say what we think our clients need.*

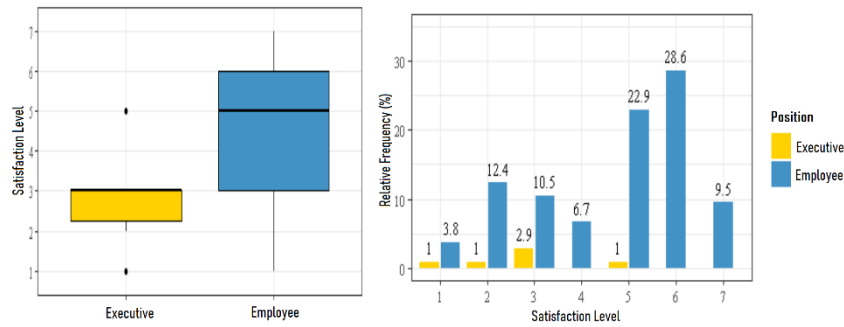
## **6.2 Analysis of the Online Self-Assessment Questionnaire Data**

The analysis of the online self-assessment questionnaire consists of descriptive and multivariate analyses based on a database generated with the tool Microsoft Forms. The sample comprised 105 respondents (n = 105), 99 of whom were employees who answered the online questionnaire, and six were executives who filled out the questionnaire at the moment of their interviews.

## **6.3 Box Plots and Bar Graphs of the Questionnaire Answered by Employees and Executives**

**Part 1 of the Questionnaire:** How well is your organization building digital technologies (digital capabilities)?

Question 1: Are we using digital technologies (such as analytics, social media, mobile, and embedded devices) to understand our customers better?



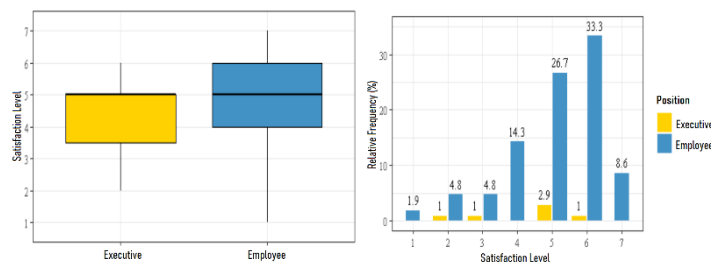
**Figure 2**

(Source: created by the authors using RStudio software (n = 105))

This first block of questions about the organization’s digital capabilities shows significant variation in the answers of employees and executives, as shown in Figure 2. The answers given by employees can be seen to differ markedly from those given by executives. Data dispersion, box size, and relative frequency dispersion are very high. It might be speculated that employees are not familiar with digital transformation concepts, or that the organization is not imparting digital transformation knowledge to all staff levels. A considerable level of divergence can also be seen in the answers given by executives. Regarding question 1, from the observation that there are two outliers with satisfaction levels 1 and 5 respectively, it can be inferred that two of the executives do not share the same opinion because they are either unaware of digital technologies or do not know which tools are used by the organization to better understand its customers and meet their demands.

**Part 2 of the Questionnaire:** How well is your organization building leadership capabilities (digital leadership)?

Question 11: Do senior executives have a transformative vision of the digital future of our company?

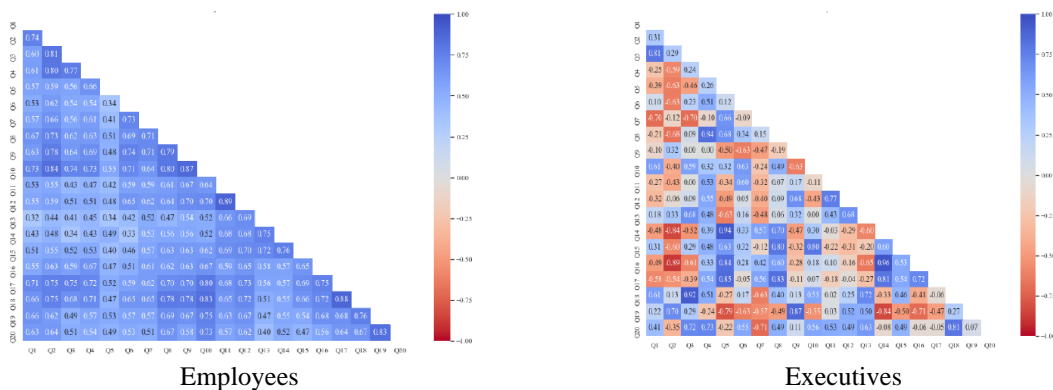


**Figure 3**

(Source: created by the authors using RStudio software (n = 105))

In the second block of questions, which assess the organization’s digital leadership capabilities, lower variability is observed in the employees’ answers, whereas it is higher in the answers given by executives. Data dispersion, box size, and relative frequency dispersion are also very high. Regarding question 11, an outlier can be seen in the answers given by the executives (Figure 3), while a high level of dispersion in the employees’ opinions is observed from their answers. In this case, it can be speculated that the organization is not investing in digital skills, at least not in a way that is noticeable to all the staff. In the following dispersion and correlation analyses, the goal will be to show whether the discrepancies seen in Figure 3 are distributed according to company department, period of employment, or whether there is no relation with these factors.

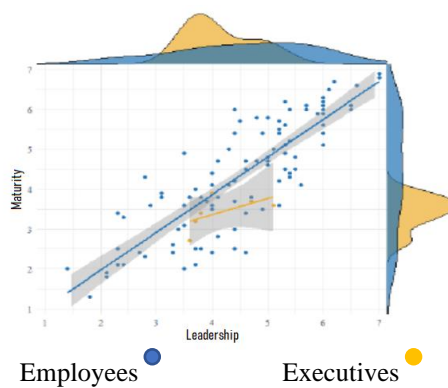
## 6.4 Correlation Coefficients of the Questionnaire Answered by Employees and Executives



**Figure 4:** Pearson Correlation Coefficients for the Answers Given by Employees and Executives (Source: created by the authors using RStudio software (n = 105))

The correlation graph of the executives’ answers (Figure 4) shows three types of correlation: positive or direct, negative or inverse, and nearly nonexistent (close to zero), with positive and negative correlations being predominant – particularly the positive ones, represented in blue. Unlike with the executives’ answers, which show the three correlation types, the answers given by employees show only positive (direct) correlation.

## 6.5 Scatter Plot of the Questionnaire Answered by Employees and Executives



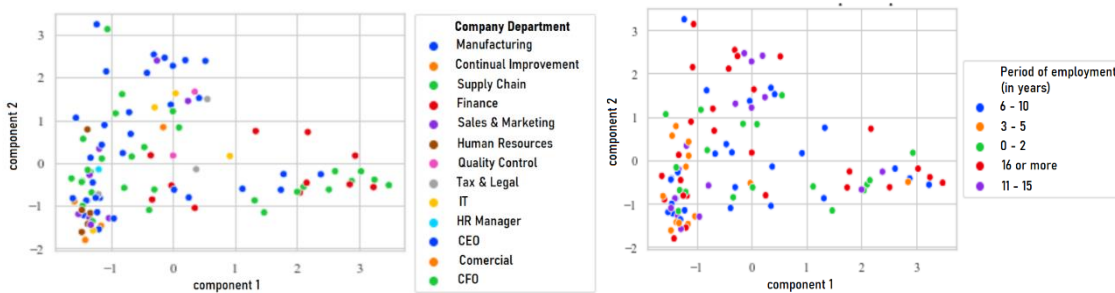
**Figure 5:** Digital Leadership in Relation to Digital Capability (Source: created by the authors using RStudio software (n = 105))

The scatter plot shown in Figure 5 points to a positive correlation between digital capability and digital leadership, since the trend line that best fits the data is ascending. However, when we compare both sets of answers for correlation strength, it can be seen that the correlation found in the executives’ answers is weaker than that found in the employees’. This is corroborated by comparing the correlation matrices of the employees’ and the executives’ answers. It can be concluded that the employees’ perception of the organization’s digital capability and digital leadership capability is quite distinct from that of the executives.



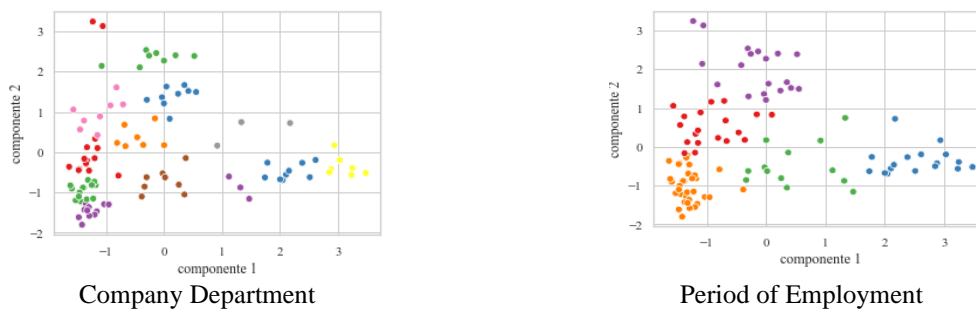
### 6.6 Principal Component Analysis (PCA) of the Questionnaire Answered by Employees and Executives

The questionnaire data also underwent principal component analysis (PCA), resulting in the reduction of 20 variables (questions) into only two components which represent the 20 questions. The value of either component was then entered into a dot graph according to company department and period of employment (Figure 6).



**Figure 6:** PCA Graphs According to Department and Period of Employment (Source: created by the authors using Python (n = 105))

Note that it is not possible to visually identify any group that stands out. Therefore, to corroborate this visual analysis, the k-means clustering algorithm was applied to identify groups within the organization. Then the normalized mutual information (NMI) algorithm was used to compare the results obtained through k-means clustering with the actual departments of the organization. The NMI algorithm verifies whether the classes predicted by k-means clustering are similar to the organization’s actual departments, and returns a value ranging from 0 to 1, with 0 signifying that there are no defined groups, and 1 that there are well defined groups. The k-means algorithm yielded the groups shown in Figure 7.



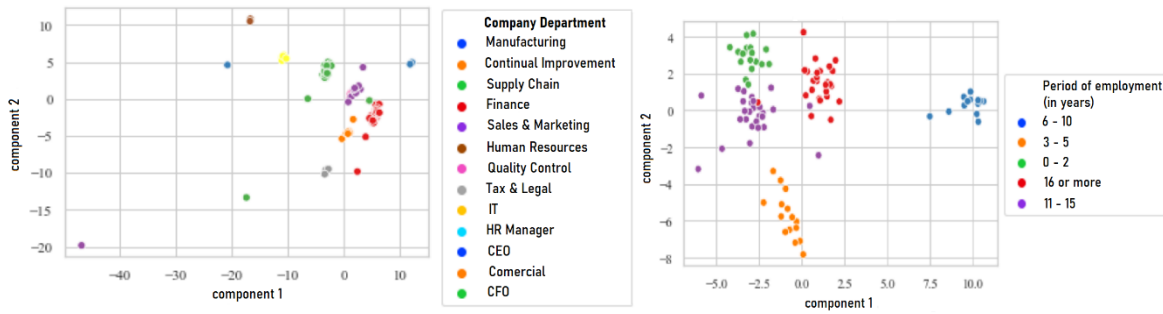
**Figure 7:** Predicted Groups Divided by Company Department and Period of Employment (Source: created by the authors using Python (n = 105))

Then the NMI algorithm was run on the groups predicted by k-means. The score obtained for each group is shown in Table 1.

Test Label	NMI Score
Company department	0.29112
Period of employment	0.09578
Job position	0.04319

**Table 1**

These values show a weak relationship between the questionnaire answers and the department an employee works in, but no relationship with period of employment and position in the organization. Additionally, linear discriminant analysis (LDA), another technique for dimensionality reduction, was used. Unlike PCA, however, LDA is a supervised technique because it predicts which group each employee belongs in, thus maximizing variance between groups and minimizing it within each group itself. Running LDA resulted in the graphs shown in Figure 8.



**Figure 8: LDA on Data About Company Department and Period of Employment**  
(Source: created by the authors using Python (n = 105))

It can be seen that different groups are obtained depending on whether data are analyzed in relation to company department or period of employment, and that the groups comprise individuals with shared characteristics in terms of digital capabilities and digital leadership capabilities. There is potential for the incorporation of these characteristics into this study's managerial vision for the development of a digital culture and the attainment of digital transformation maturity by the studied company.

## 7. Conclusion

From the qualitative analysis of the executives' transcribed interviews and the quantitative analysis of the data collected from the online survey with employees, it was possible to conclude that the B2B company studied in this research is positioned, according to the methodology laid down by Westerman (2014), as a digital transformation beginner, due to its low level of digital maturity.

There is not clear understanding in the company of the difference between a digitized and a digital organization, since there was, at various stages of the research, great variation in the opinions on the use of digital tools, with management and automation applications being often taken for digital technologies. According to Ross (2019), being a digital company involves not only converting physical data to a digital format, but also adopting digital technologies to add value to a business.

Another observation is that the company does not have a governance instance that is explicitly dedicated to managing digital initiatives. According to Matt (2015), an important approach is to formulate a digital transformation strategy that serves as a central concept to integrate the entire coordination, prioritization, and implementation of digital transformation within a company. In this regard, there are isolated initiatives within the company, but no clear leadership and resources aimed at implementing them either through a minimum viable product, a strategic process, or an experimental pilot project with the application of digital technologies and concepts.

Also, no initiatives were observed for applying digital tools to improve customer experience at the company. Engagement with customers still follows the traditional model of in-person visits, phone calls,

e-mail, and text messages. According to Zolkiewski et al. (2017), “improving understanding of customer experience in a B2B context should allow organizations to design better services and consequently enhance the experiences.”

Worth noting is that one of the company’s strategic processes for handling operational planning, demand, and sales is executed on the company’s management system, and supported by different management tools and manual simulations. This process is still executed in a traditional way, in which demand and sales forecasting is based on past history and information on customer experience and engagement provided by salespeople, as well as on additional information such as finance and market variables.

This B2B company has an industrial innovation DNA, a fact that was observed at different stages of the research. It is investing in an innovative production process with various new embedded technologies. Because the process is still in pilot phase, it was impossible to examine whether this initiative will employ any Industry 4.0 digital technologies. It is important to highlight that observations and information collected in the fieldwork point to an incremental innovation, not to a disruptive one or to the digital transformation of the company’s business model.

Throughout all the stages of this research, it became clear that this B2B company has a backbone of well-structured processes, management tools, and infrastructure, which can be further developed with digital initiatives. It is key for the company to include digital transformation into its strategy roadmap, so that the topic becomes a priority at all levels of the organization. According to Vial (2019), digital transformation is defined as “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.” The digital transformation challenges for the B2B industry in Brazil are considerable, but they are proportional to the transformative opportunities offered by the available digital technologies.

According to Ramakrishnan (2016), “the age of digital transformation is truly upon us and going strong.” Digital transformation, however, is not restricted to retail. Traditional B2B companies are awaking to the potential of digital technologies, and are seeking ways of using them to offer their customers new services.

The characteristics found in the case study of this B2B complex manufacturing company of the packaging segment may be shared by other B2B companies. Therefore, the patterns resulting from the qualitative and quantitative analyses conducted in this research can generally be applied to other B2B companies that show a low level of digital maturity and need to develop a digital transformation strategy.

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