CAPÍTULO 12

Information Management of SMEs in Portugal (North and Center)

Technology data extracted from the GIPMEI project

Armando Malheiro da Silva
Sónia Catarina Lopes Estrela
Eliane Pawlowski de Oliveira Araújo
George Leal Jamil
Claudio Roberto Magalhães Pessoa

Companies face many challenges. Especially in the last two decades, the business world has been marked by globalization, continuous technological development and fierce competitiveness, a context which emphasizes the role of information as a strategic asset and resource in organizations. The phenomenon of information, inexorably linked to information and communication technologies (ICT), has profoundly characterized this scenario because, as Ribeiro (2005) states, technology is no longer a mere resource or a tool that aids in processing and retrieving information, but has become inseparable from it throughout its whole life cycle: production, processing, use and storage.

The impact of digital technologies is visible and transversal to all aspects of individuals' existence, companies and organizational processes themselves, with profound changes in the way people and companies relate and interact. The ongoing digital transformation breaks down barriers and technology is able to help creating innovative products and services and more effective and

efficient ways of working, therefore contributing to greater effectiveness and efficiency for both workers and organizations (Rogers, 2017). However, despite this transformation, carries a multitude of possibilities, it also poses challenges that should be analyzed and reflected upon in order to identify ways of assisting organizations to face and respond competently to these new scenarios.

Considering this reality and the widely recognized importance of information and digital technologies, this chapter is part of a broader study of small and medium-sized enterprises (SMEs)[1] in the North and Centre of Portugal as part of the project Information Management and Digital Culture in Industrial SMEs in Portugal: Behavior, Memory and Innovation (GIPMEI). The data presented was collected through a survey and aims to analyze the use of digital by these companies, namely the areas whose business processes are carried out with the support of information systems or digital platforms, the types of systems used, the use of social media and to assess whether these companies have already recorded incidents related to information protection and security, as well as to identify implemented measures.

The importance of this research may be observed, as highlighted in the Davos Report (WEF, 2023), in the fact that the true value of information lies in the knowledge that might be obtained and in the strategies that may be fostered through it. In this sense, the use of information systems is fundamental for SMEs to use information strategically for the business, a condition that must be combined with two other factors: the existence of staff designated to supervise operations related to Information Technology (IT) and information security, as well as a team of employees qualified for its critical use.

---

1 Within the category of Small and Medium-sized Enterprises (SME) there are the medium-size enterprises, which employ fewer than 250 persons and whose annual turnover does not exceed EUR 50 million, and/or an annual total balance sheet not exceeding EUR 43 million. A small enterprise employs fewer than 50 persons and has an annual turnover and/or annual total balance sheet not exceeding EUR 10 million. A microenterprise employs fewer than 10 persons and has an annual turnover and/or annual total balance sheet not exceeding EUR 2 million.

The study developed also aligns with the purposes of the European Commission, who defined the Digital Decade Policy Programme[2] aiming to build Europe's digital future and established, as one of its pillars, the need for the digital transformation of companies. In this aspect, we highlight that this programme established as a target for 2030, that over 90% of the SMEs reach at least a basic level of digital intensity. It is also important to emphasize that achieving this objective is inseparable from developing basic digital skills, as well as from the existence of safe and sustainable digital infrastructures.

We must consider these highlights because despite being a movement that has been structured since 2014 (with the establishment of regulations on Cybersecurity, Data Protection, among others) (European Commission, 2020), some goals are below expectations, regarding both the European Union and the Portuguese reality. In 2022, for example, 69% of small and medium-sized companies in the European Union (EU) achieved basic digital intensity, an index that is approximately 20% below the ambition defined for 2030. This diagnosis is compounded by the fact that "the majority of SMEs had a low level of digitalization, with 31% recording a very low level, and 38% a low level of Digital Intensity Index[3]".

Portugal, which is placed on the tenth position in this statistic, has, however, mobilized to change this scenario, by establishing digitalization as a strategic priority, since the country considers this is essential for the its economic growth. Through initiatives such as the Digital Transition Action Plan, a document prepared by the Portuguese state aligned with the purposes of the European Commission, digitalization has been regarded as the engine capable of promoting the country's transformation.

The commitment to this pillar of digital transformation of the business sector is essentially based on measures and actions which provide support for

2 More information can be found at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_pt

3 For more information about the Digital Decade goals for Europe, see https://ec.europa.eu/eurostat/statistics-explained/SEPDF/cache/108644.pdf

investment, encouragement of the digitalization of companies, and awareness and training particularly to SMEs, which represent the core of business sector and employment in Portugal, and the development of initiatives that contribute to the consolidation of scientific and technological business knowledge (Plano de Ação para a Transição Digital de Portugal, 2020).

GIPMEI is therefore based on the perspective of consolidating scientific knowledge with the aim, based on the studies by Estrela (2016) and Pessoa (2016), of supporting and enabling SMEs to adopt good information management (IM) practices aligned with the implementation of information and communication technology strategies that adequately support them to improve their performance. As a consequence of this initial step, the studies carried out at GIPMEI have sought to diagnose the problems and to identify and propose technical and technological solutions that are more suited to the characteristics and needs of Portuguese industrial SMEs. However, these actions involve not only implementing strategies, but above all understanding the added value of information as an organizational resource that needs to be managed to create value.

INFORMATION MANAGEMENT: THE INVISIBLE ASSET

Despite the widespread turmoil between information and information technology which leads to the hasty association between the use of computers or digital devices and information, a misconception that is added to an older one, which is that of confusing information with news[4], creating, organizing, storing and using documents, containers, and contents (or verbal, written, numerical or audiovisual information, etc.) — it is something that any entrepreneur, no

4 There are many examples of this misconception, such as the disclosure short book by Fernandes (2011). In the chapter "O papel da informação numa democracia liberal" (The role of information on a liberal democracy"), the heading is a sentence by Thomas Jefferson: "If I had to decide whether we should have a government without newspapers or newspapers without a government, I would not hesitate for an instant to prefer the latter" (Fernandes, 2011, p. 40). Information is used strictly as a synonym for the press, newspapers, and media in general.

matter how small (due to the size of their company), tends to neglect, to let flow, investing little or poorly in valuing it. This behavior, which the GIPMEI research project aims to investigate in depth, is the opposite of the requirements of the cyclical process of information management, a process which, in the field of Economics and Management and (Technological) Information Systems, is being replaced by knowledge management. Drucker defined it as the ability to manage, discover, map, classify, capture, distribute, create and retain knowledge efficiently, effectively and competently so that an organization might gain a competitive advantage over others in order to generate profit and ensure its survival and expansion in the market (*apud* Carvalho; Gouveia, 2023, p. 46)[5].

However, this definition is tarnished with a from a misconception that should be clarified from the start: this knowledge is cerebrally produced and externalized. In other words, it is explicit and not tacit or implicit and, in this sense, there is no way to separate it from information, understood as a structured set of codified rational or emotional representations (sign and symbol) shaped by social interaction, capable of being recorded on any material support and capable of being communicated synchronously or asynchronously and uni or multi-directionally (Silva; Paletta, 2022, p. 12). They are mental and emotional representations of any kind materialized in any support (paper or digital) and human activity, no matter what the situation, context, and socio-political environment, generates an infocommunicational flow that is the object of Information Science, understood as a "social science that investigates the problems, issues and cases related to the perceptible and cognizable infocommunicational phenomenon through the confirmation of the properties inherent in the genesis of the flow, organization and informational behavior. A science that studies an

5 In the same work, the concept of Ba is explained: "creation of a Knowledge Sharing Space" conducive, consequently, to knowledge management, but which necessarily includes information management: "Information Management is (must be) one of the concerns of the most informed and active organizations from an economic point of view", according to Gouveia (2012, p. 63). For the author, in this sense, considering the economic value for organizations, "it is necessary to ensure the processing, organization, and preservation of information, both at the individual level and, more challenging and crucial, at the level of the organizations themselves" (Gouveia, 2012, p. 62).

entire process from the origin, through to the collection, organization, storage, retrieval, interpretation, transmission, transformation and use of information" (Silva; Paletta, 2022, p.12). It is an applied social science that, inherited from technical-professional disciplines (Archival Science, Librarianship, Documentation and Museology), now integrates them into its unified field, as well as a substantial part of the Information Systems area, because the genesis, organization, retrieval, and use of information is increasingly done and will tend to be hegemonic using digital technology. This fact means that the scientific dimension is at the basis or root of the practical performance embodied in the profile of the information manager, the professional of the present and the future, a professional who absorbs various functional designations such as content manager and data manager into their skills.

Information and knowledge management, the practical and professional role of the Information Science graduate or master, has become key to the daily functioning and competitive performance of organizations or companies and this is not something recent, if we go back at least as far as the 19th century and witness the emergence of professionals called "bookkeepers" in charge of writing or commercial bookkeeping, i.e. accounting records that will evolve but whose foundations date back to that time and have earlier roots. Bookkeeping was done on paper books and today all the information and communication activity of micro, small, or medium-sized companies is generated on a technological medium that shapes and conditions the contents but does not alter their nature. The digital platforms created to produce, process, classify, store, and retrieve information are only useful and have an impact on the success and competitive performance of companies if there is an effective match between technology and information.

This is not the only aspect, nor does it exhaust the complex problem of information management in SMEs, but it is undoubtedly an urgent issue that causes a lot of entropy and serious expense, which micro and small companies in particular must avoid at all costs. A key example of this is the acquisition of software that is compatible with other complementary IT solutions, to achieve interoperability between systems and not to block them or incur unnecessary equipment costs. As an alternative to proprietary digital document

management platforms, there is the so called free or open-source software, which also requires dedicated and specialized staff, which always implies an expense under the human resources heading. To avoid this expenditure, it is common practice for small business owners to assign their accounting activities to external accounting offices – they outsource this function, but in doing so assign document possession to third parties and once the mandatory retention periods for tax and economic control purposes have expired, the way is quickly paved for their disposal and with it the absence of memory in the company – a not insignificant factor for competitive performance in the market.

Adapting technology to information management therefore implies a detailed diagnosis of the reality and, as a result, a flexible plan of varied solutions, all of which converge towards a single goal: to place the company on the road to sustainability and legal, healthy success in the market in which it operates. GIPMEI focused on a segment of small and medium-sized companies, the industrial sector, limited to two regions of Portugal, which we present in brief in the following section.

INDUSTRIAL SMES IN THE NORTH AND CENTER OF PORTUGAL

SMEs play an essential role in national economies and, in the case of Portugal, according to data from the National Statistics Institute (INE), in 2021, they represent 99.9% of the companies, they were responsible for 60.1% of the country's turnover and employed 78.5% of the Portuguese workers. As the focus of the research is on SMEs in Section C of the Classification of Economic Activities (CAE) (Rev. 3) in the North and Central regions of Portugal (N&CR)[6], it should be noted that of the 67 317 national companies active in

6 We follow the Nomenclature of territorial units for statistics (NUTS), which is a geographical nomenclature subdividing the economic territory of the European Union into regions at three different levels (NUTS 1, 2, and 3 respectively). The North and Center regions are two of the 7 Portuguese level 2 units, corresponding to around 54% of the Portuguese territory, with 56.2% of the population residing in Portugal concentrated within their borders, with an average of 124.6 inhabitants per km2 (11 .7 higher than the

the manufacturing industry (Table 1), 73.1% (49 233) are located in the N&CR, employ almost 79% of workers and are responsible for 63.2% of the turnover of national companies in this section. Companies in section C of the CAE account for 7.2% and 6% of the business in NR and CR respectively. In terms of the size of these companies, 99.4% are SMEs, of which 96.4% are micro and small companies and 3.6% are medium-sized. Only 0.6% of the companies in section C in 2021 were of large dimension.

These figures highlight the importance of these companies and their predominance in the N&CR. The choice of these companies is mainly due to these figures and the strategic importance that the industry has in the national economy, with a strong impact on Portuguese exports since section C was responsible, in 2022, for 93.3% of national exports (Ministério da Economia e Mar: Gabinete de Estratégia e Estudos, 2023, p. 32). They also stand out for their survival rate, which is higher than that of the other companies, making them important cases for study.

However, despite the important role of SMEs in the Portuguese economy, these companies have limitations, such as a shortage of qualified financial, material, and human resources, and low intensity in technology and innovation, among others, which is a constraint on their economic growth and is reflected in the indicators of the country's improved competitiveness. These limitations, according to the exploratory study conducted by Estrela (2016), condition the ability to act and compete in the markets and require SMEs to be creative and responsive both to constant transformations and to the difficulties arising from the volatility and competitiveness of the markets.

national average). They are the second (Center) and third (North) most extensive and the first (North) and third (Center) most populous regions in Portugal. All together they totalize 186 (60.4%) of Portuguese municipalities (Total: 308).
In economic terms, according to National Statistical Office (INE) data for 2021, those two regions were accountable for 49.3% of the Portuguese Gross Domestic Product (GDP), being respectively the second (North) and third (Center) largest contributors to the national economy after Lisbon metropolitan area (35.6%). Despite this situation, the North region has the lowest gross domestic product *per capita* (€2 681 less than the national average) of the seven NUTS II and the Center region is the fifth (€2 475 less than the national average).

Table 1 — Number, employees and turnover of C-sector companies in Portugal (2021)

	Companies		Employees		VVN (million s €)		VABpm (million €)		Companies by NUTS II
	Nº	Regional Structure	Nº	Regional Structure	Nº	Regional Structure	Nº	Regional Structure	Weight of Section C in the Total
Portugal	67 317	100%	727 114	100%	102 856	100%	24 857	100%	5,0%
Continent	65 529	97,3%	715 278	98,4%	101 548	98,7%	24 580	98,9%	5,1%
North	32 844	48,8%	384 187	52,8%	38 879	37,8%	10 978	44,2%	7,2%
Center	16 389	24,3%	190 084	26,1%	26 100	25,4%	6 817	27,4%	6,0%
Lisbon	10 241	15,2%	100 795	13,9%	29 938	29,1%	5 388	21,7%	2,6%
Alentejo	4 098	6,1%	34 076	4,7%	6 273	6,1%	1 280	5,1%	4,7%
Algarve	1 957	2,9%	6 136	0,8%	359	0,3%	118	0,5%	2,6%
A.R. Açores	1 062	1,6%	7 579	1,0%	965	0,9%	182	0,7%	3,7%
A.R. Madeira	726	1,1%	4 257	0,6%	343	0,3%	95	0,4%	2,4%

Source: Comissão de Coordenação e Desenvolvimento Regional do Norte (s.d., p. 5).

METHODOLOGY

The presented data was taken from an ongoing study on Information Management and digital use in industrial SMEs in the North and Center regions of Portugal. Based on the studies by Estrela (2016) and Pessoa (2016), the themes on which the survey should be created were identified, and sections of questions relating to Information Management, Information Behavior and Literacy, Security and Technology, Memory and Archives and Digital Culture were defined. This paper will present and discuss the data obtained on Technology and Security.

The survey was initially administered online, through the limesurvey platform, and this approach was complemented by distribution and face-to-face collection. The online and face-to-face distribution, which began in the last months of 2022, was complemented, from January 2023, with individualized approaches to companies, by phone contacts and face-to-face visits and subsequent emailing, which took place until September 2023. This alternative is in line with what Ghiglione and Matalon (2002) advocate regarding the possibility of complementing data collection with indirect face-to-face surveys, depending on the success achieved with this instrument (response rate and observational strength of the sample). Thus, by combining these strategies, 136 responses were obtained. The data was processed using the Statistical Package for the Social Sciences (SPSS) software, version 29.0, and is presented using graphs. Whenever there are multiple alternatives to choose from, the percentage is calculated by dividing the number of "Yes" answers by the number of companies which answered.

CHARACTERIZATION OF THE RESPONDENTS

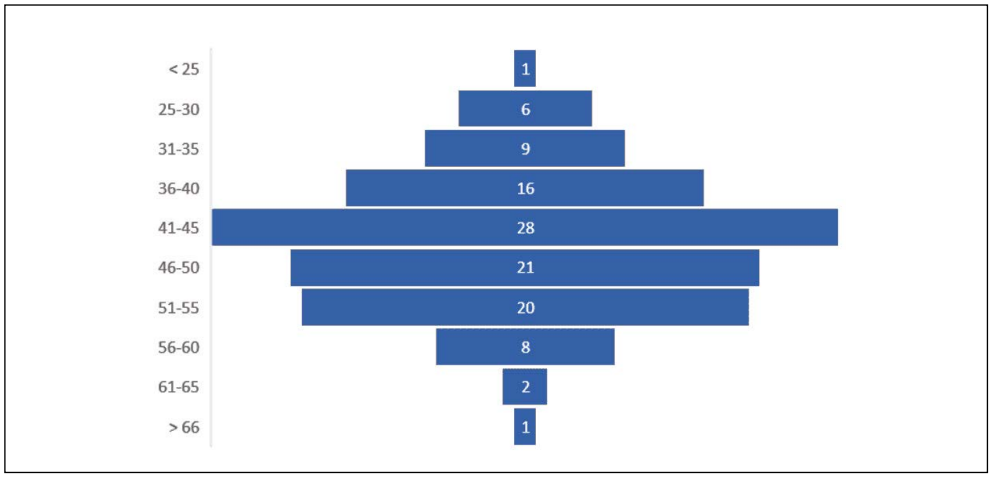
As far as the respondents on behalf of the company are concerned, there is a certain degree of gender balance, with 55.7% male and 44.3% female. Their ages vary between 23 and 67, with 85 (75.9%) of the respondents aged between 36 and 55 (Figure 1). Regarding the position held in the company, the majority of respondents (67.5%) hold management positions (Directors, CEO, Managers, Managing Partners, or responsible for specific areas), around 30%

top management, and 37.7% are directors of specific areas (especially financial directors – 18.4% of total respondents). In 16.7% of cases, they hold positions in the administrative area, 5.3% are accountants and the remaining 10.5% are technicians (namely salespeople, and textile designers, among others) or only mention the departments in which they work.

Concerning the number of years that they have worked in the company this number varies between less than 1 and 42 years. Of particular note are the 32 (28.8%) who have worked for the company for more than 1 year and less than 5 and the 26 (23.4%) who have been at the company for between 6 and 10 years (Figure 2). About the highest level of education they had attended, higher education courses stood out (81.5%). 2.5% of respondents were enrolled in a Ph.D., 49.6% in undergraduate courses, 23.5% in Master's, bachelor's (1.7%), (0.8%) MBA, postgraduate (0.8%), and Higher Professional Technical Courses (2.5%). The remainder were in the 9th Grade (5.9%) and 12nd Grade (12.6%) of Secondary Education.

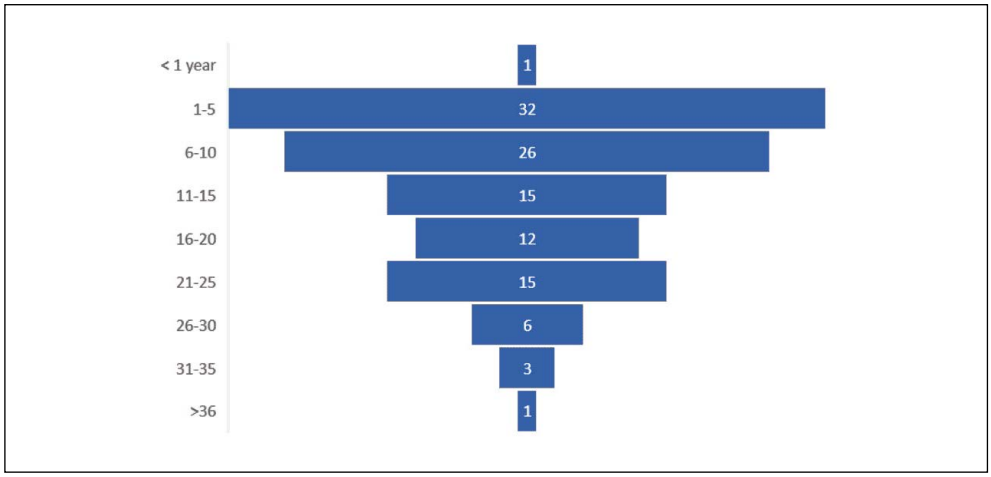
In terms of geographical distribution, 38.2% of responses were obtained in the North and 61.8% in the Center (Figure 3). The highest number of respondents was obtained in the municipality of Águeda (22.8%) in the Center Region, followed by companies located in Santa Maria da Feira (9.6%) and Vila Nova de Famalicão (8.1%) in the North Region. Among the respondent companies, 12.5% are micro-enterprises, 60.3% are small companies and 27.2% are medium-sized companies. As for the year in which they were founded, 45.4% were founded between 1981 and 2000 (especially the decades 1981-1990, with 22.8% and 1991-2000, with 21.3%).

Figure 1 — Age group (N=112)



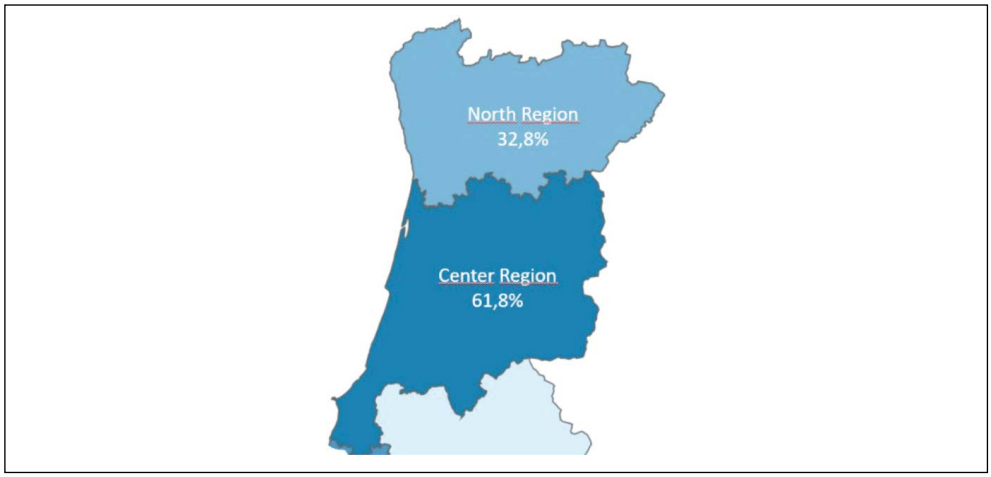
Source: authored by.

Figure 2 — Seniority in the company (N=111)



Source: authored by.

Figure 3 — North and Center Regions



Source: authored by.

PRESENTATION OF RESULTS

It's consensual that changes in technology and new innovative business models have transformed social life and business practices. As Laudon and Laudon (2020, p. 43) highlight

> In order to operate, businesses must deal with many different pieces of information about suppliers, customers, employees, invoices, and payments, and of course their products and services. They must organize work activities that use this information to operate efficiently and enhance the overall performance of the firm. Information systems make it possible for firms to manage all their information, make better decisions, and improve the execution of their business processes.

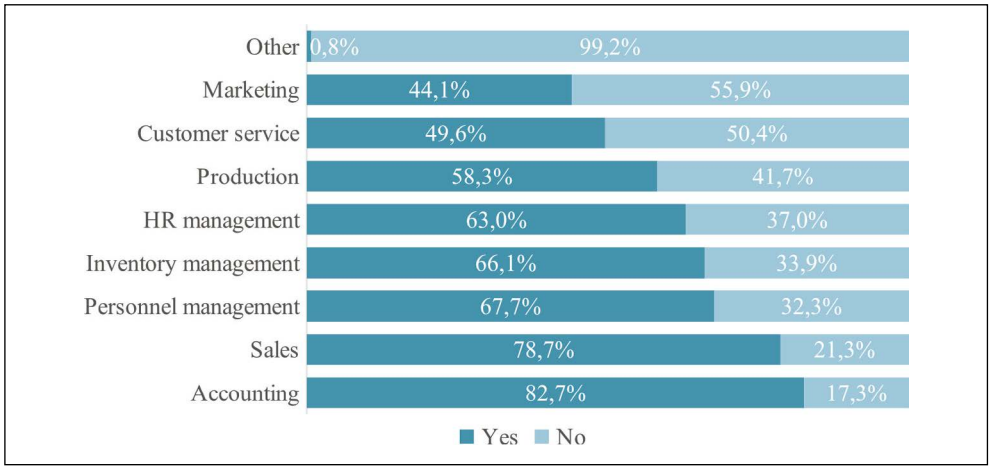
In today's business landscape scenery, IT capabilities, including information management and analysis, have become indispensable for supporting operations and achieving business objectives in all companies. To this end, data on the use of IT systems and information security in Portuguese industrial SMEs is presented and analyzed (WEF, 2023).

Information systems used in SMEs

The vast majority of companies surveyed (96.9%) state that they use information systems (IS). The remaining 3.1% (4) justify that they don't use them because a) the company functions appropriately and does not need to implement these systems); b) employees do not have the required knowledge to work with certain systems; and c) implementing IS is complex and involves risks.

Overall, as Figure 4 shows, the SMEs surveyed carry out organizational processes in various areas using IS. The areas that stand out are Accounting (82.7%), Commercial (78.7%), Personnel Management (67.7%), Inventory (66.1%%), Human Resources Management (63%) and Production (58.3%). Of the listed areas, the ones that make the least use of IS are Customer Service (49.6%) and Marketing (44.1%).

Figure 4 — Use of information systems (areas) (N=127)

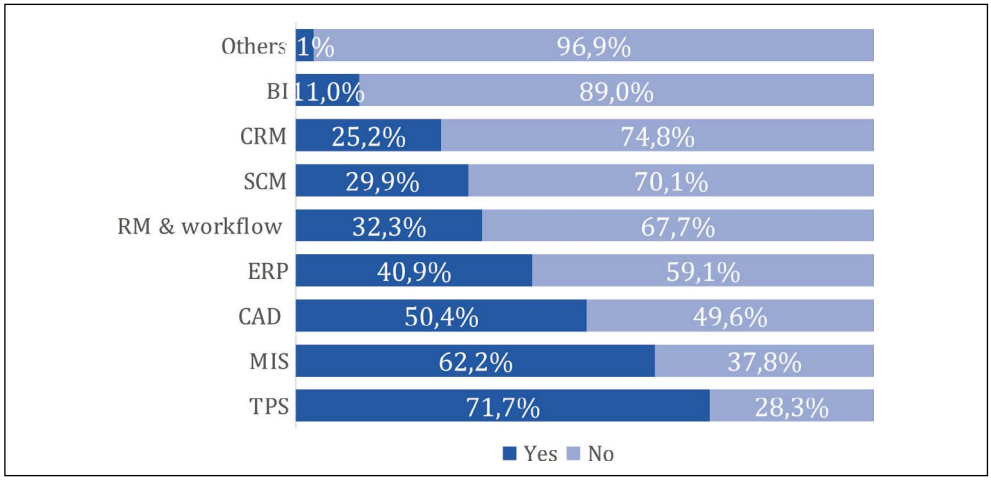


Source: authored by.

In a multiple choice closed question, it is possible to assess the existence of different levels of digitalization of companies, with 30% of companies stating that processes in the main areas are executed using digital technologies but, on the opposite side, 4.8% stating that they only use it in an area, with emphasis on

the Accounting area; 6.3% have two computerized areas or the 19% that have only 3 computerized areas, highlighting, in addition to accounting, production and inventory or sales and customer support. These figures seem to demonstrate the difficulties that are frequently underlined, especially for smaller companies in their digital transition process. This idea seems to be corroborated when analyzing the data relating to the information systems used by the Industrial SMEs of N&CR in Portugal.

Figure 5 — Types of information systems used by the companies (N=127)



Source: authored by.

The main information systems used by the companies surveyed, as can be seen from Figure 5, are:

1) transaction processing systems (TPS) (71,7%) – typically, an organization can use several of these systems to perform specific and routine tasks, namely, to process sales order entry, payroll, or employee record keeping.

2) management information systems (MIS) (62,2%) – this system summarizes and reports on the company's basic operations using data supplied by TPS. They allow to obtain regular and summarized reports on the

company's current performance, based on information gathered on stocks, production, and accounting, and to compare it with forecast performance.

3) computer-aided design systems (CAD) (50,4%) – these systems allow engineers and other professionals to digitally create 2D drawings and 3D models of real-world products before they're ever manufactured. They make it possible to share, review, simulate, and modify designs easily. In this way, they enhance innovation and the creation of differentiated products that get to market fast.

4) enterprise resource planning (ERP) (40,9%) – this type of system integrates the main areas of the companies, namely "business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system" (Laudon & Laudon, 2020, p.53).

5) records management (RM) systems and workflow (32,3%), which make it possible to archive and classify documents in digital format.

6) supply chain management (SCM) (29,9%) – those systems help the firms to manage their relationships with their suppliers. It helps suppliers, purchasing firms, distributors, and logistics companies share information about orders, production, inventory levels, and delivery of products and services so they can source, produce, and deliver goods and services efficiently. According to Laudon and Laudon (2020, p. 54)

> The ultimate objective is to get the right amount of their products from their source to their point of consumption in the least amount of time and at the lowest cost. These systems increase firm profitability by lowering the costs of moving and making products and by enabling managers to make better decisions about how to organize and schedule sourcing, production, and distribution.

7) customer relationship management Systems (CRM (25,2%) – this type of system helps manage the relationship between the companies and their customers. They

> provide information to coordinate all of the business processes that deal with customers in sales, marketing, and service to optimize revenue, customer satisfaction, and customer retention. This information helps firms identify, attract, and retain the most profitable customers; provide better service to existing customers; and increase sales (Laudon & Laudon, 2020, p. 54).

8) Business Intelligence (BI) (11%) – this type of system refers to data and a set of tools that allow to organize, analyze, and provide access to data that will support the managers and other enterprise users in the process of decision-making.

Four respondents (3.1%) gave other answers, and in two cases they mentioned two Portuguese suppliers of business management solutions, which encompass several IS.

These results show that a company uses different and various systems simultaneously but with a particular focus on the most basic systems such as TPS, a system that performs and records the daily routine transactions necessary to conduct business and that are critical for the business. On the other hand, we can see that several companies mentioned enterprise systems integrate, such as ERP, SCM, and CRM, which are the key internal business processes of a firm into a single software system to improve coordination and the process of decision-making.

Based on these results, several questions emerge, namely, with all the different types of systems used by the companies how those companies manage all the information in these different systems, how to minimize costs and ensure that all these different systems can share information and help the managers and the employees to be able to coordinate their work. As a result, there is a need to deepen these initial findings in order to obtain answers and a greater understanding of these issues.

In a more specific analysis to assess the number of systems used in each of the companies participating in the study, we observe that, in 18.9% of cases, participants state that they use only one of the systems listed, highlighting TPS

(7.4%), CAD (2.5%), and MIS (2.5%). There are, however, cases of companies that only use CRM (0.8%), ERP (1.6%) or SCM (2.5%) systems.

This data, once again, seem to demonstrate, on the one hand, the need and effort that has been made in the digital transition process but, on the other, the long road to be taken by SMEs in Portugal. The 20-percentage point difference between data on the digital intensity level of 2022 (69%) in SMEs and the European target for 2030 (89%) (Eurostat, 2023) is clear evidence of this gap, that should be recalled.

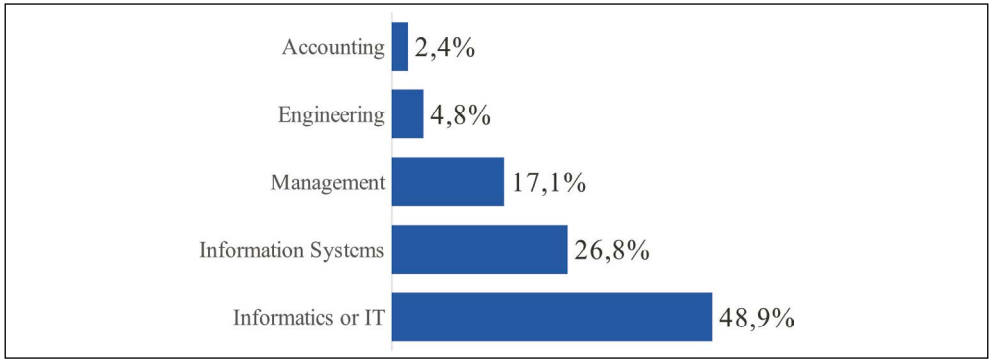
Information System management (responsible) and respective training

Keeping in mind that there are many ways in which the IT function is organized within the firm, namely that a very small company will not have a formal information systems group, we asked whether industrial SMEs in N&CR have an IS manager and, if they do, which areas of training or whether it is an internal employee or whether they outsource this service.

In 71.1% of companies there is someone responsible for IS management, while in the remaining 28.9% there is no person assigned to this role. In the case of the former, in 60.4% of cases they are external workers and in the remaining companies (39.6%) they are internal employees who carry out the task and are responsible for managing the IS.

Internal employees responsible for IS management have training in Informatics or Information Technologies (48.9%), Information Systems (26.8%), Management (17.1%), Engineering (4.8%) or Accounting (2.4%) (Figure 6).

Figure 6 — Training area of the computer systems manager: internal worker (N=36)



Source: authored by.

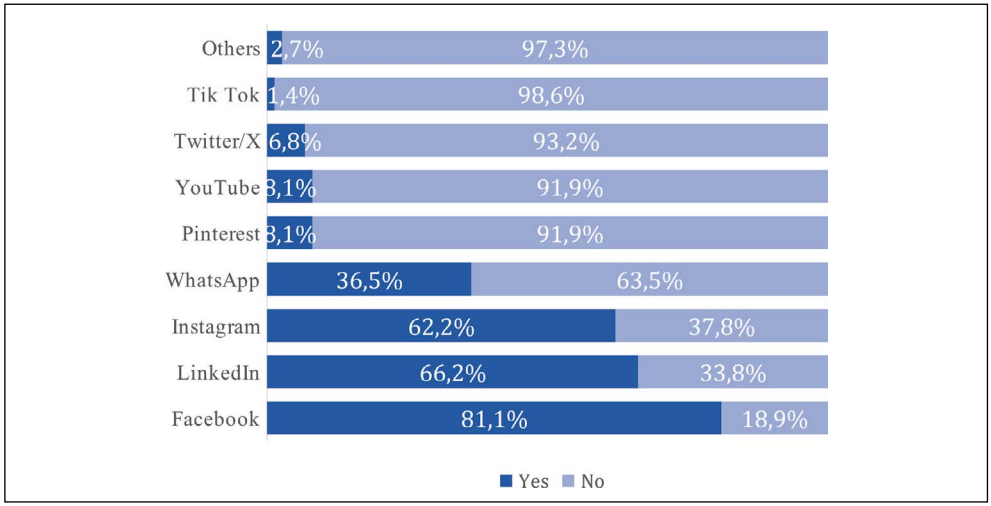
WEB environment

Regarding the presence in the digital world, the majority of companies have a website (83.1%) and 12.5% say they have an online store. It is also noted that 54.4% regularly use social media, globally they use several (between 1 and 8 different social media). 14.9% of firms use only one social media, in 31.1% of cases they use 2; 37.8% use 3 social media; 5.4% use four and the remaining 10.8% use between 5 and 8 social media. The most used, as can be seen in Figure 7, are Facebook (81.1%), LinkedIn (66.2%), Instagram (62.2), and WhatsApp (36.5%).

When asked about the objectives that lead them to use social media, we observe that SMEs do so for different and multiple reasons, with the main motivations being "To promote their products" (87.8%); "To make the company known" (74.3%); "To promote proximity to customers" (63.5%); "To attract new customers" (54.1%); "To recruit new workers" (40.5%) and "To research information about customers, suppliers, competitors" (25.7%)[7].

7 According to Eurostat's data (2023), in 2021, 59% of businesses in the EU used social media. However, differences emerge depending on the size of the business, with large businesses (83%) making more use of social media compared with SMEs (58%). In Portugal, the average use of social media, in the SMEs is 57,5%, very similar to UE's average (in the case of large businesses Portugal presents an average of 84,2%). The most popular types of

Figure 7 — Social media used by SMEs (N=74)



Source: authored by.

STORAGE AND ACCESS

Most of the companies (92.9%) that responded to the question state that they have information on paper and digitally. Of the remaining companies, 4.8% declare that they only have information on paper and 2.4% only in digital format (Figure 8).

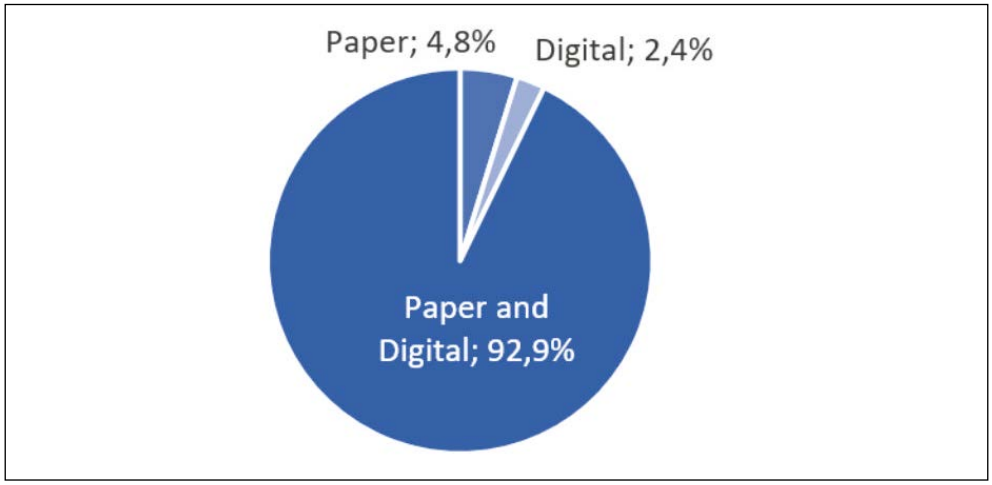
When asked in a multiple-choice question about how the company stores its information in digital format, the 120 respondents to this question showed that it is stored on:

- local servers with "cloud" backups (in 50.8% of companies that responded);
- workers' computers (44.2%);

social media among businesses are social networks such as Facebook and LinkedIn (56% of businesses) or multimedia content-sharing websites such as YouTube and Instagram (28%) (Eurostat, 2023).

- local servers, located on the company's premises, without backup copies (42.5%);
- virtual servers, which are stored in the cloud (24.2%);
- external disks or other similar devices, such as pen drives (22.5%);
- local servers, located on company premises with backup (0.8%).

Figure 8 — Information formats (N=126)



Source: authored by.

Regarding the access to digital information by workers, we observe that to access:

- to computers, workers have to enter the user's name and password (in 82.5% of the companies);
- to local and/or virtual servers ("in the cloud") it is necessary to enter the username and password (51.7%)
- computers do not need a username and password (5%);
- other ("the information in question is accessed directly or the person responsible for that type of information is subcontracted) (0.8%).

Despite the ubiquity of digital and the use of digital technologies, information on paper continues to coexist with digital. Thus, 97.7% (123) of companies have information on paper or on paper and digitally, with:

- 59.3% of respondents to this question state that the company stores paper information in cabinets and/or shelves near employees' workplaces;
- 59.3% in room(s) or space(s) dedicated to archiving information;
- 13.8% stated that this information is stored in facilities outside the company.

Regarding the access to this information, opinions are divided, less than half of the responding companies (39.8% of the 123 respondents) do not have standards or procedures and 32.5% have standards or procedures. 38.1% say they have specific rules and procedures that determine what information can be accessed and by whom (for example, the need to record on a form the consulted information, the date and who consulted it). Only in 11.4% of the cases there is limited access per employee or area.

INFORMATION SECURITY

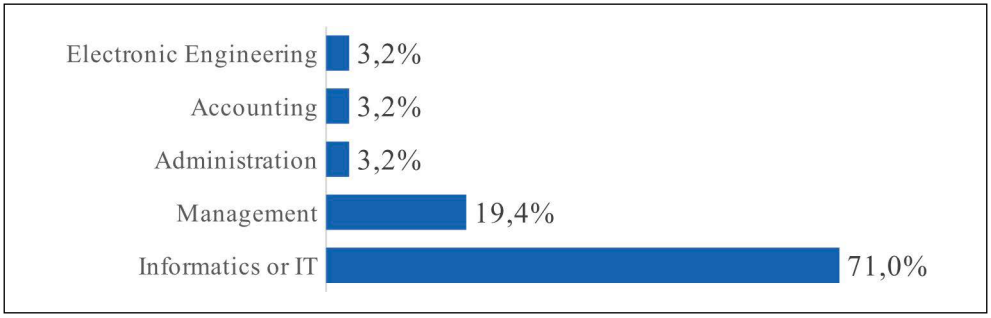
When asked if they already had information security incidents, 80.3% affirm they haven't suffered any problems. The remaining companies 19.7% (25) identified one or more types of occurrences:

- Unavailability, non-operation and failures of computer systems (44%);
- Loss of data in digital format (40%);
- Virus and/or ransomware (condition or prevent access to computers and information, in which, sometimes, the payment of a ransom is required to recover access to) (32%);
- Human error (misuse and damage to systems or destruction of documents) (20%);

- Loss of paper documents (16%);
- Identity/data theft (12%);
- Improper access (access to information for which the individual does not have permission) (4%).

53.8% of the companies surveyed affirm that they have someone responsible for information security. In 57.1% of these, the person in charge is an external worker and in 42.9% an internal employee. Looking at Figure 9 we can state that the most common area of training origin is Informatics or Information Technologies (71%). The remaining people responsible have training in Management (19.4%), Accounting (3.2%); Electronic Engineering (3.2%); and in one case an administrative (3.2%).

Figure 9 — Areas of training of the information security responsible: internal worker (N=30)



Source: authored by.

In a comparative analysis, no relationship was identified between information security problems and the size of the company (medium, small or micro). No statistically significant relationship was also identified between the size of the company and the classification of information by access levels (public, internal, restricted or confidential). However, there was a tendency for this classification to not exist in micro-enterprises.

FINAL CONSIDERATIONS

Based on the data obtained, it is firstly important to analyze with due concern the fact that a significant percentage of companies – 60.4% – delegate the management of IS to external workers. This analysis, even considering that there is a predominance of transaction processing systems, which often carry out operational work and/or the minimum regulatory or bureaucratic work required of companies, causes the concern mentioned above, as it delegates the operation of isolated and group data, as well as digital processes, to third parties, potentially not allowing them to fully learn security routines and events. These steps are essential for understanding the minimum structuring of management in organizations and point to future studies in terms of professional training and the structuring of information technology service contracts, which allow for the inclusion of interactions and communications regarding the development and retention of procedures and routines such as security, risk sampling, and identification, the development of operational procedures, interactions with end users (aimed at receiving market signals), among others.

Secondly, there is evidence of what may be considered incipient use of social media, with a large concentration on publicizing companies (87.8%), with a smaller number considering them as channels for reaching customers, implementing an offer process with increased added value that takes advantage of digital platforms and social media as constituents of business platforms. This evidence motivates us to think, in terms of future projects, that entrepreneurs, collaborators, and business agents should be exposed to current forms of integrating services into platforms, such as the typical case of several existing businesses in the Instagram environment. Given the flexibility, relative security, and dissemination of this platform, it becomes important to understand how it can be applied for this integration, with aspects discussed below.

In the Instagram environment, as with other digital platforms and social media, there is the possibility of integrating basic content display functions – such as text, audio and video – with encouraging, planned and correctly targeted display as well as complementary functions that can add substantial value to interactions with customers. Of particular note in this regard are the

functions of payment servers, distribution and delivery, where platforms can integrate "long tailed", composite offers in a way that is transparent to customers. In this context, entrepreneurs can really focus on periodically publishing (with effective communication planning) contents about products and services, communicating with customers and offering value, while other services are included in a simpler way, using resources available in the environment itself.

In addition, there is the possibility of collecting, receiving and processing data on interactions with potential and current customers, ranging from simple summaries of "likes" and "dislikes" to powerful analytics that effectively make it possible to study routing, navigation, and decision-making patterns typical of customers browsing websites or applications.

Subsequently, we observe the adoption of physical support X paper – in conjunction with digital for storing information. These signs suggest that, in order to grow both horizontally – in terms of scale – and vertically – in terms of specialization – in terms of the value on offer, two concomitant processes should be carried out by companies: 1) digitization of collections, allowing what is already used on paper to be systematized and stored on digital media; and 2) the use of media to switch to a digital environment.

Looking at these two processes, (1) – Digitization is currently the subject of widespread discussion, as is the provision of services by third parties, and companies may be motivated, for example, to extend contracts already in force to gradually include means of digitizing collections, interactions and content arising from customer service.

With regard to the second process, (2) – Means of change, it is interesting and opportune to evaluate cloud computing offers, which are in the process of maturing, and which can offer gradual progression, starting with the immediate and basic function of integrating files and making them available through multiple, authorized and tracked access, reaching virtualization environments, where even services for composing application platforms, artificial intelligence (mainly machine learning), emulating computing environments and distributing processing are already available, including cost management, budgeting

and security mechanisms that allow entrepreneurs to spend less time and overall effort monitoring technological platforms.

Regarding information security and data privacy, a few points stand out in the results of the survey. Firstly, contrary to what one might think, information security is not synonymous with IT security. When analyzing information security and data privacy standards, especially ISO 27.001, the starting point for an efficient information security project is to analyze the business context to strategically align the organization's business, using the information obtained to improve performance and, consequently, choose the technologies that will support the entire process. In Pessoa *et al.* (2106), this relationship between information and the business, supported by technology, is evident and allows us to see that, with the right information, available to the right people, the operational result will be superior. Thus, the need for protection is vital, as it is information which will enable managers to make better decisions.

Imbued with this concept, it is somehow peculiar to notice that in the survey performed, the areas that use information technology the least for business are customer support and marketing. These are areas which need a lot of information about the market, the customer, competitors, employees and strategies, in order to create solutions (services and/or products) that are better suited to their customers' current requirements.

Another point worth of note in the analysis is the fact that 80.3% of those interviewed believe that they have never had any information security problems. It is of the utmost importance that managers undergo training in data security and privacy, to raise awareness of protection. In the majority of cases, information is assigned to people who cannot access it, not by electronic tools, but in simple informal conversations. It should also be remembered that a lot of information is on paper. Incidents of access to information on paper are increasing significantly.

The results show the reality of how companies deal with paper-based information. According to the respondents, 59.3% store paper in cupboards and/or shelves near employees' workplaces, the same percentage of companies that also do so in room(s) or space(s) dedicated to archiving information and

13.8% said that this information is stored in facilities outside the company. Data also demonstrates the situation regarding access to information: 39.8% have no rules or procedures for access, 32.5% say they have specific rules and procedures which determine what information can be accessed and by whom (for example, the need to record the consulted information, the date and who consulted it on a form) and only in 11.4% of cases is access limited by employee or by area.

This reality makes tracking access to information on paper complex, generating security incidents which, more most of the times are unnoticed by managers. Furthermore, it is always wise to remember that a "simple" email sent to the wrong recipient should be considered a security incident. With all this, it is possible to note that, if this awareness of protection concepts and greater knowledge of incidents existed, this figure of 80.3% cases would decrease exponentially.

From the point of view of security linked to information technology, some aspects also deserve attention. According to the interviewees, 44.2% of the companies surveyed store information on workers' machines, 42.5% on local servers without proper backup copies, and 22.5% on external disks (such as pen drives). These practices show that there is no basic concern for security and protection, which would be copies of information.

In no case was there any mention of information classification, business continuity plans or crisis management, which demonstrates a great opportunity for research and work in organizations that will enable them to have better control, protection and consequently better results.

Finally, as highlighted by Estrela (2016) and Pessoa (2016), the research pointed to the need to support and enable SMEs to adopt good IM and ICT practices, which support them adequately, in order to improve their performance, as well as the importance of making entrepreneurs aware of the added value of adopting these good practices. The urgency of promoting training for managers and workers (developing information and technological literacy skills) and the intervention of information managers in organizations to diagnose

problems, identify and implement the technical and technological solutions best suited to the characteristics and needs of companies were equally realized.

BIBLIOGRAPHY

CARVALHO, M. L F.; GOUVEIA, L. B. **A Partilha do conhecimento nas organizações: uma abordagem baseada na gestão de conhecimento e no conceito de Ba**. Belo Horizonte: Conhecimento Editora, 2023.

ESTRELA, S. C. L. **A gestão da informação na tomada de decisão: estudo em PME da Região Centro.** Sílabas & Desafios, 2016.

EUROPEAN Commission, 19 February 2020. **Shaping Europe's digital future: Commission presents strategies for data and Artificial Intelligence**. Available: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_273. Access 30 Dec. 2023.

EUROSTAT. (2023). **Digitalisation in Europe: 2023 edition. INTERACTIVE PUBLICATIONS**. Access 12 Feb. 2024. Available: https://ec.europa.eu/eurostat/cache/interactive-publications/digitalisation/2023/01/. Access 30 Dec. 2023.

FERNANDES, J. M. **Liberdade e informação.** Lisboa: Fundação Francisco Manuel dos Santos, 2011.

GHIGLIONE, R.; MATALON, B. **O inquérito: teoria e prática.** Celta, 2002.

GOUVEIA, L. B. Tecnologias de Informação Documental: impacte do Digital. *In:* Freitas, J.; Gouveia, L.; Regedor, A. (org.). **Ciência da Informação. Contributos para o seu estudo**. Porto: Edições Universidade Fernando Pessoa. 2012. pp 41-69. ISBN: 978-989-643-090-0. 2012.

LAUDON, K. C.; LAUDON, J. P**. Management Information Systems: Managing the Digital Firm**. 16.ª ed. Pearson, 2020.

MICHELON, C. M. & SANTOS, n. V. Questionário online como estratégia de coleta de dados para trabalho de conclusão de curso: Relato de experiência. **Revista de Casos e Consultoria,** v. 13, n. º 1, 2022. Available: https://periodicos.ufrn.br/casoseconsultoria/article/view/30388/16245. Access 30 Oct. 2023.

Ministério da Economia e Mar: Gabinete de Estratégia e Estudos. (2023, março 30). ***Síntese*.** Available: https://www.gee.gov.pt/pt/docs/doc-o-gee-2/estatisticas-setoriais/c-industrias-transformadoras/8790-c-industrias-transformadoras/file. Access 10 Oct. 2023.

PARASURAMAN, A. **Marketing research**. 2.ª ed. Addison Wesley Publishing Company, 1991.

PEDROSO, G. G., FERREIRA, A. C. V. V., SILVA, C. C. da, SILVA, G. A. B., LANZA, F. M., & COELHO, A. da C. O. Coleta de dados para pesquisa quantitativa online na

pandemia da Covid-19: Relato de experiência. **Revista de Enfermagem da UFSM,** v. *12*, p. 1-14, 2022. https://doi.org/10.5902/2179769267023

PESSOA, C. R. M. (2016). **Gestão da Informação e do Conhecimento no Alinhamento Estratégico em empresas de engenharia**. Universidade Federal de Minas Gerais.

PESSOA, C.R.M *et al.* Da Gestão de TI à Gestão de Informação e Tecnologia: Uma Abordagem Teórica da evolução do conceito. **XVII Encontro Nacional de Pesquisa em Ciência da Informação (XVII ENANCIB),** 2016. Available: https://repositorio-aberto.up.pt/bitstream/10216/102595/2/180587.pdf. Access 29 Sep. 2023.

PLANO de Ação para a Transição Digital de Portugal. [S. l.], 5 março 2020. Available: https://www.portugal.gov.pt/gc22/portugal-digital/plano-de-acao-para-a-transicao-digital-pdf.aspx. Access 29 Dec. 2023.

RASCÃO, J. P. The Strategic Decision Making and Sources of Information. In JAMIL, G. L.; FERREIRA, J. J. P.; PINTO, M. M.; PESSOA, C. R. M. & XAVIER, A. (Eds.). **Handbook of research on strategic innovation management for improved competitive advantage**. IGI Global. 2018. pp.99–116.

RIBEIRO, F. Organizar e representar informação: Apenas um meio para viabilizar o acesso? **Ciências e Técnicas do Património**, IV, p. 83–100, 2005.

ROGERS, D. L. **Transformação Digital***:* repensando o seu negócio para a era digital. Ed. Autêntica, 2017.

SILVA, A. M. da; PALETTA, F. C. **Ciência da Informação**: estudos de epistemologia e de ética. Ponta Grossa: Atena, 2022.

VASCONCELLOS-GUEDES, L.; GUEDES, L. F. A. E-surveys: vantagens e Limitações dos Questionários Eletrônicos via Internet no Contexto da Pesquisa Científica. In **X SemeAd — Seminário em Administração FEA/USP** (São Paulo, Brasil), 2007.

WORLD ECONOMIC FORUM [WEF]. **Data Unleashed: Empowering Small and Medium Enterprises (SMEs) for Innovation and Success. Briefing papel***,* 2023. Available: https://www3.weforum.org/docs/WEF_Data_Unleashed_Empowering_Small_and_Medium_Enterprises_(SMEs)_for_Innovation_and_Success_2023.pdf. Access 29 Dec. 2023.