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Helena Albuquerque¹ [0000-0003-3064-1514] Makhabbat Ramazanova² [0000-0001-8451-4823]
Isabel Borges³ [0000-0003-4183-475] Fátima Matos Silva⁴ [0000-0002-1740-586X] Jorge Marques⁵
[0000-0001-5392-5128]

¹ REMIT-UPT; GOVCOPP - Universidade Portucalense Infante D. Henrique, Rua Dr. António Bernardino de Almeida, 541, 4200-072 Porto, Portugal

² REMIT-UPT - Universidade Portucalense Infante D. Henrique, Rua Dr. António Bernardino de Almeida, 541, 4200-072 Porto, Portugal

³ REMIT-UPT; CEGOT - Centro de Investigação, Desenvolvimento e Inovação do Instituto de Estudos Superiores de Fafe (CIDI-IESF) - Instituto de Estudos Superiores de Fafe, Rua Universitária - Medelo, Apartado 178, 4824-909 Fafe, Portugal

⁴ REMIT-UPT; CITCEM-FLUP - Universidade Portucalense Infante D. Henrique, Rua Dr. António Bernardino de Almeida, 541, 4200-072 Porto, Portugal

⁵ REMIT-UPT; CEGOT – Universidade Portucalense Infante D. Henrique, Rua Dr. António Bernardino de Almeida, 541, 4200-072 Porto, Portugal.

helenaa@upt.pt; ramazanova@upt.pt; isabelborges@iesfafe.pt;
mfms@upt.pt; jorgem@upt.pt

Abstract. The purpose of this paper is to analyse the consumer behaviour regarding the use of online food delivery apps during Covid-19 sanitary restrictions in Portugal. The study explores the behaviour of consumers towards digital food ordering and delivery services, and its impact in the restaurant industry.

An online survey was applied, via email and social networks, for a period of 6 months. The questions were based mainly on consumers post-purchase behaviour and perceptions when using online food delivery apps during Covid-19 sanitary restriction in Portugal. In total, 258 valid responses were collected. The data was analysed using Microsoft Excel software.

Findings suggest that lockdown, social distancing, and restrictions imposed to many activities, such as restaurants, lead to an increased use of FDA. Most respondents consider this increased use of FDA helped to maintain the activity of the food industry, and therefore to save many job positions at the restaurants.

This research contributes to a better understanding of consumers behaviour towards the use of FDA and can provide a strategic contribution to restaurant managers and owners.

Keywords: Restaurants; Online Food Delivery (OFD); Food Delivery App (FDA); Consumer Behaviour; Covid-19.

1 Introduction

In the past, the hospitality industry has been slow to uptake new technologies, but with the Covid-19 many restaurants have looked at different forms of digitizing parts of their operations. In fact, technological advances have shaped how human beings live in a society and how their experiences are shaped by the environment [4]. With so many possibilities available online, consumers are accepting new technologies that can help to make life easier.

However, deciding on what technology to implement or the type of app to be a part of, is something to take into consideration. Sometimes with fewer resources and lack of skills to adapt to new and more digitized processes, they needed to adapt automation, to do more with less and be as efficient as possible, concerning the rapid developing of Covid-19 crisis.

The pandemic outbreak had a severe impact on daily activities. Because of the high rate of community transmission and the lack of effective timely developed vaccine, most countries had to apply nonpharmaceutical interventions (NPI), such as lockdown, social distancing, closure of schools and universities and non-essential activities, cancelling or postponing events and severe restrictions on gatherings of people [6, 13, 15, 19]. The restaurant industry was particularly affected by Covid-19. The foodservice industry is highly vulnerable to epidemic crises, as it relies on human interaction and gatherings. However, this scenario turned out to had different impacts on restaurants, depending on the type of service. At least, on an initial phase of the Covid-19 crisis. While fast food, take-away and home delivery restaurants were already organized to work in this context, full-service restaurants found it more difficult to adapt [23]. In fact, as stated by [23], limited physical contact in fast-food service may lead consumers to perceive less risk at these restaurants; on the contrary, the necessity to complete the full-service cycle at full-service restaurants may increase consumer's risk perception and their reluctance to attend these restaurants.

To offset the impact of the pandemic, many full-service restaurant managers and owners had to work on alternative off-premises models, such as take away, drive thru and food delivery [23]. Technology advances and, particularly, the development of online food delivery (OFD) and food delivery apps (FDA) were of a strategic importance to help restaurants to face the difficult times imposed by Covid-19.

This paper aims to analyse the perspectives of consumers when using FDA. After a literature review, it addresses the methodological approach in section 3 and concludes with discussion of results and conclusions in sections 4 and 5.

2 Literature review and contextualization

Food delivery applications (FDA) are mobile apps used to order food from food-aggregator platforms. These applications are a subset of online food delivery (OFD) platforms, which include both restaurant-to-consumer delivery and food-ordering platforms (aggregator-to-consumer delivery). Together they are the so called online-to-offline (O2O) services [12]. Its popularity is increasing worldwide, with Statista [20] projecting the revenue from this segment to grow globally at 9.8% from 2019 to 2024.

Although existing in the past, due to these changes, digital platforms have been developed to customize the needs of consumers and to help to boost the restaurant industry during this pandemic crisis. Convenience is certainly one of the strongest motives for consumers to intensify their relationships with any service platform [5, 18].

Food delivery apps serve nowadays as the mediator, connecting people to food [2] allowing consumers to order different meals from their favorite restaurants.

Online food delivery applications have become immensely popular, changing family system and lifestyle, or fulfilling the lack of time to prepare food at home [16]. In fact, customers' comfort and safety are an important issue in this system: ordering food through mobile applications helps in time saving, different options to buy, discounts from sellers, compare costs, avoid travelling distances, door delivery and assured quality [7]. The online buying decision of customers is influenced by issues like easy payment, availability of different choices, time saving and convenience in ordering the food [10]. On the other hand, the restaurants' websites and applications are customized. When it comes to the service, there are few disadvantages like the lack of face-to-face interaction or the difficulty to replace facilities in case of bad taste or spoilage of food [7]. But during a sanitary crisis, when customers are not allowed to enjoy restaurants it's an important economical possibility to have more orders, to increase in sales of customer database and even to retain or get more customers.

Although in recent years there has been an increase in the study of topics related to consumer behavior in relation to FDA and OFD, scientific research in this area is still scarce. Existing literature focuses mainly on consumer behavior toward online products and services in general; few studies address consumer attitudes and intentions toward online food delivery [12]. Other topics identified in literature include the influence of value systems on the decision to order from O2O food delivery services [17], the impact of e-service and food quality on customer loyalty toward OFDs [21], the effect of drone food delivery on intentions [9], the influence of traffic conditions on significant performance indicators of OFDs [3], and evolutionary food quality [8]. [22] studied consumer attitudes and behavioral intentions toward OFD services relying on information-system theories of technology acceptance, while [11] worked on the technology-adoption model to investigate consumers' decision-making while ordering food products through O2O commerce. [1] have also adopted the technology acceptance model to explore factors affecting the attitudes of Internet users toward OFDs. According to [14], the unified theory of acceptance and use of technology (UTAUT) has been used to investigate psychological factors that impact the use of mobile apps for ordering food online.

Nowadays, many consumers are making use of digital food delivery applications (FDA), such as Zomato, Uber Eats, Glovo or NoMenu, among others. These drivers have completely changed the delivery process. However, more research on this field is required to better understand how consumers perceive these services.

In this context, this article intends to contribute to the enrichment of the literature in this area, helping to better understand the behavior of users of food delivery applications.

3 Method and Data Collection

The methodology followed in this investigation was based on primary and secondary data sources.

The primary data was obtained through an online survey, developed in Google's search management application called Google Forms. The questionnaire was made by the authors, based on the literature review previously performed. However, because it is a recent topic, little literature was found through which it was possible to adapt a pre-existing questionnaire, so it was necessary to use the knowledge and experience of the authors in these subjects to conceive it.

The survey consists of several questions regarding the consumers post-purchase behaviour in relation to the use of online food delivery apps during Covid-19 sanitary restriction in Portugal.

The sample was selected using the snowball sampling technique, a non-probabilistic sampling technique, in which the individuals selected invite new participants from their network of friends and connections.

The survey was shared online, via email and social networks, for a period of 6 months. In total, 258 responses were obtained, being all of them considered valid.

The data obtained was analysed using Microsoft excel software to create tables, figures, and graphics.

Secondary data were obtained through the literature review of scientific articles made available on various platforms, where the articles were selected according to the relevance of the title, abstract and keywords.

4 Results

4.1 Profile of the respondents

The socio-demographic profile of the respondents is represented in the Fig. 1. The data shows that most of the respondents are Portuguese (93%), and that the percentage of female and male respondents is very similar (52.7% female and 47.3% male). Approximately half of the respondents are aged between 25 and 44 years (49.2%), with the other half of the sample being divided between the age groups of 18 to 24 years and 45 to 64 years. Concerning marriage status, approximately 43% are single and 42% are married. There is a small part of the sample that refers that they are divorced.

It can also be seen that over 26% of the sample have a monthly income of between 1001 and 1500 euros and 22.5% have a monthly income of between 1501 and 3000 euros. However, nearly 20% of the respondents have between EUR 601 and EUR 1000 and 16.7% have no income at all. This is not surprising, given that almost 20% of the respondents are students. Furthermore, most of the respondents work in the private sector (33%) and around 26% work in the public sector.



Fig. 1. Profile of the respondents.

4.2 The use of food delivery applications

The respondents were questioned about installation period of the apps, reasons, advantages, as well as their perceptions about the usage of such apps in supporting local restaurant businesses during pandemic. About 52% of respondents said they use online food delivery apps; of these, about 68% said they were using the applications before March 2020.

Further, we attempted to understand the frequency of app usage by consumers before and after the pandemic to compare differences in consumption behaviour. As shown in Fig. 2. 54-57% of respondents used apps less than once a week before and after the pandemic, with 26-27% using apps once a week.

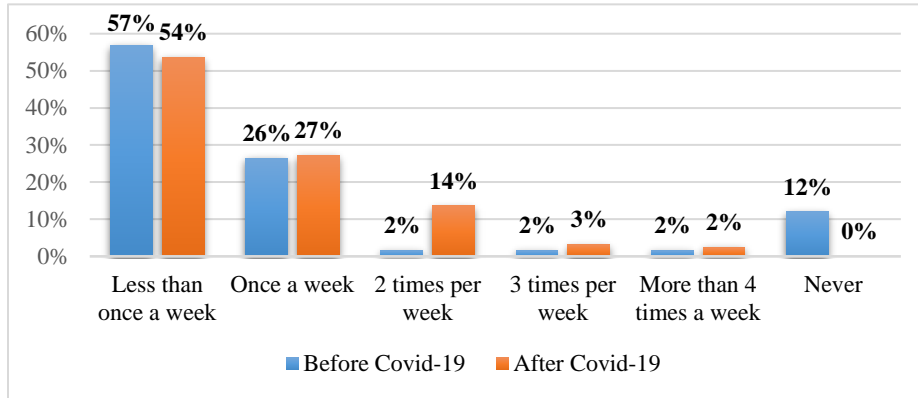


Fig. 2. Frequency of app usage by consumers before and after the pandemic.

However, among those who indicated more frequent use 2-3 times a week, there was a slight increase in post-pandemic usage. Interestingly, 12% of consumers pointed out they had never used FDAs before Covid-19, but in the case of the post-pandemic period this option was not selected.

The various reasons behind the installation and usage of FDAs can be seen in Fig. 3: 36% are related to Covid-19 restrictions, 30% to own curiosity, 27% to restaurant closures, 22% to suggestions from friends, 21% to help local restaurants and their businesses. Among other reasons convenience and functionality, accessibility, promotions, home delivery facilities, saving time at lunch, ease of receiving goods without effort and without wasting time, avoiding food waste, willingness to have a meal at home, laziness to go to the restaurant or distance should be pointed out.

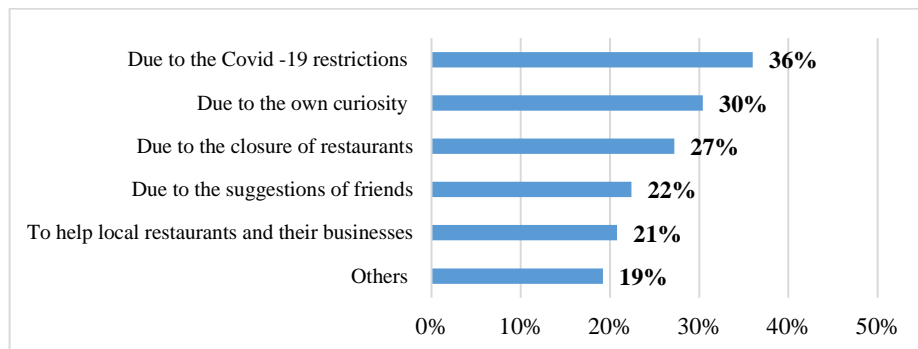


Fig. 3. Reason of installing FDAs.

The recent growth and rapid spread of online food delivery apps around the world and their differences between countries has led to the question related to the types of apps used by consumers in Portugal. As results demonstrate UberEATS (86%) and

Glovo (43%) are the most used online food delivery apps among respondents, followed by NoMenu (21%), Takeaway.com (5%), Comer em Casa (4%) and Bolt (4%). In addition, consumers named other food delivery apps such as Move, Send Eat, Deliveroo, To good to go and others (Fig. 4).

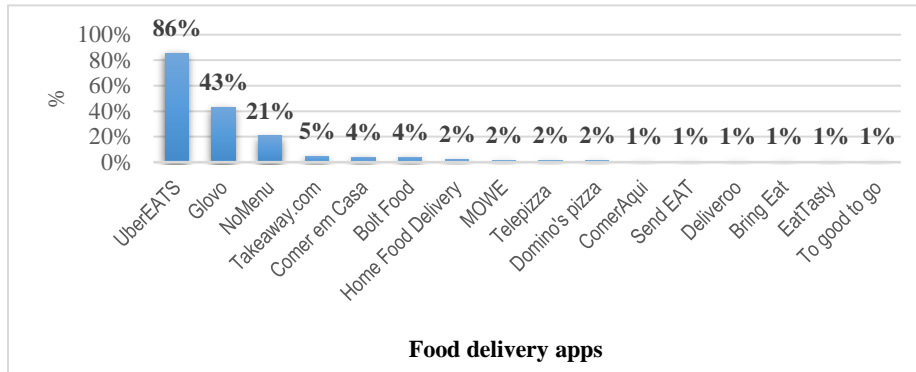


Fig. 4. Mobile applications used for food delivery service.

Considering a service diversification provided by the food industry, it was of interest of researchers to question the respondents about their preference related to two group of applications such as Food delivery apps and Take-away apps. Most consumers prefer online food delivery apps (84%), which can be explained by the changes in consumer behaviour and more cautious consumption habits in service sector, caused by the impacts of the pandemic [24].

Additionally, the respondents were asked about the reasons of using online apps for food delivery instead of traditional take away services (Fig. 5). No desire for cooking is the predominant option selected by the consumers (66%), followed by gaining time (53%), avoiding contact with other people (43%), diversity of restaurants (34%), promotions (30%) among other reasons related to not being able to circulate, comfort and functionality, helping local restaurants in time of pandemic, sustainability, distance, or displacement. Under the COVID-19 pandemic situation understanding consumers reasons to use FDAs continuously is essential for restaurant businesses to provide the services according to their expectations.

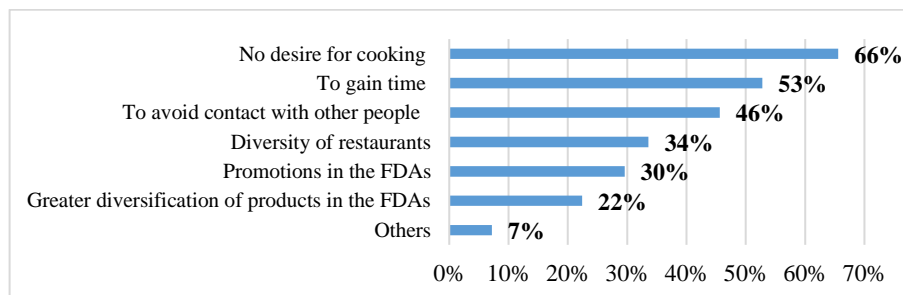


Fig. 5. Reasons to prefer using FDAs instead of using the take-away services.

Unexpected coronavirus pandemic (COVID-19) emerging in March 2020 in Portugal has had a significant negative impact on many economic sectors, including tourism and restaurant businesses. In this context, different statements were placed to the consumers to analyse their perceptions on the role of the online food deliver apps as a mitigation tools of economic impacts caused by sanitary crisis. The consumer perceptions were evaluated by using the variables scored on a Likert scale from 1 to 5. The given responses were placed and analysed below in Table 1.

Table 1. Consumer perceptions towards the use of FD apps during Covid-19.

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Since 2020 March / Pandemic I use more the FDA	2%	0%	4%	17%	78%
The FDA were/are very useful during Covid-19	1%	2%	7%	15%	75%
I usually order from the food providers that I knew before Covid-19	2%	6%	17%	38%	36%
FDA's helped me get food from my favourite restaurants	2%	3%	22%	47%	25%
The increase in use of FDA saved many job positions at the restaurants	0%	6%	29%	35%	30%
Using FDA encouraged me to go to the local restaurants from where I have ordered food, after the end of pandemic	8%	7%	32%	37%	16%
FDA's substituted the visits to the restaurants	11%	13%	26%	21%	29%
I have used FDA to support the local restaurant businesses during crisis time	9%	14%	29%	26%	22%
I have only thought about my willingness and need to order the food	11%	18%	32%	17%	22%
Ordering favorite meal using FDA contribute to better environment at the house (joining with the family)	16%	12%	37%	22%	13%
I encourage my family and friends to use the FDA to support the local restaurant businesses	14%	22%	35%	21%	8%
I try every time a new restaurant when I order through FDA	23%	41%	24%	8%	4%

Through the analysis of this table, it should be noted that the level of agreement of respondents was highest (78%) for the aspects related to usage of the apps since 2020 March, indicating the consumers use more the FDA's since facing pandemic situation, while 75% stated the FDA's were very useful during the pandemic. An interesting aspect to note is that the consumers usually order from the food providers that they knew before Covid-19 (74% - agree and strongly agree), meaning that food delivery apps did not impact on restaurant preferences. Moreover 72% referred that the FDA's helped to get food from their favourite restaurants. This finding can be supported by another question about whether consumers try a new restaurant each time they order through

the FDA, where 41% showed a level of disagreement, with 23% strongly disagreeing with the mentioned statement.

It is also interesting to notice that most of the respondents consider that using FDAs encourage them to go to local restaurants from where they have ordered food after the end of pandemic.

It has already been acknowledged an opportunity provided by the rise and increasing demand for Food delivery sector for many types of direct and indirect employment such as restaurants, delivery people, online platform developers, transportation industries, food package companies among others. In this sense, it is important to stress the awareness of consumers regarding the negative impacts of the pandemic on restaurant businesses and their willingness to support local restaurant business during crisis time. "I have used FDAs in order to support the local restaurant businesses during crisis time - 48%; The increase in use of FDAs saved many job positions at the restaurants - 65%". Also, it is possible to conclude that the questions more related to personal aspects, such as willingness and need to order food, or contribute to a better environment at the house were not so relevant for the respondents, with the majority stating that they neither agree nor disagree with these aspects. In the same way, it was also not possible to conclude that respondents are able to encourage family and friends to use FDAs to support the local restaurant businesses.

5 Discussion and final ideas

A technically developed online food ordering system has changed the restaurant's culture drastically, creating a paradigm change in this industry. In the past, customers came to the restaurant and adapted to its offer and service conditions. Today, it is the restaurant that captures customers and adapts its offer to their preferences. It is a revolutionary approach providing a set of food choices to the online consumer.

The transformation of the restaurant in the digital era means that the restaurant must look for customers (in the digital universe), attract them, win them over and adapt the offer and service to their preferences. With a single click of a mouse or just touching the screen of their handsets or mobile devices consumers can easily choose and track their orders.

This is where technological tools play a leading role, firstly allowing direct connection with customers through digital channels, and secondly, more efficient management of all internal business processes to achieve excellence and customer loyalty. Nowadays it is necessary to be where the customers are and generate digital content that they are passionate about and constantly attract them to the restaurant. Social networks, specialised portals and apps allow restaurant businesses to become part of consumers' lifestyles. In this sense, competition is fierce, so it is essential to have digital interaction strategies that keep the customer seduced most of the time by the restaurant's brand image.

Online food delivery has its pros and cons, but it's a fact that connects the consumer and restaurants through web or mobile applications offering restaurants and delivery

system reasons for evolution and helping customers to order and enjoy food more conveniently and in less time.

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