Big data business models in the food retail industry: The role of digital platforms

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Abstract

The emergence of digital technologies has transformed the global economy by enabling businesses to collect and analyse vast amounts of data. This has given organizations unprecedented insights into consumer behaviour and preferences, allowing them to tailor their products and services to meet the changing needs of their customers. The use of big data has also had a profound impact on market structures and brand management practices, shifting power from marketers to consumers. Furthermore, businesses are using big data to gain a deeper understanding of their customers and respond to changing consumer needs and preferences. The use of big data in mobile apps can enhance the customer experience and boost the value delivered to customers by providing personalized offers. In this thesis, we investigate the use of big data in the business model of a retail food company operating in Portugal. We explore how it uses big data to distribute discounts and other offers to customers through its mobile app. The approach used was a qualitative exploratory study, using semi-structured interviews with industry experts. The findings show that the company does not currently prioritize using big data in its operations and that a lack of data variety may hinder its growth. We also mentioned that while e-commerce is a potential avenue for growth, there is still much work to be done before this can be implemented successfully.

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Resumo

O aparecimento de tecnologias digitais transformou a economia global, permitindo às empresas adquirirem e analisarem grandes quantidades de dados, o que deu às organizações conhecimentos sobre o comportamento e as preferências do consumidor, permitindo que adaptassem os seus produtos e serviços às necessidades dos clientes. O big data também teve um impacto profundo nas estruturas de mercado e nas práticas de gestão de marcas, transferindo o poder dos profissionais de marketing para os consumidores. Além disso, as empresas estão a usar big data para obter uma perceção mais profunda dos seus clientes e responder às mudanças nas necessidades e preferências dos consumidores. O big data em aplicações móveis pode aprimorar a experiência do cliente e aumentar o valor entregue, fornecendo ofertas personalizadas. Neste estudo, investigamos a utilização do big data no modelo de negócio de uma empresa de retalho alimentar a operar em Portugal. Exploramos como esta empresa usa big data para distribuir descontos e outras ofertas aos clientes através da sua aplicação móvel. A abordagem utilizada foi um estudo exploratório qualitativo, por meio de entrevistas semiestruturadas com especialistas do setor. Os resultados mostram-nos que a empresa atualmente não prioriza o uso de big data nas suas operações e que a falta de variedade de dados pode estar a atrasar a sua implementação. Também mencionamos que, embora o *e-commerce* seja uma via potencial de crescimento, ainda há muito trabalho a ser feito antes que possa ser implementado com sucesso na empresa.

Título da dissertação: Modelos de negócios com big data na indústria de retalho alimentar: o papel das plataformas digitais

Autor: Inês Ludovico

Palavras-chaves: Big data, preferências do cliente, aplicação móvel, modelos de negócios, proposta de valor

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1. Introduction

The rapid adoption of digital technologies in recent years has fundamentally altered the landscape of the global economy (Foster et al., 2018; Zuboff (2018); Baller, Dutta and Lanvin, 2016). The capacity to collect, store, and analyze enormous volumes of data has been one of the primary ways that modern technologies have changed businesses (Mejias and Couldry, 2019). This has provided businesses with previously unheard-of insights into consumer behaviour and preferences, allowing them to better comprehend and foresee the demands and wants of their clients. As a result, businesses have been able to more effectively tailor their products and services to meet the changing demands of their customers, leading to increased customer satisfaction and loyalty.

The use of big data has had a significant impact on market structures and brand management practices in recent years. The provision of real-time data, which enables organizations to make better informed and strategic decisions, is one of the primary ways in which technology has altered these industries. For example, companies can use big data to offer personalized coupons to customers, which can help to increase loyalty and drive sales (Brown, Chui, and Manyika, 2011).

This use of big data has also shifted the balance of power in the market, with consumers now having greater control over the products and services they choose to consume (Erdem et al., 2016). By providing customers with more personalized and relevant recommendations, businesses can better meet the needs and preferences of their target audience, leading to increased customer satisfaction and loyalty (Sunagar et al., 2020).

By analysing customer data, businesses can better understand the characteristics and behaviours of their target audience and use this information to adjust their marketing strategies to better target specific demographics or purchasing trends (Rajput, 2021). This can help businesses to attract and retain customers, ultimately driving growth and success in the global economy (Danna and Gandy, 2002).

Businesses can use apps to gather a wide range of data from their customers, including information on behaviour, preferences, and purchasing habits. This data can be valuable for companies looking to improve the customer experience and offer personalized recommendations based on the information gathered (Gustec, 2021). By analysing this data, businesses can gain insights into the needs and preferences of their customers and use this information to tailor their products and services to better meet the changing demands of the market.

With this being said, the goal of this thesis is to examine the extent to which big data is a priority for a retail food company operating in Portugal and to understand the role that big data plays in the company's business model concerning distributing more effective and efficient discounts to clients through their app. To do so, this thesis aims to answer the following research question:

- **How can mobile apps create, deliver, and capture value with the help of big data?**

This research aimed to contribute to a better understanding of the role of big data in the retail food industry and its potential to drive business growth and success. By examining the ways in which a retail food company is utilizing big data in its operations, we hope to provide insight into the value of big data for companies in this sector and help other companies understand the potential impact of big data on their business model.

In order to address the research question, this thesis employed a qualitative exploratory design, using semi-structured interviews with industry experts within the same company. This approach allowed for a deep exploration of the ways in which a retail food business can benefit from incorporating big data into its business model, and how its mobile app can enhance its current value proposition.

The use of interviews with industry experts enabled us to gain insights into the real-world experiences and perspectives of professionals working in the retail food industry. By collecting data through this method, we were able to gain a more comprehensive understanding of the potential benefits and challenges of using big data in the retail food sector, and how it can be effectively implemented in a company's business model.

This thesis involves six sections: Chapter 2 provides an overview of big data and its potential to shape various industries. The chapter also covers an understanding of business models and how big data can be incorporated into them, as well as an overview of marketing strategies with a focus on mobile apps. The chapter concludes with a discussion of the benefits of incorporating big data into business models through the use of mobile apps, with examples of companies that have successfully done so; Chapter 3 describes the research approach and data collection process used in this thesis; Chapter 4 presents the findings of the thesis, organized according to the research question; Chapter 5 discusses the key findings of the thesis in more detail; Chapter 6 offers conclusions, recommendations, and limitations of the thesis.

2. Literature Review

The availability of enormous quantities of data has made it possible for businesses from all sectors to use data to gain a competitive advantage (Provost and Fawcett, 2013). Data is increasingly seen as the most valuable resource for businesses, as it can provide insights that can be used to generate revenue (Baida, 2020). In fact, data has been referred to as "*the new oil*" (page 1382) in terms of its potential to drive business success (Hartmann et al., 2016).

The growth of powerful computers has made it possible for businesses to process and analyse substantial amounts of data, enabling them to explore the advantages and challenges of data-driven operations (Provost and Fawcett, 2013).

The best five brands in 2022, according to Interbrand (2022), are all data-driven companies, including Apple, Microsoft, Amazon, Google, and Samsung. These companies use data analysis to manage their business, allowing them to make better and more strategic decisions (IPAG, 2022; Brynjolfsson, Hitt, and Kim, 2011).

2.1. Data

Data is information that has been converted into a digital format that can be quickly processed and moved (Vaughan, 2019). According to Dinov (2019), data is a valuable resource for companies, and the ability to understand the trends and patterns within data is known as Data Science.

Data Science is a powerful tool for businesses, as it allows them to better organize and understand their data, leading to improved company performance (Canito et al., 2018). Data Science is a new and promising technology in 2022 (Sharma, 2022) that can be used to gain insights from data (Provost and Fawcett, 2013).

Rajendran et al. (2016) distinguish between two types of data: traditional data and big data. Traditional data is smaller in size and therefore limited (Bajaj et al., 2017), for example, only showing numbers, strings, and dates and requiring less storage capacity (Valchanov, 2021). Big data, on the other hand, deals with large data sizes and is characterized by a larger storage capacity and more data variety, including images, mobile data, audio, video, emails, and more (Rajendran et al., 2016; Valchanov, 2021).

Traditional data can no longer handle the volume and variety of today's data due to its size (Eberendu, 2016), so for this thesis, we will focus on big data, as it is capable of dealing with much larger data, crucial for all industries, including marketing (Amado et al., 2018). Additionally, Lay (2022) suggests

that big data can provide a more comprehensive understanding of consumer behaviour and market trends than traditional data.

2.2. Big data

Big data is a term used to describe the vast amounts of data that are generated by businesses, organizations, and individuals. This data is typically characterized by its high volume, velocity, and variety, which require specialized technology and analytical methods to process and extract value from it (Mauro, Greco, and Grimaldi, 2015).

Additionally, Hashem et al. (2015) believe that "*Big data is a term utilized to refer to the increase in the volume of data that are difficult to store, process, and analyse through traditional database technologies*" (pages 99-100).

Big data can be identified by three main characteristics: volume, variety, and velocity (Marr, 2016; Chen, Chiang, and Storey, 2012; Wedel and Kannan, 2016; Beyer, 2011). The **volume** of data refers to the sheer amount of data that is generated, and the ability of big data systems to store and process substantial amounts of data (Schroeck et al., 2012). **Variety** refers to the several types of data that can be processed by big data systems (Laney, 2001). **Velocity** refers to the speed at which data is generated and processed, and the ability of big data systems to oversee data in real-time. (Schroeck et al., 2012; Laney, 2001)

Some authors have added a fourth characteristic to the three v's of big data, known as **veracity** (Goes, 2014; Schroeck et al., 2012). Veracity refers to the quality and accuracy of the data, and the need to verify the consistency and reliability of the data in order to extract value from it (Owais and Hussein, 2016; Schroeck et al., 2012).

As Mauro, Greco, and Grimaldi (2015) suggested, big data is about transforming data into value. Therefore, collecting and storing data does not add value for companies nor any competitive advantage. They need to analyse and understand the data to produce actual business value. Hartmann et al. (2016) suggest that big data can improve and optimize the current business model, processes, and services.

Big data has many potential benefits for organizations. It can enable businesses to make more informed decisions, improve productivity and efficiency, gain a competitive advantage, and unlock new sources of revenue and value (Bakhshi, Bravo-Biosca, and Mateos-Garcia, 2014). In particular, big data can help firms better understand their client´s behaviour and wants, enabling them to customize their goods and services to fit shifting consumer demands (Soudagar, 2013).

For the reasons above, it is important for businesses to incorporate big data into their business models, as seen before by Schroeck et al. (2012). They should take advantage of the technologies and innovations to unlock their potential in the market (Chesbrough, 2007).

2.2.1. Impact of big data on business models

The concept of the business model has been widely discussed in the field of business, with various interpretations and definitions of the term (Baden-Fuller and Haeflinger, 2013).

Every company has its unique business model (Chesbrough, 2006), and early academics in the field sought to define the concept (Osterwalder, Pigneur, and Tucci, 2005). However, despite the significant amount of discussion on the topic (Pateli and Giaglis, 2004), a general definition has not yet been established (Morris, Schindehutte, and Allen, 2005; Zott, Amit, and Massa, 2011).

Fielt (2013) conducted a study to understand the concept of the business model and concluded that it can be defined as "*the value logic of an organization in terms of how it creates and captures customer value*" (page 85). This aligns with the definitions offered by Parida, Sjödin and Reim (2019) and Teece (2010), who respectively describe a business model as the way a company creates, delivers, and captures value, and as how *"the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit"* (page 172).

According to Magretta (2002), a good business model should answer three key questions: "*Who is the customer*?", "*What does the customer value*?", and "*How do we make money in this business*?". These questions relate to the three main elements of a business model, which are value creation, value delivery, and value capture (Zott, Amit, and Massa, 2011).

Value creation refers to the product or service being offered to potential customers (Lepak, Smith, and Taylor, 2007). This element is focused on customer sensing (Teece, 2010) and customer engagement (McGrath and MacMillan, 2000), which respectively involve identifying the target customer and determining the value proposition for that customer (McGrath and MacMillan, 2000).

Value delivery involves the process of delivering the value generated by value creation to the customer (Aversa et al., 2015). It is not enough to simply create a valuable product or service - it must also be delivered to the customer in a way that adds value for the company (Kaplan, 2012).

Value capture is the process of collecting profits from value creation and value delivery (Dyer, Singh and Hesterly, 2018; Dubosson-Torbay, Osterwalder and Pigneur, 2002; Kaplan, 2012). This can

involve monetizing the value delivered to customers (Aversa et al., 2015) and determining who pays and how much for that value (Kaplan, 2012)

We chose the approach of Zoot et al. (2011) because it is the most promising and general definition of a business model, allowing companies to be flexible in their definition of the concept (Baden-Fuller and Mangematin, 2013). As referred before, the top companies in 2022 were all data-driven (Interbrand, 2022), with big data at the core of their business models (Hartmann et al., 2016). However, it is important for companies to have the right skills and knowledge to effectively incorporate big data into their business models and developing talent in this area is crucial (Bulger, Taylor, and Schroeder, 2014).

According to Wixom and Ross (2017), "*most companies are awash in data*" and can benefit from big data in several ways. For example, it can be used to improve internal operations, enhance products and services, and improve customer interactions. By analysing large amounts of data and identifying hidden patterns, big data can also help businesses make better decisions, such as predicting customer preferences (Sunagar et al., 2020). Furthermore, big data can give marketers access to previously unknown consumer data, including purchase patterns and potential consumer behaviour (Danna and Gandy, 2002), and has been shown to improve a company's daily operations (Kshetri, 2014).

2.2.2. Impact of big data on online marketing

According to the American Marketing Association (2017), marketing is "*the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large*".

A marketing strategy provides an overview of how a company will present its value proposition to customers (Coursera, 2022). Mustafi, Jost and Nguyen (2011) identified two perspectives for conducting marketing strategies: **offline marketing**, which involves selling products through channels such as public events and radio or television advertising (Digital Marketing Institute, 2018), and **online marketing**, which involves applying digital technologies such as the web, email, and mobile devices to contribute to marketing activities and deliver targeted communications and online services to customers (Chaffey, 2007).

Managing online marketing can be challenging due to the large amount and variety of data involved (Anshari et al., 2019). For instance, in the retail industry, analysing in-store purchasing patterns can be used to improve sales by adjusting stock levels, prices, and promotions (Davenport and Dyché, 2013).

Therefore, for this thesis, we will focus on the relationship between online marketing and big data, as the high volume and variety of data involved in online marketing make it an ideal area to examine the use of big data (Anshari et al., 2019).

According to Kaneshige (2022), the use of big data can help marketers anticipate variations in the market and customer behaviour. Kaneshige argues that "*we've entered a new era of high-velocity data marketing*" and emphasizes the importance of using customer data to gain a competitive advantage and improve marketing investments. One example of an online marketing strategy is the use of mobile apps (Chaffey, 2007; Bauer et al., 2005). Mobile apps are software programs designed to run on smartphones, tablets, and other portable devices (Tang, 2016).

Arora (2021) suggests that businesses can use mobile apps to enhance consumer engagement, conduct personalized marketing campaigns, and increase brand awareness. Additionally, mobile apps can help businesses gather more data from customers, understand their buying habits and preferences, and improve their return on investment (Gustec, 2021).

2.3. Digital Platforms

According to Panchal (2021), some companies are using big data in their mobile apps to study their customers. For example, Walmart uses big data to provide product recommendations to customers through its app, Netflix uses big data to predict customer preferences and offer personalized movie or TV show recommendations, and British Airways offers personalized deals to customers through its app (Panchal, 2021).

According to Abraham et al. (2017), personalization is the act of creating personalized relationships with a brand. This involves tailoring the brand's communication and interactions to each customer's individual needs and preferences.

Companies can use the data collected through big data to make more informed strategic decisions. For example, they can use this data to offer customers coupons, promotions, and relevant content that may be of interest to them and attract them to download the app (Panchal, 2021). Using big data, companies can analyse customer preferences, demographics, and purchasing trends to adjust their marketing strategies and better meet customers' needs (Rajput, 2021). The benefits of using big data in mobile apps include increased engagement, improved app income, and enhanced customer satisfaction through the use of effective strategies (Rajput, 2021).

Promoting a company's brand through a mobile app is common in the retail industry, as it allows companies to advertise their products or services, offer advice to customers, and sometimes even

enable e-commerce (Malhotra, 2022). In fact, after the COVID-19 pandemic, 17.8% of global retail sales were made through e-commerce in mobile apps, and this number is expected to grow by 24% by 2026 (Coppola, 2022). E-commerce refers to buying and selling goods and services through the internet and it involves online transactions between businesses and consumers (Sampaio, 2019).

Shankar (2019) provides some examples of how big data is being used in mobile apps. Amazon uses big data to gather information about customers and make personalized recommendations, and Kroger uses big data to offer customers weekly promotions. According to Oracle (2022), one of the key benefits of using big data in mobile apps is that it can enhance the customer experience and increase the value delivered by offering personalized offers to customers.

A study by Abraham et al. (2017), has found that brands that use advanced digital technologies and proprietary data to create personalized experiences for customers are seeing revenue increase by 6% to 10%. This is two to three times faster than the revenue growth of brands that do not personalize their customer experiences.

In the same research from Abraham et al. (2017), there are several challenges that companies may face when implementing personalization strategies. These challenges include a lack of personnel dedicated to personalization, a lack of loyalty programs or insufficient use of existing ones, a lack of executive sponsorship or prioritization, a lack of a clear business case and objectives, a company culture that is not conducive to innovation, insufficient budget, and a lack of a clear roadmap for implementing personalization (Abraham et al., 2017).

In conclusion, Panchal (2022) recommends that big data will play a significant role in shaping the way businesses operate in the competitive market and suggests that companies should invest time in learning about big data and hiring mobile app developers with expertise in this area.

With this thesis, we intend to analyse the value that big data has in mobile apps and the effects that this relationship will have on a particular business model by answering the following questions:

1. **How can mobile apps create, deliver, and capture value with the help of big data?**
    a. What kind of data is extracted from customers in the app to plan online marketing strategies?
    b. Why is important to analyse big data to create better online marketing strategies?
    c. How can the retail industry benefit from adding big data in their apps?

3. Methodology

This section summarizes the research methodology for this thesis. It begins by defining the research approach that we use to answer the question "*How can mobile apps create, capture, and deliver value with the help of big data*?" After, it suggests the method of data collection, with a justification for the method chosen. Finally, the process of data collection is described.

Overall, our research methodology is designed to provide a thorough and rigorous investigation into the role of mobile apps and big data in creating, capturing, and delivering value.

3.1. Research Approach

The main difference between deduction and induction lies in the way they approach observations. The deduction begins with a general theory or principle and uses it to draw specific conclusions or predictions (Nola and Sankey, 2007). Induction, on the other hand, starts with specific observations and uses them to develop general theories or principles (Locke, 2007).

For this thesis, we have chosen to use an **inductive approach** in order to enhance the interpretive power of our analysis (Harriman, 2010). This approach is particularly well-suited to answering questions that have not yet been fully explored or understood (Woiceshyn and Daellenbach, 2018). By starting with specific observations and using them to develop new insights and theories, we aim to provide valuable contributions to the field.

3.2. Method of data collection

Inductive research frequently involves qualitative research methods, which help answer questions like 'how' and 'why' (Eriksson and Kovalainen, 2016). According to Hesse-Biber and Leavy (2006), qualitative research seeks "*to discover, explain, and generate ideas/theories about the phenomenon under investigation; and to understand and explain social patterns (the 'How' questions*)" (page 49). Sullivan (2012) suggests some ways to collect data in qualitative research such as interviews, focus groups, observation, or a combination of various methods. He also suggests that, with the development of technology, other channels arise from collecting data. For example, conducting online meetings.

To collect information for the thesis, we chose to use **semi-structured interviews** with professionals and experts in the field as the primary method of data collection. This approach is considered to be a

qualitative research method, as it involves collecting and analysing detailed, descriptive data from a group of participants to explain an idea that has not been under investigation.

The decision to use semi-structured interviews was based on the specific nature of the thesis, which focuses on a specific company and its mobile app. In order to gain insights into the company's mobile app and its potential for leveraging big data, it was essential to gather information from people within the company who have expertise in this area. By conducting interviews with these individuals, we were able to gain a deeper understanding of the mobile app and the challenges and opportunities it presents.

We chose the qualitative research method since it allows a more in-depth exploration of the topic as well as a search for additional information and clarification when needed. Overall, the use of semi-structured interviews was deemed the most appropriate and effective method for collecting the necessary data for the thesis.

3.3. Data collection process

The data collection process for this thesis involved the development of a set of semi-structured interview questions that were designed to address the research objectives of the thesis and explore key theories and concepts from the literature review (see Appendix 1 for the full list of questions). We carefully crafted these questions to ensure that they were relevant, well-structured, and covered the key areas of interest for the thesis.

To identify suitable participants for the thesis, we conducted some internal research within the company and identified two professionals who were willing and able to answer the questions. These individuals were selected based on their expertise in the field and their knowledge of the company's mobile app and how it is used. By interviewing these professionals, we gain valuable insights into the mobile app and its potential for leveraging big data to enhance the customer experience.

We made initial contact with the participants via email (see Appendix 2 for the email invitation) and, after receiving confirmation of their willingness to participate, we sent a follow-up email with details of the proposed date and time for the interview (see Appendix 3 for the interview proposal email). The first interview was conducted on November 29, 2022, and the second interview was conducted on December 9, 2022.

The first interview was through an online meeting using Microsoft Teams, which is the company's software for internal communication. This allowed the interviewee and the interviewer to have a real-time conversation and exchange ideas and thoughts. The first interview lasted approximately one hour

and provided valuable insights into the use of mobile apps and big data within the company. The second interview was through e-mail, where the interviewee answered the questions in written form. This allowed the interviewee to take their time and thoughtfully consider their responses, as well as review their answers before submitting them.

After obtaining the first participant's consent, the audio of the interview was recorded. This allowed us to easily listen to the recording and transcribe the interview at a later time. As Sheppard (2020) suggests, it is often preferable to record interviews and then transcribe them in order to facilitate data analysis.

Once the interview was recorded, we transcribed the audio into a written transcript by listening to the recording and typing out every word that was spoken during the interview. This provided us with a complete written record of the interview, which we could then use for data analysis.

4. Findings

In the following section, we will present the findings of our research, based on the data collected through our interviews with industry experts. These findings will provide insight into the ways in which a retail food company is utilizing big data in its business model and the potential benefits and challenges of incorporating big data into its operations.

The interviews highlighted the potential of big data to transform industries and drive innovation. They suggested that, in the future, big data will be an essential part of the way businesses operate and that it is likely to become a standard part of most companies' business models "*Big data is the future, no doubt about it"* (Interviewee 1).

To gain a clearer understanding of the data collected through our interviews, we created a diagram to visually organize the results. This diagram allowed us to represent the key findings of our research clearly and concisely (see Figure 1).

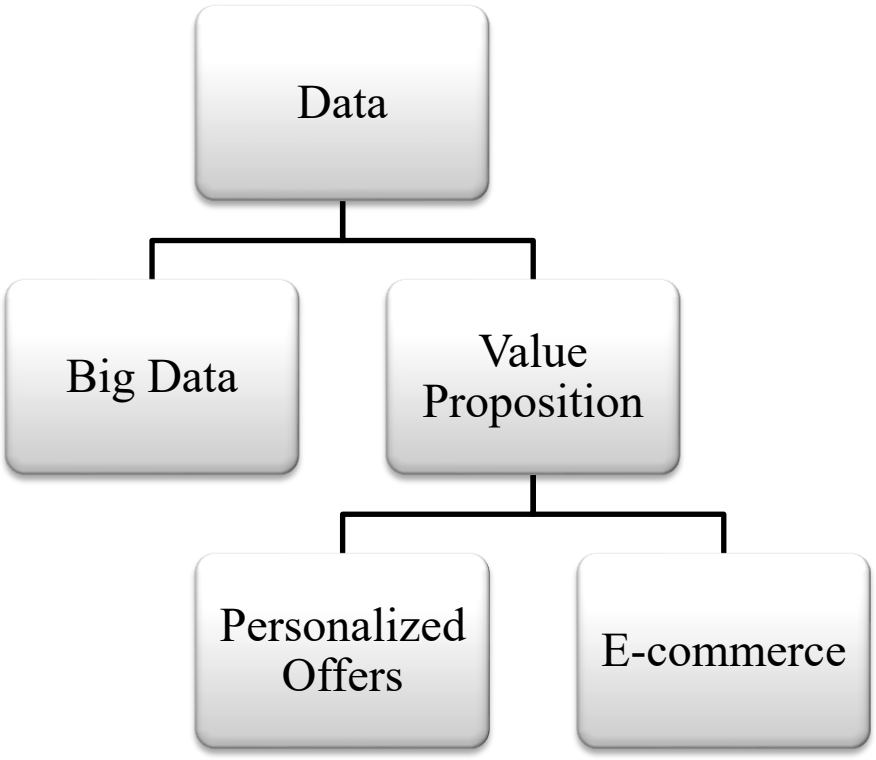

Figure 1 *- Illustration of data collection. Developed by the author.*

4.1. Big data

The company in this thesis uses both external data from the market and internal data from their app to inform their marketing strategies. Additionally, the company deals with a lot of data that is processed in real-time. However, not all of the information collected is deemed valuable enough to be included in their efforts to create personalized offers for customers. The only information that is confirmed by the company is email and phone numbers, as these are the channels through which customers receive a confirmation code to access the app. Other information collected, such as demographic data such as age, gender, name, and address, is not confirmed and is therefore not used in marketing efforts "*People could lie about themselves, and it is not viable to make marketing strategies based on that information*" (Interviewee 2).

The decision to only use confirmed data in the company's business model is motivated by a desire to protect customer's privacy and to comply with data protection regulations "*It is one thing for a database to be tampered with an e-mail or phone, another thing is with an address or NIF*" (Número de Identificação Fiscal / Tax Identification Number) (Interviewee 1). By using only confirmed data, the company can ensure that it is using accurate and reliable information to make business decisions, rather than relying on potentially flawed or misleading data.

The findings of this thesis suggest that the company in question has strong systems and processes in place for collecting and analysing data from both external and internal sources. This suggests that the company is well-equipped to gather a wide range of data from various sources and to effectively analyse this data to gain insights into customer behaviour and preferences.

However, when it comes to using this data to create effective marketing strategies, such as personalized offers for customers, the company appears to be less successful. This is due to the "*limited budget allocated to this type of marketing effort*" (Interviewee 2).

The findings also indicate that the company's annual budget for its app, which is used to deliver customized offers, is only 5%. Given the resources required to create and implement personalized offers, it is not considered cost-effective for the company to pursue this type of marketing strategy "*Making personalized offers is expensive, it takes work. And if it is 5% of the annual budget for the app, it's not worth doing*" (Interviewee 1). This suggests that the

company may be limited in its ability to fully leverage the potential of big data to create personalized offers and drive business growth and success.

The industry experts recognize the growing importance of big data in the retail food industry, and that their company is entering a "*big data era*" (Interviewee 1) in which vast amounts of data are being generated. One of the key challenges identified by the interviewees is the need for people to adapt to this new reality and to think about how to use this data effectively "*Naturally things will tend towards a greater amount of information. It is a problem of changing mindsets*" (Interviewee 1).

4.2. Value Proposition

Currently, the company's app offers discounts on selected products to all customers as its primary value proposition. However, based on the results of the interviews, it appears that there is significant potential for the app to use big data in a more sophisticated and targeted way to enhance its value proposition. By fully utilizing big data, the app could evolve to offer personalized discounts to customers based on their in-store behaviour, rather than offering the same discounts to all customers.

For example, the app could track customers' purchases and use this information to offer targeted discounts on related products. If a customer frequently buys a certain type of snack, the app could offer a discount on a similar product that they have not yet tried "*This personalized approach could help the company build customer loyalty and drive additional sales*" (Interviewee 2). By leveraging the power of big data, the company's app could provide a "*more tailored and convenient shopping experience for customers*" (Interviewee 2).

According to interviewee one, there are three main factors to consider when developing the value proposition of a retail app. The first factor is **price**, with promotions serving as the foundation of the app. The interviewee stated that "*we need to make promotions, it is obviously the gateway of the app, the base of the pyramid.*" The second factor is **differentiation**, with the aim of offering unique products and experiences to customers in order to stand out from competitors. The third factor is **communication**, ensuring that customers are made aware of the products and discounts available through the app "*We could send them e-mails or push notifications through the app to alert the customer of the coupons offered*." By focusing on these three key areas, the company can enhance the value proposition of its app and drive business growth and success.

4.2.1. Personalized Offers

The interviewees acknowledged the potential value of providing personalized offers to customers, recognizing that this approach can be more effective and generate greater value. "*It is much more efficient to make personalized offers and the value generated is also much bigger*" (Interviewee 1). However, they also indicated that the app is not currently able to deliver personalized coupons, with segmentation currently limited to location and purchase history. "*Currently we do not make segmentation based on gender, or age. We only make segmentation based on location criteria, we can make them in two ways: the first is to look at the address and the other way is to look at the favourite store that the clients selected. We also do other segmentation based on your purchase history, for example, if you buy more than X€ in one of our stores you get a 10€ discount*" (Interviewee 1).

It is challenging to create segmented coupons based on digital receipts, as customer preferences may not be accurately reflected in their purchasing behaviour. The company cannot assume anything about their customers based on receipts, as doing so could lead to delivering coupons to the wrong people and losing money. The only way the company can conduct this segmented strategy is through a feature within the app that allows customers to indicate their lifestyles and preferences. Currently, coupons are delivered based on this information, but the response rate remains low, highlighting the need for better communication and awareness of the feature.

The interviewee's concern about communication challenges in relation to personalized offers highlights the potential difficulties that the company may face when trying to deliver personalized marketing messages to its customers. In the case of the company in question, the use of mass media remains a key part of their go-to-market strategies, but this approach is at odds with the concept of segmentation, where customers are divided into smaller groups based on their characteristics or behaviour. The interviewees pointed out that it is difficult to communicate segmented strategies on television, as it goes against established practices in the market. This suggests that companies may need to find alternative ways to deliver personalized offers to their customers in order to effectively reach and engage with them.

4.2.2. E-commerce

It appears that the company's app is not currently leveraging its full potential, likely due to concerns about data security. Even though the company has all of its distributors located in secure facilities within Europe, it remains cautious about sharing information. This hesitation

may be preventing the app from fully utilizing big data to enhance the customer experience. However, the interviewee suggested that the rise of e-commerce will push the company to be more open in this regard. "*E-commerce will force the company to be more open regarding these issues*" (Interviewee 1).

Data security is an important consideration for the company, particularly when it comes to sharing sensitive customer information. If the company is worried about the security of its data, it may be hesitant to share information with third parties or use it in ways that could potentially compromise customer privacy. As a result, "*the app may be limited in its ability to offer personalized discounts or other experiences based on customer data*" (Interviewee 2).

To fully leverage the potential of big data, the company may need to address its concerns about data security and find ways to securely collect and use customer data. This could involve "*implementing strong data protection measures, as well as establishing clear policies and procedures for handling customer data*" (Interviewee 2). By addressing these concerns, the company may be able to fully utilize the power of big data to enhance the customer experience and drive additional sales.

The rise of e-commerce is a significant aspect of the company's business model. In Portugal, this option is not yet available, but the company's main competitors do offer it. The company's strategy in Portugal does not currently involve e-commerce, as it is a complex feature to implement due to logistical challenges. However, when it is introduced, the company plans to take a similar approach to Amazon and initially offer only a limited selection of non-perishable goods.

One way for the company to fully leverage the potential of big data and enhance its value proposition is by connecting the app and the website. By doing so, the company will be able to share data and offer more personalized and customized offers to customers. For example, if a customer purchases wine on the app, the website of the e-commerce could suggest related non-food items, such as a wine decanter, based on the customer's purchase history. This personalized approach would likely be highly valued by customers and could help the company build customer loyalty and drive additional sales. "*This will all be done, and it would be highly valued by the customers, it would create value for them, and increase the company´s value proposition*" (Interviewee 1).

5. Discussion

In this section of this thesis, we will delve into the data collected through the interviews with the industry experts and examine the findings in detail. The analysis will involve breaking down the data into smaller pieces, identifying patterns and trends, and interpreting the results in light of the research objectives and the literature review.

We will focus on the following questions outlined in the introduction:

a. What kind of data is extracted from customers in the app to plan online marketing strategies?
b. Why is it important to analyse big data to create better online marketing strategies?
c. How can the retail industry benefit from adding big data in their apps?

Through our interviews and analysis of the company's app, we have gained valuable insights into the role of big data in mobile app marketing strategies. In the following discussion, we will explore the data extracted from customers and the significance of this data for creating effective marketing strategies. We will also consider the potential benefits of incorporating big data into retail industry apps.

Once the analysis is complete, we will explain the significance of the results and how they contribute to our understanding of the topic. This will involve discussing the implications of the findings for the company and its mobile app, as well as their broader relevance for the field of this thesis. By providing this interpretation of the results, we will be able to highlight the key takeaways from the thesis and the importance of these findings for future research and practice.

What kind of data is extracted from customers in the app to plan online marketing strategies?

From the literature review, we saw that big data can be characterized by three *v*′s: volume, variety, and velocity (Marr, 2016; Chen, Chiang, and Storey, 2012; Wedel and Kannan, 2016; Beyer, 2011) and a few authors merge one more *v*: veracity (Goes, 2014; Schroeck et al., 2012).

Our findings confirm that the company in the study uses a large amount of data, indicating a high volume. Additionally, the data is processed and used in real time, indicating a high velocity. Finally, the interviewees also showed us that the company can analyse and transform its data into value, in accordance with the findings from the literature review where Mauro, Greco, and Grimaldi (2015) suggested that big data is transforming data into value

The company in question places a high value on the accuracy of its data and therefore limits the variety of data it collects and uses. This means that the company only collects and uses data that is confident, dependable, and accurate, rather than seeking out a wide range of data variety, such as demographic data. By limiting the variety of data, the company is able to ensure that the data it uses is of high quality and can be trusted to inform business decisions.

However, this approach also has some potential drawbacks. By limiting the variety of data, the company may be missing out on potential insights and opportunities that could be gained from a wider range of data. For instance, by only examining a narrow range of data variety, the company may be missing patterns or trends that could be important for its business. If the company is not considering a diverse range of data, it may be overlooking valuable insights that could inform its decision-making and identify new opportunities.

According to Zanon, Dutra da Rocha, and Manzato (2022), when the data being analysed is highly diverse, the accuracy may be reduced. This is because the more diverse the data, the more uncertain the data may become about their relevance, and the higher the probability that the data will be irrelevant. In other words, when there is a lot of diversity in the data, it may be more difficult to accurately predict what the user will find relevant and useful.

It is important for the company to carefully consider the potential benefits and drawbacks of its data collection and use strategies and to strike a balance between accuracy and diversity (Zanon, Dutra da Rocha, and Manzato, 2022). While the accuracy of its data is certainly important, the company should also consider the potential value of a wider range of data in informing its business decisions and identifying new opportunities.

Why is important to analyse big data to create better online marketing strategies?

The company in the study demonstrates that it is capable of collecting and analysing large amounts of data, which aligns with the characteristics of big data described in the literature. However, in order to maintain a prominent level of veracity, the company limits the variety of data it collects and uses, limiting its ability to fully leverage the potential of big data. This is reflected in the company's value creation, delivery, and capture processes, proposed by Zott, Amit, and Massa (2011).

Regarding value creation, Lepak, Smith, and Taylor (2007) described it as the product or service available to potential users. The company analysed in this study creates value for its customers through the app, offering numerous benefits and features. However, due to the company's

limitations, the value offered is limited. If the app were to make full use of big data, it would be able to offer greater value to customers.

Regarding value delivery, Aversa et al. (2015) suggested that it is about delivering value to clients. The company is also able to deliver value to customers, but its approach to communication presents challenges. The company uses mass media to reach all customers, rather than segmented strategies for personalized offers.

The use of big data for personalized offers is challenging for the company, which makes it difficult for the company to realize the value that it is offering to its clients. In contrast, the company is more successful in capturing value when it comes to marketing to a broad audience. Overall, the company's limited use of big data hinders its ability to create, deliver, and benefit from personalized offers.

How can the retail industry benefit from adding big data to its apps?

In the literature, we saw that big data can help businesses anticipate risk and have better projections of customer behaviour for several industries, such as retail (Soudagar, 2013). We also gave some examples such as Walmart, Netflix, British Airways, Amazon, and Kroger which use big data in their business models to create better and more efficient personalized offers in the app to users (Panchal, 2021; Shankar, 2019).

Additionally, we saw that e-commerce was also a notable feature to include in business models (Malhotra, 2022). Also, after the COVID-19 pandemic, 17,8% of retail sales worldwide were made in-app through e-commerce (Coppola, 2022).

The use of big data in the retail industry has the potential to bring numerous benefits, such as enhanced customer experience and increased value delivered to customers. However, as the company in this thesis illustrates, implementing personalized offers using big data can be challenging due to communication and investment limitations. This suggests that the use of big data may not be feasible for all companies in the food retail industry, particularly those that are not data-driven or less developed in terms of technology.

To fully leverage the benefits of big data, the company may need to consider expanding the range of data that it collects and investing in technology and communication strategies to support personalized offers. This could help to improve the company's value proposition and enhance the customer experience through its app. By collecting more diverse data, the company may be able to gain a more comprehensive understanding of its customers and create more

accurate personalized offers. Additionally, investing in technology and communication strategies could help the company to effectively analyse and utilize the data it collects, as well as communicate personalized offers to customers in a targeted and effective manner. Overall, these efforts could help the company to better capture value from its value creation and delivery efforts and improve the customer experience.

In conclusion, big data is an important aspect of the business model for the retail industry and can help companies anticipate risk and have better projections of customer behaviour. However, the company in this thesis has not yet fully utilized the potential of big data in its app, which limits its ability to deliver personalized offers to customers. Additionally, the company's communication strategies for personalized offers are limited by their reliance on mass media.

To fully benefit from using big data in their app, the company will need to invest in technology and data-driven strategies, such as expanding the range of data that the company collects, as well as investing in tools and resources to effectively analyse and utilize this data. By doing so, the company may be able to create more accurate and relevant personalized offers, which could help to improve the customer experience and capture value for the company.

As the retail industry continues to evolve and the use of e-commerce grows, it will become increasingly important for companies to incorporate big data into their business models in order to deliver value to customers and capture value for themselves. By using big data effectively, companies can anticipate customer needs and preferences, and tailor their products and services accordingly. This can help to differentiate them from competitors and drive growth and success in a highly competitive market

6. Conclusions and limitations

6.1 Conclusions

This qualitative research aimed to understand the potential of mobile apps in order to deliver value and increase the company´s value proposition, with the help of big data. As such, the research question "*How can mobile apps create, deliver and capture value with the help of big data*?" was explored by a combination of secondary and primary data.

We conclude that mobile apps can leverage the power of big data to create, deliver, and capture value in several ways. By collecting a wide variety of data and investing in technology and communication strategies that support personalized offers, companies can enhance their value proposition and improve the customer experience. Big data can also help companies anticipate risk and have better projections of customer behaviour, enabling them to make more informed decisions and take advantage of new opportunities.

However, it is important to note that despite the potential benefits of using big data in the retail industry, the company in this thesis faces challenges in implementing personalized offers due to communication and investment limitations. This suggests that the use of big data in business models may not be feasible for all companies in the food retail industry, particularly those that are not data-driven and less developed in terms of technology. As the retail industry continues to evolve and the use of e-commerce grows, it will become increasingly important for companies to incorporate big data into their business models in order to remain competitive and deliver value to customers. By doing so, they can capture value for themselves and create a more sustainable and profitable business model.

Businesses that want to take advantage of big data and mobile apps to improve their business model should first carefully consider their potential and investment limitations. It is crucial for companies to determine whether they are data-driven and capable of collecting data variety from internal and external sources. This data can be leveraged intelligently and effectively by having qualified experts on the topic, although this may require a significant investment.

One area where big data can be particularly useful is in e-commerce, as it can increase the value proposition for customers. By combining mobile app data with e-commerce data, businesses can offer highly personalized offers and experiences to customers based on their preferences and behaviour. This personalized approach can help businesses build customer loyalty and increase their overall value.

This thesis provides insights into the potential of mobile apps in business models with the help of big data, specifically through the lens of a large retail food company operating in Portugal. These findings can serve as a starting point for future research on the topic in different retail food companies operating in Portugal. It is important for businesses to understand the potential of big data and mobile apps in order to effectively utilize them and create value for customers. By understanding their capabilities and limitations, businesses can make informed decisions about how to best incorporate these technologies into their operations and achieve their goals.

6.2 Limitations

As with any research project, this study has some limitations, that are significant and should be taken into consideration when interpreting the results and conclusions of this thesis. In the following section, we will outline and discuss the various limitations of this thesis in order to provide a more complete understanding of the context in which the research was conducted and the potential limitations of the findings.

One of the most pressing limitations is the restricted time frame in which the research was conducted. With the time available to complete the study, it was not possible to fully explore the topic or to conduct a larger number of interviews. This restricted the scope of the thesis and limited the insights that could be gained.

This thesis was not limited by the number of interviews that were conducted. However, it would be remarkably interesting to analyse any differences or discrepancies that exist in the different countries where the company operates. To do this, we would need to conduct more interviews, with at least one person from each country, even if it takes more time. This analysis would have been beneficial because it would have given us a broader and more nuanced understanding of the topic, and it would have allowed us to gain a deeper understanding of the issues at hand.

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Appendix

Appendix I: List of questions in the interview

Research Questions	Fundamental Questions	Support Question
What kind of data is extracted from customers in the app to plan online marketing strategies?	2	3
Why is important to analyse big data to create better online marketing strategies?	4, 6	5
How can the retail industry benefit from adding big data in their apps?	8	7,1

	Interview Questions
1	What is the value proposition of your company´s app?
2	Does your company use data for marketing strategies within the app? If yes, what sort of data do you use? (Data from within your organization or are you taking data from external sources/buying), or a combination?). And what kind of data is extracted from customers? (location, receipts, gender, age…)
3	What do you think are the challenges in collecting data and in understanding data? (Privacy, security, analytical skill, data quality)
4	What is the value generated by including big data in mobile apps in order to make more personalized offers to customers?
5	Do you think your company´s app is using all its potential to collect data?
6	Are the coupons/promotions delivered to the customer in your company´s app, personalized for their needs using big data? If not, are you considering it in the future?
7	Do you suggest any development in the app regarding big data? Do you think that the app is missing some important items for clients? (e-commerce, wallet to put the card, add NIF automatically…)
8	Do you think that, if the app was using all potential of big data, your company´s app value proposition would have changed?

Appendix II: Email invitation

Dear [Name],

I hope this email finds you well. My name is Inês Ludovico, and I am currently completing my master's degree in Management at Católica Lisbon School of Business and Economics. As part of my program, I am conducting a thesis on the use of big data and mobile apps in marketing strategies, and I am reaching out to you as a potential participant in my research.

As you may be aware, big data has become an increasingly valuable tool for businesses in recent years. By analysing large sets of data, companies can gain valuable insights into market trends, consumer behaviours, and other key factors that can help them improve their operations and better serve their customers. In particular, the use of mobile apps has emerged as a powerful way for companies to engage with consumers, conduct targeted marketing campaigns, and increase brand awareness.

For my thesis, I am exploring the following research question: "**How can mobile apps create, deliver, and capture value with the help of big data?"** To answer this question, I am conducting a comparison of the use of mobile apps and big data in different countries within the same company. I believe that this research is relevant, given the growing importance of mobile apps in the business world and the potential benefits of using big data to improve marketing efforts.

I am writing to ask if you would be willing to participate in an interview as part of my thesis. The interview will be conducted via Microsoft Teams.

Thank you very much in advance. Looking forward to having your feedback.

Any questions you might have, just let me know.

Best regards,

Inês Ludovico

Appendix III: Interview proposal email

Dear [Name],

I hope this email finds you well. Thank you so much for your kind and fast answer.

I invite you to participate in an interview, which will take place via Microsoft Teams on November 29, 2022. The interview will last approximately 45 minutes and will be recorded for transcription and analysis purposes.

I understand that your time is valuable, and I appreciate your willingness to contribute to my research. If you have any questions or concerns, please do not hesitate to contact me.

I look forward to your response.

Best regards,

Inês Ludovico