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Digital transformation in Portuguese banking: the impact of the covid-19 pandemic

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Abstract

Purpose – Currently, digital transformation is a process that cuts across different sectors of activity, including banks. One of the examples is the availability of products and services on digital channels. This study aims to identify the changes implemented in the digital channels of banks in Portugal that were driven by the covid-19 pandemic, contributing to the acceleration of digital transformation.

Design/Methodology/Approach – The methods involve a qualitative approach, from the analysis of a selection of 30 Results & Accounting Reports from 10 banks between 2019 and 2021 using the Leximancer software to identify the main themes and concepts.

Findings – Four themes and 40 most relevant concepts were identified. As a conclusion, banks have reinforced digital channels in terms of products and services with obvious concerns associated with security.

Research limitations/implications – This article aims to contribute to two conceptual maps that allow us to understand the measures implemented by banks in digital channels during the pandemic.

Practical implications – This investigation aims to enable managers to define other initiatives within the scope of digital channels and enhance those already implemented.

Originality/Value – The scientific articles identified and published so far do not specifically address the impact that the COVID-19 pandemic has had on the digital channels of banks in Portugal. The originality of this article arises from this gap identified regarding the absence of similar scientific studies. The pandemic is a new phenomenon that occurred for the first time in 2019 and globally, so it is essential to know the impacts on Portuguese banks.

Keywords Banking, Digital channels, Covid-19 pandemic, Digital transformation, Portugal, Leximancer.

Paper type Research paper

Introduction

Information and Communication Technologies (ICT) play an increasingly important role in economic activity, politics, and society in general. Organizations have had to adapt business models to keep pace with evolution and meet increasingly demanding customers with digital skills (Cziesla, 2014; Duarte, 2019; Hanelt *et al.*, 2021; Poleza and Varvakis, 2019; Rodrigues, 2019).

While credit institutions previously viewed ICT as a threat, they now view it as an opportunity. We are witnessing a process of digital transformation where the digitization of products and services is evident in order to achieve new business strategies, as well as defining which opportunities justify further investigation (Rodrigues, 2019).

In this context, digital channels assume a preponderant role insofar as they allow for greater ease, speed, and convenience in accessing the bank services, also translating into opportunities and challenges for institutions, as well as increasing concerns that imply the implementation of initiatives by regulators and supervisors (Leitão, 2017; Rosalino, 2020).

This research work on the theme “Digital transformation in Portuguese banking: the impact of the covid-19 pandemic”, focusing on digital channels (online and mobile).

The scope of this article is limited to credit institutions in Portugal, more specifically, banks¹, Caixas Económicas, Caixa Central de Crédito Agrícola Mútuo and Caixas de Crédito Agrícola Mútuo, in accordance with the types of institutions defined in article 3 ° of Decree n. ° 298/92 that approves the General Regime of Credit Institutions and Financial Institutions (RGICIF) (Decree n. ° 198/92, 1992).

This research is focused on the time periods contemplating the previous year to covid-19 pandemic (2019) and the pandemic years in which the mandatory confinement was enforced (state of emergency), as well as when the most restrictive measures started to be lifted (2020 and 2021). In Portugal, the first state of emergency was declared by the President Decree n. ° 14-A/2020, of March 18th (Decree n. ° 2-A/2020, 2020) following the World Health Organization (WHO) that qualified the disease covid-19 as a pandemic.

Although the banks already had a digital transformation process underway, which involved, among other aspects, the provision of products and services on digital channels, the aim is to assess the extent to which the confinement that resulted from the pandemic has boosted changes on the banks. It's in this context that the research question arises:

RQ1. What changes were implemented in the digital channels of the largest Portuguese banks, boosted by the covid-19 pandemic?

The general objective is defined:

- Identify which changes were implemented by the largest Portuguese banks in digital channels that were boosted by the pandemic context.

The specific objectives are as follows:

- Identify which digital channels were made available by Portuguese banks.
- Know the products and services that have been implemented in digital channels.
- Assess the security measures that have been implemented on digital channels.
- Know the main concerns of Portuguese banks regarding digital channels.

In the theoretical background, no scientific works were identified specifically on the subject of this article. However, it appears that numerous articles in the generalist and specialized press proliferate, as well as studies by consultants.

On the one hand, no previous studies have been identified on this topic, specifically, as the covid-19 pandemic is a new phenomenon that occurred for the first time in 2019 and on a

¹ Although the scope of this article refers to other types of credit institutions in addition to banks, for the sake of simplification it is agreed that the expression “banks” will be used.

worldwide scale. And, on the other hand, the scientific works published so far do not deal specifically with digital channels in Portugal.

It is considered that the relevance of the topic does not come only from its relevance, but also from the role that banks assume in society (Amrani and Najab, 2020; Kitsios *et al.*, 2021), as well as the identification of this gap of research at the level of investigation and therefore the production of scientific knowledge.

The theoretical contribution is intended to consist of 2 concept maps that will be automatically extracted from the Leximancer software:

- i) a concept map for 2019, the year before the covid-19 pandemic in Portugal
- ii) a concept map for 2020 and 2021, the years Portugal lived in the pandemic context.

These two maps will make it possible to infer the differences between “before” and “during” the changes implemented in digital channels boosted by the pandemic. While the practical contribution will go through the banks, by identifying these changes, they can determine other initiatives and enhance those that are already implemented. This study aims to contribute to understanding the changes in the digital channels (online and mobile) of the 20 largest Portuguese banks that were boosted by the COVID-19 pandemic, declared by the WHO in March 2020, which devastated the world.

While the literature review has identified a gap concerning the impact of the pandemic on banks’ digital channels, this investigation aims to contribute to filling that void. However, the specific nature and extent of this gap remain unexplored. Thus, there is a need for empirical research that delves deeper into how the pandemic has affected various aspects of banks’ digital channels, including customer behavior, usage patterns, security concerns and the effectiveness of digital banking strategies. By addressing this research gap, this study seeks to provide valuable insights into the evolving landscape of digital banking in the context of the pandemic.

The COVID-19 pandemic catalyzed a widespread shift toward remote work across various industries, including the financial sector. This transition has significant implications for organizational structures, employee well-being, productivity and the future of work. While the immediate impact of remote work during the pandemic has been extensively studied, there remains a gap in understanding its long-term implications, particularly within the financial sector. The recent literature has highlighted the rapid adoption of remote work practices during the COVID-19 pandemic and its impact on various aspects of work life. Studies have examined the challenges and benefits associated with remote work, including issues related to communication, collaboration, work-life balance and employee mental health (Kniffin *et al.*, 2021). Furthermore, research has explored the role of technology in facilitating remote work and its impact on organizational performance and resilience (Brynjolfsson *et al.*, 2020). However, there is limited research specifically addressing the long-term implications of remote work adoption within the financial sector post-COVID-19. Financial institutions, including banks, face unique challenges and opportunities in transitioning to remote work, given the nature of their operations, regulatory requirements and client relationships. Therefore, the research problem addressed in this study is to assess the long-term implications of remote work adoption in the financial sector post-COVID-19, with a focus on understanding its effects on organizational dynamics, employee well-being, productivity and innovation. While existing research has examined the immediate impact of remote work during the pandemic, this study seeks to provide insights into its long-term implications, specifically within the financial sector. While the study may initially focus on the context of Portuguese banking, its findings are likely to have broader implications and applicability beyond this specific context. The insights gained from examining the impact of digital transformation on customer trust can offer valuable lessons for banking institutions globally, especially those undergoing similar digital transitions. By understanding the key drivers of trust in digital banking and the factors that influence customer perceptions, banks worldwide can develop more effective strategies to build and maintain trust in their digital services. By focusing on this industry, the research contributes to a deeper

understanding of the challenges and opportunities associated with remote work adoption in a highly regulated and client-centric environment.

Furthermore, the study's findings can inform strategic decision-making processes within financial institutions globally, offering insights into how remote work practices can be effectively integrated into organizational structures and processes to enhance resilience, innovation and employee well-being. By identifying best practices and potential pitfalls, the research contributes to the development of evidence-based strategies for managing remote work in the post-pandemic era, not only in banking but also in other sectors facing similar challenges. In summary, while the research may originate in the context of Portuguese banking, its contribution extends to the broader domain of digital banking globally, offering insights and strategies to enhance customer trust in banking institutions across diverse markets and regions. While the research may originate in the context of assessing remote work adoption in the financial sector post-COVID-19, its contribution extends beyond this specific context, offering valuable insights and recommendations applicable to organizations across different industries navigating the complexities of remote work integration. Moreover, the study's methodology and analytical framework can serve as a model for conducting similar research in other geographic regions and cultural contexts. By adopting a comparative approach, researchers can identify commonalities and differences in trust dynamics across different banking systems and socio-cultural settings, thus enriching the existing literature on trust in digital banking.

The article is structured in six sections considered essential to its understanding, namely, the introduction, the observed methodology, the results obtained, the discussion where the contributions (academic, business, and social) are also referred, as well as the conclusions that also contemplate the limitations research and proposals for future research.

Theoretical background

Digital transformation in Portuguese banking

Digital transformation is a concept currently present in companies from different sectors of activity, as well as in their strategies and business models (Alsartawi *et al.*, 2022; Carapuça, 2018; Czesla, 2014; Malar *et al.*, 2019). As Rogério Carapuça points out: "Disruption is the word that best characterizes the arrival of the digital revolution in the economy and society. When the digital revolution reaches a sector, the rules of the game are profoundly altered" (2018, p. 91). However, the literature is not unanimous about this concept, there are authors who consider it as a context, while others as a process (Poleza and Varvakis, 2019).

In a study about the process of digital transformation in organizations, Poleza and Varvakis consider that what is particularly evident is the "(...) concern of companies in relation to improving the customer experience; value creation; revenue generation; development of business and personal skills and adaptability." (2019, para. 3).

In the literature, there are several authors (Carapuça, 2018; Czesla, 2014; Duarte, 2019; Hanelt *et al.*, 2021; Lydiana *et al.*, 2022; Pinto *et al.*, 2021; Poleza and Varvakis, 2019; Rodrigues, 2019) who refer to the fact that the customer experience is one of the main factors in the digital transformation process. They state that the most successful companies started from the "outside in" to model the customer experience to identify needs, difficulties and only later redesign processes in line with customer opinion with a view to establishing a proximity relationship and proceed with the digitization of business processes.

As mentioned, digital transformation is a reality that cuts across various sectors of activity, which also include credit institutions, namely banks. These institutions have been among the areas that have been most involved due to the need to compete in an increasingly digital context to be more efficient, effective, able to create value and trust through technological development (Czesla, 2014; Lydiana *et al.*, 2022; Malar *et al.*, 2019).

Digital transformation, despite the added value it represents for the financial system, also entails some risks, namely systemic risk, that is, the risk of collapse of the entire financial system (Leitão, 2017; Lydiana *et al.*, 2022; Tomczak, 2023; von Solms *et al.*, 2021). Issues related to the

privacy, security and confidentiality of customer data are also identified (Amrani and Najab, 2020; Leitão, 2017; Lydiana *et al.*, 2022).

Trends in the provision of banking services

Regarding trends in the provision of financial services in a context of digital transformation in banking, instantaneousness and continuity are identified, with real time (24/7/365) being the new standard, as well as the diffusion of technology through the different devices (smartphone, tablet, smartwatch, etc.), in addition to channels (Cziesla, 2014; Kitsios *et al.*, 2021; Lydiana *et al.*, 2022; Rosalino, 2020). Along with these trends, the entry of new stakeholders is clearly visible, such as FinTechs (Financial Technology Companies) and BigTech. BigTech constitutes a huge challenge as they already provide payment solutions in competition with the banking sector, allowing the leverage of traditional means of payment, as well as clearing and settlement agreements. Last but not least, it is important to mention the dilution of financial services in the user experience, as well as the new business models characterized, among other aspects, by being free, banking-as-a-service and open banking versus open services (Lydiana *et al.*, 2022; Malar *et al.*, 2019; Rosalino, 2020).

Availability of products and services on digital channels

According to the BdP, the banking regulator and supervision entity in Portugal, the concept of digital channel “includes the online channel and the mobile channel” (Banco de Portugal, 2019, p. 77), with the mobile channel corresponding to the “channel customer access to banking products and services provided by the institution via app” (Banco de Portugal, 2019, p. 77), while the online channel concerns the “customer access channel to banking products and services provided by the institution via browser” (Bank of Portugal, 2019, p. 77).

In the Report on the results of the 2nd questionnaire carried out in 2018² to financial institutions about the marketing of banking products and services on digital channels in Portugal, published by BdP, it appears that 87% of institutions provide products or services to private customers through online channels and 63% regarding business customers. As for the offer through mobile applications, it stands at 68% for individual customers and 45% for companies (Banco de Portugal, 2019). It is also mentioned that “there are prospects for a high growth in the use of digital channels in the coming years, with emphasis on the online channel” (Banco de Portugal, 2019, p. 24) in the order of 50% for both customers.

As for the reasons behind this process, some authors refer to the adaptation of customers to technology but also to the reduction of costs related to the optimization of processes, the number of employees and the maintenance of physical branches (Duarte, 2019; Kitsios *et al.*, 2021; Rodrigues, 2019; von Solms *et al.*, 2021). However, when consulting the aforementioned BdP Report, the top reasons given by banks are customer loyalty with 74%, then gains and efficiency (50%) and then the promotion of an image of efficiency (47%) (Bank of Portugal, 2019).

From the bank customer's point of view, benefits associated with speed in accessing the bank, as well as the convenience and simplicity associated with the entire process can be easily identified (Leitão, 2017). In this context, opportunities are also identified by the institutions, namely the possibility of offering innovative products and services, in addition to the traditional ones that can become the target of digitization and, therefore, made available on digital channels, as well as the possibility of designing products and customized services. At the same time, some challenges facing banks are identified, namely the need to ensure the security of information systems, guarantee compliance with information duties and competition from new market players (Kitsios *et al.*, 2021; Lydiana *et al.*, 2022; Leitão, 2017; Rosalino, 2020).

² The data refer to 2018 but the Report was published in 2019 (Bank of Portugal, 2019). This is the most recent Report available for consultation on the BdP website.

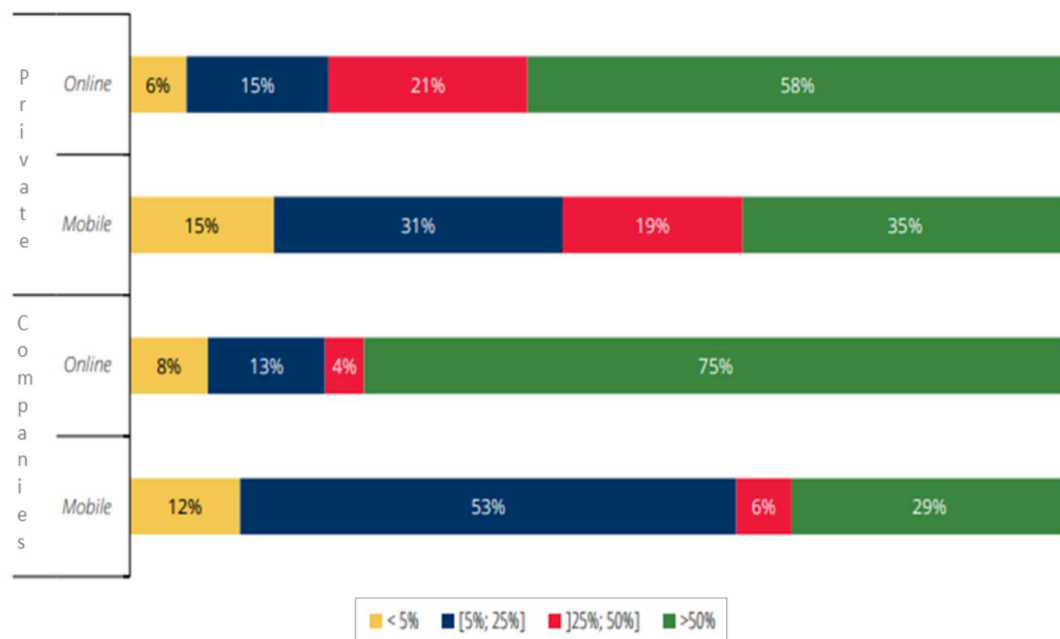
In this sense, it appears that BdP has been attentive to these changes and implementing measures that, on the one hand, guarantee consumer protection and, on the other hand, do not compromise the capacity for innovation and competitiveness of Portuguese banks vis-à-vis their European counterparts. As Susana Duarte points out, “For our regulator, safety is the main thing, so BdP tries to promote safety, without compromising innovation” (2019, p. 16), however the author considers it one of the most conservative and bureaucratic, compared to other banking regulatory and supervisory bodies at European level.

Adherence to digital channels and customer use

In addition to the availability of products and services, it is important to infer, on one hand, customer adherence, and on the other, the effective use of the online and mobile channels. Data provided by the banks on the estimate of customers points to 21% of individuals in which the rates of joining the online channel are between 2% and 50%. However, regarding the mobile channel, the numbers are lower, with only 35% indicating that more than half have already joined this channel (Figure 1).

Regarding business customers, the adhesion rate is also higher in the online channel, with most institutions (75%) mentioning that more than half of the customers adhered to the online channel, while in relation to the mobile channel the values are greater than 50% only in 29% of the institutions (Banco de Portugal, 2019).

However, although the rates of adhesion to digital channels are considerable, it appears that it does not correspond to the effective use of customers, both individuals and companies, as reflected in the Report (Banco de Portugal, 2019) since only 27% of institutions in 2018 reported that more than half of private customers used the online channel in recent months. About the mobile channel, 19% of financial institutions state that more than 50% of customers have used the mobile application.



Source: Bank of Portugal (2019)

Figure 1. Percentage of financial institutions by levels of customer adherence to digital channels

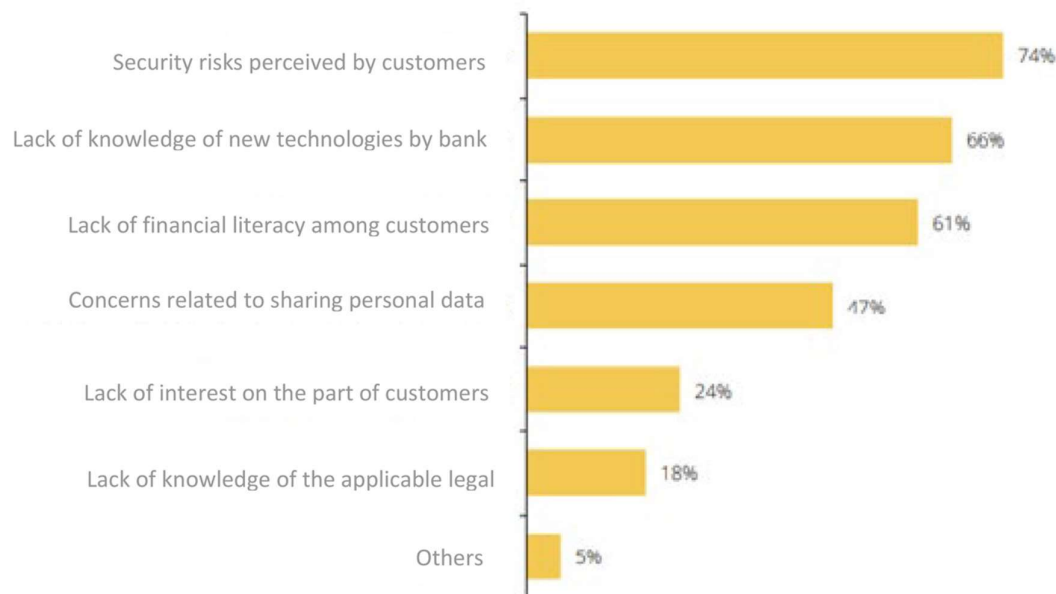
Corporate customers also have a lower usage rate, similarly to private customers. Most institutions, around 54%, state that the online channel was used in the last 3 months. As for the mobile channel, only 12% of institutions refer to use greater than 50% (Banco de Portugal, 2019).

It is also important to understand with credit institutions the main reasons they consider to constitute obstacles to the adhesion and use of digital channels. In this sense, the institutions indicated the 3 main obstacles, security risks being at the top of the concerns (74%), followed by 66% lack of knowledge of new technologies by customers and 61% lack of financial literacy. The remaining reasons have rates below 50%, with concerns related to the sharing of personal data standing out with 47% (Figure 2).

Impact of the covid-19 pandemic on Portuguese banks

The covid-19 pandemic is still a reality in Portugal and in the world, however the various publications and studies show the considerable impact it is having on financial institutions (Alsartawi *et al.*, 2022; Amrani and Najab, 2020; Bandeira, 2020; Hanelt *et al.*, 2021; Lydiana *et al.*, 2022; Marketeer, 2020; Moreira, 2020; Pinto *et al.*, 2021; Tomczak, 2023; von Solms *et al.*, 2021).

Although the pandemic is not over yet, it is already evident that it has accelerated the use of digital channels and, therefore, the availability of a greater diversity of products and services (Hanelt *et al.*, 2021; Moreira, 2020). In a study carried out by Basef Banca da Marktest it is mentioned that “(...) mobile is now the banking channel that grows the most in Portugal: there has been an increase of 7.3% over the last 12 months and a leap of 16.7% compared to 2018.” (Marketeer, 2020, para. 1).



Source: Bank of Portugal (2019)

Figure 2. Main obstacles on the demand side to the expansion of digital channels, multiple answer inquiry

As Mariana Bandeira mentions in an article published in *Jornal Económico*, “digital channels have become, more than ever, the jewel in the crown of Portuguese banks” and goes on to say that “(...) with the spread of the new coronavirus in the country, the institutions readjusted and began to advise the use of apps and home banking while restrictions and social distancing rules are in force” (2020, p. 5).

Despite the scope of this article referring to Portuguese banks, bearing in mind that no similar study has been identified so far in Portugal, the result of an investigation carried out in Brazil is presented below. In an article published in the Journal of Management and Economics for Iberoamerica about the impacts of the covid-19 pandemic on Brazilian banking institutions, it is mentioned that “The study concludes that digital entrepreneurship is influenced in traditional banking institutions from the emergence of the COVID-19 pandemic. (...) “This movement allows understanding the direct influence of the pandemic on this progress, as it removed traditional institutions from their comfort zones.” (Pinto *et al.*, 2021, p. 123).

The impact that the pandemic is having as an accelerator on the development of the digital transformation process in banks, as well as on the use of digital channels, is evident, as stated in the various articles and studies published (Alsartawi *et al.*, 2022; Amrani *et al.*, 2020; Bandeira, 2020; Hanelt *et al.*, 2021; Marketeer, 2020; Moreira, 2020; Pinto *et al.*, 2021; Tomczak, 2023; Yildirim *et al.*, 2023).

Methodology

Research method and data collection

In this article, the qualitative method will be followed, based on the selected data collection method, which is the collection of pre-existing data, namely documentary data (Quivy, 2008) that consists of document analysis of results accounting reports as primary sources. These documents are available on the banks' respective institutional websites. In this sense, an analysis model consisting of 9 steps was defined:

1. Formulation of the research question.
2. Identification of banks based on the defined criteria and compilation in a file.
3. Research of the Results & Accounting Reports on the banks' official online websites.
4. Extraction of the Results & Accounting Reports in PDF format.
5. Uploading the Results & Accounting Reports to Leximancer.
6. Processing of Results & Accounting Reports by Leximancer (automatic process).
7. Analysis of the themes and concepts identified based on the documents uploaded.
8. Selection of the main themes and most relevant concepts in view of the objectives of the article, as well as the keywords.
9. Conceptual map generation through Leximancer (automatic process).

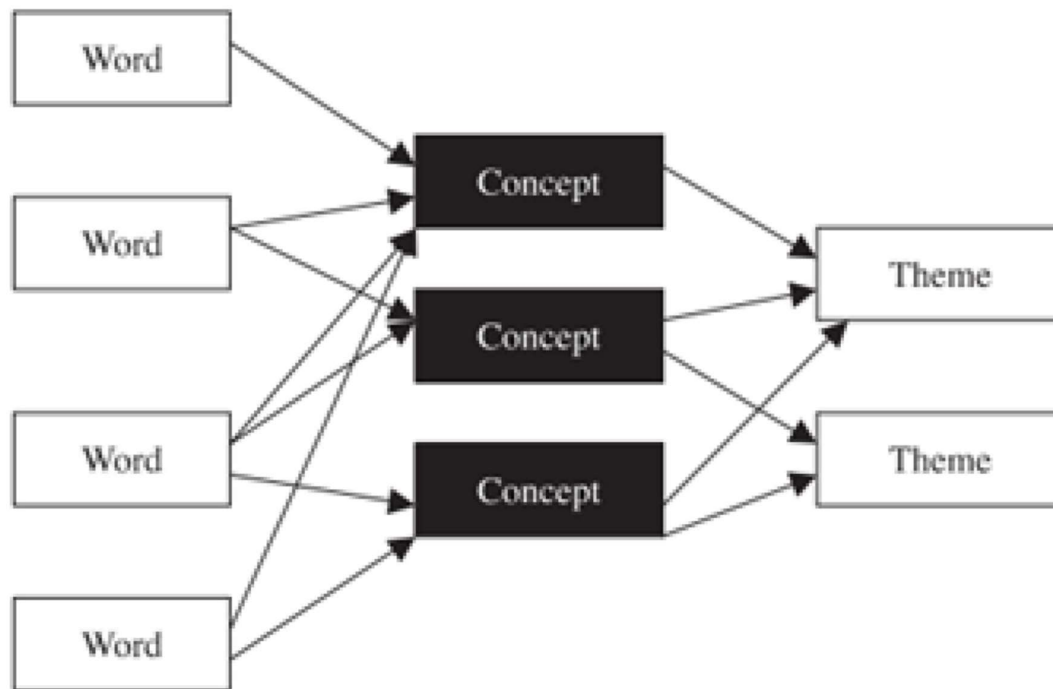
Data analysis method

The software chosen for data analysis was Leximancer v. 5.0. This tool allows the content analysis of documents, namely semantic and lexical analysis, through its visual representation in concept maps (Leximancer, 2021). This tool has been used in several areas of knowledge, as it allows the analysis of large amounts of data, namely text. This text-mining tool allows you to analyze text through the frequency of words, as well as their occurrence and co-occurrence and the relationships between words through the identification of concepts (Figure 3). From here, it prepares a list, automatically creating conceptual maps that illustrate the relationships between the keywords in the target text of analysis (Hydman and Pill, 2018), highlighting, through the colors and size of the circles, the themes and concepts most frequent identified in the documents, as well as the way they relate to each other, also including excerpts from the original text where they are referenced (Leximancer, 2021). According to Brendon Hydman and Shane Pill, “(...) Themes identified via the software can then be interpreted further by researchers to discover meaning from the textual analysis.” (2018, p. 297).

The themes are presented in the form of a circle, with the most important identified in red and the less relevant in purple. The themes contain within them the concepts, based on their relationship and proximity to the theme according to the documents that were uploaded. The correlation between the concepts reflects the frequency with which they appear, in this case, in the Reports and Accounts (Leximancer, 2021).

Scope of collection and analysis

The primary source of data collection was the Results & Accounting Reports³, as previously mentioned. To delimiting the scope of the analysis, it was necessary to identify a selection criterion for Portuguese banks that the source of the data was a reliable and reputable entity. In this sense, after researching various online sites, such as the Bank of Portugal, the Portuguese Bank Association (ABP), the National Institute of Statistics, among others, the financial criterion of “Total Equity Capital” was chosen”. This information was obtained by consulting the Individual Balance Sheets in December 2019 available on the APB online websites.



Source: Hydman and Pill (2018), p. 297

Figure 3. Leximancer software analysis model

As a result of the application of this criterion, the 10 Portuguese banks with the highest amounts of “Total Equity” were identified, resulting in the listing, ordered in descending order of value, as shown below:

1. Caixa Geral de Depósitos, S.A.
2. Banco Comercial Português, S.A.
3. Novo Banco, S.A.
4. Banco Santander Totta, S.A.
5. Banco BPI, S.A.
6. Caixa Económica Montepio Geral, S.A.
7. Haitong Bank, S.A.
8. Banco BIC Português, S.A.
9. Banco de Investimento Global S.A.
10. Caixa - Banco de Investimento, S.A.

³ Within the scope of this article, for the sake of simplification, we chose to use the expression “Results & Accounting Reports”. However, these documents may contain different names depending on the credit institution that prepared them.

Based on this list, the 2019, 2020 and 2021 Results & Accounting Reports available on the respective official online websites were searched, with the search ending on 09/24/2022.

All cedillas and accents were also removed from words, as the Leximancer disaggregates words if they have these elements. Then, the files were uploaded to Leximancer. To present the conceptual maps, the visualization option “Social network (Gaussian)” was selected, as well as the adjustment of 90% for the concepts (“Concepts”) and 65% for the themes (“Theme Size”) for the years 2019 and the years 2020 and 2021 in the “Project Control” menu of the Leximancer to facilitate the respective reading, but at the same time, obtain a map with relevant content for the analysis

- App
- Remote banking
- Digital bank
- Mobile channel
- Digital channels
- Remote channels
- Online channel
- Digitalization
- Home banking
- Mobile banking
- Digital Transformation

Results

As a result of the methodology applied for data collection, it was possible to obtain a total of 30 Results & Accounting Reports for the years 2019 to 2021, inclusive.

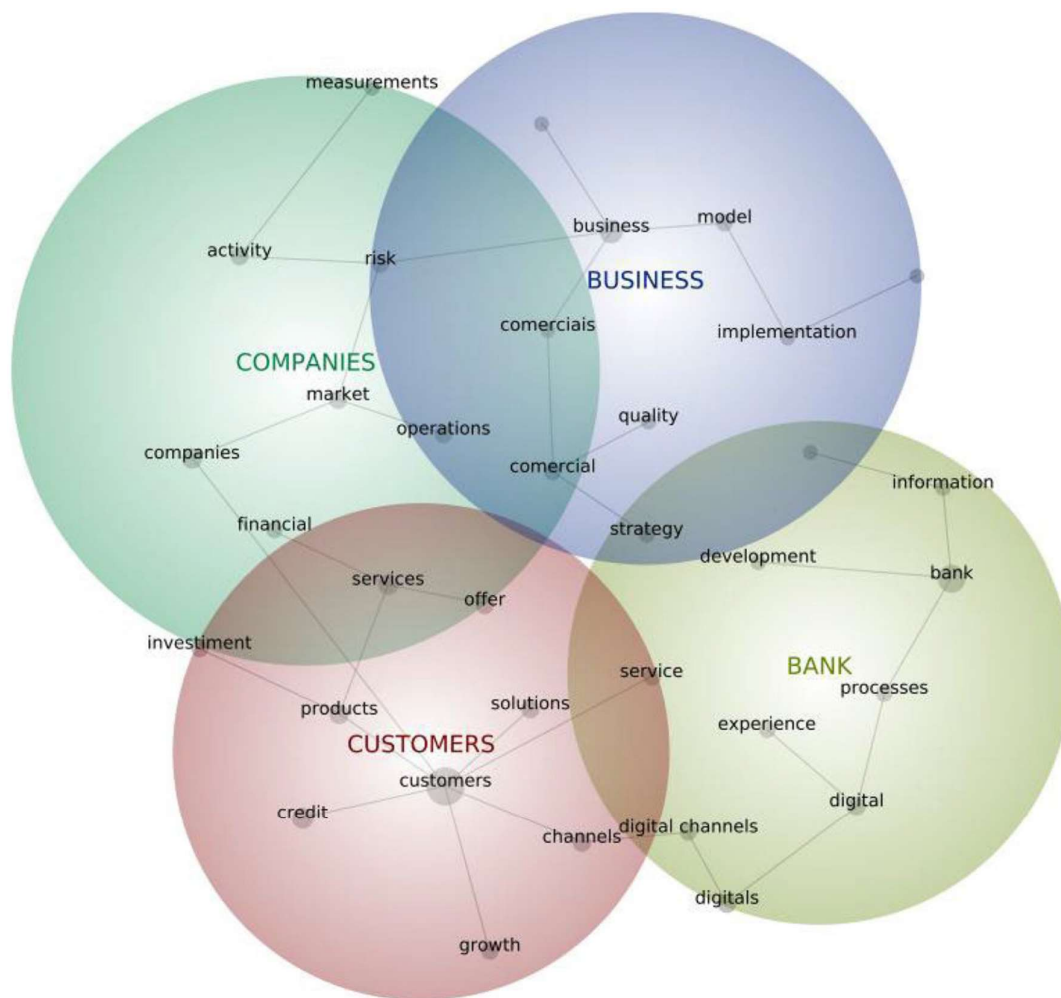
Based on the criteria described in point 3.3. Scope of collection and analysis, for the year 2019, Leximancer produced a conceptual map with 4 themes (Customers, Bank, Companies and Business), identified with capital letters and 31 concepts, marked with lowercase letters (Figure 4).

As mentioned in subchapter 3.3., in Leximancer the option 100% was not selected for the concepts, which is why they are identified with a gray dot in the circles but without the description as they are not considered relevant for this study.

Figure 5 shows the number of occurrences of each of the themes identified in descending order of relevance: Customers, Bank, Companies and Business.

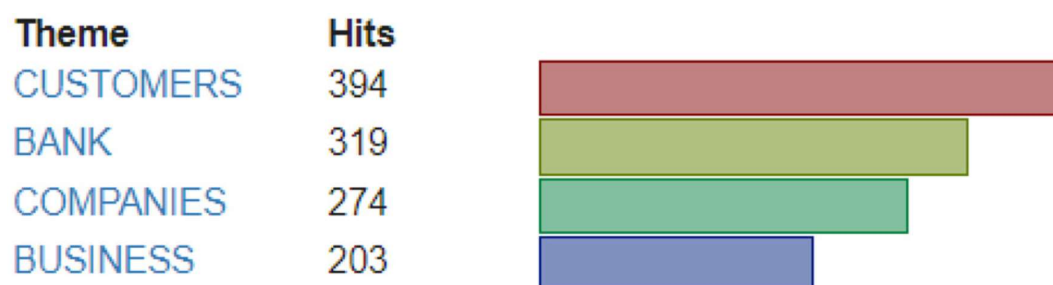
The theme “Customers” appears in first place with 394 occurrences, followed by “Bank” theme with 319. It should be noted that in all themes there is an intersection with the theme “Customers”, as well as with “Business”. However, the theme “Bank” only intersects with “Customers” and “Business” and the theme “Companies” with “Business” and “Customers” (Figure 5).

Regarding the identified concepts, Table 1 contains the concepts, frequency, and relevance, based on data extracted from Leximancer.



Source: Prepared by the author using Leximancer
Figure 4. Conceptual map for 2019, before the pandemic

In Table 1, it is possible to infer that the concept “Clients” comes first with 345 occurrences and the relevance corresponds to 100% in the documents analyzed. Next comes the concept “Bank” with 214 occurrences representing 62% of relevance and the concepts “Business” and “Credit” appear immediately but with much lower values: 37% and 32%, respectively. In the list follows “Activity” and “Services” with 21% of relevance and with a very close distance comes “Market” and “Products” with 19% and 18%. All other concepts have a relevance of less than 18%, as can be inferred from Table 1.



Source: Prepared by the author using Leximancer

Figure 5. Chart with the identification of themes and their occurrence for 2019

Concept	Frequency	Relevance (%)
Customers	345	100
Bank	214	62
Business	129	37
Credit	110	32
Companies	100	29
Activity	73	21
Services	72	21
Market	64	19
Products	61	18
Growth	58	17
Operations	57	17
Digital	56	16
Solutions	54	16
Service	54	16
Digitals	50	14
Risk	50	14
Channels	48	14
Offer	44	13
Model	44	13
Investment	43	12
Commercial	39	11
Measurements	36	10
Processes	35	10
Financials	35	10
Quality	33	10
Strategy	32	9
Digital channels	30	9
Experience	30	9
Information	30	9
Commercials	24	7
Implementation	23	7
Developments	23	7

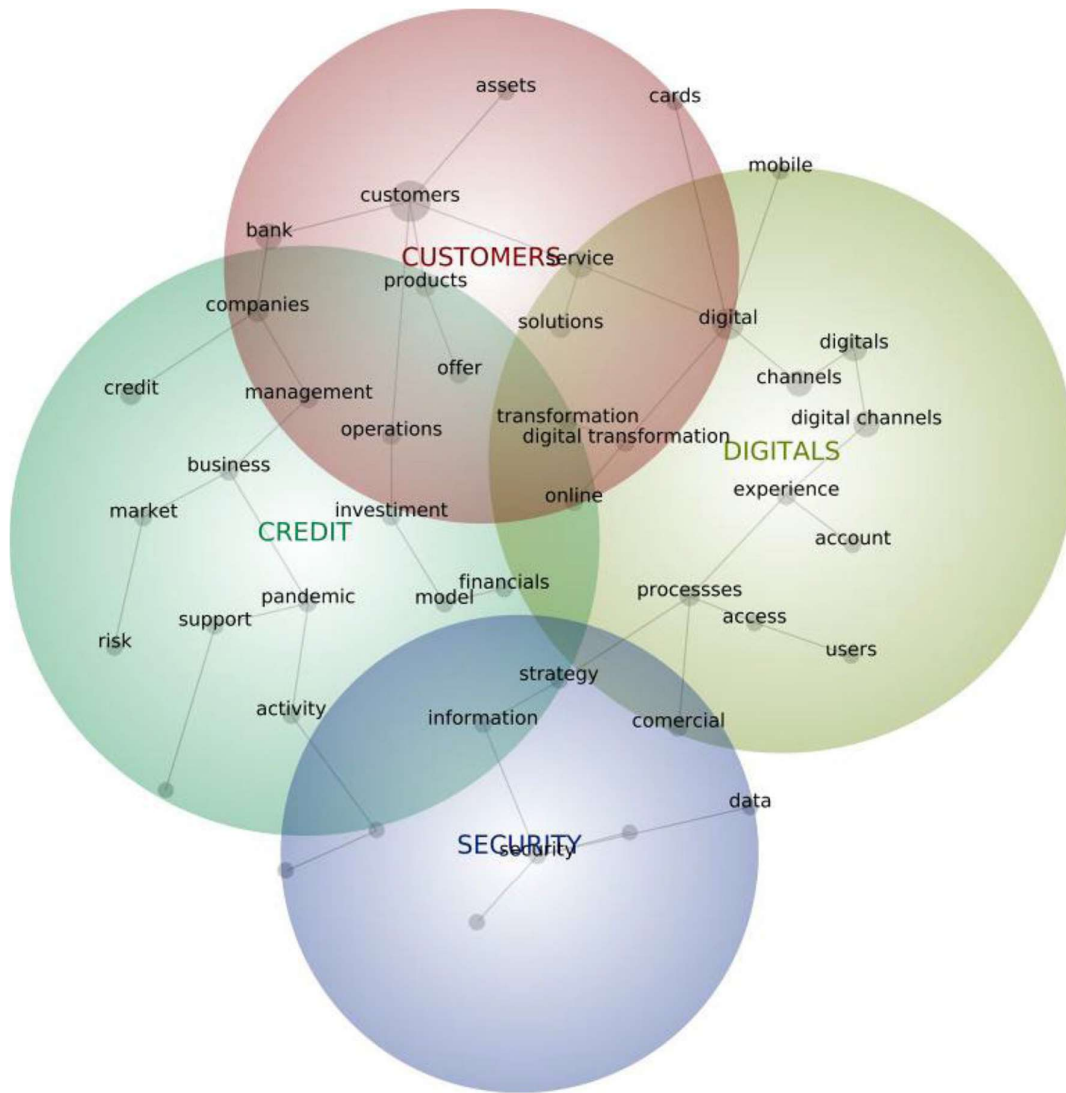
Table 1.
Table with concepts, frequency and relevance for 2019

Source: Prepared by the author using Leximancer

For 2020 and 2021, Leximancer produced a conceptual map with 4 themes – Customers, Credit, Digital and Security – and with 40 concepts (Figure 6).

Figure 7 shows the number of occurrences of each of the identified themes, in descending order of relevance: Customers, Credit, Digital and Security. It appears that the theme “Customers” is much more relevant than all the others, followed by the theme “Credit” with 598. Finally, we have “Digitals” with 524 and “Security” with 117.

Table 2 contains the concepts that were identified in this map for 2020 and 2021, as well as the frequency and relevance in the Reports and Accounts.



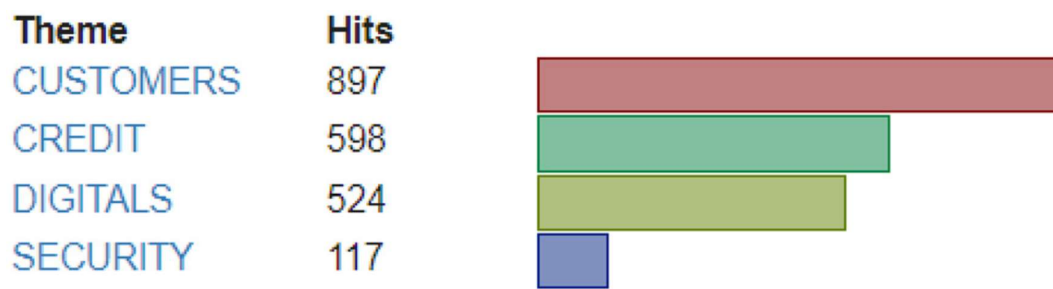
Source: Prepared by the author using Leximancer
Figure 6. Conceptual map for 2020 and 2021 during the pandemic

In Table 2, it is possible to infer that the concept “Customers” comes first with 825 occurrences, and the relevance corresponds to 100% in the analyzed documents. Next comes the concept “Digital” with 384 occurrences representing 47% of relevance and the concepts “Bank” and “Service” appear immediately but with much lower values: 42% and 32%, respectively. In the list follows “Digitals”, “Channels” and “Digital channels” with 27% of relevance and with a very close distance comes “Credit” and “Companies” with 23% and 22%. All other concepts have a relevance of less than 15%, as can be inferred from Table 2.

About the theme intersection, the theme “Digital” and “Credit” overlaps with the others, that is, with “Customers” and “Security”. In turn, the theme “Customers” intersects with “Credit” and “Digital”. The theme “Security” is overlapped by “Credit” and “Digital” (Figure 6).

When comparing concept maps, it appears that there is only 1 common theme: “Customers”, which is the most relevant theme in both maps. In the 2019 map, the theme “Companies” is replaced by “Credit” in 2020 and 2021 and the theme “Bank” by “Digitals” and finally, “Business” gives way to “Security” (Figure 6).

Based on the concepts automatically extracted from the Leximancer, a comparative graph of the 15 most relevant concepts in 2019 and 2020/2021 was prepared (Figure 8). In this sense, it can be seen that both in 2019, the pre-pandemic year, and in 2020/2021, the pandemic period, the first 2 concepts are common: “Customers” and “Bank” representing the first 100% relevance in the Results & Accounting Reports. The concept “Bank” in 2019 has a relevance of 62%, while in 2020/2021 it appears with 48%. And in 2019, we have “Business” in third place, while in 2020 and 2021 “Digital” appears. It should also be noted that many concepts are common although with different distributions regarding their frequency and relevance, such as “Companies”, “Products”, “Operations”, “Offer”, “Products”, “Services” among many others (Figure 8).



Source: Prepared by the author using Leximancer

Figure 7. Chart identifying the themes and their occurrence for 2020 and 2021

Discussion

“Customers”: the most relevant theme in both concept maps

This article has as its primary source the Reports and Accounts of the banks which, after submission to Leximancer, allowed the production of 2 concept maps. In the map referring to 2019, the theme “Customers” appears as the most relevant, being displayed in red, but this does not include the concept of “Digital Transformation” (Figure 4). In the map for the years 2020 and 2021, the theme “Customers” also appears on the map as the most relevant, however the concept “Digital Transformation” appears within it (Figure 6). When consulting the excerpts, extracted automatically by the software, the following is mentioned: “the bank continued to promote the improvement of the quality of service and customer experience based on the digital transformation process that accelerated during the year [2020/2021] (...)”. The result expressed in these 2 maps, as well as the aforementioned excerpt, are in line with what has been mentioned by several authors who consider the customer experience to be one of the preponderant factors in the digital transformation process in companies (Carapuça, 2018; Czesla, 2014; Duarte, 2019; Hanelt *et al.*, 2021; Lydiana *et al.*, 2022, Pinto *et al.*, 2021; Poleza and Varvakis, 2019; Rodrigues, 2019).

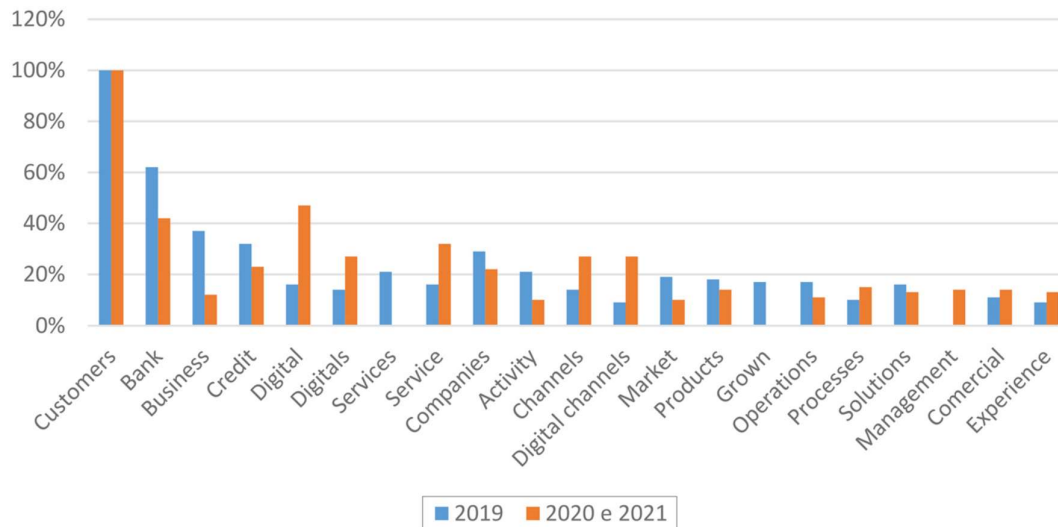
Concept	Frequency	Relevance (%)
Customers	825	100
Digital	384	47
Bank	346	42
Service	261	32
Digitals	225	27
Channels	224	27
Digital channels	222	27
Credit	191	23
Companies	179	22
Processes	121	15
Commercial	113	14
Products	112	14
Management	112	14
Experience	107	13
Solutions	104	13
Business	103	12
Operations	91	11
Pandemic	90	11
Offer	84	10
Activity	80	10
Market	79	10
Investment	78	9
Financials	73	9
Support	72	9
Online	69	8
Transformation	68	8
Assets	63	8
Security	62	8
Digital transformation	61	7
Model	61	7
Information	60	7
Account	60	7
Strategy	55	7
Risk	50	6
Cards	47	6
Access	45	5
Data	44	5
Protection	43	5
Mobile	36	4
Users	36	4

Source: Prepared by the author using Leximancer

Table 2.
Table with concepts,
frequency and
relevance for 2020
and 2021

The intersection of different themes in concept maps

In both conceptual maps, the most relevant theme and concept is “Customers”, followed by “Bank” in 2019 and “Credit” in 2020/2021. The third place in 2019 is occupied by “Companies” and in 2020/2021 by “Digitals”. This theme overlaps with “Customers”, “Credit” and “Security”, thus highlighting the impact that the covid-19 pandemic had on Portuguese banking. As mentioned by Mariana Bandeira in an article published in *Jornal Económico*, “digital channels have become, more than ever, the jewel in the crown of Portuguese banks”, as we can infer by analyzing the map (Figure 6) in which the concept of digital channels appears almost superimposed on the “Digital” theme. However, it also states that “(...) with the spread of the new coronavirus in the country, institutions have readjusted and started advising the use of apps and home banking while restrictions and social distancing rules are in force” (2020, p. 5). Through the analysis of Figure 6, it is possible to infer the relationship of the concept “digital channels” with “online”, as well as with “mobile”, verifying that they are all inserted in the theme “Digitals” and very close to the theme “Customers” in accordance with what Mariana Bandeira mentioned in a press article (2020), as well as the study carried out by Basef Banca da Marktest (Marketeer, 2020).



Source: Bank of Portugal, (2019)

Figure 8. Comparative chart of the relevance of the main concepts in 2019 and 2020/2021

The comparative analysis of the maps made it possible to infer that more products and services became available due to the correlations of the concept of "Digital Channels" with the following concepts: "Operations", "Credit", "Financial", "Investment", "Cards", "Account", "Products" and "Services", among others. The content of this map is in line with António Moreira, who refers to the fact that the covid-19 pandemic has accelerated the use of digital channels and therefore the availability of a greater diversity of products and services (2020).

"Credit" in concept maps

While in the 2019 map the concept "Credit" appears inserted in the theme "Customers", in the map of 2020 and 2021 it gains greater importance as it is represented simultaneously as a theme and concept and in an evident intersection with the themes "Customers", "Digital" and "Security" (Figure 6). This map highlights the concerns of the banking sector with the business fabric that was and continues to be affected by the crisis, as well as the measures that were implemented by the banks in articulation with the respective supervisory and regulatory entities, as well as with the State to face the impacts on the economy through, for example, the granting of credit with more favorable conditions, as well as the moratoriums applicable to credit contracts, as shown in the map, thus demonstrating the role of this banking product for these institutions, as well as the consequences of a serious economic and financial crisis due to the pandemic.

"Security" in concept maps

And, finally, it appears that although "Security" is identified as a concern by customers, as well as by banks (Banco de Portugal, 2019) and by the supervisory body (Leitão, 2017) in the 2019 map it is not mirrored, neither in the form of a theme nor a concept but appears on the 2020 and 2021 map as a theme and as a concept. Its emergence is justifiable by the greater impact that digital has come to assume in the customer's relationship with the bank, as well as the concerns and risks that result from it. As also mentioned by Duarte, "For our [Portuguese] regulator, safety is the main thing, so BdP tries to promote safety, without compromising innovation" (2019, p. 16) and it is verified (Figure 7) that when the concept "Security" is selected there is a relationship, among others, with the concepts of "Customers", "Bank", "Digital channels", as well as with "Digital transformation".

Academic contribution

This study aims at an academic level, to contribute to the knowledge of the impacts of the covid-19 pandemic on digital channels, allowing to identify the changes that were implemented by banks. This contribution is embodied in 2 concept maps that were automatically extracted from Leximancer, on one hand, a concept map for 2019, the year before the pandemic and, on the other, a concept map for 2020 and 2021, the year's corresponding to the pandemic context.

By analyzing these two conceptual maps, it is possible to infer the differences between “before” and “during” the pandemic based on the source of information for this article, the results and accounting reports. Therefore, this study may contribute, in a broader scope, to knowing the extent to which the pandemic has contributed to accelerating the digital transformation of Portuguese banking.

Business-level contribution

As for the implications at a business level, it is intended that by identifying the measures that have been adopted, managers will be able to define other initiatives within the scope of digital channels, as well as boost those already implemented, taking advantage of the skills that customers have acquired and their own habits and behaviors. This allows us to assess which products and services are most in demand, thus making it possible to prioritize these investments over others.

Social contribution

This study contributes to helping bank managers reflect on their social responsibility and actively engage in the potential social impact of their contribution to meeting the financial needs of their customers. This social responsibility of banks involves both the responsibility of individual banking institutions for the security of the funds entrusted to them and the economic responsibility for services provided to customers and support in making financial decisions based on the commitment to contribute to customers' financial security.

Conclusions

The work described in this article allowed, using Leximancer tool, the identification of the main topics addressed in the Results & Accounting Reports in the previous year to the pandemic in Portugal (2019) and in the following 2 years of the pandemic (2020 and 2021), as well as the concepts that appear more frequently and their correlations.

To answer the opening question – “What changes have been implemented in the digital channels of the largest Portuguese banks boosted by the covid-19 pandemic?” – 1 general objective and 3 specific objectives were defined.

Regarding the general objective – “Identifying which changes were implemented by the largest Portuguese banks in digital channels that were boosted by the pandemic context” – a review of the literature on the subject in the context of Portuguese banking began. In this sense, scientific works specifically on the object of study of this article were not identified, although generalist and specialized press articles proliferate on the Portuguese reality, as well as studies of consulting companies. The scope of the theoretical background also covered other geographies, in addition to Portugal, if they dealt with the theme of this investigation, in addition to the fact that the covid-19 pandemic is a phenomenon on a global scale, having devastated the entire world.

The processing of the Results & Accounting Reports by Leximancer allowed the production of 2 conceptual maps that, on one hand, portray the reality in 2019 before the pandemic and, on the other hand, the pandemic context in the years 2020 and 2021 in Portugal. The comparative analysis of these maps makes it possible to identify, through the themes and concepts inscribed inside each circle, that there is 1 common theme in both chronological periods: “Customers”. Both on the 2019 map and in 2020 and 2021, “Clients” assumes the same relevance when represented in the red circle. The concepts within the various themes, such as

“Digital channels”, “Digital transformation”, “Security” denote the importance that banks attribute to these matters through the measures that had to be implemented, as well as the concern with “Protection”, “Information”, “Data” and naturally the “Business” in an inevitably more digital context due to the circumstances of the various total or partial confinements that were in force.

Another of the noticeable changes between the pre-pandemic map, 2019, and the pandemic years, 2020 and 2021, is the fact that there is now a theme entirely dedicated to “Digitals”, which includes concepts such as “Digital channels”, “Mobile”, “Online” and “Digital Transformation” (no concept on the 2019 map), among others. In this sense, it appears that the changes implemented mainly involve the adoption of initiatives related to the digital component and security, whether physical or digital, as well as credit and the provision of products and services through digital channels.

As for the specific objectives, the 2020/2021 map shows that the digital channels made available were online and mobile through the interconnections between the concepts. As for the products and services available in 2020 and 2021, the following concepts are identified in the “Digital” theme: “Operations”, “Cards”, “Financial”, “Account” and “Credit”.

Regarding the security measures that were implemented, it appears that the theme “Security” only appears on the 2020 and 2021 map, denoting the concern of Portuguese banks in this period of the pandemic, clearly justifiable by the fact that banks favor exclusively digital contact, whenever possible, with customers in line with public health guidelines, as well as the increase in cyber-attacks that organizations have been targeted. This theme includes the concepts of data, information, strategy, commercial and protection, as well as security. Although the map’s content does not detail the concrete measures implemented, the excerpts from the results and accounting reports that Leximancer automatically extracted allow access to more detailed information. For example, 3D Secure and customer notifications are identified when consulting the excerpts pulled from the tool.

Therefore, the comparative analysis of the two concept maps allows us to infer the main concerns of Portuguese banks before and during the pandemic. A common theme is identified: “Customers” with identical relevance in both maps when found in the red circle (the most relevant). In 2019, the theme “Business” appears as the least relevant, replaced by “Security” in the 2020 and 2021 maps because of the context mentioned above. Security is a concern of the banks themselves, as well as the regulators and the customers themselves.

The “Digital” theme clearly appears on the 2020/2021 map, highlighting, as already mentioned, the role of digital channels for Portuguese banks. Inside, above all there is a reference to digital channels, including mobile and online, as well as users, access, experience and digital transformation.

Therefore, digital channels are a primary concern for banks, as they appear both on the 2019 map and for 2020 and 2021, focusing on this pandemic period by including “Digitals” as a concept and simultaneously as a theme. The concern about security closely linked with the theme “Digitals” is also notorious.

It is thus evident, comparing both maps, the impact of the pandemic on digital channels, as well as on banking activities and business, through correlation with all the themes and concepts with the most occurrences, allowing us to conclude that the covid-19 pandemic has driven changes on digital channels and, therefore, accelerated the digital transformation process, already underway, in the 10 largest Portuguese banks.

As previously mentioned, the study concerns Portuguese banks. However, the problem and conclusions can be global to all banks due to the pandemic being a phenomenon on a worldwide scale.

Moreover, finally, we found that the use of Leximancer made it possible to achieve, in general, the general objective and the specific objectives outlined in this research work, both through the explanatory concept maps of the measures adopted in the digital channels by the

banks that constitute the contribution theory, as well as all the information that was possible to extract from the tool

Research limitations

Regarding limitations, it should be noted that, although measures to combat the pandemic are being lifted in Portugal and the confinement period has already ended, the end of the pandemic has not yet been decreed, so the period for which this article intends to address is still ongoing.

The other identified limitation is closely related to what was discussed above, that is, considering the topicality of the subject, there are still not many studies in the banking sector, scientific articles and other academic works that deal with the same, with only a few statistical analyzes having been identified and articles in the generalist and specialized press.

Given the limitations within the scope of the elaboration of this article, the lines of future research that are considered relevant to be conducted are presented below to obtain all the intended information and achieve the outlined objectives, as well as to deepen and improve this study.

Future research

As future studies and due to the limitations identified, it is considered that a study should be carried out, based on the same primary source – Results & Accounting Reports – but after the end of the pandemic.

A more robust and complete study should be complemented with another data collection method, namely, semi-structured interviews aimed at those responsible for the digital channels.

Future research could also extend the scope of analysis to all Portuguese banks and not just the 10 banks with the highest “Total Equity”, allowing for a more global view.

Another line of investigation could include extending the scope of the analysis to all the countries that form an integral part of the European Union, thus encompassing a more significant geographic scope, allowing for a comparative study between the different countries. This future research would enable us to confirm whether the conclusions of this article on Portuguese banks are also applicable to other international banks, considering the global phenomenon of the COVID-19 pandemic

Notes

1. Although the scope of this article refers to other types of credit institutions besides banks, for the sake of simplification, it is agreed that the expression “banks” will be used.
2. The data refer to 2018, but the report was published in 2019 (Bank of Portugal, 2019). This is the most recent report available for consultation on the BdP website.
3. Within the scope of this article, for the sake of simplification, we chose to use the expression “Results & Accounting Reports”. However, these documents may contain different names depending on the credit institution that prepared them.

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