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The Impact of Digital Transformation on the Wine Industry in Portugal

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THE IMPACT OF DIGITAL TRANSFORMATION ON THE WINE
INDUSTRY IN PORTUGAL

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To my father and mother for all the effort and support they had for me to have the opportunity to
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ABSTRACT

The present study examines the effects of digital transformation on the Portugal wine industry, which is a traditional industry with strong historical and cultural connections with the country. The term "digital transformation" refers to the process of implementing digital technologies to improve and optimize internal processes, business models and relationships with vendors and customers. This process in the wine industry goes beyond task automation and causes fundamental changes that impact productive efficiency, product quality and competitiveness in the global market.

Portugal faces unique challenges by adopting digital transformation. The country has a prominent position in the international wine market with about 189,000 acres of vineyards and a varied production of wines. However, the division of the industry, which consists mostly of micro and small businesses, makes the implementation of new technologies difficult.

In contrast, digital transformation also offers a multitude of opportunities. The production cycle of wine may depend on technologies such as automation, big data, and artificial intelligence, to track grape maturation and make chemical analysis of the final product. These new instruments make production more efficient and sustainable, reducing the use of pesticides and water, while improving the quality of the final product.

This research also addresses the various ways in which scanning affects companies, depending on their size and investment capacity. Small usually monitor the grape maturing process using more basic technologies, while large companies can invest in sophisticated chemical analysis and control systems, allowing them to more effectively compete in the global market. Digital transformation affects not only productive processes, but also auxiliary activities such as marketing, HR and internal communication. By adopting digital tools to improve communication and administration such as chatbots and team management platforms, companies could optimize their resources and become more competitive.

The Wine industry in Portugal can still benefit much more from digital transformation, increasing efficiency, quality and competitiveness. However, cultural resistances, lack of technological infrastructure in rural areas, and the shortage of financial resources for small businesses are issues that still need to be overcome. By analyzing such impacts and challenges from a change management perspective, this study aims to contribute to a better understanding of the potential (and/ or threats) the Portuguese wine sector has today in terms of digital transformation.

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Introduction

Background and Presentation of the Project

Digital transformation (DT) is the term used to describe how companies leverage digital technologies to innovate or adapt their business models and methods. This transformation extends beyond mere technological adoption, encompassing the reorganization of structures, optimization of resources, and the reshaping of relationships with internal and external stakeholders. The significance of DT is particularly relevant in traditional industries, such as the wine industry.

Portugal is distinguished by its deep-rooted tradition in wine production, reflecting a rich historical legacy. As of the most recent data available, the total vineyard area in Portugal covers approximately 189,000 hectares, with a significant proportion dedicated to the production of both still and fortified wines. The Douro region, known for its exceptional Port wine, is a notable part of this extensive viticultural landscape. This historical tradition places Portugal in a unique position to analyze the impacts of digital transformation; (explained in section 1.3).

In recent years, the Portuguese wine industry has demonstrated robust performance. For instance, in 2022, Portugal maintained its prominent position in the global wine market, producing a diverse range of wine types produced across the country. The sector has shown resilience in its economic performance, reflecting a 1.56% increase from the previous year. This economic overview highlights the robust yet fragmented nature of Portugal's wine industry, predominantly composed of micro-enterprises (74%) and small businesses (21%), with medium-sized firms representing 4% and large companies less than 1%. This fragmentation, combined with the sector's long-standing traditions, provides valuable insights into economic performance variations within the industry and offers lessons applicable to other sectors with similar business structures. In the context of the Portuguese wine industry, digital transformation is particularly relevant as companies seek to modernize their operations, enhance their competitiveness in global markets, and meet evolving consumer demands. These advancements not only transform the way companies operate but also reshape their interactions with customers, highlighting how tradition and innovation can coexist and drive success in the industry.

Furthermore, this thesis aims to understand how digital transformation affects a classical industry such as the wine sector. To achieve this objective, interviews will be conducted with employees from small, medium, and large enterprises to explore how digital transformation has impacted their work. By examining these perspectives, the study seeks to shed light on how tradition and innovation can coexist, ultimately driving success in this historical industry.

Being employed at one of such companies, by the time this research was developed, I had the opportunity to be directly involved in every step of the outlined experimental technique, from defining the methodological assumptions to formulating the study objectives and hypotheses. Choosing and establishing the study's universe and sample, which included sociodemographically characterizing the participants, was informed by my participating observer position. To further understand how digital transformation has affected their work, I conducted interviews with staff members from small, medium, and large wine firms (including the one I was working at). To meet the research goals, I carried out the data analysis and interpretation after gathering the data, spotting important trends and topics.

In the first chapter we will make an introduction to digital transformation, deepening its concept, evolution and challenges. Throughout the writing of this dissertation, it was also possible to observe a direct relationship between digital transformation and change management that is also explained in the course of Part I. As the title of the dissertation indicates, digital transformation will be addressed in the wine industry that is an industry with a great weight in Portugal and this will be explained through its historical context, as is its cultural connections. To be able to reach a conclusion where a general reflection will be made on the results of this research, in light of the limitations of it, as well as pointing out proposals from future development paths for the production of knowledge in this field.

Part I. Literature Review

1.1. Introduction to digital transformation

Digital Transformation is something that has existed for longer than most people associate it with. Nowadays it is quite popular to talk about Artificial Intelligence (for example, ChatGPT) and how such tools can help make business processes simpler. But the truth is that Digital Transformation has existed since the 90s, the simple fact that it is common nowadays for companies to exchange emails and not letters already demonstrates a process of digital transformation. The stock being placed using a PDA (Personal Digital Assistant) instead of written on paper already demonstrates an evolution towards Digital Transformation. So Digital Transformation appears with the objective of reducing costs, reducing errors, reducing touch points, simplifying human interactions and ends up having the objective of transforming the various operations from the primary state of a product or service to its final state (Vias, 2019).

1.1.1. Concept

Major advances in digital technology applications are changing the way people interact with each other, buy products and services, and relate to each other. According to Klaus Schwab, founder of the World Economic Forum, we are living in the digital revolution, in which an increasing number of services are using these new technologies to provide different products (Schwab, 2016).

Digital transformation has gone beyond the limits of organizations' internal processes to redefine traditional business models and radically transformed the relationship with customers and suppliers due to the great technological advances of recent years, which include the ubiquity of the mobile internet, increasingly smaller sensors, more powerful and cheaper and artificial intelligence (Bharadwaj, Sawy, Pavlou, & Venkatraman, 2013; Schwab, 2016).

This big change could include operations that are essential to the business and affect products and processes, as well as reviewing organizational structures and management concepts. Within this context, it is crucial to develop a digital transformation

strategy that serves as a central idea to integrate the entire organization, prioritization and implementation of digital transformation. The definition of information technology (IT) strategies is commonly done by companies; however, Matt, Hess, and Benlian (2015) state that these definitions generally focus on managing IT infrastructure within the organization and have little or no impact on driving business development innovations.

Different approaches to digital transformation have different perspectives and various goals. These strategies come from a business perspective, focusing on the transformation of products, processes and organizational aspects as a result of new technologies. This represents a significant distinction between automation and process optimization, as digital transformation strategies go beyond the process paradigm and involve changes across business models as well as products and services (Bharadwaj et al., 2013; Matt et al., 2015).

“Organizational strategy formulated and executed leveraging digital resources to create differential value,” says Bharadwaj et al. (2013, p. 472). This definition clearly links digital business strategy with the creation of differential value for the business. This raises the implications of IT strategy performance, efficiency and productivity metrics for promoting differentiation and competitive advantage.

However, it is important to keep in mind that, when creating a strategy for digital transformation, the company must consider all these changes that affect the organizational environment. The company cannot ignore the significant impact these changes have on the organization's workforce. The World Economic Forum released a report on the future of work (WEF, 2016) which states that although new technologies will not completely replace all existing occupations and job categories, they will likely replace certain tasks that were previously done. This allows employees to focus on new tasks and enables rapid changes in the skill sets and core competencies that are critical to success.

1.1.2. Evolution

From a historical perspective, our society saw significant upheaval and change at the start of the century. The start of the twenty-first century was not any different. Advances in technology and the swift renewal of knowledge have brought about significant and many transformations in human endeavors. People's behaviors as well as the makeup and operations of companies are constantly changing because of these shifts (Gouveia, 2012).

The term "digital" refers to the process of encoding data and information utilizing electronic equipment for processing, communication, and storage. This makes representation and unification possible, which is something that is becoming more and more crucial for human activity. This technique makes multimedia, integration efforts, format and content convergence, and transcoding easier, more comfortable, and perhaps more reused (Gouveia, 2012).

First, there's a decrease in organization and agency expenses. A growing amount of information is digitally mediated human behavior. This is because being offline from the digital world is growing more and more expensive, and it's already becoming impractical in several industries (Floridi, 2014). According to Gouveia (2012), you are the source of digital power. Because computers can encode data and information in a standard format, they play a significant role in human activity. It makes symbolic communication, interaction, and representation easier. It not only encourages creative endeavors but also the unavoidable and essential command and control tasks. It permits the repurposing of earlier work, information and system integration, relational data support, and information crossover.

The scope and complexity of data processing were able to grow with the introduction of digital technology. The ongoing usage of networks and computers has made it possible for people to innovate and create new practices, which are then adopted by companies and individuals as new methods of doing things. Among these new practices, something changes. With greater balance and less control and supervision, digital and information technology has a positive impact on people's lives, connections, work, and interactions (Zuboff, 2019).

1.1.3. Challenges

The electrical environment can be intimidating, as stated by Stockdale & Standing (2004). For most companies, starting to digitize is still a challenge. The facilitating conditions, the characteristics of the owner or manager, the perception of ease of use and the perception of usefulness may be some of the elements that can explain the reluctance observed by organizations in following this process, with technological use dependent on them (Kumar & Ayedee , 2021).

Facilitating conditions can be defined as the degree to which a person believes that their technical and organizational infrastructures will be useful in supporting technological adoption. Most small and medium enterprises (SMEs) have insufficient technical infrastructure, which is a significant barrier to technology adoption. This inadequacy will be caused by the size of SMEs and the scarcity of capital and resources.

On the other hand, perceived ease of use is defined as the degree to which a person thinks a system is easy to use and does not require specialized knowledge to use it. This means that managers and owners of SMEs do not understand the importance of having specialized knowledge for this purpose, although some digital resources appear to be easy to use. However, misuse will make the usefulness of adoption less perceived, as the expected results will not be shown, that is, it will not be possible to see the benefits of the performance expected from adopting the technology, this will increase skepticism about the digitization process (Kumar & Ayedee, 2021; Klein & Todesco, 2020). On the other hand, SMEs may adopt generic technological solutions that include very complex and sometimes unnecessary tools, not meeting their needs or strategic objectives. The lack of knowledge makes SMEs less motivated to obtain the expected return (Klein & Todesco, 2020).

When starting technological adoption, it is necessary to invest in technical infrastructure to obtain return on investment (ROI), which takes time to see the financial benefits of digital presence, which can harm SMEs (Klein & Todesco, 2020; Erbet & Duarte, 2018). Thus, limited financial resources and specialized knowledge and the lack of information disseminated by SME managers are the biggest obstacles they will face (Klein & Todesco, 2020; Erbet & Duarte, 2018).

1.2. Digital transformation and change management

The quick advancements in technology, the economy and globalization have made change an unavoidable part of organizational life, so organizations require more and more people with some sort of perspective on how to manage changes. Change management is a way to ease an organization through the transition it would undertake from its current state where they are today, to their desired future position. In this way, we can define change management as the process of modernizing an organization in terms of skills, direction and structure to fulfill internal clients (line managers) demands while promptly translating external customers' needs. The process and tools used to help individuals through a change is sometimes called Change Management. The most well-known change management models are described and synthetized in Table 1.

Table 1 Overview of change management models

Kurt Lewin's Change Management Model	Kotter's 8 Step Change Model	GE's Change Acceleration Process (CAP)	Prosci 3-Phase Change Management Process
Unfreeze	Establish a sense of urgency	Lead the change	Prepare for change:
			- define change management strategy
			- prepare change management team
			- develop a sponsorship model
Change	Build a powerful guiding coalition	Create a shared need	Manage the change:
	Create a shared vision	Shape a vision	
	Communicate the vision	Mobilize commitment	
	Empower others to act on the vision	Make change last	
	Plan for and create short-term wins		
Refreeze	Consolidate improvements and produce still more change	Monitor the process	Reinforce the chance:
			- collect and analyse feedback
			- diagnose gaps and manage resistance
			- implement corrective actions and celebrate success

Source: Digital Transformation Models for the I4.0 Transition: Lessons from Change Management Literature, Nicola Bellantuono, Angela Nuzzi, Pierpaolo Pontrandolfo and Barbara Scozzi.

As the founder of change management theory, Kurt Lewin's "three-step model" inspired later approaches to manage changes. The basic concept in this simile is that emerging behaviors will outgrow old ones, so the people within an organization must shed their customary habits before any real changes can take place. For this purpose, the description of three steps in the model follows:

1. *Unfreeze* - This is when members of the organization realize that they have to change and it makes sense; The balance sustaining current behaviors and attitudes crashes, therefore this step must be taken into account a couple of risks for the changes but also should motivate those who will suffer them.

2. *Change* - It changes the behavior of a department, an organization or its members to that new state. This involves intervening to change organizational systems and processes in a way that would introduce new types of behavior, values and attitudes. Given that some employees are likely to resist, it is imperative for organizational leaders to explain the rationale behind—not only directly affected parties but also indirectly involved—the nature of such a change and what benefits they should expect from it.

3. *Refreeze* - In this step the organization is stabilized into a new state of equilibrium; the new procedures and behaviors introduced in the two previous steps are consolidated and incorporated into the company. Employees tend to feel confident and comfortable with the new ways of working.

Since this theory, many authors have written studies and models on the various stages of organizational change. Elrod and Tippet (2002) examined fifteen of these models and found that one thing they had in common was that there is always a relatively constant level of performance in the first stage. But this capacity decreases when we enter the disruption or transition stage. Performance is reestablished and generally improves when the new level of normality is reached (Figure 1). The authors conducted an experimental measurement of this decrease in performance during the transition (Elrod & Tippet, 1998 apud Elrod & Tippet, 2002).

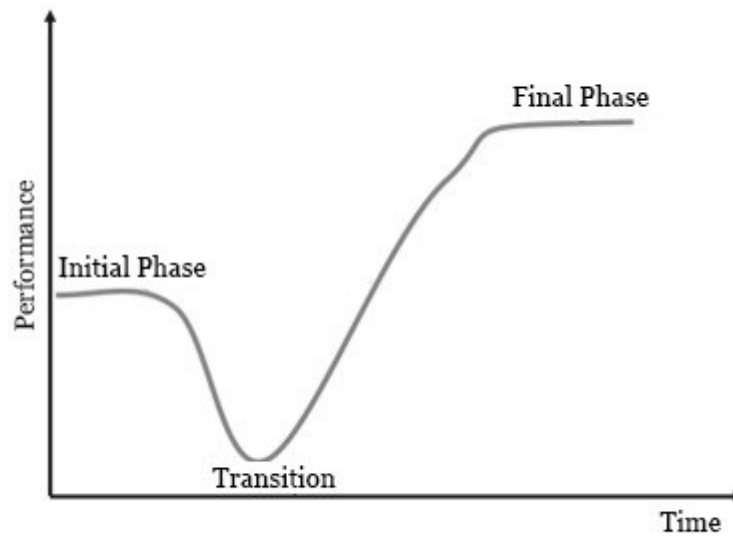


Figure 1: The Change Curve (Adapted from Elrod & Tippet (2002, p. 284)

Although resistance to change is inevitable and seen as a natural reaction to organizational change (Thomas, Sargent, & Hardy, 2011), its cause cannot be solely related to the tendency to remain in the “comfort zone”. On the one hand, McKinley and Scherer (2000) point out that organizational changes can give top management a sense of cognitive order because they align the company with a specific need. On the other hand, they can cause a feeling of cognitive disorder in their subordinates, which disrupts established business processes and creates opportunities for more familiar methods of getting work done.

This behavior is also strongly related to other factors, such as the fear of losing power, prestige, or even one’s job (Oreg, 2006). A tumultuous environment can emerge and jeopardize the transformation process if these elements are not identified and managed correctly by the company (McKinley & Scherer, 2000). On the other hand, things that can reduce the impact include trust in management and an adequate understanding of the need for change (Oreg, 2006). In 1995, John P. More than one hundred companies had to reorganize themselves to meet the new demands of an increasingly demanding market (Kotter, 1995).

In this work, the author lists the eight main mistakes that organizations have made. After that, the author presents eight steps to transform an organization. It is necessary to establish a sense of urgency, form a coalition to lead the change, develop a vision, communicate it, strengthen teams, establish short-term goals, consolidate improvements, and embed the change in the organization's culture (Kotter, 1995, 1996). In addition, Rosenbaum et al. (2018) examined a

comprehensive collection of literature on the subject and discovered the most common elements that contribute to the failure of changes and that, if managed better, could help increase their acceptance. Table 1 presents the seven main factors.

Table 2 *Main factors for failure in Change Projects*

Main Factors of failure in Changes	Description
1. Structure and content of communication about change	The way change is implemented in the organization can have a significant impact on its success or failure (McClellan, 2011). Professionals must have the belief that change is really necessary, that senior management supports it and that they can obtain the necessary skills to be successful in the process (Armenakis and Harris, 2002). The authors also suggest three methods for addressing these problems: persuasive communication (direct communication with stakeholders), active participation (involving people in activities that help them learn new skills and competencies), and appropriate information management (disseminating information from external sources organization, such as speakers or press articles, giving more content and credibility to the subject).
2. The role of senior managers and of the management in changes within the organization	When carrying out the transformation process, managers are required to break with the norms that supported the organization's previous success and teach employees how to deal with a new environment (Tushman & III, 1996). Although the role of senior executives in this environment varies depending on the context, they are still essential to the success of change (Bartunek, Balogun, & Do, 2011). It is not enough for senior management to support the change; Support must be active and evident throughout the process (Prosci, 2016). Furthermore, when it comes to forming a coalition to lead change, Kotter (1995, 1996) emphasizes this point.
3. Tensions between the organizational focus and people's focus	The organization and people participate in all changes (Bunker & Wakefield, 2005). Managers often create action plans by focusing only on processes, operations, and structures, as well as success and advancement metrics that are based solely on these factors. Often, how people react to change processes and associated emotions is not considered. For change to be successful, managers must develop empathy with their employees and create a reaction of trust and support throughout the process. They must balance the focus of the organization and employees (Bunker & Wakefield, 2005).
4. Disregard of the role of organizational culture	Organizational culture is defined by Schein (1984) as a "set of basic assumptions that a group invented, discovered, or developed in learning to deal with the problems of external adaptation and internal integration and that have worked well enough to be considered valid and taught to new members as the correct way to perceive, think and feel in relation to these problems". Cultural change is necessary because transformation processes require new ways of working and behaving. Due to the fact that there is no single model for managing a cultural change process,

	Schein (1984) states that leaders are responsible for orchestrating change using the techniques they deem most appropriate.
5. Little understanding of the impact of readiness levels for changes by agents of change	Armenakis, Harris, and Mossholder (1993) suggested that willingness to change "reflects the beliefs, attitudes, and intentions of organizational members regarding the extent to which changes are necessary and the organization's ability to successfully implement those changes." (681) According to Drzensky, Egold, and van Dick (2012), a culture of change should be an essential component of an organization's overall culture. But this is not a short-term effort. Therefore, change leaders must understand the importance of preparing their employees for change, especially those who are more familiar with the organization's current culture. This is because they will be more productive and more likely to produce multiplier effects (Drzensky et al., 2012).
6. Limited focus on importance of engagement of employees in planning and execution of change	People must support what they create for change management to be good. The key to effective change is the active participation of people in the change process (Levasseur, 2003). Kotter (1995, 1996) emphasizes that making plans for short-term gains is a good way to increase team confidence and increase credibility.
7. Processes unsuitable for planning by lack of diagnosis organizational appropriate	Organizational diagnosis is very important for management initiatives. organizational transformation in terms of choosing appropriate solutions and contributing to preparing an organization for change (McFillen, O'Neil, Balzer, and Varney, 2013). If there is no in-depth diagnostic process, organization leaders run the risk of solving the wrong problems and choosing inappropriate solutions, which often results in wasted resources and discredit among employees. Common misdiagnoses include underestimating the effort required to move people out of their comfort zone or underestimating leadership involvement in the transformation. Both errors have a significant impact on the success of the change (Kotter, 1995, 1996).
Source: Change Management in Digital Transformation Projects: Case Study in a Financial Organization, Maria Paula N. Perides, Eduardo Pinheiro Gondim de Vasconcellos, Liliana Vasconcellos, 2019.	

1.3. Digital transformation and the wine industry

1.3.1. The history of the wine industry in Portugal

The history of wine in Portugal begins in the period 2000 BC. in the Kingdom of Tartessos to the Iberian Celts. This wine, which at the time was produced in the Tagus and Sade valleys, was used very frequently as an exchange currency, and, I must add, it was a very valuable exchange currency, ending up valuing the vineyard culture and the wine consumption of the people of that time. Many years later, and the dominance of the Roman empire in Portugal had already increased (around the 2nd century BC), the production of this good began to increase due to strong demand from Rome. Much later, with the founding and formation of Portugal in 1143, as well as the territorial conquest from the Moors in 1249, wine gained considerable prominence in religious ceremonies and took its place in the meals of men of the time. (Wines of Portugal, 2022)

After the Reconquista and the establishment of the Kingdom of Portugal, the wine sector continued to expand. However, it was in the 18th century, under the reign of King José I, that significant changes in its organization and regulation occurred. The Marquis of Pombal, Prime Minister to King José, was responsible for implementing the first structured policies for the sector. In 1756, he created the Companhia Geral da Agricultura das Vinhas do Alto Douro (General Company of the Agriculture of the Vineyards of the Upper Douro), with the aim of regulating the production and trade of Port wine. This measure marked the first official demarcation of a wine region in the world, the Douro, establishing strict quality criteria and protecting the exclusivity of the terroir in that region. Furthermore, the Marquis of Pombal restricted the production of low-quality wine and prohibited the addition of harmful substances, which contributed to the improvement of the reputation of Portuguese wines internationally (Ribeiro, 2002; Martins, 2015). These reforms consolidated the wine sector and helped establish Portugal as a leading wine producer, especially regarding Port wine.

Despite this, Portuguese agriculture, was not prepared to reach big stages due to the lack of organization in the wine sector, both in terms of production and commerce. But it, had a fresh restart with the "Golpe de Estado" and affirmation of the "Estado Novo"

in 1926, due to better regulation, production standards and endless export possibilities. Potentials that were stagnant before this same Coup. The Federation of Winegrowers of the Center and South of Portugal - FVCSP was created in 1933, which had the power to intervene and credit, thus being able to cancel market excesses and save these same goods for periods of greater scarcity. (IVV, 2018)

The National Wine Board – JNV was established in 1937 as an economic coordination entity, it was a broader approach to the production and marketing policy of wine products. JNV's main responsibilities were the economic protection of small producers, the regulation of wine prices and the improvement of quality. In relation to the stabilization of wine prices, JNV endeavored to determine the average annual price that results from the balance between supply and distribution, the evolution of production and its correlation with the average annual production, in addition to storing surpluses in years of large production, which are compensated in lean years (IVV, 2018).

A significant event for Portugal's economy was its entry into the European Community in 1986, this represented a significant advance for the wine industry, which underwent a reformulation of economic coordination bodies. The National Wine Board was replaced by a new body known as the Vine and Wine Institute (IVV), with the main purpose of improving the efficiency of services through the reduction of bureaucracy, from the registration and control of the culture to the management production and marketing needs (IVV, 2018).

Like all industries, wine had its ups and downs, but it ended up becoming a very relevant industry in Portugal, with great emphasis not only on its economic value, but also on the social role to which it is associated, the enrichment of Portuguese history and culture which, despite its territorial limitations, continues to be among the main wine producers worldwide (IVV, 2018).

Winegrowing is one of the agricultural industries most suited to Community competition and one of the most dynamic because of Portugal's entry into the European communities. Portugal ranks sixth among EU countries that produce wine. The average values are considerably far from Italy, France, and Spain, the world's biggest wine producers and exporters, and very near to those of Germany. With values equivalent to

those of France and Italy, our nation is among the biggest consumers when it comes to consumption.

On the international market, wines in terms of Europe and the world, the Portuguese are also noteworthy. Portugal belongs to a group of nations that include the US, Australia, Chile, Germany, and Portugal and have market shares ranging from 3% to 5%. Nonetheless, our wine industry is highly globalized, with the world's greatest export-to-production ratio (second only to Chile) (Silvia, Maria, Ariovaldo, Sílvia, 2017).

1.3.2. The cultural connections of vineyards and wine

Wine and vineyards are important for reasons beyond just economics. It served to humanize vast areas while being a labor-intensive endeavor and a custom connected with soils unsuitable for agriculture (Unwin, 1991; Johnson, 1989). For similar reasons, subsequent generations were able to establish a connection with the land, either via the people who labor directly on it or through those who simply get their income from it, but who they seldom ever get to be apart from. However, landscape modification, while a useful necessity in previous eras, is now required. Depending on the human activities that took place there, it might be applied in many ways (Teixeira, 2022).

Consumption of wine varies depending on the region, climate, and method. Wine has long been used as a socially distinctive instrument. Distinctive consumption patterns have always been linked to distinct socioeconomic circumstances of production, both historically and currently (Cholette et al. (2005). On the other hand, the quality of the natural beverage that may alter one's usual state of awareness while also appropriating the symbolic that it elevated wine above produced things and gave it a spiritual quality, transforming it into a Christian rite (Dietler, 2006). Moreover, the correlation between wine and art and the cultures of the Mediterranean basin was founded on this aspect (Gade, 2004). As it is essential to the sociability of the area in a unique position to address the current challenges facing rural communities, regional food and wine are abundant as part of the cultural legacy of the primary producing areas.

The way of life in rural wine-growing regions is still characterized by the vineyard culture. Those who were relocated to cities and departed the planet a long time ago can return on a regular basis during the harvest (Cholette et al. (2005). And it's not just the "lords" of the Douro or the Minho farms that organize the yearly ceremonial of going back to their origins. Additionally, under a cooperative regime, the workers of businesses and services that reserve a portion of your vacation for you to spend with friends and family are the blazing fire. Rather, they packed some food and wine bottles in their automobiles to help them stay connected to the planet.

The conviviality that was formerly prevalent in private vineyards and bars has long since vanished. Nevertheless, the cooperative wine cellar remains available to

anyone who are unable to live without making wine for their own enjoyment. When a member's account is active Another opportunity to strengthen ties between the regions and the sea is offered by the harvest festival (Cholette et al (2005). These professional parties feature regular personality presentations by the attendees, depending on their size. Technology news is provided with plainly enjoyable and participatory games.

Nowadays, digital transformation applied to the wine industry plays a much more important role than just speeding up the bottling process or increasing the production of cork stoppers. The entire process, from assessing the ripeness of the grapes to the microscopic analysis of each particle present in the wine or on any surface that comes into contact with the wine, has been mastered over the years through the digital transformation process (Teixeira, 2022).

As in all companies, this process is also present in certain common areas, such as Marketing, Human Resources, Strategy and Innovation, etc. But the real question lies in the application of these processes in the wine industry and how companies with a more traditional approach are adapted (Teixeira, 2022).

1.3.3. Digital Transformation in Wine Industry

The question that arises in this article is what will be the best strategy to implement this type of latest digital transformation such as ChatBots, Big Data and Artificial Intelligence in a classic industry such as the Wine Industry? Well, according to (Qiang Zha (2020) and Bahavesh Talaviya et al. (2020) applying AI in a classic sector such as wine or agriculture is one of the most viable solutions to face the growing needs associated with the increase in population (Zha, 2020; Talaviya et al., 2020). Technological solutions allow producers to have more outputs instead of inputs, improve the quality of the products being produced and improve marketing. In other words, in addition to administrative processes, Digital Transformation can be a fundamental help in understanding grape maturation, for example. It can also be used to understand the perfect fermentation point for a given batch of wine. These innovations can also help reduce water consumption used in agriculture and grape gestation, as well as the use of herbicides, pesticides and understand the degree of soil fertility (obviously for grape growth some of these potentials would be more limited, but the comparison between harvesting and agriculture seems reasonable). In addition to these facilities (Zha, 2020). Talaviya et al. (2020) also refer to the greater efficiency of human energy, as well as the increase in productivity in other activities, through spraying using sensors, robots and drones (Zha, 2020; Talaviya et al., 2020).

McKinsey carried out a study in 2020 with 750 farmers, which found that 47% of them use digital transformation in the precision process, and in the same study 33% of those interviewed revealed that they use two or more tools. It is important to point out that the profile of those interviewed had an average age of less than 45 years, which may not represent the values of a classic industry such as wine in Portugal. In fact, this may be the reason why the use of digital technologies on rural properties is scarcer among older rural managers (Bolfe et al., 2020).

Another very relevant challenge that still needs to be faced for the insertion of digital transformation in classic industries is the capacity of infrastructures to receive this type of transformation, for example, a high percentage of rural establishments still do not have internet connectivity, and this type of challenge arises from social and economic

inequalities, territorial dimensions and the low demographic density of these types of areas (Bolfe et al., 2020). The International Agricultural Development Fund (IFDA) indicates that more than half (around 63%) of the world's poorest individuals work on small properties in rural environments. However, there are countries that deviate from the rule and people below the poverty line are more concentrated in urban areas. Finally, another challenge that will be encountered will be reaching the breaking point of training family businesses (which are very present in Portugal) about this new reality.

Part II: Methodology

2.1. Methodological Assumptions

This thesis seeks to understand the impact of digital transformation on a classic industry such as wine in Portugal, which is, in theory, a more difficult industry to apply this type of transformation and technology. To understand various perspectives, a qualitative study was carried out on several individuals in the wine sector, from farmers with 1 or 2 employees to companies with more than 500 employees.

This data collection was carried out through interviews with stakeholders in the wine industry in Portugal, such as producers, distributors, sellers and landowners. Conducting interviews allows for a more flexible type of approach because for this topic it is more important to understand exactly what type of innovation and adaptations are being made by the industry and this is best achieved through long-format interviews rather than short answers. normally present in more quantitative analyses (Timothy, A. 2000). Because the universe is not very extensive, this could alter the percentages obtained through research.

In carrying out this thesis, the work "The Portuguese wine industry and its contribution to the Sustainable Development Goals - ODS, the case of the Sogrape Group" written by Túlio Henrique Torres Teixeira for the completion of the Master's degree in Development and International Cooperation at Lisbon School of Economics & Management was a very important and a reference both in the structure and in understanding the history of the wine sector in Portugal.

In addition to the interviews, documentary analyzes of reports, publications and all types of relevant materials will be carried out to understand the history of Digital Transformation and the Wine Industry, as well as documentaries, books and theoretical explanatory videos.

2.2. Research Question and objectives

The objective of this thesis is to explore the impact of Digital Transformation on the wine industry in Portugal, as this is a historically classic industry, both at the level of customers and at the level of employees and practices (Panda, 2024): to what extent have wine industry activities been (differently) impacted by digital transformation and what have been the main challenge faced during such process? More classic industries tend to be more resistant to change, often with infrastructure limitations (even in companies with very high turnover and profits), due to adopting practices that have been rooted over several centuries. These practices worked and always satisfied all agents involved, from the producer to the consumer (West, 2017).

To test the hypothesis and understand the impacts of digital transformation in this industry, this study will establish several objectives. The first being to understand and identify the main challenges in implementing digital transformation in the wine sector. This type of challenge may be due to a lack of technical and IT knowledge, a lack of capital to invest in technology or simply a lack of need to change these operational processes that have always been manual. Secondly, also understand which activities have the greatest impact on this implementation of Digital Transformation, whether they are support activities such as Marketing, Human Resources or even Accounting, or sectors directly linked to the maturation and collection of grapes and wine.

To add value to digital transformation and the classic wine industry, this thesis also seeks to propose some practical recommendations to improve the integration of small, medium and large companies into this type of transformation. The basis of these recommendations come from national companies that have successfully applied digital transformation and have become partners to boost their sales through greater resource efficiency and improvement of the products sold.

2.3. Sample and Universe

Since the theme of this thesis is the impact of digital transformation on the wine industry in Portugal, obviously the research universe comprises all organizations and individuals that are involved in the wine industry in Portugal, from wine companies, small farmers, cooperatives, winemakers, wine sellers or regulatory bodies from all regions of the country, from Douro, Alentejo, or Dão. From all those involved in this sector in Portugal, the sample selected for the preparation of this thesis is made up of five wine industry companies, which were meticulously chosen to obtain different views on the digital transformation topic, including companies that have more or less. Through interviews to founders and employees, we tried to understand, which ones were more averse to change and whether this was related to the type of person in charge of the company. This sample results from the need to obtain views from various perspectives within this industry, mainly reflecting the differences between large and small companies was collected from a pool of 11 companies identified. The five here presented were the ones that were available and/or willing to participate in this research (this was one of the limitations of this dissertation (check conclusion page 37)).

2.3.1. Socio-demographic characterization of the sample

Our sample was made up of five interviews with business owners and employees in the wine sector. That has already engaged in digital transformation somehow. Due to data protection, we will not disclose the names of the interviewees or the names of the companies they represent. Below is a summary table as well as the term that will be used from now on to refer to a specific individual.

Table 3 Summary Table of the individuals interviewed by me

Name	Interview Number	Age	Role	Companie's age	Number of employees	Liters of wine produced annually
A	1	38	Owner	80 y.o.	5-12	20-30 thousand
B	2	60	Owner	Over 100 y.o.	15-25	50 thousand
C	3	37	Owner	3 y.o.	4-6	2-3 thousand
D	4	41	Head-Of Digital Transformation	Over 80	30-50	100 thousand
E	5	31	Digital Transformation Specialist	Over 70	1000+	60 000 thousand

2.4. Methodological Instrument

One of the most important ways to collect data is through interviews. It is an essential tool for quantitative and qualitative approaches (Selltiz, 1971). Therefore, interviews were chosen as a preferable research instrument to get more detailed answers than it would be possible using surveys or questionnaires.

The wealth of information that can be used is its main advantage. collected by the interviewees' comments on the stimuli presented, as well as the possibility of recording their non-verbal reactions. Furthermore, because the interview is a flexible and personalized interaction, it gives the researcher the opportunity to explore and answer all your questions. It often helps to clarify situations or obtain information that would not be possible through observation alone (Patton, 2002).

Regarding its limitations, it is important to remember that it is an interaction between the researcher and the research object. This can result in an ineffective survey if the respondent misinterprets the questions or if the researcher has trouble communicating (Kvale, 1996). The biggest restriction is the possibility for the researcher to manipulate or induce the responses produced in this interaction. Because of this, the content of the questions must be elaborated and examined in detail (Bryman, 2012). Conducting pilot interviews, adapting the script and making good use of time are some ways to deal with these problems (Silverman, 2013).

However, the focus should be on balance the interaction between the interviewer and the interviewee, as in both cases, the answers can be compromised, and the results can be useless (Denscombe, 2014).

As said, I was working at one of the companies interviewed for 10 months, this allowed participatory observation and facilitated the connection/communication with interviewees (Spadley, 1980).

To identify smaller companies for interview, an uncommon strategy was adopted: using the digital platform "OLX" (one of the major general marketplace platforms in Portugal) because it's not easy to identify companies in this sector. After identified 11 relevant companies related to the wine industry, we were able to interview the only 4 that

were available/interested to respond to the interviews via telephone. The fifth interview was obtained because I worked at that company for several months, one of the reasons for the lack of interest from some of the individuals I called can be justified because I explained to the interviewees that I worked at a company in the wine industry, so they maybe thought it was some strategy to get some type of competitive advantage.

Part III – Analysis and Discussion

Age	The younger respondents, such as 31-year-olds, were more receptive to innovation and had a more dynamic view of new technologies. These respondents work in larger companies and focus primarily on digital transformation processes that increase efficiency and competitiveness in the market, such as implementing chatbots and more agile recruitment systems. That greater inclination toward digital transformation reflects a trend: younger workers, who have grown in digital environments, tend to adopt new technologies in the workplace more easily. On the other hand, older respondents, such as 41-year-olds, show a more strategic perspective. They emphasize the importance of incorporating technological innovations to improve internal processes and product quality. But they also realize important problems, mostly the endurance of older employees. These resistances are frequent, mainly in traditional companies. They show that while digital innovations are increasingly necessary, there is a cultural barrier that needs to be overcome. That point is widely supported by studies showing that digital transformation faces challenges in more traditional sectors when it is accepted by more conservative or less familiar with technology employees (has seen in section 1.1.3).
Company age	Younger companies, up to three years old, tend to benefit from an environment that is already involved in digital technologies (interview 3). Companies usually start with an advanced technology infrastructure that makes it easy to integrate new tools and systems from the start. The respondent emphasized the adoption of the digital practice company, such as using software to monitor wine maturation since its foundation. Kumar and Rajan (2014) corroborate that phenomenon, showing that startups and new businesses can more easily adopt digital technologies because they don't need to replace existing systems. On the other hand, companies with a longer history, such as the one mentioned in Interview 4, with approximately eighty years old, usually face more obstacles by trying to adopt digital innovations. Resistance to change is a big problem, especially when it comes to replacing or updating old systems and persuading a workforce that may be used to traditional

	methods. The respondent talked about the challenges found during the initial and intermediate implementation steps. These challenges reflect the resistance to change that is commonly found in more consolidated organizations. Kotter (1996) emphasizes that older firms usually face larger internal resistance. This may retard or make it hard to adopt new technologies. A different scenario is presented by mature and large companies, such as those mentioned in Interview 5, who are over 70 years old and over a thousand workers. Those companies have many years of history, but they have a lot of resources and a solid framework that helps them implement advanced large-scale technologies. The respondent talked about the adoption of complex tools for quality analysis and control, which is possible because of the available capital and infrastructure. Large companies can take advantage of tech innovations because they have financial power and can invest in new systems, which helps them maintain a competitive position in the market, according to Brynjolfsson and McAfee (2014).
	Small companies with only four employees – and two more during harvest – have a leaner and more adaptable structure. Small dimensions facilitate the development of new technologies, as changes can be communicated and administered faster. According to the interview, the company already uses basic technologies such as Microsoft Excel and digital photos, but it is thinking of using more sophisticated software to control the wine maturation process. This agrees with research that indicates that minor companies can adapt to new technologies faster due to lower organizational complexity and rapidly adapting ability (Agarwal & Helfat, 2009).
Number of Employees	On the other hand, large and medium-sized businesses face different issues. Interview 4 describes a company with more than thirty employees who already deal with more complex internal processes. The respondent talked about how people use tools like Microsoft Teams and chatbots to organize and if it communicates better, which indicates a gradual change for the digital age. However, resistance to change and the need to train more employees are important challenges. This is in accordance with the research by Allen and Helms (2006), who says that companies with a

	larger workforce can find more challenges in implementing new technologies because of the diversity of roles and the need for coordination between various departments. The situation of large corporations with over a thousand employees, as mentioned in Interview 5, is unique. These companies have the capital and infrastructure needed to invest in complex technologies such as grape maturation and microscopes analysis for quality control. However, the implementation of new technologies in an organization of that size can be difficult because of the need to coordinate changes between the various departments and deal with the large number of employees. The company was able to conduct significant innovations despite the initial problems, according to the interview. This corroborates the findings of Westerman, Bonnet and McAfee (2014) that large corporations can eventually overcome the challenges of digital transformation using their infrastructure and scale economy.
Liters of Wine Produced Annually	A company that produces approximately three thousand bottles a year is described in company C. The company can focus on less automated and more manual tasks, such as managing the wine maturation process using Excel and photos, thanks to this small volume. Reduced production can limit the need for heavy investments in sophisticated technologies, which allows companies to operate more crafted and customized. But as production increases, there is a willingness to use more advanced technologies, according to the interview. This is in keeping with research that indicates that smaller low-producing companies may not prioritize sophisticated technological advances unless they are expanding or facing major problems (Brynjolfsson & McElheran, 2016). At Interview 4, the company in question produces more than 100,000 liters per year. The company already has established digital processes for internal communication, such as using Microsoft Teams and a chatbot. To maintain efficiency and quality, larger scale production requires more effective coordination and integration of technologies. Consistency and final product excellence depend on implemented technologies, such as grape maturation analysis tools and quality control. To maintain competitiveness and quality, the implementation of digital technologies on that scale is seen as a necessity (Chen, Mocker, & Preston, 2017).

	A company produces more than 80 million bottles annually as demonstrated in Company E. The company invests heavily in sophisticated technologies such as chemical analysis systems and tools to optimize the maturing process due to high production volume. Complex management of processes and resources required for high-quality production justifies the use of digital technologies to increase the efficiency and quality of products. To remain competitive in a global market, you should be able to adopt and integrate new technologies. Literature indicates that large firms generally have the resources required to invest in innovations and can gain great benefits from digital transformation in terms of scale and operational efficiency (Kane et al., 2015).
Examples of Digital Transformation in the Company	The company, which produces about 3000 bottles per year, uses simple digital transformations in Company C. An example of initial scanning is the use of basic tools like Microsoft Excel and photography apps to administer the barrel maturation process. The company is not yet implementing sophisticated technologies, but acknowledges that as production increases, more complex systems are necessary. Small companies, which use basic digital tools to meet their immediate needs, usually go through that digital transformation stage (Bharadwaj, El Sawy, Pavlou and Venkatraman, 2013). The company shows a more advanced level of digital transformation in Company D. The company is modernizing its administrative and operational processes, implementing a chatbot to manage agendas and using Microsoft Teams for internal communication. Employees hope to use these technologies to communicate better and work more efficiently. Middle-carry companies are the ones needing the most of digital transformation, and the implementation of systems that help optimize coordination and resource management is a way to reflect those needs (Westerman, Bonnet, & McAfee, 2014). The company that produces over 80 million bottles is at the forefront of digital transformation as demonstrated in Interview 5. The company recreated its website to facilitate recruitment, is implementing chatbots to help employees and implement sophisticated technologies for chemical analysis and quality control of the wine. These examples demonstrate a

	significant investment in technologies that improve the efficiency of internal processes and ensure the high-quality product worldwide. A market leadership-centered digital transformation approach is indicated by the presence of sophisticated tools and ongoing innovation (Fitzgerald, Kruschwitz, & Bin, 2013).
Innovation that should be implemented in the Company	In the first interview, the company, which has been operating for ten years and produces 10,000 bottles annually, is seeking to implement an ERP system to improve production and sales. This creation arises as a response to the need to maintain a lean structure at the same time in which the processes are optimized. Essential processes can be integrated and automated with the use of an ERP system, which makes management easier and allows for long-term development. In the second, the interviewee emphasized the use of tracking technologies and data analysis tools to improve production and ensure the quality of wine. To predict the quest and increase efficiency, the integration of automation solutions and predictive analysis is one of the expected changes. This shows that, even when the company is in a more advanced stage of development, she wants to continue being competitive and innovative. In the third interview, the respondent of a three-year company of modest operation and production said the use of software to monitor the maturation process of the barrels was necessary. The company now uses less sophisticated methods such as Microsoft Excel and photos taken with the cellular. This situation shows how a company is growing and acknowledging the importance of modernizing its processes as production increases, but it is still not an immediate priority to make those innovations.
Main Difficulties	In all interviews, staff resistance to adopting new technologies is a common problem. Resistance to change is a major problem for companies like Interview 2, which has 15 years of operation and produces 50,000 bottles per year, and Interview 4, which has more than 80 years of operation and produces more than 100,000 liters per year. Employees usually have problems accepting new tools and processes, which can delay launch and cause tension in the desktop. Fear of the unknown and insecurity with new forms of work are often associated with resistance.

	Proper training and effective communication are essential to the success of digital transformation in different sized companies such as Interview 1, which has ten years of operation and produces 10,000 bottles per year, and Company E, which is over seventy years old of operation and produces 80 million bottles per year. Delays and confusion can be caused by the difficulty in training employees and clearly explain the benefits and operationality of new technologies. Lack of communication can often lead to slow and ineffective adoption of innovations. Bigger companies, such as Interview 5, are facing great difficulties by integrating new technologies into their existing structures. It is common for people to worry about the difficulty of adapting new systems to existing processes and ensuring that all parts of the organization can work cohesively. The difficulty of integrating technologies can cause transient operational failures, which require constant adjustments during implementation. While not directly mentioned in all interviews, a prevailing concern is resource manage- ing and costs associated with digital innovations. Companies such as Interviews 1 and 3 have minor structures and resources and may have additional problems when trying to allocate staff and budget for adopting new technologies. The struggle to balance costs with the potential benefits of innovation can be a big challenge. Adaptation to new work methods is also a common problem. In companies such as Interview 4, the complexity of new tools such as chatbots and advanced analysis systems may require a period of adaptation for employees to familiarize themselves with new procedures and learn to use them effectively.
Initial Phase, Transition, Final Phase	The initial phase of all interviews is marked by strong resistance to change and uncertainty by employees. Resistance is shown primarily in doubt and fears on the effects of new technologies on interviews 1 and 4, respectively, with a young and small company. Preparation is required at this stage, and the lack of clear communication can increase employee resistance and anxiety. Effective communication of changes at this stage and proper preparation of employees are essential. Company E shows that talking about new innovations such as chatbots and advanced systems can be particularly

	difficult at first. Slower adoption and higher resistance can be caused by inadequate communication or clarification. Throughout the change process, companies such as Interview 3 find significant difficulties in incorporating new technologies to existing processes. Adaptation and adjustment of new systems can result in operational failures and instability. Interview 4 emphasizes the costume that unforeseen errors occurred in the chatbot implementation process added additional problems. Continuing adaptation to new processes and employee training are essential currently. As Interview 2 shows, the challenges of training and adjusting processes during the transition can cause delays and confusion. Employees need to adjust and adapt to the new tools. Initial problems and systems optimization should be solved in the final stage. As demonstrated in Interview 5, when systems are in operation, the focus moves to solve pending problems and increase efficiency. As processes stabilize and staff familiarize with new technologies, difficulties tend to decline at this point. Despite the challenges faced in early stages and the transition period, the benefits of digital innovation become more evident in the final step. Upon implementation, efficiency and processes improved and employees better adapted to new tools, as interviews 1 and 3 demonstrate.
Responsible for training	At Interview 1 and Interview 4, the project leader or manager responsible for implementing innovation directly responsible for employee training. The respondent, who also owns the company, personally oversees training in Company A, using an approach that resembles a family working environment with a small team structure. Similarly, in Interview 4, the innovation responsible is responsible for training employees after the completion of the chatbot project. This method can be useful for obtaining detailed information about innovation and direct communication. However, if the leader is overwhelmed with other responsibilities or does not have the right skills to teach, this can be harmful. Trainings can be less organized and informal, which can result in unequal absorption of knowledge by employees. In the second interview, the respondent said that the leaders in each sector get training, and they then teach their teammates. Adaptation of training

	to the unique needs of each department can be facilitated by that decentralized model. The advantage of that method is that employees receive personalized training and adapted to their role, which can improve the relevance and effectiveness of training. However, there is a disadvantage, which is that the quality of the training can vary according to the knowledge and skills of the trainees and trainers for training in each department. In addition, there may be inconsistencies in the data transmission process. The training is supported by external and expert consultants, who help in the implementation and training of new technologies in interviews 3 and 5. In Interview 5, consultants play an important role in providing specialized information and training, especially in complex technological innovations. The main advantage is the in-depth knowledge and experience that specialized advisors can provide, ensuring that the team receives exceptional training based on industry best practices. The drawback of the training, however, is that it can be less personalized for the needs of the company and may require external services.
Where the Innovation comes from?	The first interview allows the respondent to base their thoughts on previous experiences in other companies by observing and comparing procedures and practices. This practical experience will help you identify areas in which digital transformation can be beneficial. In the same way, in Company B, the experience and observation of processes in large firms or multinationals (benchmarking) are cited as significant sources of inspiration for innovation. That method allows for the implementation of best practices based on concrete experiences and direct comparisons with other organizations. However, it can be difficult to adapt those practices to the specific context of a company. This is especially true when conditions or resources are extremely different. At Interview 4 and Interview 5, external consultants and experts, which provide insights and advice based on emerging trends and technologies, provide the ideas for digital innovations. These consultants have access to a wide range of information about practices and technologies that can be used to improve an organization's internal processes. External consultants can provide a fresh perspective and up to date knowledge on the latest

	trends in technology, which can accelerate technological progress. Excessive reliance on consultants, on the other hand, can be expensive and result in results that are not fully aligned with the company's internal culture and procedures. In the third interview, the respondent says that internal needs and employee opinions are the source of innovation ideas. For example, the limitations of the current process and the difficulties faced by the team have determined that software to monitor wine barrel maturation was necessary. The advantage of that approach is that innovations are directly aligned with the actual needs of the company and employees, which can ensure that they are more accepted and applicable. On the other hand, internal management or employees may have difficulty seeing new perspectives. At Company E, the company invests in research and development to develop new products, while in Interview 2, the respondent says ideas for innovations also come from inquiries and internal research. Internal research and development allow closer alignment with the company's unique needs. Conducting internal research and development, on the other hand, may require considerable investment in time and resources.
Digital Transformation in the Product vs Support areas	Digital transformation has a direct impact on product quality as demonstrated in interviews 3 and 5. To improve the quality of the final product, the respondent wants to implement software to monitor wine barrel maturation. In a similar way, in Interview 5 technological changes, such as using tools for measuring grape maturation and chemical analysis of corks and wine are mentioned. These developments are intended to improve the quality of wine by ensuring a more consistent and higher value product. Innovations that are directly linked to the product can give the final product a significant advantage over competitors. However, these innovations may require high investments in technology and may be more difficult to implement because they need specialized training and integration with existing processes. Digital transformation is used primarily in support fields such as communication management and administrative processes, interviews 1 and 2. In Interview 1, the respondent talks about using basic tools such as computers and manages, while in Interview 2, the respondent highlights

	the use of a ChatBot to manage scheduling and answer employees FAQs. That type of scanning is meant to increase efficiency of operations, reduce time spent on administrative tasks and improve internal communication. The scanning of the supporting sectors can save time and resources by increasing the overall efficiency of the company. However, it may not directly affect product quality, which may prevent people from perceiving the value of innovations if the focus is only on improving administrative and internal procedures. The respondent notes in the second interview that digital transformation has an impact on both support areas and product processes. He believes that while scanning makes support processes more efficient, it is also critical to the continuous enhancement of the product. In a similar way, in Interview 4, digital transformation is considered essential to optimize administrative processes and improve product quality, with the belief that both areas need to be improved to ensure company competitiveness and growth. Implementing digital transformation in support and manufacturing processes can result in a more productive and competitive organization. Finding that balance, on the other hand, can be difficult as it requires efficient allocation of resources and careful management of expectations and priorities.
Does Digital Transformation take employees jobs?	The initial perception that digital transformation can result in a job replacement is present in interviews 2 and 5. In the second interview, the respondent mentions that in theory, the application of technologies can reduce the need for labor as the machines can take tasks that were once done by people. Similarly, in Interview 5 the respondent initially thought that scanning could reduce employee needs, but later discovered that innovations usually lead to new roles in other departments. Technologies that automate repetitive tasks can increase concern with reducing jobs. However, the effects can be reduced if the company spends money to train its employees for new duties. The disadvantage of the change is that it can cause uncertainties and concerns amongst employees, which can affect employee morale and confidence in management. Interviews 1 and 3 present a different perspective, in which digital transformation does not necessarily result in loss of jobs. The respondent highlights in Interview 1 that despite digital changes, the company still has

	a reduced workforce, and that scanning helps optimize processes without reducing staff. Similarly, the interviewee in Interview 3 believes that technological changes in minor and more family-friendly companies help keep agile and competitive organizations rather than reducing the number of employees. Digitization does not lead to a reduction in jobs can be seen as an advantage as it allows companies to expand and maintain a team involved and qualified. However, the company can find problems to manage the transition and ensure that all workers adapt to new technologies. Interviews 2 and 5 show that the impact of digital transformation on the workforce can vary depending on the type of innovation. Developments that increase product efficiency and quality can create new opportunities and functions, while developments that automate repetitive processes can decrease the need for manual labor. Interview 5 respondent notes that digital transformation often allows the creation of new positions and functions, compensating for reducing jobs in other sectors. Adaptation of the workforce to new technologies may require investments in training and development but may result in a more qualified and prepared team to face obstacles in the future. The initial cost and time required to train and adjust employees are the problems.
Can a small companies compete more easily with bigger ones because of Digital Transformation?	Digital transformation has been a big change for small businesses. The owner of a small wine has said in one of the interviews that despite its limited production, the digitization has allowed their company to operate with comparable efficiency to that of large corporations. The use of digital tools has helped optimize processes and reduce costs, which allowed companies to compete better in the market (Interview 1). Thus, a middle-carry company manager said scanning support areas such as recruiting and communication made her company more agile and effective, which made it more competitive compared to larger companies (Interview 3). However, digital transformation also brought problems. A representative of a large company noted that while scanning gives greater competitiveness to small businesses, large corporations continue to have significant advantages due to their more abundant size and resources (Company B). Large companies can invest more in innovation and are better able to support the costs associated with scanning, which can result

	in unequal competition. On the other hand, digitization also offers large businesses new opportunities. Digital transformation has increased competition and made the market more dynamic, according to the large company interviewed. Even large companies are required to quickly change their strategies and operations to maintain their competitive advantage, as smaller companies can enter the market and compete more effectively with the help of accessible digital tools (Interview 5).
Would Digital Transformation be more impactful in other industries?	Digital transformation is essential for industries like the wine industry, but it is important for more than that. The respondent of a small wine has emphasized that while digital transformation is crucial for quality management and the optimization of production processes, it is equally important in all sectors. He stated that scanning is no less important in traditional sectors such as wine where adaptation may be more difficult due to the craft nature (Company A). However, he also highlighted that digital transformation can be even more important in sectors where rapid adaptation and innovation are essential to success and survival. A representative of a great wine has corroborated that idea saying that while digital transformation is key to the wine industry, it is no more meaningful in that industry than in other industries. Scanning in any sector is essential for efficiency and competitiveness, he said. In a costume, he noted that digital transformation has a universal impact, even if he faces specific problems in more traditional sectors such as the wine industry and should be seen as more significant compared to more modern sectors (Interview 2). On the other hand, the respondent of a large company operating in various regions and sectors emphasized that digital transformation is equally important regardless of the industry. Digitization is essential for operational efficiency and innovation, he said, although some sectors may face additional problems because of the nature of their operations or resistance to change. This point of view suggests that while digital transformation may face some challenges in traditional sectors, its importance is not necessarily reduced by it (Interview 5).

Conclusion

This research process had strengths like the diversity of companies ranging from the four employees to more than a thousand companies, also the fact that I was used to the terms used in this industry facilitated my communication with all respondents and for that reason some of them also accepted. I also acknowledge weaknesses/limitations, such as the fact that my sample is reduced and unrepresentative, some difficulties in identifying the universe (lack of business directories in this branch) and those difficulties led to the OLX appeal to establish contact with the respondents.

The digital transformation of the wine industry in Portugal is not only a big challenge, but also a unique opportunity to modernize a traditional industry. Throughout this study, it was clear that improving is not limited to adopting new technologies. It also involves deep change in operational processes, resource management, and how companies interact with the market. While the wine industry has a strong connection with Portuguese history and culture, it is inevitable to change to the modern era, especially in an increasingly competitive and dynamic world.

All steps of the wine value chain, from production in the vineyards to the marketing of the final product, can be optimized with scanning. Artificial intelligence, large data, and predictive analysis have the potential to change how agricultural and industrial operations are executed by increasing sustainability and efficiency. For example, applications that can reduce production costs and improve wine quality include drone use to monitor vineyard health and sensors to monitor grapes maturation. A more efficient use of natural resources such as fertilizer and water can be done more efficiency, which reduces the negative impact on the environment and promotes more sustainable agricultural practices.

However, resistance to change is one of the biggest obstacles faced by the wine industry in Portugal. This is particularly true for smaller family businesses with many years of history. Older workers, who prefer (or are used to) traditional methods of production, can see adoption of new technologies as a threat. In addition, another significant obstacle is the lack of enough digital infrastructure, particularly in rural areas, where most vineyards are located. For example, the lack of internet connectivity makes it difficult to implement sophisticated technological solutions in agricultural areas, delaying the process of digital transformation.

The future of the wine industry in Portugal depends on the ability of companies to adapt and innovate to the new market demands, despite all those obstacles. Wine companies that can successfully implement digital transformation will have better competition conditions both on the

national and international market. Since scanning offers tools to improve the efficiency and quality of products without the need for large investments in additional, small and medium-sized workmanship can particularly benefit from it. In addition, companies can increase their range with scanning, which allows them to target global markets by means of digital marketing strategies and e-commerce platforms.

It is critical to rebound that digital transformation should not only be used to improve operations efficiency, but also to aggregate value to products and brands' communication. The use of digital platforms to tell the story of a wine, showing the production process and emphasizing the distinct qualities of each wine can attract more consumers. By combining innovation and tradition, this approach can increase the perception of value of Portuguese wines in the global market and differentiate the product from international competition.

Finally, companies must adopt a continuous change mindset for digital transformation to be successful. This means that employees should be given training to familiarize themselves with new tools and procedures, as well as establishing a business culture that values flexibility and innovation. Overcoming the obstacles of monitoring, mainly in terms of infrastructure and financing, will require cooperation between businesses and government and regulatory organizations.

I would like to point out some possible directions for future research (eg, impact of digital transformation on the level of competitiveness - and survival - of companies, level of internet access to firm productivity in different regions, identification of agents and relevant investments for support the digital transformation of this sector, etc.

Digital transformation is an ongoing process that requires an integrated and strategic approach. Companies that can balance the need for innovation with respect for traditions will be better prepared to meet future challenges and take advantage of the opportunities offered by an increasingly digital and interconnected global market. Thus, the Portuguese wine industry can preserve its rich cultural heritage while simultaneously prospering in an ever-changing business world.

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Attachments

Attachment 1 – Interview 1

Interviewer – Thank you very much for agreeing to do this interview, today is Monday, July 3rd and it is currently 2:30 pm. I would like to start by informing you that this interview is completely anonymous to protect both your identity and the company's information, so the only statistical data I would like to ask about to start the interview is how old are you and how old is the company?

Interviewee – Good afternoon, thank you for your interest and for this brief introduction. I'm 38 years old and I'm the owner of this company, which is 80 years old.

Interviewer – Still about the company, we are talking about a company with how many employees, and which produces how many liters of wine annually?

Interviewee – At the moment we have 5 employees, but at harvest time we have 10-12. Every year it depends a lot on how good the harvest was that year, but I would say between 20-30 thousand liters of wine... Now we have around 5 hectares which gives us this productivity.

Interviewer – In which region is this harvest grown?

Interviewee – We are present in the Alentejo region.

Interviewer – Thank you very much, I would now like to ask you about the main topic of the thesis I am writing and ask you about Digital Transformation. Have you ever heard of this topic, are you familiar with it?

Interviewee – I confess that I had heard of it, but nothing special. I imagine that, as the name says, it is the name given to a process that becomes digital and stops using paper, for example.

Interviewer – Okay, a brief introduction to digital transformation is that it has been present for longer than we can imagine and not just in our own company's processes. We already enjoy it when we don't have to stop at tolls to physically pay an employee, we just need a device with a chip for them to scan while passing through tolls and the money is automatically debited from our bank account. We already enjoy digital transformation

when it makes it easier for us to get a password only when we arrive at Social Security, but rather when we are leaving home and using the application. Basically, digital transformation involves all processes that make our lives easier through technology, inside and outside the organization.

Interviewer – With that said, do you remember any examples of digital transformation that you apply in your company?

Interviewee – So, from the top of my head, I remember the payroll and accounting sheets that used to be made up of countless sheets and all added up with a calculator and nowadays it's a much faster process. I don't know if this counts, but I still go back to the time when we were sending bottles to all types of restaurants and future customers to try our wine and nowadays it's something easier to get online... We can much more easily present the product to a more distant customer and if he is interested, we send the wine.

Interviewer - And is there any innovation you would like to apply in your company?

Interviewee – Yes, I am aware of a device used to understand the perfect grape ripening point, so this type of equipment would be interesting. In the previous question I forgot to say that bottling is also done with a machine that has a barrel that contains many liters of wine and this fills the bottles. As for new innovations, I would basically like to apply them more directly to wine production.

Interviewer – What are the main difficulties you experience when applying this type of innovation?

Interviewee – There is always the monetary factor, for example using this type of equipment to measure grape ripeness can become expensive, especially in the short term... It is also necessary to dedicate time to employees so they can learn the new processes.

Interviewer – When you are going through this phase of applying a new means of digital transformation, do you experience more difficulty at the beginning, middle or end of the process? In other words, before you start implementing it, are you explaining to employees how it will work, during the change process or after it has already been implemented?

Interviewee – Certainly in the middle of the process. I usually say that they can understand everything but not apply anything. It's a joke, but it ends up being true in the sense that when we are explaining some change or process that will happen, none of them raise any doubts and everyone understands the concept well, but it is only when we are applying it that problems start to appear.

Interviewer – When you are applying this type of process, how do you usually delegate tasks, that is, who does the training for employees, etc.?

Interviewee – It's always me. Depending on the process, but as a rule I start working, for example, with the program in question and after understanding whether it is something we will apply, I explain to the employees how it works.

Interviewer – And where do you get the ideas that certain processes need changes as well as the best ways to apply them.

Interviewee – Through lunches and dinners with friends in the same industry, sometimes also social networks after watching a video or something similar.

Interviewer – We already talked about this at the beginning of the interview, but do you feel more of an impact from digital transformation in processes directly linked to wine or in more support areas?

Interviewee – In my case I feel it in the support areas because there is little digital transformation that I remember in the grape maturation/ripening process, but I believe that once applied it should be spectacular and equally important.

Interviewer – When you apply digital transformation to one of your processes, do you feel the need to have fewer people in the company?

Interviewee – This is obviously the case, for example, automatic bottling replaces the work of 2 or 3 employees, but in my case, I always ended up reallocating these employees by associating them with distribution or the harvest itself. So yes, it replaces many jobs, but we always end up finding alternatives.

Interviewer – We are almost finished, do you feel that in a way digital transformation is in some way related to the company's ease of growth, that is, a small company will compete more with a larger company because these normally cheaper resources allow a

“balance of accounts” where companies that are growing no longer need to hire dozens or hundreds of employees to compete.

Interviewee – Yes, it is always an added value and something that helps us compete with certain companies that have a very large share.

Interviewer – Finally, if you didn't have a classic industry like wine, do you feel that digital transformation would be even more important and would have even more strength?

Interviewee – It depends a lot on the area, it always ends up being necessary... Whether it's one more or not, I can't tell you why it's there, it depends a lot on the sector itself. In a technology company certainly, in other sectors I can't confirm that.

Interviewer – Thank you very much for your time and availability, it was a pleasure talking to you.

Interviewee – The pleasure was all mine, a hug!

Attachment 2 – Interview 2

Interviewer – Thank you very much for agreeing to do this interview, today is Friday, July 5th and it is currently 3:30 pm. I would like to start by informing you that this interview is completely anonymous to protect both your identity and the company's information, so the only statistical data I would like to ask about to start the interview is how old are you and how old is the company?

Interviewee - Hello good afternoon! Thank you for the invitation, I am 60 years old and the company is over 100 years old.

Interviewer - Still about the company, we are talking about a company with how many employees, and which produces how many liters of wine annually?

Interviewee - It depends on whether it is harvesting time or not. But it varies between 15-25 employees. Per year it also depends, but about 50 thousand liters of wine.

Interviewer - In which region is this harvest grown?

Interviewee – Douro region.

Interviewer - Thank you very much, I would now like to ask you about the main topic of the thesis I am writing and ask you about Digital Transformation. Have you ever heard of this topic, are you familiar with it?

Interviewee - Yes, I'm familiar with the concept. I don't know in depth, but I know the cases that I believe everyone knows.

Interviewer - Perfect! I'm just going to give a small introduction so that we are perfectly framed! Digital transformation has been present for longer than we can imagine and not just in our own company's processes. We already enjoy it when we don't have to stop at tolls to physically pay an employee, we just need a device with a chip for them to scan while passing through tolls and the money is automatically debited from our bank account. We already enjoy digital transformation when it makes it easier for us to get a password only when we arrive at Social Security, but rather when we are leaving home and using the application. Basically, digital transformation involves all the processes that make our lives easier through technology, inside and outside the organization.

Interviewer – With that said, do you remember any examples of digital transformation that you apply in your company?

Interviewee - Yes, we have several examples. The first one that I remember starts right in the recruitment process, in the past we would post in places around the region saying that we were hiring, and we would talk to recruitment companies. Nowadays it is much easier through our website or social networks like LinkedIn to receive CVs digitally and only print them when we are going to do a physical interview. Then obviously we also end up having in our processes related to the grape collection itself in which employees send us photos daily, so we know how the day went.

Interviewer - And is there any innovation you would like to apply in your company?

Interviewee - Yes, without a doubt! Now we are digitizing all the processes that we normally did and stored on paper and covers and now we are trying to switch to Blockchain and make this type of procedure more dynamic. I would also like to be able to make wine fermentation in the skins more dynamic, by analyzing the wood and calculating the perfect time to bottle it.

Interviewer - What are the main difficulties you experience when applying this type of innovation?

Interviewee - The first thing I remember is always the question of time. We are always busy doing all kinds of tasks and this branch is a very complex branch that requires exceptionally detailed work. It is different from the production of juice, for example, as sometimes we can produce a harvest this year that will only be bottled next year and this type of uncertainty and detailed deadlines make the business especially complex, which is quite time consuming. Then we also have the money factor, obviously... There are certain types of equipment that are quite expensive and being related to time, we have the training that employees need to have to get used to this type of change. Because they are also already busy and "wasting" 2 or 3 hours teaching a new process makes the desire to introduce that process demotivating.

Interviewer – When you are going through this phase of applying a new means of digital transformation, do you experience more difficulty at the beginning, middle or end of the process? In other words, before you start implementing it, are you explaining to employees how it will work, during the change process or after it has already been implemented?

Interviewee - Always at the beginning and in the middle. At the beginning because the employees themselves often don't have the desire to change and then that learning phase in which more mistakes are made makes the process more difficult at that stage.

Interviewer - When you are applying this type of process, how do you usually delegate tasks, that is, who does the training for employees, etc.?

Interviewee – It's always me. As I am usually the one who brings innovations to the company, I am also the one who learns them first and provides training.

Interviewer - And where do you get the ideas that certain processes need changes as well as the best ways to apply them.

Interviewee - Many of them come from my children (laughs), they also work at the company, and they often see videos on the internet or other companies will talk to them so they get the ideas.

Interviewer – Do you feel more of an impact from digital transformation in processes directly linked to wine or in more support areas?

Interviewee - In my specific case I would say perhaps in the support areas. I don't know how it works in other companies, but all these Human Resources processes, communication between the team, etc. became 1000 times faster.

Interviewer – When you apply digital transformation to one of your processes, do you feel the need to have fewer people in the company?

Interviewee - Honestly no. It's all about relocation, we even have an example of an employee who was responsible for part-time payroll and when we changed the payroll process, he became responsible for getting candidates for the harvest seasons and for payroll work that was left.

Interviewer – We are almost finished, do you feel that in a way digital transformation is in some way related to the company's ease of growth, that is, a small company will compete more with a larger company because these normally cheaper resources allow a “balance of accounts” where companies that are growing no longer need to hire dozens or hundreds of employees to compete.

Interviewee - That's a good question, I've never thought about that perspective before. But yes, the example I just gave you really explains this. In other words, a company that previously needed one employee for Payroll and another for Recruitment now only needs one due to process improvements. As it becomes cheaper, more companies can enter due to the costs being more balanced.

Interviewer – Finally, if you didn't have a classic industry like wine, do you feel that digital transformation would be even more important and would have even more strength?

Interviewee - I don't think so. It is a tool that is necessary for all companies, we all have Human Resources, Marketing and inventories. So, it might help one or the other, but I don't think it's something very noticeable.

Interviewer – Thank you very much for your time and availability, it was a pleasure talking to you.

Interviewee – Thank you!

Attachment 3 – Interview 3

Interviewer – Thank you very much for agreeing to do this interview, today is Monday, July 10th and it is currently 10 am. I would like to start by informing you that this interview is completely anonymous to protect both your identity and the company's information, so the only statistical data I would like to ask about to start the interview is how old are you and how old is the company?

Interviewee - Good morning. I'm 37 years old and the company is only 3 years old.

Interviewer – Still about the company, we are talking about a company with how many employees, and which produces how many liters of wine annually?

Interviewee - We are still a very small company, we only have 4 employees, excluding at harvest time when we have 2 more. I honestly don't know how to answer the annual liters, but there are around 3000 bottles.

Interviewer – In which region is this harvest grown?

Interviewee - Now, only in the Douro region.

Interviewer – Thank you very much, I would now like to ask you about the main topic of the thesis I am writing and ask you about Digital Transformation. Have you ever heard of this topic, are you familiar with it?

Interviewee - Yes, I've heard about the topic! But I think it's common to hear. I confess I don't know the complete definition, but you will certainly explain it to me.

Interviewer – Yes, a brief introduction to digital transformation is that it has been present for longer than we can imagine and not just in our own company's processes. We already enjoy it when we don't have to stop at tolls to physically pay an employee, we just need a device with a chip for them to scan while passing through tolls and the money is automatically debited from our bank account. We already enjoy digital transformation when it makes it easier for us to get a password only when we arrive at Social Security, but rather when we are leaving home and using the application. Basically, digital transformation involves all processes that make our lives easier through technology, inside and outside the organization.

Interviewer – With that said, do you remember any examples of digital transformation that you apply in your company?

Interviewee - Honestly, I don't remember many because the company is very new, so we entered the market with this type of transformation already very present. Before I had this company, I had others and the digital processes we have are the same, we use computers to do everything, so I think this could be an example.

Interviewer - And is there any innovation you would like to apply in your company?

Interviewee - Yes, there is always room for improvement. I would like to have software that shows us exactly how the maturation process of each barrel is going. This would make it easier to make changes, see dates, etc. Now this is our most old-fashioned process, we work with Excel and photographs taken on our cell phones. As we still don't have very high production, we are able to keep things organized, but with a higher production volume it is something that will be necessary.

Interviewer – What are the main difficulties you experience when applying this type of innovation?

Interviewee - Now I'm not facing any major difficulties, as I mentioned, our company is still very small and has a family nature... I have my wife and my brother also working here, so when I inform them that there will be some change, they have complete trust in me and are always ready to learn.

Interviewer – When you are going through this phase of applying a new means of digital transformation, do you experience more difficulty at the beginning, middle or end of the process? In other words, before you start implementing it, are you explaining to employees how it will work, during the change process or after it has already been implemented?

Interviewee - If I had to choose one, I would say during implementation.

Interviewer – When you are applying this type of process, how do you usually delegate tasks, that is, who does the training for employees, etc.?

Interviewee – Like I said before, that comes from me.

Interviewer – And where do you get the ideas that certain processes need changes as well as the best ways to apply them.

Interviewee - I had a brief experience at a multinational wine company where I was able to see their processes, so I have an idea of what the company needs...

Interviewer – Do you feel more of an impact from digital transformation in processes directly linked to wine or in more support areas?

Interviewee - I think it's 50/50. For a smaller company, the most important thing will be to improve processes in support areas so they can allocate all their energy to improving their product, which in this case is wine, and be increasingly competitive. If the company starts to get bigger, I think it makes more sense to allocate more time to digital transformations that also help us with wine directly.

Interviewer – When you apply digital transformation to one of your processes, do you feel the need to have fewer people in the company?

Interviewee - In my case not because there are few of us, but in a larger company I think this is the case. If we have a machine that replaces 20 employees, even if they can go and help in another area, they will always end up having employees who are doing "nothing" and are fired.

Interviewer – We are almost finished, do you feel that in a way digital transformation is in some way related to the company's ease of growth, that is, a small company will compete more with a larger company because these normally cheaper resources allow a “balance of accounts” where companies that are growing no longer need to hire dozens or hundreds of employees to compete.

Interviewee - I think so, for example us. With just a few employees, we managed to have an organized and cohesive structure, very similar to large corporations, without having to spend a lot of resources. This ends up helping us to launch on the market.

Interviewer – Finally, if you didn't have a classic industry like wine, do you feel that digital transformation would be even more important and would have even more strength?

Interviewee - I don't think so, it ends up being important in all companies.

Interviewer – Thank you very much for your time and availability, it was a pleasure talking to you.

Interviewee – Thank you, and good luck with your thesis.

Attachment 4 – Interview 4

Interviewer – Thank you very much for agreeing to do this interview, today is Thursday, July 20th and it is currently 3:00 pm. I would like to start by informing you that this interview is completely anonymous to protect both your identity and the company's information, so the only statistical data I would like to ask about to start the interview is how old are you and how old is the company?

Interviewee - Hello, thank you very much for the invitation. I'm 41 years old, I've worked at this company for 5 years and I think it's over 80 years old.

Interviewer – Still about the company, we are talking about a company with how many employees, and which produces how many liters of wine annually?

Interviewee - In recent times we have had some departures, but we have more than 30 employees and during harvest time it can exceed 50. About the liters of wine, it easily exceeds 100 thousand.

Interviewer – In which region is this harvest grown?

Interviewee - We currently make wine in the Dão region.

Interviewer – Thank you very much, I would now like to ask you about the main topic of the thesis I am writing and ask you about Digital Transformation. Have you ever heard of this topic, are you familiar with it?

Interviewee - Yes, it is one of the branches of the company that is under my responsibility, so if I didn't know, the boss would fire me (laughs).

Interviewer – Perfect, so we can move on!

Interviewer – What are the best examples of digital transformation that you apply in the company that you work for?

Interviewee - There are lots of them. Starting with our most recent project which involves a ChatBot for employees who, when they have a question about schedules, meetings, etc., ask the bot and it automatically responds by analyzing each employee's schedule, etc. It is also possible to ask the bot to schedule a meeting for 2 pm on X Day and it automatically sees the availability of the people who are going to hold the meeting. If

these are not available, the bot also recommends new dates that everyone can attend. This project was a lot of work but at the same time very rewarding when it was finished. So, simpler tools, for example, we have Microsoft Teams, which is basically our entire communication structure and hierarchical organization. This tool has greatly speeded up the messaging process that was previously done solely through emails and is therefore much more practical.

Interviewer - And is there any innovation you would like to apply in your company?

Interviewee - Yes, there is always room for improvement. I would like to improve the company's recruitment process through our website, to make it more practical for our candidates to show interest in vacancies because now it is quite laborious. The company works a lot with recruitment companies, and this is quite expensive, so if we have better recruitment options, we can save a lot of money.

Interviewer – What are the main difficulties you experience when applying this type of innovation?

Interviewee - The main difficulties are asking for training and convincing employees of the measures that will be taken. Senior management is completely open to changes and whenever I make improvement proposals, they are always willing to listen and allocate a large part of the company's capital to improve processes. Employees are often afraid of change and have lower morale.

Interviewer – When you are going through this phase of applying a new means of digital transformation, do you experience more difficulty at the beginning, middle or end of the process? In other words, before you start implementing it, are you explaining to employees how it will work, during the change process or after it has already been implemented?

Interviewee - It's in the early stages of the application phase, but if I had to pick one, I'd say the middle one. The example I mentioned earlier about Chatbot, I remember when I was presenting this innovation to employees, they were telling me that "now they were talking to robots instead of talking to humans" which didn't even make much sense because the bot just replaces the employee's calendar. Teams and schedules, then when we were implementing it it was more complicated because the bot itself made errors that

we weren't expecting and now the employees have come to me and told me that it is actually much more practical, and that the robot helps them a lot. It's normal, as human beings we are all afraid of the unknown...

Interviewer – When you are applying this type of process, how do you usually delegate tasks, that is, who does the training for employees, etc.?

Interviewee - It depends on the innovation, in the case of Chatbot I was something because it was a very personal project that I carried out side by side with our programmer, in more specific scenarios I normally explain the process to the Head-Of of the area and he passes the information to the respective employees.

Interviewer – And where do you get the ideas that certain processes need changes as well as the best ways to apply them.

Interviewee - I have some meetings with consultants, and I am also in close contact with wine companies in Spain and France, which gives me lots of opportunities to study their processes and compare them with ours.

Interviewer – Do you feel more of an impact from digital transformation in processes directly linked to wine or in more support areas?

Interviewee - I think it's a different impact, while on the one hand digital transformation improves the product, on the other hand it makes processes faster. I think both are equally important.

Interviewer – When you apply digital transformation to one of your processes, do you feel the need to have fewer people in the company?

Interviewee - Honestly, no. At the beginning of my career, I thought so, but at this stage I think not. Obviously, we have some cases where a machine comes to replace dozens of employees and this can be very impactful, but as a general rule we end up generating new jobs that we didn't even know would be needed before having this surplus.

Interviewer – We are almost finished, do you feel that in a way digital transformation is in some way related to the company's ease of growth, that is, a small company will compete more with a larger company because these normally cheaper resources allow a

“balance of accounts” where companies that are growing no longer need to hire dozens or hundreds of employees to compete.

Interviewee - Yes. We see from the number of companies that exist today, in the past much more capital was needed to start a company. In fact, I believe that this was one of the reasons why the Social Capital to create a company fell from 5,000.00€ to 0.00€. Because nowadays with the help of digitalization and technology it is easier to compete in these markets.

Interviewer – Finally, if you didn't work at classic industry like wine, do you feel that digital transformation would be even more important and would have even more strength?

Interviewee - I don't think so. It's equally important in all industries, I don't like differentiating companies and areas like that. We all have several departments, nowadays nothing can be done without chips, computers and the internet, so I think it's just as important.

Interviewer – Thank you very much for your time and availability, it was a pleasure talking to you.

Interviewee – Thank you!

Attachment 5 – Interview 5

Interviewer – Thank you very much for agreeing to do this interview, today is Thursday, August 29th and it is currently 2:30 pm. I would like to start by informing you that this interview is completely anonymous to protect both your identity and the company's information, so the only statistical data I would like to ask about to start the interview is how old are you and how old is the company?

Interviewee - Hi! First, thanks for the invitation, I am 31 years old and the company I work for is over 70 years old.

Interviewer – Still about the company, we are talking about a company with how many employees, and which produces how many liters of wine annually?

Interviewee - Now we have more than 1000 employees, depending on whether we are in the harvesting season or not and last year we sold over 80 million bottles of wine.

Interviewer – In which region is this harvest grown?

Interviewee - We produce wine in all major regions of Portugal, from green wine, Douro/Port, Dão, Bairrada, Bucelas, Alentejo...

Interviewer - Thank you very much, I would now like to ask you about the main topic of the thesis I am writing and ask you about Digital Transformation. Because it's your function I'm sure you are aware of what that stands for.

Interviewee – Yes, I am aware of the Digital Transformation and its complexities and applications.

Interviewer – Great! So, we can move on. Do you remember any examples of digital transformation that you apply in your company?

Interviewee - Yes, we're working on a chatbot for employee help to solve their questions and issues, just being a bit late in that innovation. Not long ago we also completely recast our site to be more intuitive for potential talent to apply for our company. Obviously for a few years now we had to go adapting to the scan of the processes with the introduction of Microsoft Teams and Outlook tools overall. As for the most related tools we have had a very hard work in we manage to have all sorts of innovations that improve the efficiency

and quality of our products through tools that tell us exactly the grape maturation points and what is the right time to do the harvest of it. We have also been having a technological advancement regarding microscopes for we have been able to chemically analyze the wine that is bottled, as is the cork corks of it. It's with some pride that I say we're constantly on the front lines for this kind of innovations, in fact we are currently with a company's rebranding process that will help us further improve and be more present in this communication and continuous improvement.

Interviewer - And is there any innovation you would like to apply in your company?

Interviewee - Now we are really focused on this new phase that the company will be in that we are thinking of being completed in 2025, until then we are not focused on other innovations, excluding such a chatbot that is more related to the IT department.

Interviewer – What are the main difficulties you experience when applying this type of innovation?

Interviewee - It depends on the innovation and the department to which that innovation will be applied. Usually, more labor departments tend to have an aversion to the larger change. So, I'd say that the greatest difficulties go through the communication of this innovation and the application of it.

Interviewer – When you are going through this phase of applying a new means of digital transformation, do you experience more difficulty at the beginning, middle or end of the process? In other words, before you start implementing it, are you explaining to employees how it will work, during the change process or after it has already been implemented?

Interviewee - It is during the early phase and the middle phase, as I said in the previous question, when we are making the innovation presentation and during the innovation itself. It always ends up being the stages where more questions and doubts arise and employees have more uncertainties about what they are doing and the new processes then always elicits a delay in innovations, but it is something normal. In the final stage it is when the machine wheels are all already engaging, and the processes start to get faster than the difficulties decrease.

Interviewer – When you are applying this type of process, how do you usually delegate tasks, that is, who does the training for employees, etc.?

Interviewee - Basically the officials of each department receive the training of how it will work out certain process and they pass the training for employees.

Interviewer – And where do you get the ideas that certain processes need changes as well as the best ways to apply them.

Interviewee - We are always in touch with R&D departments, also with consultants who always inform us about the best processes to develop and the innovations and transformations that best apply to our company. We also have some internal ideas, but consultants have a very strong impact on transformations.

Interviewer – Do you feel more of an impact from digital transformation in processes directly linked to wine or in more support areas?

Interviewee - Both have an important role, but they are differently named on one side we have the improvement of our product and the other one we have the improvement of our processes. Obviously, there are also cases where we can improve both at the same time, but both are quite important. With no product quality will not need to improve the processes because we are not going to sell products but having quality suits to be efficient to be competitive.

Interviewer – When you apply digital transformation to one of your processes, do you feel the need to have fewer people in the company?

Interviewee - Honestly, I thought it would be like that in theory. But the truth is that after applying certain innovations and processes I concluded that it didn't. It is often even more people are needed to follow in other departments what a certain machine has been able to do in the initial department.

Interviewer – We are almost finished, do you feel that in a way digital transformation is in some way related to the company's ease of growth, that is, a small company will compete more with a larger company because these normally cheaper resources allow a “balance of accounts” where companies that are growing no longer need to hire dozens or hundreds of employees to compete.

Interviewee - Yes. Especially innovations related to support areas such as ATS, etc. They can be found in the market for rather appreciative prices which makes market competitiveness much higher.

Interviewer – Finally, if you didn't have a classic industry like wine, do you feel that digital transformation would be even more important and would have even more strength?

Interviewee - I don't think so. Sometimes it is harder to apply in these types of companies because employees are people with a higher age group as well and that they are not so used to change, but I think it would be equally important in the other industries.

Interviewer – Thank you very much for your time and availability, it was a pleasure talking to you.

Interviewee – Thank you, it was a pleasure.