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## **Impact of Intelligent Systems on Small and Medium Enterprises Performance: An In-company Project**

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Master in Management

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Operations

Co-Supervisor

Prof. Ricardo Jorge Castro de Correia, Assistant professor,  
University of Madeira

July 2023





BUSINESS  
SCHOOL

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## **Resumo**

Atualmente as pequenas e médias empresas enfrentam uma forte concorrência por parte das multinacionais devido à globalização e ao avanço da tecnologia dado que estas passaram a atuar em mercados locais e a satisfazer as necessidades de diferentes targets que não eram os seus tipos de cliente. Com a evolução da tecnologia as multinacionais começaram a utilizar os sistemas inteligentes de forma a otimizarem os seus processos logísticos e operacionais tornando assim a sua estratégia e performance mais eficiente e agressiva. Com o aparecimento destas tendências surgiu a introdução do tema de como é que as pequenas e médias empresas iriam fazer face a esta concorrência. Por consequência, levantou-se a dúvida se a implementação destes sistemas seria possível nas operações de uma PME e qual seria o impacto da adoção destes na performance das empresas. Para responder a esta questão foi realizado um projeto para uma PME pertencente ao setor do comércio por grosso utilizando como técnica o delineamento dos atuais processos logísticos e posteriormente remodelação dos mesmos com a incorporação de alguns sistemas inteligentes. Com o intuito de avaliar o impacto destas melhorias definiu-se algumas métricas que deverão ser utilizadas pela empresa após a implementação destes sistemas estar concluída de forma a avaliar o real impacto que estas medidas poderão vir a ter na performance desta empresa.

## **Palavras-chave**

Pequenas e médias empresas; Sistemas inteligentes; Indústria 4.0; Otimização de processos

## **Classificação JEL**

M - Business Administration and Business Economics, Marketing, Accounting, and Personnel Economics

M1 - Business Administration

M11 - Production Management

M15 - IT Management





## **Abstract**

Currently, small and medium-sized companies face strong competition from multinationals due to globalization and the advancement of technology, as they have started to operate in local markets and satisfy the needs of different targets that were not their type of customer. With the evolution of technology, multinationals began to use intelligent systems to optimize their logistical and operational processes, thus making their strategy and performance more efficient and aggressive. With the appearance of these trends came the introduction of the theme of how small and medium-sized companies would face this competition. Consequently, the question arose whether the implementation of these systems would be possible in the operations of an SME and what would be the impact of adopting them on the companies' performance. To answer this question, a project was carried out for an SME belonging to the wholesale trade sector using as a technique the design of the current logistic processes and later their remodeling with the incorporation of some intelligent systems. In order to evaluate the impact of these improvements, some metrics were defined that should be used by the company after the implementation of these systems is completed in order to assess the real impact that these measures may have on the performance of this company.

## **Keywords**

Small and medium-sized enterprises; Intelligent systems; Industry 4.0; Process optimization

## **JEL Classification System**

M - Business Administration and Business Economics, Marketing, Accounting, and Personnel  
Economics

M1 - Business Administration

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## Table of Contents

|                                                                              |           |
|------------------------------------------------------------------------------|-----------|
| <b>1. Introduction .....</b>                                                 | <b>1</b>  |
| <b>2. Literature Review - Theoretical Basis of the Topics Covered .....</b>  | <b>3</b>  |
| <b>2.1. Small and Medium Enterprises .....</b>                               | <b>3</b>  |
| 2.1.1. Definition and Characteristics of an SME .....                        | 3         |
| 2.1.2. Opportunities and challenges of SME .....                             | 4         |
| 2.1.3. Management Practices and Multinationalization Strategies of SME ..... | 5         |
| <b>2.2. Intelligent Systems and Digital Transformation .....</b>             | <b>7</b>  |
| 2.2.1. Digital Transformation and Types of Industries .....                  | 7         |
| 2.2.2. Types of Intelligent Systems .....                                    | 8         |
| <b>2.3. Small and Medium Enterprises and Intelligent Systems .....</b>       | <b>14</b> |
| <b>3. Functional Presentation of the Study - Project Company .....</b>       | <b>15</b> |
| <b>3.1. Contextualization .....</b>                                          | <b>15</b> |
| <b>3.2. Methodology .....</b>                                                | <b>17</b> |
| <b>3.3. PESTEL analysis .....</b>                                            | <b>20</b> |
| <b>3.4. Stakeholders .....</b>                                               | <b>23</b> |
| 3.4.1. Clients .....                                                         | 23        |
| 3.4.2. Competitors .....                                                     | 24        |
| 3.4.3. Suppliers .....                                                       | 26        |
| <b>3.5. SWOT Analysis .....</b>                                              | <b>27</b> |
| <b>3.6. Company Strategy .....</b>                                           | <b>29</b> |
| <b>3.7. Organization Chart .....</b>                                         | <b>29</b> |
| <b>3.8. Project objectives .....</b>                                         | <b>30</b> |
| <b>3.9. Conceptual Model .....</b>                                           | <b>31</b> |
| 3.9.1. The importance and role of RPA technology .....                       | 32        |
| <b>3.10. Project Development .....</b>                                       | <b>35</b> |
| 3.10.1. Feature Map .....                                                    | 36        |
| 3.10.2. Implementation Phase .....                                           | 42        |
| <b>3.11. Control process .....</b>                                           | <b>43</b> |
| <b>4. Conclusion .....</b>                                                   | <b>44</b> |
| <b>5. References .....</b>                                                   | <b>47</b> |
| <b>6. Appendixes .....</b>                                                   | <b>50</b> |
| Appendix 1: PESTEL analysis .....                                            | 50        |
| Appendix 2: SWOT analysis .....                                              | 50        |
| Appendix 3: Organization Chart .....                                         | 51        |
| Appendix 4: Brands official websites .....                                   | 51        |

## **Figures**

Figure 1 - Methodology Framework

Figure 2 - Conceptual model

Figure 3 - Actual flow of the primary activities

Figure 4 - Features that will be developed during the project

Figure 5 - Actual flow of purchasing process

Figure 6 - Future proposed flow of purchasing flow

Figure 7 - Actual flow of transport and stock management process

Figure 8 - Future proposed flow of transport and stock management process

Figure 9 - Actual flow of sales process

Figure 10 - Actual flow of distribution process

Figure 11 - Future proposed flow of sales process

Figure 12 - Future proposed flow of distribution process

## **Tables**

Table 1 - Benefits of RPA technology

Table 2 - Challenges and limitations of RPA technology

## **Glossary**

SME - Small and medium enterprises

AI - Artificial Intelligence

RPA - Robotic process automation

PME - Pequena e média empresa

IS - Intelligent systems

## **1. Introduction**

The trend of globalisation associated with development and innovation in technology has over the years boosted the competition present in the market for small and medium-sized companies since they have faced global challenges that did not exist before. Currently, multinationals reach types of consumers and supply markets that previously could not do so, which naturally causes an increase in pressure on small and medium-sized companies. The development of technology triggered the emergence of intelligent systems in the so-called industry 4.0 era, which aim to create a safer and healthier work environment, providing employees with the abandonment of routine and monotonous tasks as they are now performed by the systems, thus leaving only those that require critical and analytical thinking to them. In this way, the purpose of using these systems is to perform certain tasks to satisfy customer demand in as little time and resources as possible.

Subsequently, through the use of these intelligent systems by multinationals, it was found that companies were able to obtain better performance by optimising their processes. In this sense, several studies have emerged to explain the relationship between the performance of a company and the use of intelligent systems aimed at optimizing and automating processes. It was therefore concluded that the optimization of logistical processes allows for an increase in results and, at the same time, a decrease in associated operating costs, which consequently enables better performance in any company.

Considering that these systems are already being used by multinationals, the problem arose as to whether these intelligent systems could be used by small and medium-sized companies to minimise the costs that they support and face the intense competition that they have been facing due to globalisation. To try to answer and present a solution to this question, it was elaborated a project in a small and medium-sized company belonging to the wholesale trade sector characterised by large-scale sales and at reduced prices, which act as intermediaries between manufacturers and the final consumers and that their main differentiation factor is the personalised service where they operate.

In this sense, to evaluate the possibility of implementing intelligent systems in a small and medium-sized company and measuring the impact on its performance with the introduction of these systems, it was defined as project objectives the analysis of the logistic and operational processes currently used by the company, the reformulation of these processes through the incorporation of technology and finally the design of control measures that should be used to evaluate the real impact of the suggested improvements on the company's performance.

Concerning the structure of the report, a review of the existing literature was first carried out to design a framework around the theoretical concepts previously analysed by academics in which the main topics studied were small and medium-sized companies, intelligent systems, and also the existing

relationship between the two topics. Thus, in this section several topics were addressed, including the characteristics of these companies, the main opportunities that these can take advantage of and the difficulties they will have to face with the use of intelligent systems.

Then, it was elaborated a brief contextualization of the company as well as the sector to which it belongs and the methodological plan that will be followed throughout the project, making a brief description of what will occur in each phase. Subsequently, the next phase of the project consisted of an external analysis of the market using the PESTEL tool, a description of the stakeholders and also a SWOT analysis in order to obtain a broad description of the current situation of the company as well as your surroundings. Taking into account the analysis carried out previously, it was defined the company strategy as well as the specific objectives of the project and analysed the current organizational situation of the company.

Afterwards, the conceptual model was described in order to relate the use of intelligent systems with the increase of the company's performance and also portrayed the importance of RPA technology in the optimization and automation of processes and how this can be combined with intelligent systems with the aim of obtaining better results. Throughout the project development phase, it was described the actual processes implemented in the company and new ones with the improvements already incorporated, making a simulation through their design to describe the changes between the new processes and the existing ones. At this stage, it was also detailed the actions that the company would have to take to implement the suggested improvements and how they should be implemented.

Finally, it was defined a control phase with some metrics that should be used to measure the impact of the new processes on the company's performance to control the actual results and compare them with those that would be expected.

## **2. Literature Review - Theoretical Basis of the Topics Covered**

In the following chapter, previous studies on this topic will be presented to establish knowledge and understanding about it in order to be the guide to proceed with the research and development of the project.

### **2.1. Small and Medium Enterprises**

#### **2.1.1. Definition and Characteristics of an SME**

Nowadays, small and medium enterprises perform an important role in the development of the economy since these types of companies represent a big percentage of actual companies in the world. In this sense, the World Trade Organization (WTO) defends that the participation of small and medium enterprises in international trade is fundamental since this organisation considers these types of companies the engine of sustainable economic development (Prasanna et al., 2019). The current speed of globalisation has been triggered by the growth of information and communication technology forcing small and medium-sized companies to try to modernise and use more of these technologies as a strategy to improve their competitiveness in the market (Gamage et al., 2020).

According to Article 2 of the Recommendation 2003/361/EC of the European Commission can be defined as a small and medium enterprise a company that employs fewer than two hundred and fifty persons and which has an annual turnover not exceeding fifty million of euros or a total annual balance sheet not exceeding forty-three millions of euros. Regarding the criterion for counting workers, this one is mandatory to be considered a small and medium enterprise and covers full-time, part-time, temporary, and seasonal workers and includes operational workers, service providers for the company, owner-managers and partners who work for the company and obtain financial benefits of the same. About the other two criteria annual turnover and total annual balance, the company can choose to meet just one of them since there is no need to satisfy both requirements. Thus, the annual turnover is determined by calculating the income that a company achieved during a year with the sale of products and the provision of services within the scope of the company's activity, deducting any rebates such as valued added tax, which must not be included in the volume as well as other indirect taxes. Regarding the total annual balance refers to the value of a company's major assets (European Comission, 2020).

Several studies already identified some of the characteristics of small and medium enterprises. Knight (2000) defends that this type of company can be characterised by their entrepreneurial behaviour in unstable environments for example during the process of globalization (Makkonen &

Leick, 2019). Hagen (2019) argues that small and medium enterprises are in most cases new and minor companies (Jafari-Sadeghi et al., 2023). Furthermore, more than half of small and medium enterprises develop more innovative activities than bigger and older companies that prefer to invest more intensively without planning and analyse the best activities to do the investments (Belas et al., 2018).

Bertello (2022) and Pullen (2009) considered that small and medium enterprises have unique characteristics such as informal organisational culture, flexibility, and organic structure that enable them to react quickly in changing environments and innovate (Istipliler et al., 2023). This quick reaction is noticed through the adaption to the new necessities of production and the global market, the introduction of new industrial know-how, the adoption of contemporary techniques and technologies for new business models, the nonexistence of bureaucracy, and the fast implementation of new products and innovative methods. Kersten (2017) defended that the funding plans that small and medium enterprises started trying to implement revealed a very positive effect as the investment, the company performance, and the job opportunities for workers increased (Gherghina et al., 2020).

### **2.1.2. Opportunities and challenges of SME**

Small and medium enterprises are playing a fundamental role in the creation of employment, the reduction of poverty, the promotion of foreign trade and contribute to economic growth, especially in developing countries, however, they face some funding barriers (Gherghina et al., 2020). Makkonen and Williams (2018) argue that small and medium enterprises can open up opportunities for cross-border cooperation, thus laying the foundations for innovation and economic growth in border regions. Thus, cooperation at the level of cross-border by small and medium enterprises will contribute to the creation of competitive advantages for the firm level of the company (Makkonen & Leick, 2019).

Despite the unique characteristics that these types of companies have that lead to good opportunities in the market, they face a few challenges and limitations. Small and medium-sized enterprises have less access to sources of finance and typically have less investment capacity, which can make it impossible to raise capital and in turn will block their progress (Camilleri, 2018). The lack of resources and the inconveniences to reach the global market when these companies intend to start their activity thus leads to a lower capacity to apply international strategies. In addition, small and medium-sized companies are more exposed to external shocks, such as economic crises, which consequently challenges the productive sustainability of these companies or disables their production for a certain period (Gamage et al., 2020).

The European Commission considered two main challenges for these types of companies. Firstly, market failures make the environments where small and medium enterprises operate and compete more challenging. These market failures can occur in areas such as finance, research, innovation, or



environmental regulations which will provoke that small and medium enterprises may be unable to access the finance and investment in research, innovation and resources to comply with environmental regulations. Secondly, the structural barriers such as the lack of technical and management skills, the hardness in labour markets, and restricted knowledge about international expansion (European Commission, 2020).

The global challenges that small and medium enterprises face can be divided into eight categories such as the market competition, the global capital and economic crisis, the information communication technology, the multinational corporations, the transnational corporations, the international terrorism and religious conflicts, the international trade war, and the international dumping (Gamage et al., 2020). In addition, small and medium enterprises suffer from the influence of large-scale companies because the role of these companies is increasing in economies of developing countries which incites competitive challenges since in these countries small and medium enterprises dominated the market (Prasanna et al., 2019). This is leading to the biggest issue for SMEs in developing countries being the considerable percentage of SMEs that are closing within a very short period after opening due to the emergence of strong competition from multinationals in these countries (Gamage et al., 2020).

### **2.1.3. Management Practices and Multinationalization Strategies of SME**

Some authors argue that there is a direct influence on the performance of small and medium-sized companies through their management methods. In this sense, for example conservative investment choices to maintain the company's existing profit allow these types of companies to maintain a solid and consistent position in the market (Gherghina et al., 2020). Thite (2022) and Sousa and Rocha (2019) argue that the development of management capabilities regarding human resources and possible changes is crucial for their acceptance by workers. According to Van Steenberghe and Yeow (2018) the acceptance or rejection of new organizational strategies including digital ones depend on the impact they will have on the work circumstances of each job. Thus, it is up to managers to try to minimise possible dissatisfaction generated by the appearance of these changes (Jafari-Sadeghi et al., 2023).

According with the literature it is possible to identify the seven most critical and relevant fundamentals that entrepreneurs of a small and medium-sized companies must execute that influence the performance of their companies. Firstly, they should carry out regular reviews of all areas of their company using digital literacy for example. Secondly, they should seek to obtain all relevant and specialised information on the market in which they operate. Thirdly, entrepreneurs must have the ability to implement creativity and innovation in their activities. Fourthly, they must explore all new business opportunities that may be advantageous for the company. Fifth, they must have the ability to seek to develop the performance of their workers. Sixthly, entrepreneurs must also seek the

commitment of their workers to the company. And finally, in seventh place, entrepreneurs must have the ability to manage projects with high performance (Jafari-Sadeghi et al., 2023).

Currently with globalisation, local markets have less and less expression because companies do not get results just selling in their area. Some authors defend that small and medium-sized companies choose to use the multi-nationalization strategy to enter international markets in search of the growth and development of their companies since this strategy allows access to new resources, knowledge, customers, and networks that are not reachable in local markets (Monaghan & Tippmann, 2018).

Small and medium enterprises could use one of these four multi-nationalization strategies: resource seeking, hub reaching, serendipitous resource leveraging, and controlled expansion. Regarding the first resource-seeking strategy, the aim is to look for the best and most strategic resources in close international locations such as employees, partners, investors, or key customers, which are essential for the company's growth but are not available in their home countries. This strategy will allow companies the necessary flexibility to meet the needs of customers in multiple locations simultaneously. The second strategy is called hub-reaching and aims to establish an international presence using cluster areas or key industry locations that are areas made up of potential customers, investors, partners, and talented employees. This will allow for quick access to industry hubs that allow companies to reach out to several interesting companies to partner with in one location. Regarding the third serendipitous resource-leveraging strategy, this strategy uses the resources and opportunities currently available for strategic actions that lead to the company's growth instead of using predetermined goals to achieve the objectives. Thus, entrepreneurs seize short-term opportunities and use reactive strategies instead of long-term goals and proactive planning. Finally, the fourth controlled-expansion strategy aims to expand to international markets carefully and gradually over time only after exploring the domestic market such as establishing operations, mastering technology, and developing products. These companies prefer to first consolidate their position in the domestic market and only then explore international markets when the domestic market is normally already saturated and sold out. Thus, the entrepreneurs of these companies see international growth as a necessity and not as a goal (Vanninen et al., 2022).

## **2.2.Intelligent Systems and Digital Transformation**

### **2.2.1. Digital Transformation and Types of Industries**

According to Verhoef (2021), a firm's digital transformation can be defined as a change in how a company uses digital technologies to develop new digital business models that will help to create and appropriate more value to the company. Li (2020) and Nambisan and Luo (2021) defend that digital transformation is becoming crucial for companies to gain a competitive advantage and remain successful in national and international markets. However, Warner and Wager (2019) consider that the term digital transformation is not only dedicated to high-tech and innovative companies and that may occur in companies of any size and which are operating in any industry. Denicolai (2021) and Strange and Zucchella (2017) defend that the emergence of digitalization and the technologies such as artificial intelligence, big data, 3D printing, the internet of things, and nanotechnology has been transforming the competitive landscape for all industries. The emergence of these technologies has been called the technological revolution, fourth industrial revolution, or Industry 4.0, which has challenged companies in two different ways. Firstly, Lahteenmaki et al. (2022) and Wrede et al. (2020) argue that disruptive digital business offerings from new market entrants have changed customer behaviour and expectations. Secondly, according to Favoretto (2022) and Selimovic (2021) advanced technologies and innovative initiatives have significantly challenged companies to not only change the way they conceive of their offerings but also how they manage their employees and their reaction to the new digitally driven workplace (Jafari-Sadeghi et al., 2023).

The types of industries have been associated with the evolution of technology and the use of the different intelligent systems present in the market. Some researchers defend that the actual industry 4.0 is still characterised by the union of physical assets and advanced technologies. However, other researchers defend that the time of Industry 5.0 is coming.

The first industrial revolution appeared in the eighteenth century with the production of machines. It was considered a change of mentality of the people about the function of machines that impacted several industries such as mining, textile, agriculture, and glass. Industry 2.0 occurs between the years 1871 and 1914 when the faster transfer of persons and innovative ideas with the presence of machines replaced the workers. It was an era of economic growth and business productivity. The third industry that began in 1970 was characterised by mass production and the use of digital logic, integrated circuit chips, derived technologies, and the internet. In this phase occurs the digital revolution that consists of converting the technology into digital format and transforming traditional products and business procedures (Adel, 2022).

According to Kagermann et al. (2011), industry 4.0 appears to give a new vision about the work with the use of technologies in the manufacturing industry to achieve the highest proficiency. Furthermore, decentralised production using intelligent products could play an essential responsibility in this industry since they know their destination and history for example (Ingaldi & Ulewicz, 2020). Varela et al. (2021) defend that Industry 4.0 offer a safer and healthier working environment for the employees related to the traditional systems since the use of these intelligent systems helps to complete the clients' demand with the least amount of time spent. Furthermore, these authors argue that the information analysis and the real-time systems are fundamental to the success of Industry 4.0 since they help and follow the manufacturing processes and will be able to be adjusted as needed (Gupta et al., 2022). Following Leone et al. (2020) the companies that use intelligent systems such as artificial intelligence, IoT, robots, 3D printing, and cloud computing that are characteristic of industry 4.0 with the physical assets could transform companies flexible and ready to make decisions based on the data.

On the other hand, some scientists and scholars defend that the era of Industry 4.0 is outdated and that society is currently in Industry 5.0. According to Adel (2022), this industry is a paradigm shift that aims to bring the solution since it is supposed to focus on the collaboration between humans and machines and give less attention to the technology itself. In today's society with the development of technology aligned with this industry, it is supposed that companies gain competitive advantage through their economic growth since these technologies were designed to be efficient. Ocicka and Turek (2021) argue that Industry 5.0 is the compilation of the evolution of various technologies, ideas, and other areas that have focused on individual factors and technologies in manufacturing systems. According to letto et al. (2022), this new industry has brought three key elements that there are the human-centricity, sustainability, and resilience since it will develop the manufacturing systems globally by avoiding monotonous tasks from individual workers. Furthermore, intelligent robots will infiltrate manufacturing supply chains as well as the system of manufacture to unparalleled stages (Adel, 2022). According to some authors the change focuses on the fact that instead of what humans can do with technology, in this industry the point of view is to what technology can do for humans and the planet (Kolade & Owoseni, 2022).

### **2.2.2. Types of Intelligent Systems**

#### **2.2.2.1. Artificial Intelligence**

According to Uren V. and Edwards J. (2022), there is still missing clarity about a common definition of artificial intelligence. This can be explained by the multidisciplinary description of AI research along

with the growing business and public interest in the theme which brings multiple perspectives. They also argue that in most cases, the purpose of implementing artificial intelligence is to produce benefits for companies through automation or support capabilities, such as decision-making, that would otherwise be delivered by the human staff. DeCanio (2016) defends that Artificial Intelligence is considered “the broad suite of technologies that can match or surpass human capabilities, particularly those involving cognition” (Uren & Edwards, 2023). On the other hand, some authors define Artificial Intelligence as “a system’s ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation” (Obschonka & Audretsch, 2020), (Haenlein & Kaplan, 2019).

Akkiraju (2020) argues that artificial intelligence cannot be adopted without the commitment and collaboration of all elements of the company. Neumann et al. (2022) describe the process of the adoption of an ongoing procedure instead of a particular point in time. Subsequently, it can be considered a process with a series of “boom and bust” cycles. Uren (2020) identifies the following technologies categories in artificial intelligence: learning, perception, reasoning, communication, and knowledge representation. On the other hand, Collins (2021) categorises the subsequent applications of AI as expert systems, machine learning, robotics, natural language processing, machine vision, and speech recognition (Uren & Edwards, 2023).

According to Anyoha (2017), Miyazaki and Sato (2018), and Haenlein and Kaplan (2019), artificial intelligence is being used in several areas and for different types of data, reducing the cost of the necessary adaptations for each area and at the same time for each type of data. Agrawal (2019) and Rammer (2022) expected that artificial intelligence would impact innovation processes for example use of big data for new purposes and increase the efficiency in research and development processes. Craglia (2018), Aghion (2019), and Goralski and Tan (2020) mention that as a consequence of these recent and impactful advancements in artificial intelligence, the entrepreneurs, politicians, and scientists believe that AI is a key intelligent system for the technological and economic growth in the future (Grashof & Kopka, 2022).

However, these systems will face some challenges to their implementation such as the determination of the scale of responsibility that will be delegated to these autonomous systems (Berente, 2021) and the effect of these systems on people's motivation and their capacity to continue to carry out their tasks effectively (Uren & Edwards, 2022). Furthermore, Willcocks (2020) and Niederman (2021) argue that artificial intelligence chosen by a project team could impact the nature of the tasks or the roles that the team will perform and for that reason the processes to which the tasks contribute (Uren & Edwards, 2023).

#### 2.2.2.2. AI-based Chatbots

Sheehan et al., (2020) defined a chatbot as a programmed computer that uses natural language text or voice to imitate dialogue among humans. Doing this, the chatbots offer a realistic experience to those engaging with such systems. Some studies prove that investment in this technology will allow companies to provide a better service to their customers through personalization and improving the engagement of the customers remaining available to their queries and requests around the clock. These systems also bring benefits to the employees such as the reduction of the time spent with customer support without companies spending additional costs (Sharma et al., 2022).

According to Efraim et al. (2017), there are two different types of chatbots: traditional or rule-based chatbots and artificial intelligence-based bots. AI-based chatbots can be defined as the ones that use computing and artificial intelligence to communicate with humans. This modern chatbot has several motivations such as accuracy and quality of communication, anthropomorphism, the facility of use and the expectation of the informativeness (Ramachandran, 2019).

The key elements of the chatbot technology are the personalized recommendation, the humanised conversation, and responsiveness match the customer profile of small and medium enterprises (Selamat & Windasari, 2021). Once a small and medium enterprise recognizes the benefits and the value of these chatbots for example the convenience and real-time communication with their customers without the need for more employees are more likely to adopt these systems because the company perceived the real advantage of implementing it (Sharma et al., 2022).

However, there still are some constraints to implementing these systems in small and medium enterprises due to their characteristics. Firstly, some authors defend that some small and medium enterprises face significant financial constraints compared with large businesses (Harness et al., 2018). For that reason, once these companies perceive the cost of implementation and maintenance of these systems the adoption of them will be seen as a challenge. The costs include updating systems cost, troubleshooting, or hiring external consultants to ensure the system's smooth running. Secondly, small and medium enterprises usually have few internal IT capabilities that can allow the occurrence of some mistakes and risks. For that reason, the company becomes reluctant when they perceive that these systems tend to be complex and difficult to implement and use (Sharma et al., 2022).

#### 2.2.2.3. Big data

According to Wamba-Taguimdje (2020) the term “Big data” can be defined as having the potential to change business procedures and hence produce business value since it can change decision-making processes within a company, by developing transparency and improving performance. Zhu (2019)

considers that this is a trending topic given that it can be considered the most common data processing technique in conjunction with Machine Learning (Cappa et al., 2021).

According to Vecchio et al. (2018) and Visconti and Morea (2019) big data is in the middle of the digitization of a business environment as it can offer information about consumer preferences, feedback on the company's products and services performance and provide insights about rising trends. Sena (2019) defends that big data can be a valuable source that is not easily imitated or substituted by opponents. For that reason, some authors argue that companies with the development of digitalization and the use of big data in several sectors help managers to make better business decisions and produce better products (Batistič & der Laken, 2019).

Cappa et al. (2021) define that big data can be classified into three different categories: public, open or private big data depending on who owns and manages it. Concerning public big data includes the data collected by people that are used for research purposes by public entities, for example, the data collected from Wi-fi services in public areas and from their transport, it is used for public organisations in the process of decision-making. On the other hand, open big data is information accessible to anyone who has an interest and is therefore non-tradeable information. This type includes the data collected and offered by the World Bank about worldwide economic and institutional tendencies. Lastly, private big data which is usually created by companies on their platforms, this information is owned and used by the private companies for commercial reasons. Nowadays, several sources of private big data are used by companies. However, the most recurrent is the interactions with the consumers since it is the most available to the companies.

Even though the use of big data by companies has several benefits to their performance and development, on the other hand, can represent a big cost to them too. Brook (2019) argues that the larger amount of storage, the processing times, and the complexity of data analysis predominant in the use of big data represent a big cost to the companies since there is the need for insurance against privacy breaches and associated reputational damage. Another cost of big data according to Sandle (2019) is the reputational damage incurred when a company's digitalization practices are deemed to be inappropriate. In conclusion, Cappa et al. (2021) defend that this intelligent system can positively impact long-term performance for companies when it becomes a distinctive resource that can create and capture value for them.

#### 2.2.2.4. Machine Learning

According to Mahmood and Wang (2021), machine learning can be defined as a computational mechanism used to develop and improve performance with great predictive precision since the electronic data collected is used for the proficient study with accurate algorithms related to data

analysis and statistics. Kaplan and Haenlein (2019) claim that although machine learning is an essential part of artificial intelligence, it can be more embracing as it allows analysing and understanding data such as natural language processing or voice recognition. In this sense, Nelson (2018) defines machine learning as a branch of Artificial Intelligence since it acts in an autonomously or semi-autonomously way as a response to what it has studied from information. For this reason, this author considers that the companies that do not try to implement machine learning will flop in contemporary days.

Han and Jochum (2020) defend the way that machine learning programs the computers attend to improve system executions of data management, preventing monotonous manual duties and being an expense-saving opportunity since these machines are used to recognize standards and provide outcomes through projections and precise information. In the same line of thought, Beg et al. (2019) argue that the techniques applied in machine learning are useful for making better trading decisions at any time since the system will collect all information provided by big data and cross it with the times providing actual and decisive data that will be used in management decisions. Coglianese et al. (2017) state that algorithms influence and revolutionise all tasks in a company previously performed by humans as it is promoting innovations in areas such as product marketing and decision-making. In this sense, according to di Francescomarino and Maggi (2020), this intelligent system has been used for different procedures such as forecasting the future of present tendencies, along with explaining deviations in corporate procedures behaviour.

According to Zhang (2021), the performance of many tasks was improved with advancements in machine learning as it became possible to program and train these systems to perform these tasks well enough on their own. For example, in 2020, companies transformed at least one function performed by their employees into an automation process.

Ahmed and Malik (2020) argue that the level of automation of informational systems is crucial for the large amount of data that is analysed and for the decision-making processes as the use of computational methods avoids monopolisation problems. Obukhov (2019) defends that to enjoy and take advantage of all the benefits of this intelligent system, it is necessary to understand how it can help the company, choose the ideal software, and hire a responsible team to then, with the information obtained, elaborate exact strategies. The author identifies as benefits the automation of decision-making processes, reduces negative control by employees, and accelerates the processes themselves.

Nelson (2018) argues that there is a direct relationship between the machine learning system and data management since this system can optimise a high number of daily tasks that data management has such as the identification of forecasts, patterns, and irregularities. Thus, the author concludes that traditional data management systems were poorly updated and were no longer the most efficient due to poor data quality. Selim (2020) argues that these systems have been useful for the daily decisions



to which companies are subject, given that they can collect the "Big Data" available, and organise this same information to prevent very precise and conclusive trends (Selim, 2020).

#### 2.2.2.5. Blockchain

According to Yetis et al. (2022) blockchain is described as dispersed database technology that is tamper-proof and guarantees coherent trades throughout several users. In 2008, Nakamoto defined this concept as a distributed data configuration including blocks of information about trades or occasions that are connected using cryptographic hashes, which safeguards the comparative tamper-proofness of data (Völter et al., 2023).

Gorkhali et al. (2020) defend that this intelligent system has increased its approval with its consistent structure by offering innovations in many areas such as health, finance, and industry for example. Leung C.K.S. (2019) argues that it attracts the attention of all these areas because of the benefits that this system brings to the companies due to its scalability, traceability, and sustainability. This system eliminates the central authority that is expected to provide drastically changed economies and social models that require a consistent third party (Yetis et al., 2022).

Yetis et al. (2022) conclude that their research shows that blockchain decreases the problems of distrust and suspicion by consistently offering certified transactions to all members. This also allows the consumers to administer and monitor network actions by offering an information access instrument and agreement. Subsequently, these authors identify as benefits of the transparency, reliability, immutability, traceability, and decentralisation of this system.

With the increasing recognition of the benefits of blockchain, this system started to be considered a reliable system for companies. Zheng et al. (2017) defend that blockchain technology can produce an ecosystem for trust-less connections that lets each member directly participate with any other participant in a value switch. Frizzo-Barker (2020) and Locher et al. (2018) argue that this trust-less connection is a fundamental value proposition of blockchain technology but does not remove the necessity for faith at its center. For Janssen et al. (2020), consumers do not need to believe in a control authority to manage trades but trust in the application of algorithms controlling the transactions between the users.

In this sense, according to Völter et al. (2023) blockchain technology tries to differentiate itself from other technologies by the conception of a reliable environment for untrusted connections generated by itself. Since here there is no intermediary or a central party that could make some faults just like what happens in the traditional ecosystems.

Pu and Lam argue that several researchers suggest that blockchain technology start to be applied as a solution in the fundamental technologies of digital diplomas such as public key infrastructure (PKI)

and certificate authority (CA) with system schemes and application of models. For example, Madala (2018) recommends a blockchain-based system to resolve a safety issue in current certificate authority systems so that a CA cannot produce a certificate for a field without the agreement of the domain proprietor. On another hand, Kubilay (2019) suggests a blockchain-based public key infrastructure architecture to prevent split-world incidents and develop certificate transparency and reversal transparency (Pu & Lam, 2023).

### **2.3.Small and Medium Enterprises and Intelligent Systems**

According to Chiappetta Jabbour et al. (2020) , the SME sector contributes to the improvement of the worldwide economy and generates employment for a wide scope of age groups in different industry sectors. In this sense, Yu et al., (2022) considers that digital transformation has been also considered a strategic decision for small and medium enterprises to become international despite this can assist them to develop new digital capabilities and renew their business models as necessary.

Jagtap et al. (2021) argue that the SME sector is competing with global industries by implementing new developing technologies and maintaining sustainability in business practices that already exist. For that reason, the authors defend that by adopting these systems the SME sector will have a better chance to achieve long-term success. On another hand, Telukdarie et al. (2018) declare that these systems will allow the companies to achieve operational efficiency easier and quicker while also increasing the productivity.

Thite (2022) and Sousa and Rocha (2019) defend that the change in management capacities and the development of human resource management is determinant in the use of these systems. In addition, Van Steenberghe and Yeow (2018) considered that the working circumstances affect the acceptance or rejection of new technologies. On the other hand, Jafari-Sadeghi et al., (2021) believe in this type of company the behaviour of the senior managers is fundamental to this change since they are often the central decision-makers at the individual level.

Ferraris et al. (2019) and Heavin and Power (2018) defend that organisations can incorporate digital literacy among workers and managers providing clear access to all digital platforms throughout the company. This will allow small and medium enterprises to transform their businesses toward technology-based operations despite their size or the age of business life. In this sense, Esmailian et al. (2020) defend that the emergence of Industry 4.0 will offer a safer working environment than the previous and traditional systems provided.

However, there is still a long way to go about the implementation of these intelligent systems by small and medium-sized companies. According to Chiappetta Jabbour et al. (2020), the limited adoption level of these systems by SMEs is due to the fact of the higher investment costs and the

maintenance of sustainable operations. Furthermore, the weak use of these systems induces market losses and a lack of resources.

### **3. Functional Presentation of the Study - Project Company**

#### **3.1.Contextualization**

Currently, small and medium-sized companies face strong competition from multinationals in terms of efficiency and process optimisation as these companies are increasingly investing in intelligent systems for the aforementioned purpose. Therefore, it becomes imperative and necessary for a small and medium-sized company to adopt strategies and processes that would not otherwise be necessary to compete with multinationals.

To understand the possible impact of the implementation of these systems on the performance of a small and medium company, it will be developed a project in a company of this type and analyze the probable impact of the application of some of the intelligent systems that can be applicable in it for the optimization of processes and cost reduction. For the purpose mentioned before the actual operational processes will be reformulated so at the end, it will elaborate a set of control measures that should be put into practice by these companies after the implementation of the suggestions to evaluate the success of the project and the positive impact.

To develop this project, it was chosen a specific company, “BEIRADRINK”, to serve as a sample for this study, and for the choice of this company it was considered two fundamental factors. Firstly, the current characteristics of the company such as annual turnover, number of employees, and location. Secondly, it was considered as a criteria the company’s future objectives as well as the trends it intends to follow in the future. Concerning the company's current characteristics, the company operates essentially in the wholesale sector and, to a lesser extent, in the retail sector, with some physical shops for the sale of its products. It currently employs around ninety workers and on last year the company had an annual turnover of twenty-one million euros, which is a small company according with these details mentioned before. The headquarters of this company is in the interior region, with fewer accesses and opportunities for growth in the area of technology, so for that reason implementing a project of this type could be a greater challenge. However, the innovation in optimisation processes to reduce costs and increase sales is becoming essential for these companies as it will allow them to increase their profit margins and sometimes to survive to the intense competition that they face with the multinationals. Regarding the company's future objectives, it intends to implement automation and improve the efficiency of its processes using some intelligent systems with the purpose of reduce their operational costs. Furthermore, given that after this optimization a long-term objective of the

company is the implementation of e-commerce that will allow a faster and more agile direct contact between the company and its customers.

Regarding the sector in which the company is located, the wholesale sector, this is characterised by large-scale sales and lower prices than the list price for its consumers according to the quantity purchased by them. These companies usually purchase the goods or services directly from the manufacturer and sell to their customers in relatively large quantities as the sale is usually not intended for the final consumer of the product since at least will occur one resale with a higher price. Wholesalers, as they are also called, can offer a wide diversity of products or services due to the low prices they charge thanks to the large quantities purchased. In turn, the retail sector is composed of companies that sell their products or offer their services directly to their final consumers for their personal use with no intention of resale. Sales by these companies can occur either through physical shops or through e-commerce.

As in any industry, this sector will be subject to several trends in the future that will bring different challenges and opportunities for companies. In this sense, they must seek to adapt quickly so that these trends become an opportunity for innovation and not an obstacle to it. Thus, we can identify as main trends for the sector the digital transformation since companies are trying to adopt technologies in their processes to automate them through artificial intelligence, for example, to improve operational efficiency and offer more personalised services to their customers, this offer is occurring through e-commerce platforms allowing their consumers a more convenient and effective shopping experience. With the emergence of e-commerce, these companies are developing new business models such as direct-to-consumer sales and subscription services, to diversify their revenue sources and offer more options to customers by personalising the service based on the preferences and purchasing behaviors of them. These new business models will imply a greater coordination and attention to the logistical processes implemented by the company to ensure that products arrive more quickly, efficiently and in good condition to its customers. As sustainability is a global trend, it is also affecting the wholesale sector and companies are increasingly aware of this issue and are adopting practices such as reducing carbon emissions, recycling materials, and reducing food waste.

Regarding the main challenges that this sector will face in the future, it can be highlighted competition, given that this sector is very competitive with several companies dedicating themselves to the same market, which creates some pressure on prices and profit margins. Globalisation has brought competition with international companies in addition to domestic ones, which may affect companies that cannot keep up with the prices charged or the quality delivered by them. With globalisation come associated technological changes that can also be a challenge for those companies that cannot adapt quickly to these changes. Logistics and changes in consumer preferences are also a challenge for companies in this sector given that they manage large quantities of products that need

to be delivered to their customers on time and sometimes sudden changes in consumption require an agile and fast offer to maintain the expected quality and delivery time. Finally, regulation is also a challenge for companies in this sector as it is subject to various laws that may vary from country to country which can increase the cost and complexity of operations and processes of these companies.

As already mentioned, technological changes and globalisation will be part of the future of this sector, as well as part of the future of small and medium-sized companies, so that they can compete with competitors such as multinationals. Therefore, these companies can benefit by adapting quickly to these changes by implementing intelligent systems in their processes, allowing them to automate processes such as stock management, invoicing, project management, and customer service so that their employees can focus on more strategic and value-added tasks. Intelligent systems can analyse a large volume of data in a short period and provide important insights for the management of a small or medium-sized business such as market trends and consumer preferences. With the insights gained, SMEs can offer products and services that match the specific needs of their customers, which will improve the customer experience and increase customer loyalty. With the implementation of intelligent systems, companies will also be able to improve customer service through chatbots and virtual assistants that can provide quick and accurate answers to their customers' questions and doubts. Finally, these systems will also be able to reduce the costs that these companies pay by identifying the areas of inefficiency in these companies and processes that enable the optimization of operations in these companies. In conclusion, intelligent systems will bring benefits and positive results for these companies, however, the process of choosing the systems that they will use must be done carefully to take into account which are effectively applicable to each one to carry its implementation to the end successfully.

### **3.2.Methodology**

After the first phase of the project which consisted of researching several scientific articles on the various topics relevant to the project. The current diversity of articles was allowed to obtain a sample of very solid and coherent information that will serve as the basis for the entire project allowing to sustain it from the point of view of veracity. Before moving on to the planning and implementation of the project, it is necessary to define the methodology that will be followed throughout the process so that a control plan can later be defined and the project's conclusions can be drawn.

Firstly, an external analysis will be carried out, which directly influences the company as well as the internal indicators that also affect it. The external analysis will consist in analysing the market to identify the indicators and characteristics of the external environment that affect the company's performance, such as its competitors. Then, it will be described the various stakeholders that include

type of clients, players in the market and suppliers of the company. Lastly, a SWOT analysis will be made in order to obtain a general vision of the company and its surroundings.

After these analyses, it will carry out a brainstorming session with the company's management to understand internally the current situation of the company regarding the subject under study as well as to understand their opinions and ideas of possible practices or systems that could be implemented to achieve better performance and consequently results. Subsequently, a team building activity will be carried out to allow to define the company's strategy and the current organization. This way, it is possible to have a more comprehensive work sample, since with the management we will have more strategic and long-term results, while with the workers we will have operational and short-term results. Next, with the collection of all the information gathered with the techniques described above, it will start the elaboration of the project itself. This project will be divided essentially into three phases: planning, implementation and control.

In the planning phase, first it will be define the project objectives clearly and objectively so that all parties involved in the project are working in line to achieve them, then proceed to the identification of the project requirements such as the resources needed for example the choice of intelligent systems that can be used by this company to enhance the existing characteristics and qualities as well as all other factors that may affect the project. Secondly, action plans will be drawn up for the use of the chosen intelligent systems, including techniques and processes, so that there is an understanding of what is included in the project and what is not. Before the implementation, it is necessary to define the main costs to be expected with the elaboration of this project and the main risks that may affect the project, as well as a contingency plan to minimise possible impacts. Next, in this phase will be defined the workers that will be involved in the project as well as the communication between the parties involved to guarantee that everyone is aligned and informed about the evolution of the project. Still at the planning stage, the results, conclusions and expected limitations of the project will be defined so that, at a later stage, it will be possible to ascertain whether what was then likely was or was not effectively verified. Finally, at this stage, the set of points mentioned above is presented to the CEO of the company to understand whether he agrees with them to move on to the next phase.

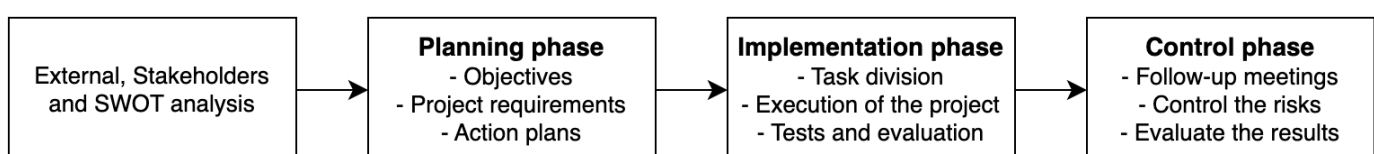
In the implementation phase, the previously planned actions will be put into practice so that the project is developed. Firstly, it is necessary to ensure that all the essential resources for the project are available and the necessary people are prepared to ensure a good start to the project. Then comes the phase of task division, which consists of distributing the work among the people involved so that they know exactly what they have to do and when. Thirdly, there will be the execution of the project itself, which will consist in applying some intelligent systems in activities already existing in the company to evaluate the impact on the company's performance. During execution, it will be necessary to monitor the project's progress to ensure that everything is being executed as planned and to adjust the plan as

necessary, being crucial at this stage the good communication between the teams to ensure that all activities are aligned toward the same common goal. Next, the adaptability of the company to these systems will be evaluated and tested and if these correspond to the requirements to achieve the increase in performance that the company aims for, as well as the correction of any faults or problems that may occur with the execution of the system. Fifthly, after validation and finalised tests, the definitive implementation of the project will be carried out and these systems will be made available for use by the workers. Finally, still in this phase is necessary continuous monitoring to ensure that the systems are fulfilling the function and purpose for which they were developed and it is always possible to make some adjustments to ensure the quality and efficiency of the implemented project.

The last phase of the project, called the control phase, aims to monitor and evaluate the evolution of the project to ensure that the objectives previously defined for the project are effectively being achieved. During this phase, regular control meetings will be held and progress reports will be prepared to periodically supervise the project to the schedule, budget, and quality, for example. Secondly, during the project unforeseen events may arise that imply a change in the project so it is necessary at this stage to control these changes and assess the possible impact they will have on the project before deciding on a possible implementation of the same. This stage also manages the risks that may affect the project as well as the resources to avoid waste and problems of allocation of staff that may arise with wear and tear or fatigue of the staff. Fourth, in this stage, the performance of the team allocated to this project will be evaluated as well as the performance and availability of the suppliers to have all the necessary resources at the exact time fulfilling the agreed responsibilities. Finally, at this stage, it is necessary to ensure that the results of this project are following the defined quality standards based on the expected objectives through quality reviews, tests, and audits.

In the final phase, it will be compared the conclusions drawn from the literature review of several scientists with the practical conclusions of the project carried out in the company to see if what scholars say about this subject is true in a company with these characteristics.

Figure 1 – Methodology Framework



Source: Author's Elaboration

### **3.3. PESTEL analysis**

Firstly, an analysis of the external environment was carried out using the PESTEL analysis as a tool. This analysis was carried out considering the type of company and the sector where it operates, that is, it was carried out on a small and medium-sized company that operates in the wholesale sector in order to provide an idea about the surrounding environment where it is located. According to Vasileva (2018), this analysis provides any company with a comprehensive perspective of the entire environment in which it operates for the implementation of a future business strategy such as strategic and marketing planning, the development of a new product or service, or research on a pertinent issue.

Shtal et al. (2018) argue that PESTEL analysis is one of the most important and indispensable tools for any company to use to assess all the external impacts that the company may be subject to define a plan of action to achieve better results. The acronym PESTEL derives from the six external factors, among them the political, economic, sociocultural, technological, environmental, and legal factors that may affect the performance of a company and therefore must be analysed thoroughly to avoid or reduce risks and identify the best strategies to be adopted to oppose any adversities that may arise.

Beginning with the political factor it can be highlighted the main factors of government policies and regulations such as tax policies, labour laws, and commercial policies that can affect the performance and profitability of this type of companies. This sector must comply with certain regulations, namely licensing requirements and the payment of taxes. Trade policies, particularly customs duties, quotas, and trade agreements create restrictions on import and export practices which may in turn influence the accessibility of certain products along the supply chain and impair logistical processes. Another political factor that can be highlighted is the political instability caused by riots, revolutions, and political unrest which in turn will trigger the disruption of supply chains, increased security costs, and reduced demand for goods and services, which may lead some companies to seek alternative suppliers or even relocate their operations to regions where there is more political stability. Government spending can also be considered a political factor as small and medium-sized enterprises due to the low working capital available for their investments are dependent on the appearance of public contracts or state-funded projects. Therefore, the decrease in expenses that the government is willing to have directly influences the volume of financing available for this type of company. Changes in public spending priorities may also affect the demand for certain products or services provided by these companies. Finally, international relations can also influence these companies as they operate in the international market or have suppliers that do so, which creates a dependency on the diplomatic relations that exist between the various countries. Thus, sanctions or political tensions can affect imports or exports in this sector.



Regarding economic factors, it can be highlighted the economic cycles, since this type of company is more vulnerable to the changes that can come from a change of cycle than a multinational. Therefore, an economic downturn could lead to a decrease in consumer spending and demand for products. In the case of a time of economic growth, these consumption expenses increase as well as investment by companies, which in turn increases the demand for goods and services in the sector. Secondly, it can be highlighted interest rates, since their increase causes a growth in the costs associated with loans requested by small and medium-sized companies due to their lack of working capital, as mentioned above. The increase in these costs or even the lack of availability of financing for these companies will reduce the profitability of these companies, which in turn will invest and expand their businesses less. Another economic factor that can be identified is inflation, as this factor can lead to an increase in production costs and, in turn, to a decrease in consumer purchasing power, forcing companies to adjust their pricing strategies to maintain their profit margins for the products they sell. Consumer confidence in their country's economy also directly influences consumer habits, given that when they feel more confident, they tend to spend more money and look for the products they want. This confidence can also negatively affect consumption habits, for example, when unemployment rates are rising, having the opposite effect to the one mentioned above. Finally, it can be identified exchange rates as an economic factor for those companies that directly or indirectly operate in the international market, and the performance of a small and medium-sized company can be affected by fluctuations in these rates, which in turn will reduce the competitiveness of exports and traded products.

The third external factor that can affect a small and medium-sized company operating in the wholesale trade sector is the sociocultural factor. In this factor, it can be highlighted the demography since changes in the population such as population growth, ageing or even urbanisation may impact the company's customer base as well as the demand of its producers. In this way, the company must adjust its offer to satisfy the needs of its entire target audience. Consumer behavior can also be considered a determining factor given that the change in consumer preferences for the type of products or brands, such as the increased consumption of healthy products or even the increasing use of online commerce, will involve an adjustment in marketing strategies used by the company to continue to attract its consumers. Social trends such as environmental concern, ethical sourcing, and even changes in lifestyles with people's growing focus on health and well-being will also be crucial insofar as they can bring opportunities or challenges to a company. Thus, companies should seek to adjust their supply and product supply strategies to correspond to emerging social trends. In addition, it can be highlighted the workforce as an essential factor, since the availability, retention, and productivity of a company's employees directly affects the performance of a small and medium-sized company. In the sense that the shortage of qualified and available workers could influence its growth

or even its expansion. Thus, this type of company must adopt small practices to raise the loyalty and dedication of their employees. Finally, companies that operate in countries with different cultures should also take this factor into account, as these differences will lead to the adaptation of the strategy applied by the company to correspond to the needs and ideologies of all its consumers and to be in line with the norms and cultural preferences.

Fourthly, it can be identified the technological factors that, with the evolution of technology, have been gaining increasing relevance in this analysis. Technological innovation has created new opportunities for these companies, such as the development of new products, for example. However, this innovation also implies a greater investment by these companies in research and development that needs to be well controlled so as not to affect the company's cost structure too much. The increase in connectivity with the availability of the internet has become a determining factor as small and medium-sized companies can operate online, expand their customer base and reach new markets. E-commerce is a trend that has developed in the sector as consumers in this market have shifted their purchases to the online market. Thus, these companies were forced to adapt to this new reality and implement strategies to implement this new market. With the emergence of automation and artificial intelligence, companies began to adopt these technologies to improve their efficiency and productivity, for example, with the existence of automated warehouses, companies have lower labour costs. However, these technologies must be adopted consciously as they could increase uncontrolled unemployment and require a high investment in machinery for their implementation. Mobile technology allows this type of company mobility and flexibility in the workplace as it allows them to manage stocks, track shipments, and even communicate quickly with customers, for example. With the emergence of cloud computing, SMEs can store a large volume of data without high investment in hardware and infrastructure, allowing them to simplify the operations of these companies and improve the decision-making processes of their leaders. Finally, these companies must be aware of the computer attacks to which they are subject, as they can compromise data and damage their reputation. Thus, these companies must seek protective measures, taking into account that these, although necessary, are still expensive, so the choice of these measures must be calculated.

Regarding the Environmental factor, it can be highlighted the following variants: climate change and natural disasters such as floods and fires, for example, can disrupt the operations and supply chains of these companies, as well as delays in the delivery of shipments. This factor may also cause a change in the availability and quality of raw materials. Currently applied environmental regulations governing waste management, emissions, and pollution control for example could affect the operations and cost structure of these companies. However, this is a mandatory cost for any company since its non-compliance leads to fines and damage to its reputation. The social trend about concern for sustainability and carbon reduction triggers the need for investment by SMEs in sustainable

practices and technologies to meet the expectations of their consumers to attract them and still provide differentiation from their competitors. Another environmental factor that influences the performance of these companies is the availability of natural resources and their costs since their scarcity could lead to increased competition with competitors to obtain them. Finally, it can be highlighted the energy costs, since small and medium-sized companies are affected by fluctuations in these costs, given that they represent a major influence on the promotion of operations and the transport of goods. Thus, companies should consider them as an external source that could significantly increase their cost structure.

Finally, concerning legal factors, it can be highlighted the commercial regulations such as tariffs, quotas, and agreements that influence exports and imports and which will subsequently affect the availability and cost of goods. The growth of intellectual property is also associated with the implementation of laws on this subject such as patents, trademarks, and copyrights that must be considered to avoid legal disputes and protect the intellectual property of the company itself. Labour laws such as minimum wage, overtime pay, and workplace safety regulations must also be considered crucial factors for small and medium-sized businesses as non-compliance also leads to legal penalties in addition to tarnishing the reputation of the company itself. Finally, it can also be identified consumer protection laws, namely product safety, labelling requirements and advertising practices, and contractual laws that govern the terms of agreements made by the company with its suppliers and customers, for example, given that failure to comply with these laws also causes legal disputes, financial damage and a bad reputation for the company.

### **3.4. Stakeholders**

#### **3.4.1. Clients**

The company's clients are individuals or organizations that can purchase of products made available by the company associated to hire services such as machine rentals, for example. The company has several types of customers and must adjust its offer according to their characteristics and needs to maximise their satisfaction.

The company essentially works with B2B (business-to-business) customers who are characterised by not being the final consumers of the product being sold by the company. Its customers are included in the so-called HORECA market, which consists of a set of establishments made up of hotels, restaurants, and catering services, that is, it encompasses a wide range of companies that provide food and beverage services, for example. In this way, these company's customers have some diversified characteristics, which oblige it to adjust its offer according to the needs of each type of existing

customer. This market is characterised as crucial for the vitality of the economy as it satisfies the needs and desires of consumers with regard, for example, to living together and socialising between individuals. This market also plays a relevant role in the tourism industry, which currently allows these companies to show constant growth in their performance.

As challenges about its customers, it is considered that the company needs to pay attention to stock management to avoid stock ruptures, personalised and effective service to its customers, as well as the promotion of a personalised and unique experience to themselves feel that the company takes care of them and the ease of adapting to possible changes in preferences on the part of consumers. In this way, the company focuses its operations on its customers using a good marketing strategy to keep them attracted and at the same time try to arouse the interest of potential buyers. This company choose for a differentiated service to deliver quality service and create an irreverent brand in the market. Finally, the optimization of operating costs also plays a fundamental role for this company since, as it is a warehouse with low margins, it needs to combine large-scale sales with the reduction of these costs to increase its profits.

### **3.4.2. Competitors**

The company's competitors are those who supply products with similar characteristics to those supplied by the company and thus satisfy the same needs of its customers. In this way, the company must look for differentiating characteristics and strategies to stand out from its competitors by offering better service to maintain its leadership in the market.

This company has two types of competitors given that it can be considered direct competitors those who have the same characteristics as the company or even indirect competitors who are companies that sell competing brands to those that the company represents. Regard to direct competitors are entities that act as storekeepers or are also called intermediaries who in turn can sell the same products as they are covered by some special conditions of the concession contracts or represent competing brands and sell products that can be considered substitutes for those sold by the company. Concerning indirect competitors, it is considered that the competitors of the brands that the company represents should also be considered competitors of the company since the loss of notoriety of the brands that the company represents directly means a drop in sales for the company. In this sense, it is reflected that the company should consider competitors who have substitute products and who intend to satisfy the same needs of the company's customers and deliver similar benefits to them. It can be thus highlighted as the main competitors of the company the following entities.

## Sagres

Sagres beer was launched in 1949 in Portugal. A few years later, they opened a beer production plant in Lisbon. Over the years, the company has chosen to launch new products and packaging sizes. In 1993, the brand was the official sponsor of the national team, demonstrating a willingness to support national entities. More recently, the company has chosen to launch new brands such as Bohemia to create new beers to meet the different needs of its customers. With the changing trend of alcohol consumption, in 2019 the company launched Sagres 0.0% beer, which contains zero percent of alcohol. In 2022, it won the Gold Quality Award from the Monde Selection Quality Institute.

## Nestlé

In 1867, pharmacist Henri Nestlé created an innovative baby food in Switzerland. The emergence of the Nestlé Group occurred in 1905 and Nestlé was founded with its main competitor at the time, Anglo-Swiss. With this merger, in the same year, the group started its international expansion project and after the World War, it became the global leader in dairy products. Over these years, economic and political crises affected the group, but it always managed to overcome them. The company has been in Portugal in the ice cream business since 1988 with the brand Camy. In 1929, the group launched one of its main pioneering products, known as Nescafé. In 2000, the ice cream brand was renamed Ice Cream Nestlé, having recognized successes such as Maxibon and Nesquik. This group uses diversification as its main strategy, given that it is currently present in various branches of activity through its brands or established partnerships and assumes a relevant global position in the areas in which it operates. In 2022, Nestlé Portugal registered a value of 677 million euros in sales, with a growth of 8.3% compared to last year, with 125 million euros resulting from exports carried out by the company, which currently employs 2 484 employees of 52 different nationalities.

## SICAL

SICAL - Sociedade Importadora de Cafés, Lda was born in 1947 in Porto with less than 10 employees, and without its manufacturing facilities, it began its activity as an autonomous importer of pure roasted coffee. The brand is characterised by its pioneering spirit in the industry, from the creation of the first advertising shown in cinemas to the unprecedented grain packaging process at the time. Over the years, the company grew and opened commercial activity in more places in the country, such as Lisbon, and also in 1967, it began its international manufacturing process in Angola, at the time a colony of Portugal, which allowed it a privileged position on the international scene. During this long period of existence, it also faced some crises that generated some difficulties, making the path to success more difficult and the emergence of the need to overcome adversities. In 1987 the brand was acquired by the company Nestlé to reinforce the position of both brands in the market and become a relevant

partnership. Until today, the company has always sought to expand its range of products, contribute to the advancement of the industry, and implement emerging trends to enhance its position in the market.

### **3.4.3. Suppliers**

These company's suppliers are the entities that are represented by essentially market-leading brands that have established partnerships with the company through concession contracts, thus, the company is the only one to supply the products it represents in the pre-established geographic regions. It can be thus highlighted as the main suppliers of the company the following entities.

#### **Super Bock Group**

In 1926, Super Bock entered the Portuguese market with its first original advertisement. The following year, the brand was registered so that it is the only one that can be marketed under that name. In 1933, the company began its export process to expand throughout the world. In 1950, the first revolutionary and innovative ideas began to emerge, including the implementation of advertising on distribution trucks, the sponsorship of sporting events, and the replacement of wooden barrels with aluminium. In 1968, the company implemented a new distribution system that consisted of iconic Super Bock trucks passing directly through the city of Porto making direct distribution. In 1985, the company began to be distinguished in the market for its quality through the Monde Sélection gold medal. In 1989, it reached record sales of 300 million litres and became the market leader. As the years went by, the company sought to keep up with trends, so it decided to expand its network of distributors and invest in technology, creating new products such as Super Bock Stout and Super Bock Green, for example, to satisfy most of its customers' needs and also innovate in the packaging presented to customers such as the invention of easy opening to contribute to their comfort. Currently, the brand has a wide range of products and tries to adapt its offer to the needs of its customers. About its main competitor, Sagres, this dispute has been fierce since from year to year the difference between both brands is short, so the company has sought practices to become the undisputed market leader.

#### **Unilever – OLÁ**

In 1959 the brand's first factory opened and thus began the production of its first ice creams. The arrival of the brand to Portugal was carried out through a partnership between Unilever and Jerónimo Martins. The founders of the brand shared the vision that ice cream should be comprehensive to satisfy the tastes of the general population. In 1970, OLÁ had seventeen different ice creams available in the market and the sale was carried out through carts that roamed the streets. Currently, the brand is the

market leader and has almost two-thirds of the market share through the brand's emblematic ice creams but also through the constant innovations that are always a success in the year of launch. The brand is present in more than fifty countries, assuming a different name depending on the country where it is located, such as Algida in Italy and Frigo in Spain. To standardise the brand image despite the different names in each country, it chooses for a simple symbol, a heart, to convey the idea of being a brand close to the consumer. The brand's great challenge lies in the fact that it is a seasonal brand and therefore very dependent on weather conditions, so the brand's long-term strategy will be to try to make its sales more constant throughout the year.

#### **DELTA CAFÉS**

Delta Cafés decisively consolidated its commercial position from the second half of the 1970s onwards, corresponding in a balanced way to new market demands such as the development of new products and the delivery of global quality service. In 1984, the commercial and industrial activities were separated with the creation of two independent companies. Thus, from that date onwards, the commercial activity was carried out by the company Manuel Rui Azinhais Nabeiro, Lda, and the industrial activity began to be developed by the company NOVADELTA - COMÉRCIO E INDÚSTRIA DE CAFÉS, LDA, which was the first company certified in the sector in 1994 the distinction of this brand was declared by the image of a brand with a human face passed on to its customers. The notable presence of its leader, as well as his management philosophy, were the main success factors for the brand since Rui Nabeiro considered that a commercial relationship should be based on the following phrase “A Customer, a Friend”. This philosophy helped the brand to conquer a wide network of loyal customers, enabling the sustainable and sustained growth of the brand. Currently, the company has earned more than 340 million in sales with more than 22,600 tons of coffee sold, with one hundred tons of roasted coffee produced daily. Exports represent more than twenty-five percent of turnover, being present in more than forty countries.

### **3.5.SWOT Analysis**

The SWOT analysis is an analysis that allows companies to assess their position in the market and their sector and is used by them to study their internal environment consisting of strengths and weaknesses and their external environment consisting of opportunities and threats for future use in moments of indecision and the need to make a decision (Rozmi et al., 2018; Wu, 2020). The internal environment is represented by the characteristics of the companies, which have control over possible changes.

Regarding the external environment, this is characterised by factors that cannot be controlled by companies, but that directly influence their performance and strategy.

Firstly, regarding strengths, it can be highlighted the strong relationship that the company has with its partners, which allows it to negotiate more favourable conditions regarding price and delivery time, for example. The company adopted a next-day delivery policy for all products sold to offer a quality service that keeps its customers satisfied, thus needing to invest in efficient logistics and distribution resources. The increase in the number of partnerships has consequently allowed the widening of the range of products available to its customers to satisfy the needs of all the customer segments it has. The company uses economies of scale to take advantage of large purchases to obtain better prices and thus obtain a better margin. Finally, it can also be considered the experience of employees as a strength of this company since their knowledge also helps the company to achieve more favourable results and more effectively.

Concerning weaknesses, it can be emphasized the limited financial resources since it is a small and medium-sized company, that is, it has a small size that causes a lower capacity to invest in new markets, for example. The company, being a distributor of leading national brands, faces the difficulty of distinguishing and notoriety for the company itself, given that its image is directly related to the same, so the mistakes made by these generate immediate negative impacts for the company. The fact that the company is not the producer of the products it markets causes dependence on its suppliers about price increases or possible interruptions in the supply chain, for example. Finally, this company buys the goods on a large scale, as already mentioned, which in turn can generate a high cost of maintaining the stock.

As opportunities, it can be identified the e-commerce which is a trend that is emerging in the wholesale trade sector and which should be taken advantage of by the company investing in marketing systems and instruments that boost these sales to make the supply chain more efficient and provide increased productivity. The increase in strategic partnerships intensifies the company's participation in the market and the diversification of the range of products available to satisfy the needs of its consumers and also to attract new consumers to increase the customer portfolio. Finally, expansion into new geographic markets can also be considered an opportunity as the company will be able to explore new customer niches and build relationships with new suppliers to increase the company's profit.

Finally, about threats it can be recognized the competition from multinationals, given that these companies have more resources and their brands are sometimes more recognized. The excessive advancement of technology can be a threat to the extent that the company cannot keep up with them due to its low cash flow and low financing capacity. The regulations to which the sector is subject, such as commercial restrictions and tariffs, it can increase the company's costs and influence its supply and



distribution processes. The vulnerability of the economic fluctuations that this sector is subject to can also be considered a weakness given that it is a sector directly related to consumer consumption habits in such a way that a crisis, for example, causes an immediate decrease in demand for its products. Lastly, external forces such as political crises and natural causes can disrupt the supply chain, thus affecting the availability of products and causing a destabilisation of supply.

### **3.6. Company Strategy**

As previously mentioned, the company is present in the wholesale trade sector and is therefore not the producer of the products it sells. In this way, since the differentiation of its competitors cannot occur through the characteristics of the products as well as their production, the company chooses to stand out from them through the service provided and the diversity of its range of products. In order to reduce dependence on each of its suppliers, the company has sought to increase the number of suppliers in order to minimize the risk of losing customers due to the cancellation of any of the partnerships that the company has with suppliers. With regard to the service provided, the company made a commitment to its customers to always deliver the goods ordered by them the next day, which puts pressure and responsibility on the distribution and logistics team so that everything goes as planned.

With the uncertainty that comes from being an intermediary and the commitment assumed by the company with its customers, the need for an operational plan that is functional and at the same time strategic intensifies as errors can increase the cost structure that the company will have to bear. In this sense, it can be defined that the company's strategy involves assuming its customers as a central role in its operations, as it seeks to outline all its processes around them. In this way, when customer satisfaction can be taken for granted, the company investigates chances of reducing its costs.

### **3.7. Organization Chart**

The company presents the organisational structure that is represented in the organisational chart in Appendix 3. As the first and only level of strategic decision, typically characteristic of this type of company, due to its size and low investment capacity, the company has a CEO who is also the owner of the company. Next, the company is divided into four departments, including the purchasing department, the commercial department, the distribution department, and the financial and marketing department. Starting with the purchasing department is responsible for the entire process of interaction and the company's relationship with its suppliers, consisting of the head of purchasing in charge of controlling orders and managing stock to avoid stock disruptions and also by two operators

who carry out the instructions of the department head and maintain direct contact with suppliers to ensure that the process runs as expected. Next, the commercial department is in charge of presenting the range of products to customers and placing their orders, comprising the head of sales responsible for controlling the execution of pre-defined objectives, negotiating the company's new relevant contracts, and for support its sales team, through salespeople who carry out weekly visits to all customers through established routes and who are responsible for making sales, presenting the different products available and still maintaining a good relationship with customers and finally, for support team responsible for the back office tasks necessary to maintain the activities of this department, such as opening new customers in the system, for example. About the distribution department, is responsible for transporting the goods ordered by customers from the warehouses to their establishments, which is composed of the warehouse manager in charge of the entry and exit of the goods and the distributors responsible for distributing the goods requested by customers through transport trucks. Lastly, the company has a financial and marketing department, which is made up of the TOC, financial operations, and marketing operations, which is responsible for supporting the company's primary activities, carrying out activities such as controlling the credit available to customers and operating expenses and also the promotion of available products through social networks.

### **3.8. Project objectives**

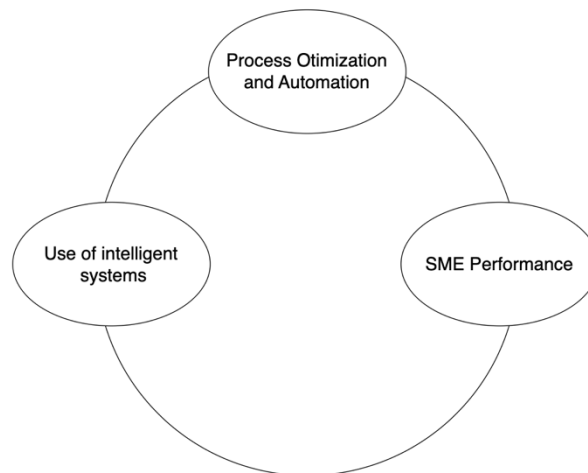
As previously mentioned, trends related to technological advances, and the use of intelligent systems in logistics processes and e-commerce have increased over the last few years in the sector. So, any company that belongs to the same and that does not try to adapt to these changes will end up losing market share and sales volume, which could lead to a decrease in performance or even to bankruptcy. This project aims to review some processes that are currently implemented in the company and how it can, with RPA technology and intelligent systems, optimise its processes with the aim of the future implementation of e-commerce. In this sense, the project will begin with an analysis of the company's current processes to understand the points that can be improved. Next, the current processes of the company will be reformulated with possible improvements in them, combining the use of intelligent systems with the action of human strength in which way the implementation of intelligent systems can be practised. Finally, a strategy will be outlined as well as defined a set of measures that must be implemented to achieve the desired optimization of existing processes and will also define some control measures that must be implemented during and after the project to perceive the relevance and impact of the changes outlined throughout the company's processes.

### 3.9. Conceptual Model

Taking into account the topics addressed in the literature review and following the objectives and purposes of this project, it is considered important to analyze in detail the relationship that exists between the use of intelligent systems and the performance of small and medium-sized companies. For this purpose, it was defined a conceptual model to explain some key factors for the company's strategy and for the success of the project that can serve as a guide for its implementation.

The conceptual model developed and represented in figure 2 intends to relate the method through which it is intended to demonstrate how the increase in the company's performance may be enhanced through the implementation of intelligent systems. In this way, it is intending to demonstrate that the use of these systems allows an optimization of the company's operational and logistical processes and that, consequently, it will enhance its performance. This model is important to understand the relationship between these key concepts, but also to be analyzed as a whole so that some conclusions can be redrawn for the implementation of the measures developed throughout the project.

Figure 2: Conceptual model



Source: Author's Elaboration

During the literature review, it was individually described the key concepts relating to intelligent systems and small and medium-sized enterprises, as well as a brief description of the association between these two concepts. As previously mentioned, one of the objectives of the project is to remodel the processes that already exist in the team and to what extent the possible changes will benefit the company. In this sense, for a better understanding of the role of process optimization and automation, as an intermediary between the concepts mentioned above, it will be explained how intelligent systems can be incorporated into these processes, as well as the benefits and challenges of

their implementation. Additionally, it will also be addressed to what extent their optimization will produce an increase in the performance of an SME.

### **3.9.1. The importance and role of RPA technology**

Currently, the world economy is changing due to the development of new technologies, which in turn requires companies to become more agile in responding to their customers' needs (Axmann & Harmoko, 2022). Additionally, given the high competition and the constant pressure on the costs to which they are subject, they consider that the investment in the digitization of their processes in terms of purchasing and stock management, for example, is a priority given their importance within any organization. In this sense, companies that adopt digital systems throughout their internal processes achieve faster adaptation due to the ease of obtaining information, which leads to more conscious, informed, and quick decisions (Postolea & Bodea, 2022). According to Ratia et al. (2018) and Willcocks et al. (2017), the concept of digitalization is expanding, covering several service companies and including sectors such as logistics, for example (Farinha et al., 2023). Several authors argue throughout the literature that cost efficiency, service quality, productivity, and business sustainability can be achieved through process optimization combined with the adoption of technology and IS (Aydiner et al., 2023), (Axmann & Harmoko, 2022).

With the emergence of these trends, a technology called robotic process automation (RPA) was created, which, according to Hallikainen et al. (2018) will allow companies to generate great returns on investment. This software allows the automation of processes using “bots” through pre-established rules that imitate the actions that an employee would perform in one or more systems performing functions such as entering and manipulating data in a computer. In this sense, software robots will reduce routine, structured, high-volume, repetitive tasks performed by workers, automate processes and intensify certainty in decision-making. According to a survey carried out by Deloitte in 2021, RPA was identified as one of the technologies that allow for greater satisfaction on the part of customers and employees, guaranteeing their professional development (Costa et al., 2022). In addition, Lacity and Willcocks (2021) argue that RPA practices, when well implemented, generate an increase in competitiveness due to the cost and time savings that the software allows obtaining with its use (Flechsigt et al., 2022). RPA represents one of the most promising office automation technologies as it has a growth rate of around 30% annually (Axmann & Harmoko, 2022). Scheppler and Weber identify that European companies intend to implement this technology in at least ten of their processes, which consequently presents a statistical perspective that considers that RPA will represent a disruption in the mindset of the companies where it will be implemented (Aydiner et al., 2023).

Some authors argue that the basic level of RPA implementation is not enough for strategic use by companies in the sense that they should choose for intelligent automation, which consists of implementing RPA with artificial and cognitive intelligence to eliminate the problems of adjustment of some tasks (Aydiner et al., 2023). Regarding the sector where the company of this project is inserted, the wholesale sector, uses this technology to improve the efficiency of its current operations, optimizing manual tasks. The companies present in this sector choose it for the initial configuration of this system to be carried out internally due to the superior knowledge that their employees have of the existing processes. Then, the maintenance and development of these systems are usually outsourced to free up workers for other tasks with more added value (Asatiani et al., 2023).

Currently, this RPA system is already able to aggregate and perform several tasks that were previously manual, such as entering data, preparing simple calculations, reading and extracting data from systems, filling out forms, and collecting data from a web page. According to Huang and Vasarhelyi (2019), the implementation of this technology takes place in four phases, which are the identification of tasks, redefinition and remodeling of processes, development of the “bot” software, and monitoring of the actions taken. Other companies, as defined by Gex and Minor (2019), choose to include an extra phase that consists of testing the software before its implementation (Costa et al., 2022). RPA has software robots that can be divided into autonomous or assisted robots. Autonomous robots are not assisted by human intervention and follow a standardized workflow of everyday transactions, mitigating executions during the execution of tasks. These projects take more time and experience to implement due to their execution complexity. On the other hand, assisted robots do not perform tasks independently since they are only used when workers consider it appropriate. In this way, these designs are faster to produce and involve a low production cost. Hofmann et al. (2020) argue that companies can combine these two types of robots taking into account the objectives that need to be achieved since autonomous robots are more suitable for large volumes of processes that have not changed in the last year while assisted robots offer more security to the company since throughout the process a human is supervising what the robot is executing (Farinha et al., 2023).

Throughout the elaboration of this project, the main benefits that RPA technology could provide to the company with its implementation were added in the table below, with time savings being possible, given that the tasks that used to take several days with the use of this technology start to be executed in just minutes or seconds and consequently the reduction of associated costs. The second benefit that can be highlighted is the conditions of the employees since, with this technology, they pass the high-volume, repetitive, and routine tasks to the “bots” so that their focus is diverted to value-added activities and the capacity to develop a diversified and strategic view of business processes. In this way, it is possible to reduce human errors since the system is not likely to make the same mistakes as humans due to pre-established characteristics. In addition, with the appearance of this system, the

creation of new jobs such as software management is also boosted, since a team will always be needed to support the activities performed by the “bots”. As a fifth benefit, it can be highlighted the improvement in the quality of products and services and, consequently, the increase in customer satisfaction provided by the faster execution of processes, which leads to a more agile response to customer requests. Finally, improvement and efficiency of operational performance can be identified due to the elimination of heavy labor tasks and their cost.

Table 1: Benefits of RPA technology

| Benefits                                   | Authors                                                                                                                                                                  |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time and cost savings                      | Huang F. and Vasarhelyi M. A. (2019); Syed R. et al (2020); Wewerka et al. (2020); Wojciechowska-Filipek (2019)                                                          |
| Employees focused on tasks that add value  | Syed R. et al (2020); Choi et al. (2021); Hartley and Sawaya (2019); Nawaz (2019)                                                                                        |
| Increased quality of products and service  | Acemoglu D. and Restrepo P. (2019); Dixon J., Hong B., and Wu L. (2019); Pérez J. B. and Falótico A. J. A. (2019); Vijai C., Suriyalakshmi S. M. and Elayaraja M. (2020) |
| Improved efficiency and productivity       | Choi et al. (2021); Denagama Vitharanage et al. (2020); Harmoko et al. (2021)                                                                                            |
| Decreased error rate                       | Ketkar and Gawade (2021)                                                                                                                                                 |
| Creation of new jobs                       | Santos et al. (2019)                                                                                                                                                     |
| Improved customer service and satisfaction | Parker and Appel (2021),                                                                                                                                                 |

Source: Author’s Elaboration based on literature

On the other hand, the presented technology still suffers from some challenges and limitations that are summarized in the table below. The first limitation can be highlighted by the fact that it is a recent technology, which causes poor knowledge and experience of its implementation, and RPA technicians do not yet have a high cognitive capacity. In this way, some authors such as Santos et al (2019) argue that with the transfer of this technology to growing intelligent systems such as artificial intelligence and Machine Learning, companies will be able to better develop this technology. Then, the internal resistance to the existing organizational culture can be identified as a challenge, since employees are afraid of the impact that the adoption of this technology will have on their work, as they will be faced with the need to have new skills that they previously did not have. were required such as ease of use of technology for example. As a third limitation, one can identify the need for current processes to be structured as well as the database that supports them, since “bots” need standardized information to be able to follow pre-established rules to avoid systematic errors that they can commit. Finally, the difficulty on the part of management in choosing which processes should be automated stands out as a challenge, since the software may not be suitable for everyone. Thus, it

should be considered that complex and poorly standardized tasks will represent a challenge for the use of these systems, as human decisions will be required.

Table 2: Challenges and limitations of RPA technology

| Challenges / Limitations               | Authors                                                              |
|----------------------------------------|----------------------------------------------------------------------|
| Little knowledge and experience in RPA | Wewerka et al. (2020); Gotthardt et al. (2020); Lacity et al. (2015) |
| Company cultural resistance            | Marciniak and Stanisławski (2021)                                    |
| Need for a structured database         | Wewerka et al. (2020); Vokoun and Zelenka (2021)                     |
| Choosing which processes to automate   | Axmann, B. and Harmoko, H. (2021); Wanner, J. et al. (2019)          |
| Systematic errors                      | Gotthardt et al. (2020)                                              |

Source: Author's Elaboration based on literature

### 3.10. Project Development

Currently, the company has a simple operational process as most of the necessary tasks are implemented by human force and the intervention of technology is almost non-existent. In this sense, as identified before the main objective of this project will be to remodulate the actual operational processes due to the incorporation of RPA technology together with some intelligent systems in order to understand their impact on the performance of this company. The actual process of its primary activities can be described through the flow presented below.

Figure 3: Actual flow of the primary activities



Source: Author's Elaboration

Briefly, the process begins with the execution of orders by the purchasing manager to the various suppliers. The goods are then transported and stored in the company's warehouses currently located in the district of Castelo Branco. Weekly, customers are visited by salespeople for them to place their orders to be later delivered by the distribution team. The process is concluded with the charge of the order value by the team of its customers according to the pre-established deadlines.

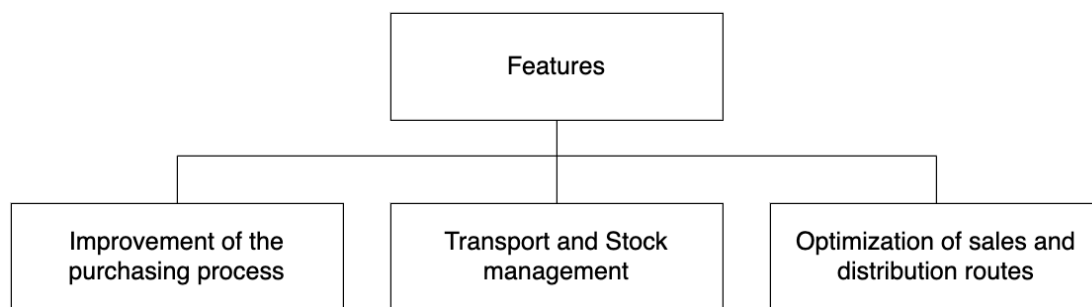
As previously mentioned, the implementation of this technology must be carried out through four phases: the identification of tasks, the redefinition and remodeling of processes, the development of

"bots" and the monitoring of the actions taken. Thus, throughout the project, three of the four phases of this implementation will be described and only the development phase of the "bot" will not be explained since it will require the help of a specialist in the field of informatics for its realization.

### 3.10.1. Feature Map

In a first phase, the project will consist of the improvement of three current processes of the company, namely the purchasing process, stock management and sales and distribution routes, as shown in the figure below. These processes will be redesigned with a view to improving them independently, but also jointly providing for the achievement of the common objective mentioned above. In this sense, the next section will describe the current and future situations individually in order to better understand the suggested changes.

Figure 4: Features that will be developed during the project



Source: Author's Elaboration

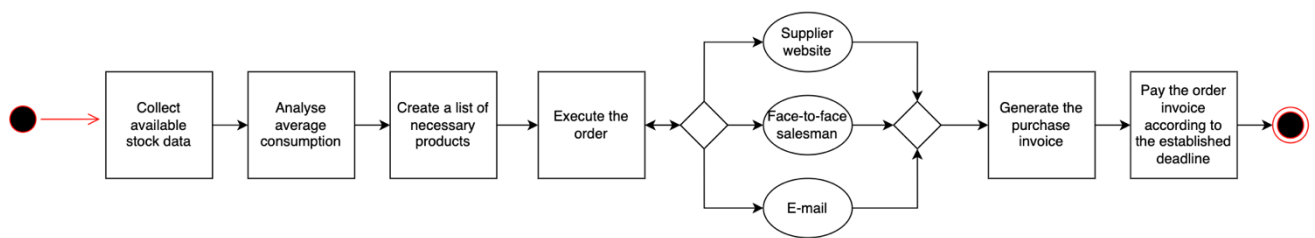
#### 3.10.1.1. Purchasing process

##### Actual Situation

The purchasing department is responsible for placing orders with the company's suppliers, which, as already mentioned, consist of the brands that have established partnerships with the company. In more detail, the process begins with the collection of data on available stock and average consumption by the operational staff, who subsequently deliver these elements to the head of purchasing so that he can draw up a list of the products to be ordered. The manager then makes this list available to the operator responsible for executing the order, which can now be placed on the supplier's shopping website, by email, or during a face-to-face visit by the brand's salesperson. After completing the order, the purchase invoice is issued and the financial operator pays it according to the agreed period.



Figure 5: Actual flow of purchasing process

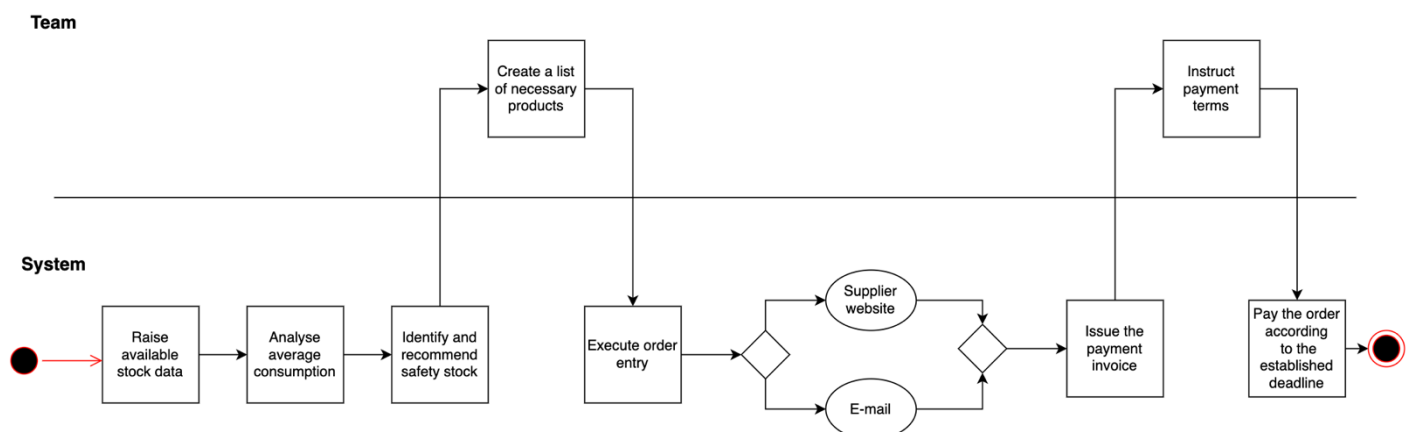


Source: Author's Elaboration

### Future Situation Proposed

In order to improve the process was defined that through big data the company will be able to collect in a matter of seconds the data about the stock available in each warehouse as well as analyse the average weekly consumption of each product. In this way, the artificial intelligence will allow the recommendation of the security stock that the company must have to avoid stockouts, to allow the minimization of the error and the optimization of the time spent since the system will provide this output in a well faster than the head of purchasing can currently do. Then, taking into account the output of the system, the purchasing manager will analyse it and draw up a list with the necessary products. The system will scan the information and execute the order in the appropriate way depending on the supplier, that is, the system will be able to identify whether the order should be carried out through the website or by email. This will immediately issue an electronic payment invoice that will be received by the financial department so that it can provide the necessary instructions and payment conditions so that the system can subsequently process the payment according to the established deadline.

Figure 6: Future proposed flow of purchasing flow



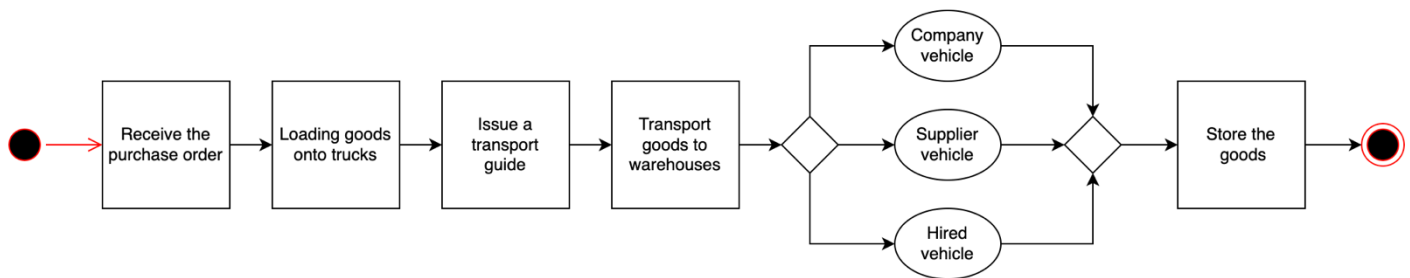
Source: Author's Elaboration

### 3.10.1.2. Transport and Stock Management

#### Actual Situation

Regarding the goods are transported and stored from the suppliers' factories to the company's warehouses, this process starts when the supplier receives the purchase order in its system. Then, the goods are loaded onto the trucks that will transport them and the system simultaneously issues a transport document that must be in the driver's possession during the movement of the goods. Currently, the transport of the order can take place using the company's vehicles with payment by the supplier for this service, using the suppliers' vehicles, or even using vehicles contracted by the suppliers to transport companies. This process ends with the storage of the goods at the company's facilities by the warehouse manager.

Figure 7: Actual flow of transport and stock management process

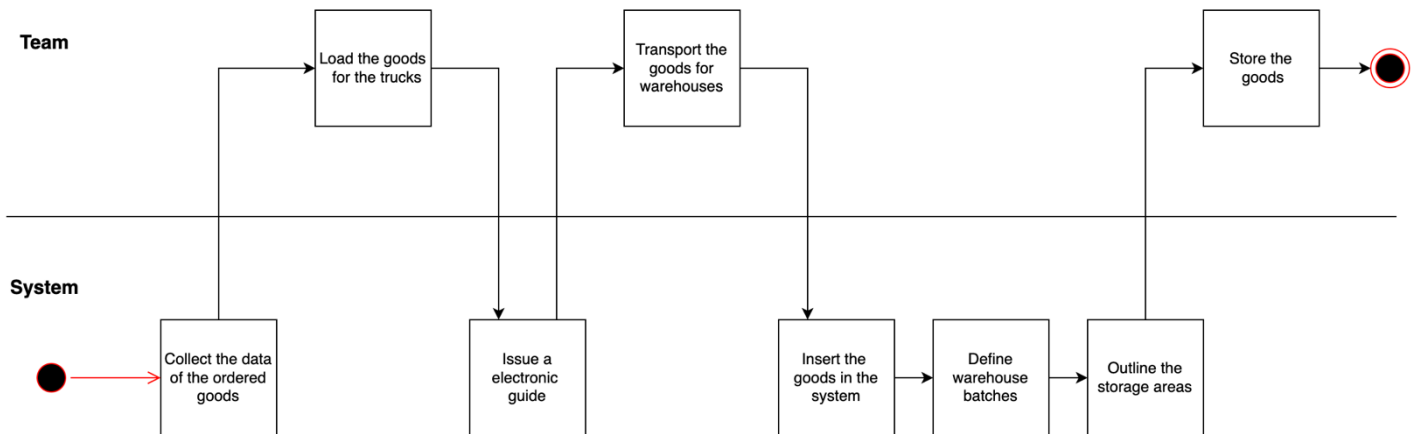


Source: Author's Elaboration

#### Future Situation Proposed

For the purpose of upgrade the flow of transport and storage of goods, the process will begin with the system automatically receiving the purchase order and notifying the staff responsible for the warehouse on the part of the suppliers of when the goods must be loaded onto the trucks, as well as the quantity of the same. Then, the system issues an electronic guide to the driver's email, allowing the minimization of the risk of losing the document and reducing the time spent loading the goods. The driver transports the goods to the company's warehouses and using scanning devices, the warehouse manager will be able to automatically insert the goods into the system to categorise the lots present in the same as well as to define the storage area that must be used upon entry of each order and this process ends with the storage of the respective goods in the warehouse. This optimization in the stock entry process will allow for a reduction in the time spent loading the goods sold by distributors, as well as better control of the existing stock in each warehouse since each lot will be well identified.

Figure 8: Future proposed flow of transport and stock management process



Source: Author's Elaboration

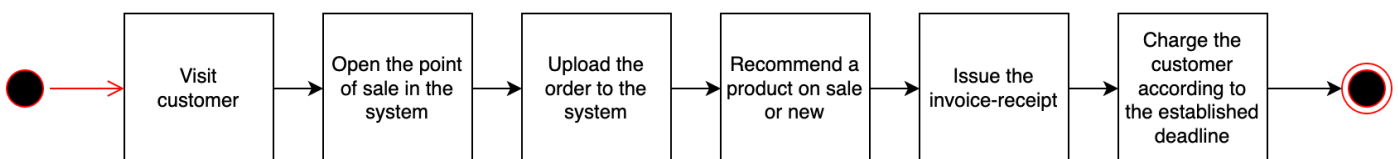
### 3.10.1.3. Sales and Distribution routes

#### Actual Situation

##### Sales Routes

The process initiates with sales team visit the establishments. Then, the salesperson opens the customer's file in the system and enters the customer's order. Before finalizing the sale, the seller tries to recommend a new product or one in sale. Finally, they issue the invoice receipt in the system and charges customers who have credit agreements according to the established period, varying between seven, fifteen, or thirty days depending on the volume of monthly billing and the agreed conditions.

Figure 9: Actual flow of sales process



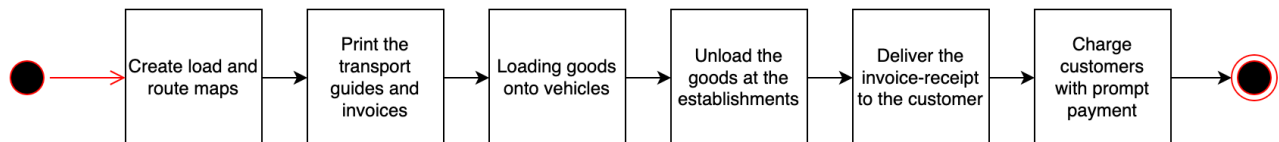
Source: Author's Elaboration

##### Distribution routes

The goods distribution process begins with the collection and analysis of the orders placed by the sellers on the previous day and the elaboration of the load maps that consist of the distribution of the products sold by the trucks according to the number of drivers available as well as the capacity vehicle loading. The route maps are issued with the indication of customers who ordered and should receive

the goods at their establishment the next day. Subsequently, the transportation notes are printed, as well as the customer receipts for immediate payment. With the supervision of the warehouse manager, distributors load the vehicles taking into account the loading maps, and they move to the establishments to unload the goods. Finally, the distributors deliver the invoice receipt to the customers and charge those who are in prompt payment condition upon delivery.

Figure 10: Actual flow of distribution process



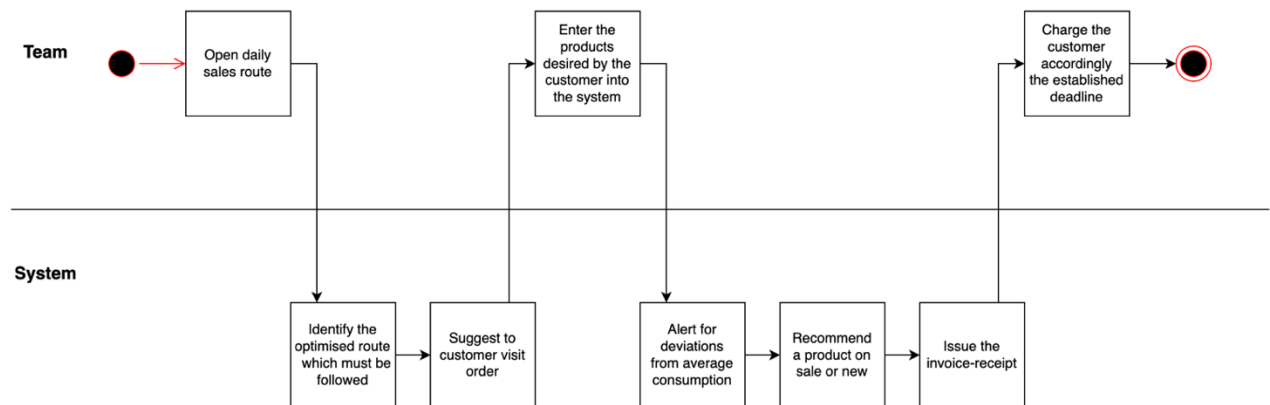
Source: Author's Elaboration

## Future Situation Proposed

### Sales Routes

In order that enhance the flow of salespeople visiting commercial establishments, the process will begin with the opening of the daily sales route by the salesperson in the system. Then, the system will identify an optimised route for the salesperson, providing the number of customers per day, as well as the regularity of purchase of each of them and the order of visits to customers that the salesperson must follow. Subsequently, the seller enters the products that the customer wants to buy into the system. After this insertion, the system automatically alerts the salesperson of possible deviations from the customer's average consumption, as well as the products that the customer has not purchased for at least fifteen days, to encourage their repurchase. The system identifies new or sale products that the customer is not yet buying so that the salesperson recommends them to customers. When the sale is finalised, the system issues the customer's invoice receipt with credit and the salesperson charges the customer according to the established period.

Figure 11: Future proposed flow of sales process

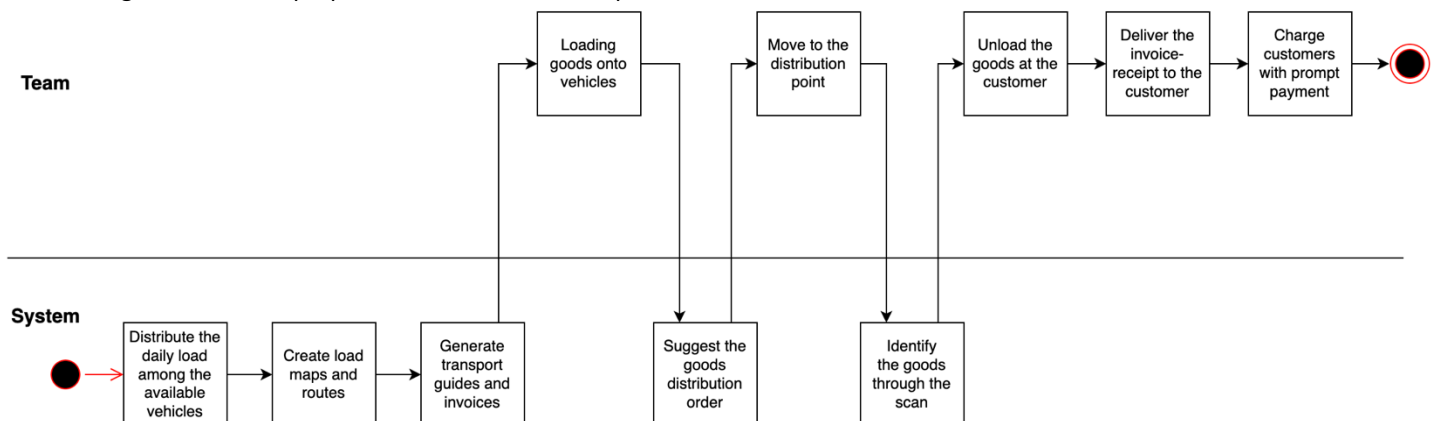


Source: Author's Elaboration

### Distribution routes

As a way to refine the distribution flow of goods to customers starts with the system distributing the daily load of the previous day's sales to the available vehicles and thus preparing the repetitive load maps and routes that will be needed. It also generates transport notes and invoices for prompt payment customers that will be delivered by distributors. Taking into account the load map, each distributor loads their car with the goods ordered by customers and opens their daily distribution route in the system. Then, the system suggests the delivery order of the goods that must be followed to optimise the costs of the same and facilitate the displacement of the distributor, providing him with the necessary instructions for each customer's establishment. When arriving at the customer, the distributor will use a scan device to identify the goods ordered by each customer to increase the delivery speed of the goods by the distributor. Finally, the distribution process is completed with the delivery of the invoice receipt and the collection of customers in cash by the distributor.

Figure 12: Future proposed flow of distribution process



Source: Author's Elaboration

### **3.10.2. Implementation Phase**

The implementation of these changes to existing processes will have to be a continuous and conscious process, as it will be a challenge for the company, since currently its processes are practically only humanised. Thus, for the company to achieve good results with the implementation of these changes, it will be necessary to plan a strategy that should be followed by the company. Synthesising in a first phase, the company will incorporate RPA technology with the intelligent systems such as big data and artificial intelligence in order to obtain the improvement of the processing of orders to suppliers, the optimization of the routes of sellers and distributors and the improvement of the management of stock and storage. Firstly, for the implementation of any of the purposes described above, the company will have to carry out an extensive collection of data from its customers, as this database is currently incomplete, which directly influences the quality of the data necessary for the implementation of these processes. Next, the company must have a working capital since it will still have to make a large investment in software and hardware, infrastructure and training for its teams to know how to use the systems that they intend to use.

For the development of a better purchasing process the company will need to invest in software in order to develop the improvements suggested. Then, it will still be necessary for the company to integrate this process with the management of stock in the warehouse, since if the latter fails, the system information will be wrong and it may process some orders incorrectly, which could lead to stock outages. Next, the company must maintain the job of the head of purchasing in order to supervise the work that the system will do, as it will be a process that includes decision-making.

Regarding the improvement of stock and storage management, which will consequently evolve the processing of orders to suppliers and the transport of goods, the company will invest in big data in order to store all the data necessary for the artificial intelligence to analyse the available stock data and the average monthly consumption of each product and provide the limit of a security stock. Next, the company will still have to invest in scanning devices that will be used both by the warehouse staff during the entry of stock into the same and by the distributors in order to speed up the process of unloading the products to the customers. Finally, the company will still need to define the storage areas by drawing up a warehouse plan so that, with the help of artificial intelligence, the batches of each product can be defined taking into account various factors such as the brand, the date of arrival in stock and the expiry date of the products so that when loading, distributors know which batches to load.

With regard to the optimization of the routes of sellers and distributors, it will first be necessary to proceed with the typification of customers, in which the following criteria must be taken into account: the type of establishment such as hotel, cafe, restaurant, for example, the brands that the customer consumes, including Super Bock, OLÁ and Delta, as well as the monthly sales volume with

different levels such as 0-500€, 500-2000€, 2000-5000€ and more than 5000€. Then, using artificial intelligence, the company will measure the distances between the points of sale based on their addresses and analyse the frequency of visits to the customer, whether this should be weekly, biweekly or monthly, depending on the monthly sales volume and the purchase regularity. Thus, through these two steps, the routes will be adequate and the costs will be reduced.

### **3.11. Control process**

Throughout the implementation of the project, it is necessary for the company to simultaneously apply control measures over it through pre-established metrics to maintain the plan as outlined above and for the objectives to be achieved. The control phase assumes a very relevant role in the project since it determines its longevity and success. A project with well-defined control measures leads to a reduction in the number of errors and a faster resolution of them when they occur since errors will be more easily identified, which will later lead to a faster and more conscious decision by managers. Concerning the metrics defined, these will be implemented in the scope of evaluating the impact of the changes in the processes suggested throughout the project.

As metrics that evaluate the company's global performance, can be defined the numerical distribution of customers, which consists of the analysis of the company's customers versus customers who place orders regularly and in the last six months, and the effectiveness rate of the products, which corresponds to the measurement of success sales of each product. Regarding the sales optimization process, can be defined it as measuring the evolution of sales of each employee by route to understand whether their optimization translates into a direct increase in sales, the positivity of customer sales by route, that is, assess whether the improvement of this process represents a favourable evolution for the increase in the number of customers who buy with those who do not place orders per route. Furthermore, it is important to evaluate the increase or decrease of the drop size, which is an indicator that checks the efficiency of the order through the total volume of the order and the number of orders. Thus, a larger drop size translates to the same weight distributed over fewer orders, which means less travel, which subsequently provides lower delivery costs, vehicle optimization, and even increased operational efficiency. Regarding the distribution process, it is relevant to measure the success rate of delivery through the opinion of its customers after it has been carried out, and about the stock management process, it will be necessary to measure the product turnover rate in the warehouse to understand whether the definition of batches and the consequent departure of the goods from the warehouse is taking place as expected.

With the use of the metrics mentioned above, the company will be able to verify the success of the measures presented and will correct any errors that may occur in advance to avoid major errors.

#### **4. Conclusion**

With the development of this project, it was possible to achieve the proposed objectives to solve the identified problem, which was the lack of optimization and efficiency of the company's operational and logistical processes to measure the impact that a possible implementation of some intelligent systems could have in the performance of this company. The use and preparation of the analysis presented above made it possible to identify some trends and limitations that the company could face given its characteristics as well as those of its surroundings, including current competition. For the successful design of this project, it was relied on the experience and wisdom of the employees and the owner of the company, which allowed the development of updated and real processes so that the base of this project was clean and the measurement of results was not adulterated. The conclusions of this project are in line with the existing literature, thus demonstrating the feasibility of the results achieved so that the approach developed in this project can be used by more companies belonging to the wholesale trade sector to improve their performance and enhance its results.

Through a literature review, it can be concluded that the company could face certain limitations such as the low investment capacity and the strong competition it faces from multinational companies, given that they have already introduced these intelligent systems into their operations with the same objective and have a relatively greater investment capacity than small and medium-sized enterprises. However, this type of company will have unique characteristics in its favour, such as informal organisational culture, flexibility, and quick reaction to changes in the surrounding environment. Intending to use a company belonging to the sector as an example, it was intended to demonstrate that the trend towards automation and optimization of operational and logistical processes will grow due to its relevant advantages for the performance of a company suggesting the incorporation of some intelligent systems in the company's current processes.

The demands and needs of consumers are constantly changing, so they are looking for the fastest and cheapest service. However, they continue to simultaneously seek a service that is personalised and suited to their needs, which for this type of company is a differentiating factor given that, as they do not produce the products they sell, they cannot innovate in terms of their characteristics, but in the way, these are delivered to your customers. In this specific project, taking into account the characteristics of the company as well as those of the surrounding environment, it was considered that redesigning the current processes of the company with the introduction of some intelligent systems will enhance the performance of this company since it will allow the reduction of time spent in some tasks, better management of existing resources, a decrease in some operating costs and an increase in customer satisfaction. As already mentioned, this project is essentially based on develop a better purchasing process, optimising the routes of sellers and distributors and improving stock management



in the company's warehouse. The success of this project will be measured and evaluated through the metrics set out in the control phase since measurable variables will be used to determine the results of the project. In this way, it is considered that the control phase will be a phase that the CEO of the company should pay special attention to and will have to be involved in the entire phase to conclude, through the pre-established metrics, if the project presents the results that were expected and that everything goes as planned.

Taking into account the pre-defined objectives for this project, it can be considered that these were achieved. However, the impact assessment of these improvements can only be carried out after the implementation of the project through the metrics defined in the control phase. It can be considered that the project contributed to the development in the wholesale trade sector of the growing trend of optimising logistical processes through the incorporation of technology since using the company as an example, intending to demonstrate that with the correct design of current processes and with the incorporation of some intelligent systems any company belonging to this sector will increase its performance and reduce its operating costs. In this way, it was considered that this project allows, in practical terms, the simulation of how with only small changes in its current processes the company will be able to enhance its performance and obtain better results.

As the main limitations of the project, it can be highlighted the existing restrictions regarding financial resources, given that a high investment will be necessary for the implementation of this project, which will also cause difficulties in the purchase of material and technological resources that are indispensable for its implementation. The limitation of the time available to carry out this project can also be considered adversity in the sense that extra effort will be required on the part of the team since it will be a project that will have to occur in parallel with the execution of the main activities of the company given that it will not be able to stop its operations to carry out the same. The complexity of integrating this project with existing activities may also represent a restriction insofar as for the implementation of this project it will be necessary to have an updated and complete database of customers and suppliers, for example, which will take some time to complete and may cause a delay in project implementation. In the same sense, as the project involves the integration of all processes simultaneously for optimization to be achieved, effective coordination between all collaborators involved in the project will be crucial for it to be successful. The reaction to the change on the part of the employees may also represent a limitation in the sense that good management regarding the change by the CEO will be essential given that the changes will still be significant since they are currently practically humanised processes in their entirety, which will cause inexperience on the part of the employees and a longer adaptation to possible changes, which consequently causes greater nervousness and instability on the part of the employees, which must be accompanied by management. The risks and uncertainties associated with changes that occur in the company's external

environment may influence the performance of the project, requiring adequate management when these situations occur and the preparation of contingency plans to minimise the possible negative impact. Finally, the poor management of the previously mentioned metrics control may make it difficult to evaluate the project results and consequently lead to bad decisions taken by the management according to the fallacious data.

Concerning future recommendations, it is suggested in case of success of this project, the incorporation of intelligent systems in more operational processes of the company, such as the creating a credit control system due to the high value that the company has in credit to customers and the development of a direct contact network between customers and the company since it is currently in deficit and the main point of contact between them are the salespeople since it is important that customers can have more than one point of contact to enhance the regularity of contact between both parties so that the relationships between them become stronger and more reliable.

In addition, it is suggested the implementation of e-commerce take place after this project is concluded, as it will be easier to create a new sales model for the company when it has more automated processes, since the use of e-commerce will open up new opportunities for this company and it is expected that its customer base will grow a lot with this change, so if the processes are not automated, the delivery of a personalised and efficient service could be compromised since it can be considered that investing in the capacity of the company's employees in the execution of these new processes will increase their competence and motivation, which will lead to better performance. In this sense, it is considered fundamental a continuous investment in training and acquisition of new skills of the employees. Finally, it is suggested the indication of clear and measurable objectives for each collaborator only with this project to apply practices of extra motivation about this project since, as already mentioned, it will require extra effort on the part of the collaborators for its implementation.

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## 6. Appendixes

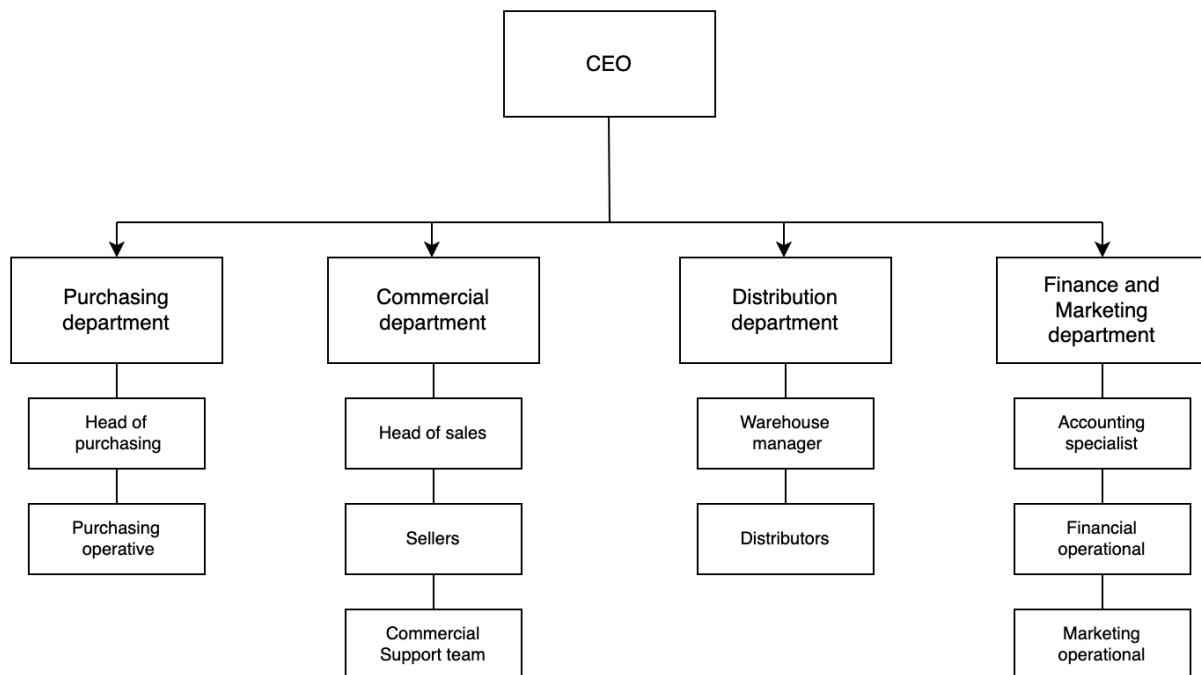
### Appendix 1: PESTEL analysis

|                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Political Factors</b> <ul style="list-style-type: none"> <li>- Government policies and regulations</li> <li>- Political instability</li> <li>- Government spending decisions</li> <li>- International relations</li> </ul>                            | <b>Economic Factors</b> <ul style="list-style-type: none"> <li>- Economic cycles</li> <li>- Influence of interest rates and inflation</li> <li>- Consumer confidence</li> <li>- Exchange rates</li> </ul>                         | <b>Sociocultural Factors</b> <ul style="list-style-type: none"> <li>- Demography</li> <li>- Consumer behaviour</li> <li>- Social trends (environmental concern and ethical sourcing)</li> <li>- Workforce</li> <li>- Different cultures</li> </ul> |
| <b>Technological Factors</b> <ul style="list-style-type: none"> <li>- Technological innovation</li> <li>- Increase in connectivity</li> <li>- New methodologies to work (e-commerce)</li> <li>- Mobile technology</li> <li>- Computer attacks</li> </ul> | <b>Environmental Factors</b> <ul style="list-style-type: none"> <li>- Natural variants (e.g. climate change)</li> <li>- Environmental regulations</li> <li>- Availability of natural resources</li> <li>- Energy costs</li> </ul> | <b>Legal Factors</b> <ul style="list-style-type: none"> <li>- Commercial regulations</li> <li>- Grow of intellectual property</li> <li>- Labour laws</li> <li>- Consumer protection laws</li> </ul>                                                |

### Appendix 2: SWOT analysis

|                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strengths</b> <ul style="list-style-type: none"> <li>- Strong relationship with partners</li> <li>- Adoption of a next-day delivery policy</li> <li>- Increase in the number of partnerships</li> <li>- Use of economies of scale</li> <li>- Experience of employees</li> </ul> | <b>Weaknesses</b> <ul style="list-style-type: none"> <li>- Limited financial resources</li> <li>- Role of be a distributor of leading brands</li> <li>- Dependence of suppliers</li> <li>- High cost of maintaining the stock</li> </ul>              |
| <b>Opportunities</b> <ul style="list-style-type: none"> <li>- E-commerce</li> <li>- Increase of strategic partnerships</li> <li>- Expansion to new markets</li> </ul>                                                                                                              | <b>Threats</b> <ul style="list-style-type: none"> <li>- Competition from multinationals</li> <li>- Excessive advancement in technology</li> <li>- Sector regulations</li> <li>- Vulnerability of economic fluctuations and external forces</li> </ul> |

### Appendix 3: Organization Chart



### Appendix 4: Brands official websites

- Sagres official website accessed on <https://www.cervejasagres.pt/pt/>
- Nestlé official website accessed on <https://empresa.nestle.pt/>
- SICAL official website accessed on <https://cafestorrados.nestle.pt/sical/>
- Super Bock Group official website accessed on <https://superbockgroup.com/>
- Unilever - OLÁ official website accessed on <https://www.ola.pt/home.html>
- DELTA CAFÉS official website accessed on <https://www.deltacafes.pt/>