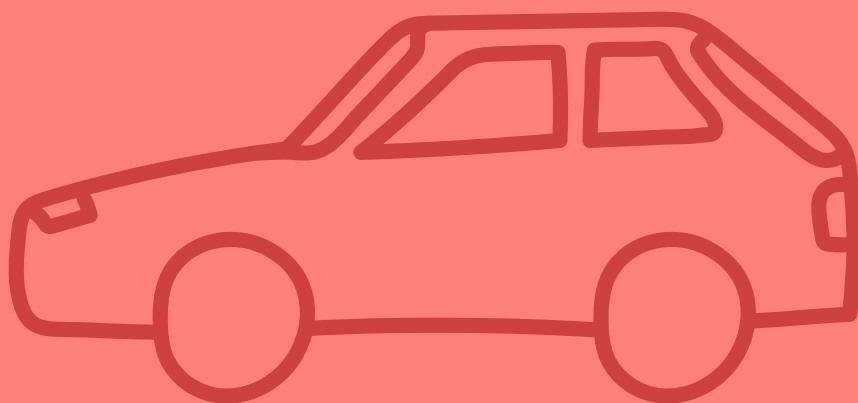




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THE RISE OF FOOD DELIVERY AND RIDE-HAILING MOBILE APPS: THE CASE OF SERBIA



THE RISE OF FOOD DELIVERY AND RIDE-HAILING MOBILE APPS:

THE CASE OF SERBIA

Authors

This study was produced by a Public Policy Research Centre team comprised of Branka Anđelković, Tanja Jakobi, and Ljubivoje Radonjić, with help from the opinion polling agency Smart Research Plus **SMART+** RESEARCH which conducted a nationwide survey of a sample of food delivery and ride hailing app users. Our thanks go out to Jovana Dukić Vasić, Head of Research at Smart Research Plus, for providing invaluable insights into the data collected in the poll. We are also grateful to our colleague Vladan Ivanović, who proved an observant reader and editor, for his contribution to the final version of the text.

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INTRODUCTION

Mobile apps, as a specific product of innovation have emerged in various fields, including the purchase of diverse product and service categories, such as food, accommodation, real estate, ride-hailing or car rentals. Approximately 204 billion mobile apps downloads worldwide were identified in 2019 (Statista, 2020). They are entering into daily lives of hundreds of millions of consumers, changing behaviour patterns and starting new trends, and as of recently also showing a high level of flexibility in the conditions imposed by COVID-19 pandemic.

Among mobile apps, the ones for food delivery and ride-hailing are exponentially gaining in popularity globally as well as in Serbia. The notable trends that contributed to this transformation are the changed habits and priorities of people living ever faster lives and their need to save time. The emergence of food delivery apps (FDA) and ride hailing mobile apps (RHA) has to do with the nature of urban consumers' behaviour. These consumers use food delivery services for various reasons, most often due to the need to have a quick and adequate meal during or after a long workday. As for RHA, its affordability and easy-to-use system are the key determinants for the popularity of this service. The general and available statistical data indicate that online food ordering is the most popular among the younger population (as many as 58% of the total number of consumers are young people under 35), and that this form of technology is globally used by men and women equally. It is particularly interesting that 41% of the consumers are persons with low personal income (Statista, 2020).

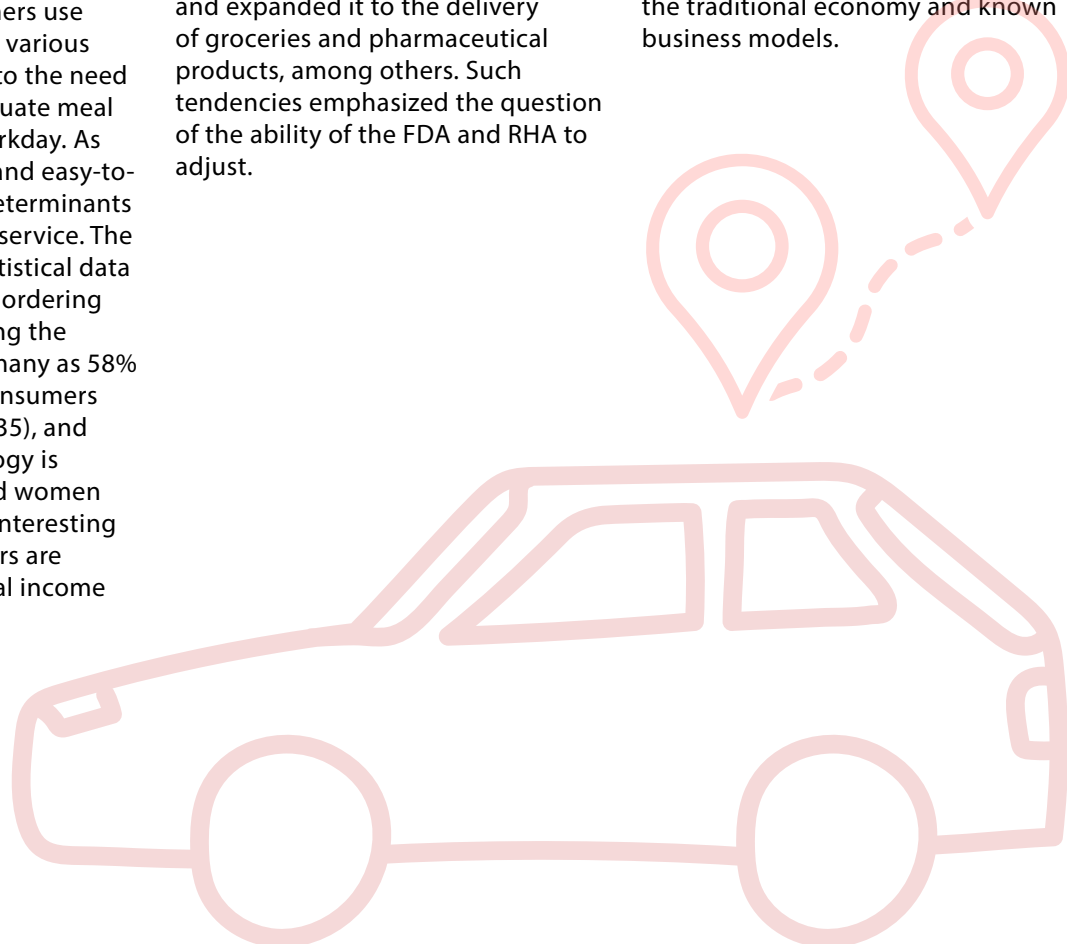
The online food delivery market has been evolving due to the impact of global COVID-19 pandemics over the last couple of months. The lockdown(s) forced the consumers to avoid restaurants and search for food delivery services on the online platforms. The pandemics resulted in rise of orders over the mobile apps and the Internet in general, at the same time posing logistic challenges on the companies in the industry. Investment in protocols and equipment for food delivery has, largely, defined the level of exploitation of the potential for growth during the crisis. The pandemic also influenced RHA requiring new modus operandi aimed at higher protection of both drivers and passengers.

COVID-19 outbreak certainly raised questions about the scopes and perspectives of food delivery and ride-hailing apps, as well as the possibilities for further growth of this aspect of the economy. The circumstances that the coronavirus induced reshaped the app economy and expanded it to the delivery of groceries and pharmaceutical products, among others. Such tendencies emphasized the question of the ability of the FDA and RHA to adjust.

Research on FDA and RHA in Serbia was triggered by the need to examine current state of play, key characteristics, and the future potential from the perspective of the Serbian market.

The aim of the study

The main objective of the analysis is to identify and describe the scope of the mobile app-based businesses in Serbia, focusing on the FDA and RHA from a consumer standpoint. Starting from the national representative survey, this analysis assesses demographics of FDA and RHA customers, their habits and preferences for using mobile apps. It also in more detail explores spatial distribution of the users of FDA mobile apps and estimates the market value of the leading online food delivery businesses in Serbia. The analysis further investigates the RHA as a raising app-based business model in the country. These fast-growing companies, as part of platform economy, are spreading like wildfire, disrupting the traditional economy and known business models.



CHAPTER 1.

Conceptual framework

The digital era has shown a great potential to drastically transform our well-known social relationships and models of behaviour, as well as the way in which the economy works and develops. Related to that, the dispersion of digital platforms drastically reshaped a wide range of socio-economic patterns, such as consumption, communication, and work style. By investigating phenomena such as ways in which digital platforms disrupt industries and shape everyday life, the digital platform discourse research can provide a portion of knowledge for a better understanding of further platform economy development path (de Reuver, Sørensen, & Basole, 2018).

Literature recognizes rather varied methodological approaches to identifying the concept of the platform economy. This aspect of economy is frequently labelled as “the sharing economy”, “the gig economy”, or “the peer economy”. Despite the difficulties in defining it, the platform economy is emerging as a technologically driven and technology-dependent development that shapes work, institutions, organizations, value chains, and business models (Poutanen & Kovalainen, 2017).

Essentially, the platform business model can be described as a manner on which a network of participants cooperates in creating and capturing value from technological innovation (Chesbrough, 2003). Platforms are generally described as “two-sided” and/or “multi-sided” online markets which facilitate transactions or, at the minimum, interactions between numerous independent groups, in which at least one but usually all of them benefit directly or indirectly from having a growing number of users on the other side(s) (Hagiu & Wright, 2015; Martens, 2019). This intermediation channel can lower search costs for all the participants, and improve the match between

agents at different ends of the exchange, enabling value-creating in the interaction process. (Parker, Van Alstyne & Choudary 2016; Duch-Brown, 2017).

Täuscher (2016) describes the complexity of platform economy in four main characteristics. First, he notes that independent groups on the supply and demand-side are being connected via the platform. Second, both sides enter into direct interactions with each other to initiate and realize a transaction, but these interactions go beyond the highly automated processes in electronic commodity trading or stock markets. Third, the platform provides an open, participative institutional and regulatory infrastructure for these interactions and sets governance conditions for them (Takagi, 2020). Fourth, the digital marketplace does not substantially produce or trade goods or services itself. Further, El Sawy and Pereira (2013) explain the concept of digital platforms as a new interactive business approach where the value is co-created, co-converted, and co-captured among the different players in the ecosystem: producers, customers, competition, and community.

Various approaches were used to define a unique typology for the platform economy, but the main

classification of digital platforms is based on the type of resources they give access to, and it is described through: 1) access to information (or content), 2) access to personal data, 3) access to goods and/or services, 4) access to workforce or the expertise or intellectual capabilities of people, 5) access to money or capital such as crowd funding sites (Strowel & Vergote, 2019).

Access to goods and services is mainly provided through mobile-based platforms which may be defined as a sub-aspect of online platforms emerging from technological innovation of mobile devices (such as smartphones, tablets) and their increased usage. The popularity of mobile-based platforms was also boosted by increased usage of the internet and by the development of applications (apps).

As such mobile apps play a particularly central role in the complex business processes transformation (Basole & Karla, 2011). They create specific digital marketplace in the mobile ecosystem. The main function of the mobile platform is, like an online platform, defined as mediating between two or more groups of stakeholders, usually a demand and a supply side, to extract revenues from both sides, implying that the platform must generate some kind of

		Business Model attributes				Specifications			
		Platform type		Web-based platform		Mobile apps			
Value creation dimension	Key activity	Data services		Community building		Content creation			
	Price discovery	Fixed price	Set by sellers	Set by buyers	Auction	Negotiation			
	Review system	User reviews		Review by market place		None			
	Key value proposition	Price / cost / efficiency		Emotional value		Social value			
Value delivery dimension	Transaction content	Product			Service				
	Transaction type	Digital			Offline				
	Industry scope	Vertical			Horizontal				
	Marketplace participants	C2C		B2C		B2B			
	Geographic score	Global		Regional		Lokal			
Value capture dimension	Key revenue stream	Commissions	Subscriptions	Advertising	Service sales				
	Pricing mechanism	Fixed pricing		Market pricing		Differentiated pricing			
	Price discrimination	Feature based	Location based	Quantity based	None/other				
	Revenue source	Seller		Buyer	Third party	None/other			

Table 1: Comparative analysis of web-based and mobile apps platforms

Source: Täuscher & Laudien, 2018

added value for all parties involved (Gonçalves & Ballon, 2011).

Täuscher and Laudien (2018) go a step further in making a distinction between the online and mobile apps platforms, by offering a comprehensive review of the main differences between them. The Table 1 shows the elements of the business model.

Most remarkable examples of mobile apps platforms are those of the food delivery and ride-hailing type of platforms (Strowel & Vergote, 2019). Globally, the most renowned mobile apps (platforms) in the FDA are: Deliveroo, UberEat, DoorDash, Takeaway.com, FoodPanda, Swiggy, GrubHub, Postmates Inc. Among ride-hailing mobile apps Uber, Lyft and Bolt are most popular ones. However, these two types of mobile platforms have lately been showing a strong inclination towards a merger. Thus, today most ride-hailing companies including Uber and Bolt also stepped into the food delivery, one example being Uber which expanded to Uber Eats.

Food delivery mobile applications (FDA) unite a variety of functions such as providing consumers with a wide range of food choices, taking orders and relaying of orders to food producers, monitoring payments, the organization of food deliveries and provision of tracking facilities. This business model has been recognized as one of the fastest-growing phenomena in the e-commerce space (Thamaraiselvan, Jayadevan & Chandrasekar, 2019).

Platform-to-consumer refers to the mobile app delivery model which is a subset of the online food delivery model that also includes restaurant-to-consumer delivery. It is the delivery of the order made directly by the concerned restaurant.

Despite food delivery still being dominated by the traditional model of phone orders and restaurant deliveries, food providers are increasingly challenged by the emergence of innovative ordering experiences via apps and delivery methods that are driving substantial channel migration. However, channels of distribution

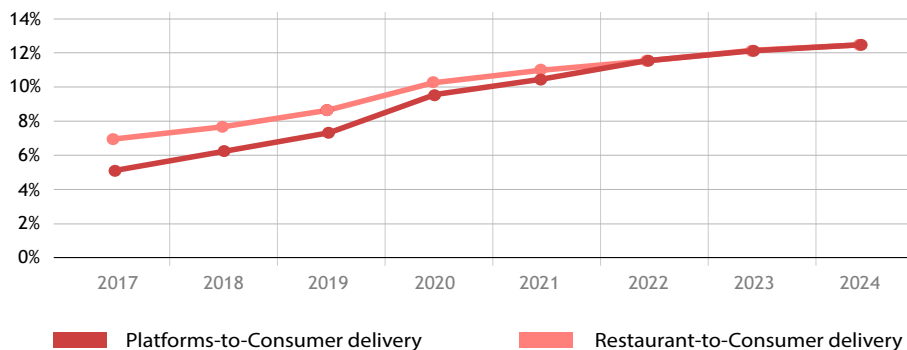


Figure 1: Estimation of OFD market development (Statista, 2020)

reshape constantly. Figure 1 focuses on possible changes on the delivery market globally.

As shown above, Statista estimates indicate that the gap between these two distribution channels could narrow over time, and that the platform-to-consumer channel could become the main food delivery channel in the world by 2025.

Ride-hailing mobile applications (RHA). Similarly, the concept of ride-hailing apps emerged as a new form of personal transportation of passengers (taxi) driven by the rise of information age including the developments in technologies such as the GPS, smartphones, and electronic payments (Hahn & Metcalfe, 2017).

Researchers have been focused on these new services from different perspectives including level playing field, sales opportunities, job creation, relationship between the consumers and their food, public health outcomes, environmental impact, and others. Despite many positive aspects, Gawer and Cusumano (2014) remind that there is a risk of the rising power of platform leaders on the market (Gawer & Cusumano, 2008). Indeed, many platforms by their very nature prove to be winner-take-all markets, in which only one or two companies survive, and the platform owner can appropriate a generous portion of the entire value created by all the users on the platform (Pulignano, 2019). Like classic monopolies in which increasing returns to scale and high sunk costs enable market concentration, network effects allow platforms to race ahead of potential competitors to secure and defend their market dominance. However, with platforms,

that dominance is often hidden from view; it does not always take the more visible form of vertical or horizontal integration that marks traditional antitrust analysis (Rahman & Thelen, 2019). More important, however, is that as the power is centralized, the platform owner may become a virtual monopolist (Kenney & Zysman, 2016). As evidenced by practices from different markets, this is particularly the case of mobile apps where companies are entering mergers to secure monopolistic position on the market. One of most recent examples is the acquisition of Glovo's operations in Latin America by Delivery Hero which also own Donesi in Serbia and is expanding further in the Western Balkans and elsewhere.

METHODOLOGY

To survive fierce competition, mobile apps platforms have to be in a constant state of innovation, driven by a deep knowledge of their end-users' expectations, preferences, and needs (Dillahunt, Wang, Wheeler, Cheng, Hecht & Zhu, 2017). Therefore, we decided to focus on the attitudes of consumers, their preferences, beliefs, experiences (Simonson & Rosen, 2014), when analysing the use of FD and RH apps model in Serbia. The analysis covers the following aspects:

- Socio-demographic characteristics of users and non-users
- Attitudes, preferences, perceptions, and other related findings which determine characteristics of use/non-use of the apps
- Market value estimation

The first country analysis on the use of mobile apps in food delivery and ride-hailing is based on a survey of a representative sample of food delivery and ride-hailing mobile apps users in Serbia, and the scrutiny of research and statistical data from other countries. This pioneering research was conducted in the period August - October 2020. The data were organised in line with the ethical principles for research (Townsend & Wallace, 2016), respecting data protection principles. The survey was carried out by the Smart Plus Research from Belgrade.

The nationally representative sample consisted of 1,006 Serbian citizens, aged 18 to 64. They were interviewed to identify whether they are apps users, e.g. to determine penetration in the population. The data were collected throughout September 2020 by quantitative method research, using face-to-face (f2f) method. The group of 1006 respondents correspond to the share of men and women in the overall population, as there were 489 men (48.6 percent) and 517 women (51.4 percent) in the sample.

Beside this main sample, a sub-sample of 399 users of delivery and/or ride-hailing apps was used. Boost interviews were conducted online to better determine characteristics of apps users in Serbia and zoom in their attitude towards apps usage, perceived advantages and other additional characteristics of apps usage.

Having in mind the specificities of online data collection and purpose of this part of the survey, a sub-sample of 399 respondents did not reflect the national gender structure. Namely, 117 men (28.8 percent) and 284 women (71.2 percent) were took part in it. However, such results should not lead to erroneous conclusions, as the definition of the national sample was done in accordance with national statistics. Additional sub-sample was only used to reveal app usage in Serbia in detail.

The research was conducted in urban areas, in ten Serbian cities which were preselected based on the initial

information of the mobile apps locations and their plans to expand their operations. The following cities were included in the research: Belgrade, Novi Sad, Nis, Kragujevac, Subotica, Pancevo, Kraljevo, Krusevac, Leskovac and Cacak. However, the analysis included only results from six cities (Belgrade, Novi Sad, Nis, Kragujevac, Subotica, Pancevo) as the mobile apps were only detected there. In other four cities only Donesi was active at the time of the research, not as a mobile app like in other cities but as a web platform.

As mentioned above, the research was conducted amidst the COVID-19 pandemic. This is noteworthy as the recent literature already asserted the impact of the pandemic on the increased use of mobile apps (Li, Miroso & Bremer, 2020; Hassen, Bilali & Allahyari, 2020; Rani & Dhir, 2020).

In our research we define a user as a person who used a delivery or ride-hailing app at least once since early 2020 and up to the launch of survey in September 2020 (Dazzi, 2019). Penetration is defined as a share of app users in a representative sample of the research.

The average expenditure per order/ride was estimated for each type of order (food from a restaurant, groceries and medications) and a ride. It was calculated as an average value of orders during one month of the user of apps from our representative sample.

The monthly market value was calculated by multiplying three elements: 1) penetration, 2) an average monthly frequency of app use and 3) an average expenditure per one app use, i.e., per one order which was computed as an average value of estimated costs of users per month. This methodology is based on the one used by Statista (2020). The market value is understood as an estimate of the total monetary flow in an analysed market of a certain service.

The main limitation in this type of studies is reliance on data offered by a respondent about the costs and frequency of app use – which is very subjective and inaccurate most

often.

Another limitation of this study refers to recognizing the services provided by food delivery mobile apps. This being a relatively new service on our market, it is not recognized by this name or it may be confounded with the apps for home delivery from individual restaurants. The chosen data collection method and interviewer training helped alleviate this limitation.

In order to better understand the users' habits, we reinforced the sample using a networking data collection method. Members of Smart + panel and of adequate demographic structure were invited to take part in the survey. Notwithstanding, the survey covered only those who were users of food delivery apps of ride-hailing apps and those who responded to the calls first.

With respect to the market value assessment for a year and five years respectively, the assumptions used as a baseline were: 1) coverage of cities by apps will remain the same, 2) the average consumption will remain the same for both the existing and the new users, and 3) the future users will have similar habits as the existing ones. In other words, they will place one order more or less relative to the current number. In that sense, the market assessment model is based on the so called "static" and not "dynamic" analysis.

CHAPTER 2.

Analysis of digital markets in Serbia: mobile apps food delivery and ride-hailing

When COVID-19 pandemic struck the mobile app market in Serbia was in its infancy. The veterans on the market were platforms such as Donesi and CarGo at the time. Originally both local, Donesi was acquired by Food Panda in 2014 and subsequently by Delivery Hero in 2016. CarGo active as of 2015 is a mobile app of local origin which faced different setbacks in developing its operations. Only with the entrance of global mobile apps such as Wolt and Glovo, did the Serbian market start to resemble the foreign ones in developed economies.

COVID-19 accelerated the growth of this market which showed remarkable flexibility by including almost immediately the delivery of pharmaceutical products and groceries. Moreover, the pandemic affected the RHA model of CarGo as it depressed during COVID-19, this prompting the company to expand and test food delivery service in March and roll it out in October 2020.

We start with presenting the demographic data of consumers and their main characteristics, key drivers for ordering via apps, the profiles of non-users and continue with market indicators (average frequency of ordering, average expenditure, level of penetration).

In the conclusion we discuss the impact of COVID-19 and the prospect of non-users becoming consumers. Finally, we dive deeper into possible trajectories of the development of the mobile apps based on the push they received during the pandemic.

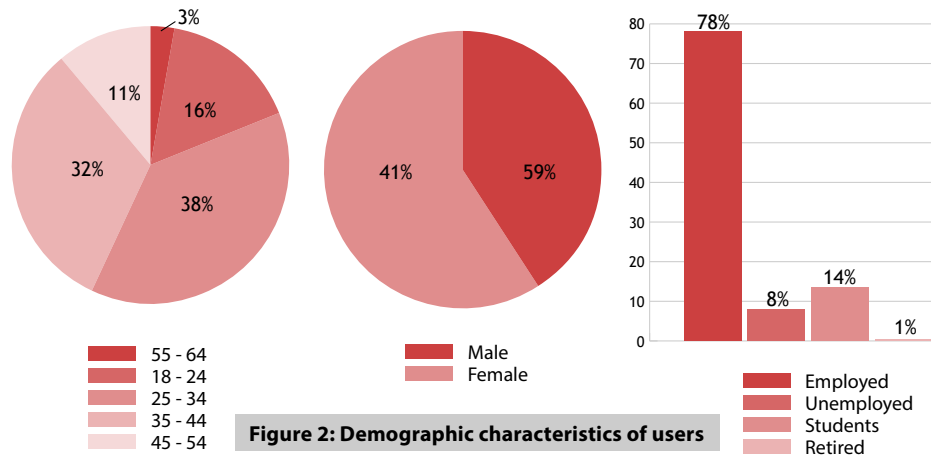


Figure 2: Demographic characteristics of users

MOBILE APPS FOOD DELIVERY (FDA) IN SERBIA

With respect to the Serbian market, before the emergence of food delivery apps, a part of the population was used to ordering food online (via PC) or by phone, and the delivery itself would be done by restaurants. This pattern of food ordering still occupies a significant market segment, but the FDA is increasingly gaining ground.

In addition, the breakout of COVID-19 and the state of emergency resulted in emergence of new forms of delivery via apps. Namely, over that period – globally and in Serbia – delivery services expanded also to include other products such as groceries from supermarket and pharmacy products in the lead. Therefore, our analysis also focuses on these orders in addition to food delivery as a dominant form of delivery via apps.

Demographics

The analysis of demographic characteristics can be valuable to identify opportunities for business development by understanding the market and its needs. Demographic data often reveal customers' preferences, habits and motives, and help businesses make strategic decisions for the future. The research covered important dimensions such as age, gender and employment status.

Regarding the data, the average user of food delivery apps in Serbia is more likely to be a woman, which is

in contrast to demographics in other countries where men dominate (Statista, 2020).

In general, using FDA proved to be a dominant habit among employed persons. The results from Serbia show same pattern: 78% of users are employed. Also, FDA adoption proves to be very much tied to age and younger populations (Garcia, 2018). In Serbia over 50 percent of app users belong to the population aged up to 34. Furthermore, a significant part of the population aged 35 to 44 or 32.2 percent use food ordering apps, confirming that technology is more accepted by the younger age cohort. Not only that age composition within Serbian app users is in line with a global comparison (Statista, 2020), but it also coincides with regional studies that confirmed higher participation of the younger population in using apps, for example in Romania (Voinea, Vranceanu & Filip, 2019) and in Greece (Kamenidou, Mamalis, Pavlidis, & Bara, 2019).

Marketing agencies and FDA providers remind that individuals with these socio-demographic characteristics often tend to be recognized as prototype app users (Kant, Whitley & Graubard, 2015).

Spatial distribution

Not surprisingly, the largest number of users is in Belgrade, followed by the number of users from Novi Sad, Nis and Kragujevac. As it can be seen consumers of food delivery via apps prefer Donesi - 67% of all FDA users in Serbia are choosing this app. Donesi

is followed by Glovo (with 25%) and Wolt (15%). However, in two largest cities - Novi Sad and Belgrade, Wolt and Glovo have larger market shares: 34% and 30% respectively.

What FDA users order

Analysis of an additional sample of 399 respondents, application users, allowed us better insights in their behavior. When deciding to use food delivery application, our users are mostly interested in takeouts. As many as 64 % of all consumers use FDA for this purpose only. The remaining 22 % refer to FDA for orders from groceries, while 14% rely on FDA to order pharmaceutical products. One has to keep in mind that these percentages are affected by COVID-19: grocery and pharma products were for the first time extensively offered during the lockdown and during the pandemic. Only "Glovo" had these and other products in its offer even before the outbreak of the COVID-19.

With respect to the type of food ordered, the orders are mostly related to basic, simple dishes, often called junk food: our users most often order pizza (83%) burgers (48%), pasta (43%). This finding also failed to confirm ideas by some researches that app users represent a population increasingly showing interest in eating healthy (Voinea, et.al., 2019).

The basket of consumers that order groceries in most cases include water, soda, juices, sweets, snacks and one-week basic supplies (fruit, meat, etc.). However, the choice of these orders is also bound by the size of boxes which curriers can carry on bikes and motorcycles or on foot (box size is usually 40x40x30 cm). The weight of the order also plays an important role (it must be less than 9 kilos for Glovo, for example).

Pharmacy/drugstore buyers can be divided into three groups depending on the products that are commonly ordering: 1) cosmetics, 2) prescriptions and 3) COVID-19 prevention supplies. Interestingly, twenty-seven percent of orders are made for other people, e.g. for people not living under the same roof as the buyer.

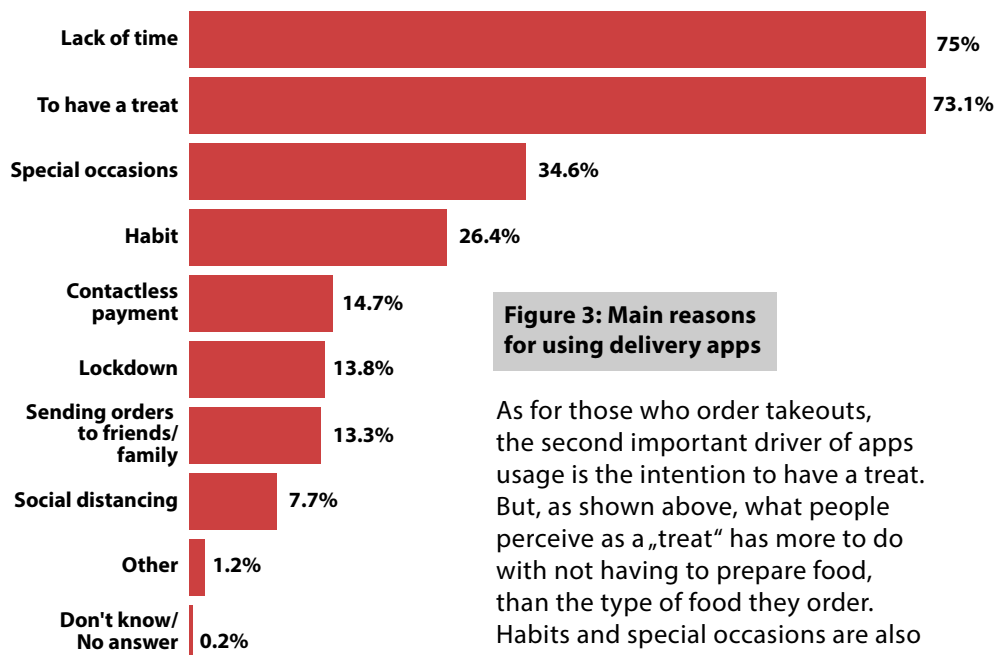


Figure 3: Main reasons for using delivery apps

As for those who order takeouts, the second important driver of apps usage is the intention to have a treat. But, as shown above, what people perceive as a „treat“ has more to do with not having to prepare food, than the type of food they order. Habits and special occasions are also among frequent motives for using FDA for food as the Figure 3 shows. COVID-19 surfaced some other reasons as important for takeouts' usage: contactless payment and lockdown have been declared as two important reasons for ordering takeouts via apps by 14.7 and 13.8 percent of the respondents, respectively. An option of sending orders to friends is also considered as important (13.3%).

As for those ordering groceries, heavy basket comes second, followed by lockdown (28%), and special occasions (26%).

For pharmacy/drugstore buyers, after saving time, social distancing

Main drivers for ordering via apps

Lack of time appears to be the most common reason for ordering all type of products (takeouts, groceries, pharmaceutical products, etc) via apps. Thus, it is inferred that the majority of people use food apps as it is the best way to save time (Tribhuvan, 2020). The time-saving factor increases the value of services provided because it reduces the amount of time and energy consumers expend to purchase a product (Jeng, 2016), and has been proven significant to the Serbian citizens as well.

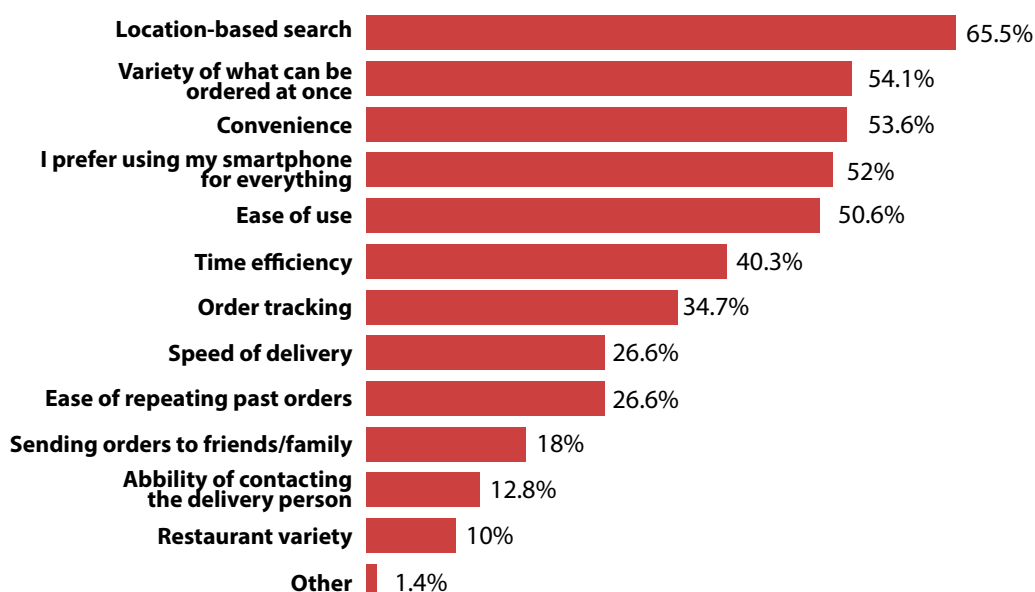


Figure 4: Perceived advantages of ordering via apps

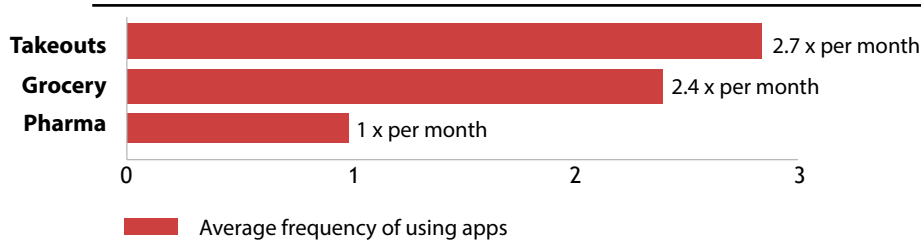


Figure 5: Frequencies of using delivery apps

and lockdown are most important reasons for ordering items via apps.

Recent research consists of numerous efforts to identify the technical and other prerequisites of apps that attract that type of users. Some international studies focus on the impact of the combination of customers' needs and design and technical prerequisites of an app, when deciding whether or not to use an app (Williams, Tuche, Ebrahimi & Mahmoud, 2020). As shown below (Figure 4), the users in Serbia rate the location-based search, variety of ordering options, ease of use, order tracking as important characteristics related to an app quality.

Average frequency of ordering

The average ordering frequency is 2.6 times per month for all FDA users in Serbia. Around one quarter (26%) of delivery app users use these apps on a weekly basis (at least once per week), while the remaining respondents are actually monthly users of apps (at least once per month).

The consumers ordering takeouts are the most frequent users: they order food delivery 2.7 times per month (Figure 5). With regards to the type of order, takeout has the highest user base. Also, most of these consumers have never ordered groceries or pharmacy/drugstore items. The food ordering frequency via apps in Serbia is somewhat less frequent compared to other countries. The results of cross-sectional data from the International Food Policy Study (IFPS), conducted in Australia, Canada, Mexico, the UK, and the USA show that the average ordering frequencies in these countries to be approximately 1-2 times a week (Keeble, Adams, Sacks, Vanderlee, White, Hammond & Burgoine, 2020).

The grocery users place orders 2.4 times per month, while the pharma users are the least frequent with 1 order per month. In addition, it seems that for this type of order there is no difference between apps, e.g. all three apps are equally used.

WHO ARE NON-USERS OF FOOD DELIVERY APPS?

With respect to the age structure, one may conclude that the older population prevails in the so-called "non-users": 60% are over 45. Only 10 percent of non-users belong to the population aged 18 to 24, while 30 percent are below 35. The gender distribution can be classified as uniform. Further, structure of non-users by employment status is same as in user's group, but the type of work seems to be different – non-users are more likely to be skilled workers. The two groups are, however, of similar education and employment status.

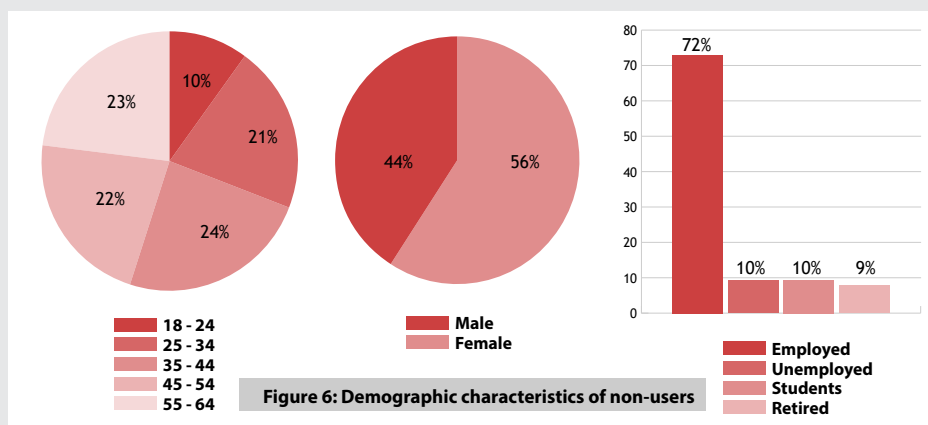


Figure 6: Demographic characteristics of non-users

Figure 6 covers the same demographic dimensions previously represented for users.

What distracts them from using apps? The possibility to order by app is not defined as useful by the majority of non-users. The main obstacle to ordering, no matter what is ordered, is a perceived lack of purpose for doing so. People either say that they prefer the full experience of dining out, or that they prefer to prepare/choose food by themselves. In addition, other obstacles are low affordability, lack of trust in delivery, lack of trust in product selection, and the inconvenience of the payment method.

The other reason could be characterized as a preference of non-users to meet certain needs outside the world of digital apps. Based on the answers, one may also infer that ignorance of technologies does not constitute an important factor in deciding to use apps. Despite the findings from some developed economies, that the high cost of delivery distracts consumers from using applications (Dobrila, 2018), a monetary factor has not been recognized among the consumers in Serbia as an important limiting characteristic for app usage.

In sum, in Serbia users and non-users of FDA apps differ in age and lifestyle.

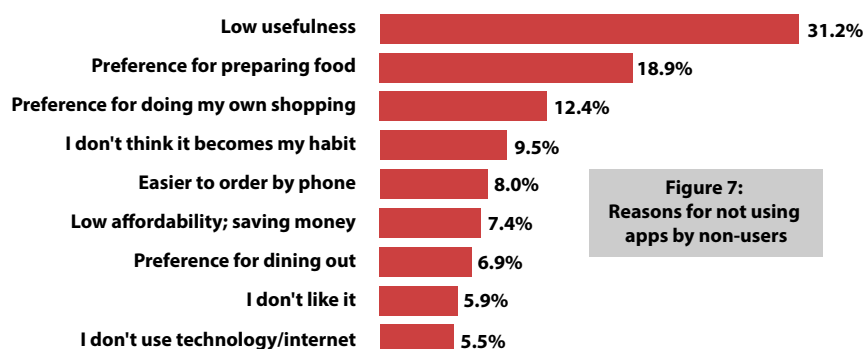


Figure 7: Reasons for not using apps by non-users

MARKET INDICATORS FOR FOOD DELIVERY AND RIDE-HAILING APPS

Average expenditure per order

Users in Serbia do not differ much regarding order expenditure – per order, most spend in the range of RSD 1000-2000 (EUR 8,5 – EUR 17). As for the type of order, takeout orders are of lowest average value - a typical takeout order amounts to RSD 1,312 (EUR 11,2) vs RSD 1,835 (EUR 15,6) for pharmacy/drugstore order and RSD 3,055 (EUR 26) for groceries order.

Level of penetration

The penetration level of app usage in the selected cities is determined at 21 percent. Although such a high level of penetration was not expected, it can be partially justified by the fact that the study investigates the market in the conditions of the coronavirus pandemic, and that the lock-down increased a demand for services offered via apps. According to the calculated penetration, an estimated 356,000 Serbian inhabitants are apps users.

Among 18,3 percent of users of apps nationwide, 1 percent claims to use all 3 apps, while 3 percent are both users of Glovo and Donesi, and 6 percent of Wolt and Donesi.

Leaders on the market

The data show that Donesi occupies the largest part of the FDA market in Serbia. 75 percent are using only Donesi, which is not a surprise, having in mind that this company has the largest distribution network and the longest presence on the market. Market share of other two providers, Wolt and Glovo, has been estimated to 28 percent and 26 percent, respectively. Figure 8. represents current market share by three dominant providers in Serbia:

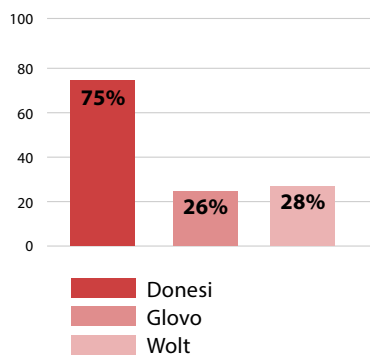


Figure 8: Relative shares of apps in total realized orders

Furthermore, Belgrade and Novi Sad make 75 percent of total users of delivery apps and all three providers e.g. Donesi, Glovo and Wolt operate in Belgrade and Novi Sad. In other cities, deliveries are usually possible via Donesi app, while Glovo exists in Nis and, as of lately, in Kragujevac. To date, Wolt is available only to the citizens of Belgrade and Novi Sad.

Distribution of FDA

The above graph shows the intensity of use of individual apps per city, measured by a number of the deliveries effected. Although it may seem that "Glovo" and "Wolt" in Belgrade and "Wolt" in Novi Sad are more intensively used than "Donesi" service, the market representation of these apps should be primarily perceived through the base of their users. Judging by the population of persons using it, "Donesi" represents the leading delivery app in Serbia.

Market value

Based on the level of penetration, the average expenditure per order and the average frequency of ordering we sought to estimate the market value of delivery model on monthly basis. Thus, the market value can be presented by the following equation (Figure 10).

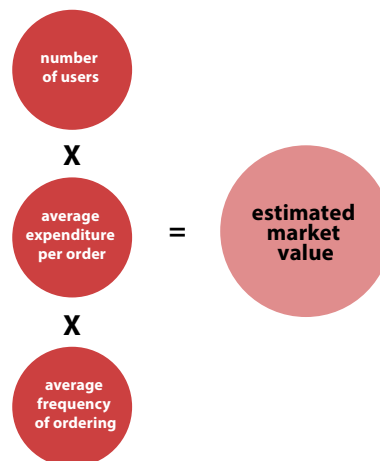


Figure 10: Calculation formula for market value

For delivery apps, the average expenditure per order in Serbia is calculated at RSD 1,312 (cca. 11 EUR), while the average frequency of ordering is estimated to 2.7 times per month. As for the number of users it is estimated at 356.000. Based on all these inputs, the Serbian FDA market is estimated at RSD 1,275,619,909 per month (cca. 10,810,338 EUR). This projection must take into account the COVID-19 factor. As already noted, the pandemic became one of the key drivers of popularity of mobile apps in Serbia. However, it remains to be seen whether this trend will persist once the pandemic is over.

Notably, the assessment of market value was based on the value of the market of food deliveries via apps, because the data are founded on the relevant sample and the business model with the longest presence on the market. On the other hand, the assessment of the market value of groceries and pharmaceutical products deliveries via apps has been omitted for it is based on a small sample and a short-term trend that accelerated during COVID-19 pandemic. As limited and unrepresentative that sample

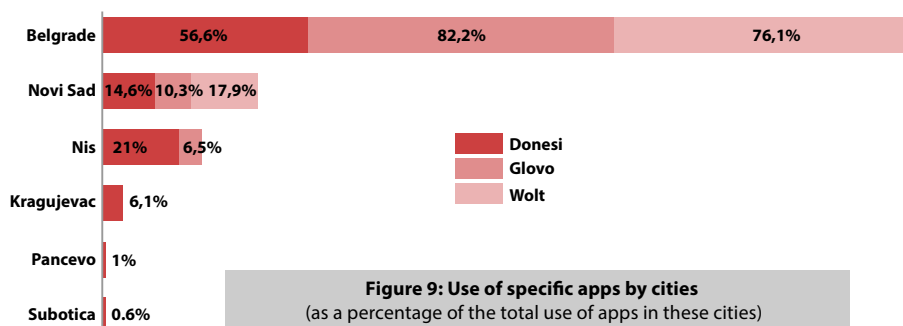


Figure 9: Use of specific apps by cities (as a percentage of the total use of apps in these cities)

is, the initial assessments show the good response of the users to expanded services – groceries from supermarkets and products from pharmacies. Certainly, we are yet to see whether these trends will persist once the pandemic is over.

RIDE-HAILING APP IN SERBIA

Basic facts. Findings about RHA usage in Serbia are much more modest, for two reasons at least. First, there is only one active app that provides RH services. Secondly, RHA service covers the territory of Belgrade only, and thus a smaller number of the respondents - potential users. CarGo was founded in 2015 to offer RHA services in Belgrade. With the coronavirus outbreak, and the increased demand for delivery, CarGo owners decided to build a food delivery platform named CarGo Butler which started in October 2020.

Average expenditure. The average expenditure per one use of the RHA is estimated at RSD 890 (EUR 7,6). As expected, users of RHA spend less than users of delivery apps.

Level of penetration. Calculated penetration of the RHA usage from a used sample is estimated to 19 percent, indicating that RHA penetration is less than the one for FDA. The calculated level of penetration indicates that 198.000 inhabitants in Belgrade declared the use of RHA out of the total population of 1.058.000 (18-64 years of age).

There is a great potential for RHA expansion prospects in Serbia. This is supported by two facts identified in our research. First, 37 percent of RHA and 10 % of RHA non-users claimed they are willing to start using RHA. Second, 46 percent of delivery app users expressed a high probability of using RHA services.

Market value. One can also assess the value of RHA market on the basis of the number of users, average expenditure per use and the average

The impact of COVID-19 on mobile apps market in Serbia

The breakout of the coronavirus pandemic and ensuing lockdown boosted the apps usage in Serbia. During this health crisis, with many people working from home, online ordering has become a daily necessity. The data indicate not only that 38 percent of respondents used apps more frequently, but over 20 percent of them started using the apps during the lockdown.

Graph 12 (below) points to several important implications observed following the lifting of the state of emergency. On the one hand, it is indicative that the frequency of use of apps among those who used it prior to the pandemic and declaration of the state of

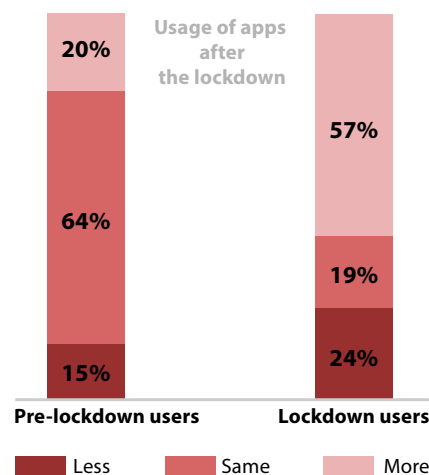


Figure 12: Estimated frequency of use of apps after the lockdown, among old and new (lockdown) users

emergency has not changed significantly after the lockdown. The highest percentage (64%) of the “old” users continued to use the apps with the same intensity. On the other hand, more than one half (57%) of persons who started using the apps during the lockdown stated that they do used them less in the period following the lifting of the state of emergency. This leads to two conclusions. First, that the habit of use of food delivery apps is more strongly rooted among the persons who used them in the pre-pandemic period, and so a significant number of them may be described as a

2.3x per month

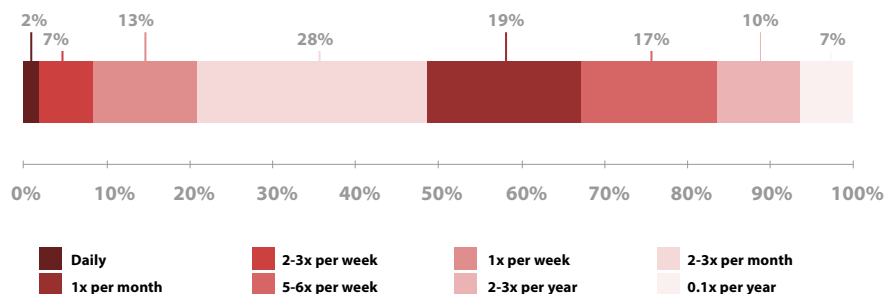


Figure 11: Frequency of using RHA

Who are the users? Similar to the users of FDA, the users of the RHA belong to the younger population and majority of them are employed. Key driver for using the RHA service is to save time.

Average frequency of using RHA

On average, CarGo clients use RH service 2.3 per month. According to the results, the usage of RHA is rarer than using FDA apps.

frequency of app usage. The survey has shown that the RHA user population is estimated at 198,000 users; the average expenditure per use thereof to be RSD 809 (cca. 7 EUR) and the average RHA use frequency 2.3/month. Consequently, the value of this market may be estimated at RSD 368,418.600 per month (approximately EUR 3.132,811).



base of loyal users. Second, that the persons who started using the apps during the lockdown did not maintain the habit as the majority used the possibility of delivery via apps less after the lifting of the state of emergency.

Some international findings show that the consumers will likely spend more on food delivery, prepared foods, and groceries after the pandemic than they did before it. Again, because of the financial strains and lingering concerns about eating in crowded places, the consumers will likely continue to prefer eating at home, at least for some time (Becker, Haas, Kuehl, Ignacio & Venkataraman, 2020). Our findings collaborate these findings because 25 percent of users who started using delivery apps during lockdown increased their usage after the lockdown as well.

The lockdown not only disrupted food delivery but other distribution channels as well. Thus, during the crisis, there was an increase in demand for the delivery of certain goods, which the owners of the platforms responded to by creating opportunities for delivery, primarily groceries and pharmaceutical products. However, food remained dominant on the list of priority orders even during the crisis. Despite suggestions that pandemic boosted orders for groceries and pharmaceuticals, majority of all orders still referred to food deliveries. Yet, expansion of apps on groceries and pharmaceutical industry clearly indicated the possibilities for growth of app-based business on these fields in the future.

CHAPTER 3.

Conclusion

This analysis offers an initial description of the users of mobile apps in Serbia. Socio-demographic characteristics of the Serbian users are in line with general prototypes of users and non-users elsewhere.

Non-users are older and enjoy a different lifestyle. They do not drastically differ from users otherwise. For example, they FDA consumers refrain from buying online only because they enjoy the personal experience when shopping for food, groceries, in pharmacies. Interestingly, digital literacy did not prove to be decisive for the mobile apps' usage.

Mobile apps are popular among men and women, but more users belong to the younger population. With regards to FDA, women are the more frequent users of food delivery apps, which is a specificity of the Serbian context. Technical advantages of the apps have been recognized as important driver in motivating people to use the mobile apps both in Serbia and beyond. Time saving and ease of use are prevailing motives for FDA and RHA use and are in line with global consumers.

This research also points to similarities between (relative) average monthly expenditures. It coincides with other values of the research from abroad. With regards to the average frequency of ordering, the Serbian users still order less than their peers in developed countries, but this can be explained by variety of factors, and they are related to the consumers' characteristics, such as cultural, ethnical, habitual, etc. However, due to different methodologies that researchers use, the comparisons between Serbia and other geographies should be taken as general observations.

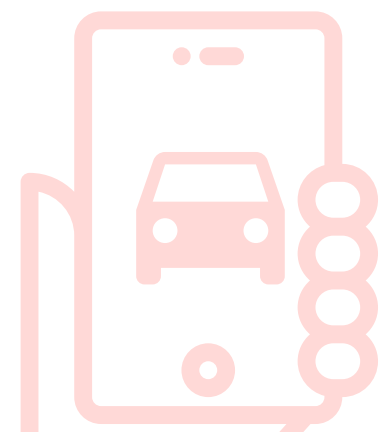
Delivery app model growth: possible scenarios for Serbia

As delivery applications have proven to be rising in the Serbian market, there is a need to assess the possibilities of their expansion. The attitudes of non-users regarding the possibility of future use of the of apps give a reason for optimism. While 29 percent declared that they would start to use a delivery app within one year, 37 percent of them believe that they will acquire this habit within 5 years.

Based on these assumptions, we have developed three scenarios: optimistic, realistic and pessimistic. According to the first scenario, the market is expected to increase by over 390,000 users next year, resulting in a total of about 750,000 users of food delivery applications. According to the second, the number of new users could increase by about 230,000, while the third or pessimistic scenario indicates an increase in the market by 204,000 users in the same period.

Certainly, all of the three projections need to be assessed critically. The optimistic forecast is most likely the result of the impact of the pandemic when the use of apps increased, so one should be aware that the number of users will probably not grow at the same pace in the future. Therefore, it is necessary to examine the main drivers of market development. In this light, it is important to ascertain in which way will the app-based models reshape the market (whether the majority of restaurant, supermarkets and other retailers will migrate to FDA), and how will they adapt to the market conditions (e.g. purchasing power of the population, tax policy regarding FDA and RHA, etc). The question is whether and to what extent the consumers will embrace the app-based models.

The growth of the population of users of RHA is even more difficult to assess precisely. Though the popularity of food delivery apps is on the rise, the RHA are not quite as clear. Several important aspects call for caution when assessing the growth of this market segment. Namely, the demand for transportation services is



significantly less expressed than the demand for products offered within the scope of food deliveries via apps. Food in the first place, followed by groceries and pharmaceutical products represent an essential part of the consumer basket, while transportation does not fall into the list of prioritized needs of consumers. While on the pandemic affected even the increase in use of delivery apps, the services of passenger transportation via apps in the same period and after the state of emergency in particular, were less in demand. In other words, the situation of protracted pandemic whereby the movement of people is restricted to minimum, does not represent the period during which optimistic assessments about the growth of RHA may be offered. Furthermore, for the time being RHA exists on the territory of Belgrade only, which indeed is the market with the largest base of potential users. However, there is no indication about the potential expansion into other cities.

In view of the above, one may assess with a certain caution that the RHA base of users may increase by some 80,000 new users over the next 12 months, which would represent approximately 10% of the current non-users. Certainly, having in mind all the circumstances that the RHA market has been exposed to during the past year, even more cautious assessments about the growth of the number of users would not be wrong.

Establishment of CarGo Butler confirms that the future may bring diversification of business and expansion of transportation platforms into delivery services, rather than territorial expansion of the transportation service itself.

Although we asked the respondents in our survey about their preferences in the next five years, we refrained from any long-term projections bearing in mind that this is a very dynamic market.



References

- Basole, R. C., & Karla, J. (2011). On the Evolution of Mobile Platform Ecosystem Structure and Strategy. *Business & Information Systems Engineering*, 3(5), 313-322. doi:10.1007/s12599-011-0174-4
- Becker, S., Haas, S., Kuehl, E., Ignasio, M., & Venkataraman, K. (2020). Delivering when it matters: Quick-service restaurants in coronavirus times. New York: McKinsey&Company.
- Chesbrough, H. W. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Massachusetts: Harvard Business School.
- Dazzi, D. (2019). Gig Economy in Europe. *Italian Labour Law e-Journal*, 12(2), 68-122. doi: 10.6092/issn.1561-8048/9925
- de Reuver, M., Sørensen, C., & Basole, R. C. (2018). The digital platform: a research agenda. *Journal of Information Technology*, 33(2), 124-135. doi:10.1057/s41265-016-0033-3
- Dillahunt, T. R., Wang, X., Wheeler, E., Cheng, H. F., Hecht, B., & Zhu, H. (2017). The sharing economy in computing: a systematic literature review. *Proceedings of the ACM on Human-Computer Interaction*, 1(CSCW), 1-26. doi:10.1145/3134673
- Duch-Brown, N. (2017). *The Competitive Landscape of Online Platforms*. Seville: Joint Research Center Digital Economy Working Paper 2017-04.
- El Sawy, O. A., & Pereira, F. (2013). *Business Modelling in the Dynamic Digital Space: An Ecosystem Approach*. Berlin: Springer.
- Garcia, K. (2018, November 05). Five Charts: The State of Food Delivery. Retrieved from eMarketer: <https://www.emarketer.com/content/five-charts-the-state-of-food-delivery>
- Gawer, A., & Cusumano, M. A. (2008). How Companies Become Platform Leaders. *MIT Sloan Management Review*, 49, 28-35.
- Gawer, A., & Cusumano, M. A. (2014). Industry Platforms and Ecosystem Innovation. *Journal of Product Innovation Management*, 31(3), 417-433. doi:10.1111/jpim.12105
- Gonçalves, V., & Ballon, P. (2011). Adding value to the network: Mobile operators' experiments with Software-as-a-Service and Platform-as-a-Service models. *Telematics and Informatics*, 28(1), 12-21. doi:10.1016/j.tele.2010.05.005
- Hagiu, A., & Wright, J. (2015). Multi-sided platforms. *International Journal of Industrial Organization*, 43, 162-174. doi:10.1016/j.ijindorg.2015.03.003
- Hahn, R., & Metcalfe, R. (2017). The ridesharing revolution: Economic survey and synthesis. In S. D. Kominers, & A. Teytelboym, *More Equal by Design: Economic design responses to inequality*: Oxford Volume IV (pp. 1-20). Chicago: University of Chicago.
- Hassen, T. B., Bilali, E. H., & Allahyari, M. S. (2020). Impact of COVID-19 on Food Behavior and Consumption in Qatar. *Sustainability*, 12(17), 1-18. doi:10.3390/su12176973
- Jeng, S.-P. (2016). The influences of airline brand credibility on consumer purchase intentions. *Journal of Air Transport Management*, 55, 1-8. doi:10.1016/j.jairtraman.2016.04.005
- Kamenidou, I. C., Mamalis, S. A., Pavlidis, S., & Bara, E.-Z. G. (2019). Segmenting the Generation Z Cohort University Students Based on Sustainable Food Consumption Behavior: A Preliminary Study. *Sustainability*, 11(3), 1-22. doi:10.3390/su11030837
- Kant, A. K., Whitley, M. I., & Graubard, B. I. (2015). Away from home meals: associations with biomarkers of chronic disease and dietary intake in American adults, NHANES 2005-2010. *International Journal of Obesity*, 39(5), 820-827. doi:10.1038/ijo.2014.183
- Keeble, M., Adams, J., Sacks, G., Vanderlee, L., White, C. M., Hammond, D., & Burgoine, T. (2020). Use of Online Food Delivery Services to Order Food Prepared Away-From-Home and Associated Sociodemographic Characteristics: A Cross-Sectional, Multi-Country Analysis. *International Journal of Environmental Research and Public Health*, 17(14), 1-16. doi:10.3390/ijerph17145190
- Kenney, M., & Zysman, J. (2016). The Rise of the Platform Economy. *Issues in science and technology*, 32(3), 61-69.
- Li, C., Miroso, M., & Bremer, P. (2020). Review of Online Food Delivery Platforms and their Impacts on Sustainability. *Sustainability*, 12(14), 1-17. doi:10.3390/su12145528
- Martens, B. (2019). *An Economic Policy Perspective on Online Platforms*. Brussels: Institute for Prospective Technological Studies Digital Economy Working Paper 2016/05. JRC101501.
- Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform Revolution: How Networked Markets Are Transforming the Economy-And How to Make Them Work for You*. New York: WW Norton & Company.
- Poutanen, S., & Kovalainen, A. (2017). New Economy, Platform Economy and Gender. In S. Poutanen, & A. Kovalainen, *Gender and Innovation in the New Economy* (pp. 47-96). New York: Palgrave Macmillan. doi:10.1057/978-1-137-52702-8_3
- Pulignano, V. (2019). Work and Employment under the Gig Economy. *Partecipazione e conflitto*, 12(3), 629-639. doi:10.1285/i20356609v12i3p629
- Rahman, K. S., & Thelen, K. (2019). The Rise of the Platform Business Model and the Transformation of Twenty-First-Century Capitalism. *Politics & Society*, 47(2), 177-204. doi:10.1177/0032329219838932
- Rani, U., & Dhir, R. K. (2020). Platform Work and the COVID-19 Pandemic. *The Indian Journal of Labour Economics*, 63(1), 163-171. doi:10.1007/s41027-020-00273-y
- Simonson, I., & Rosen, E. (2014). What marketers misunderstand about online reviews. *Harvard Business Review*, 92(1), 7.

-
- Statista. (2020, August 20). Mobile Internet Apps. Preuzeto sa internet stranice Statista: <https://www.statista.com/markets/424/topic/538/mobile-internet-apps/>
- Statista. (2020, August 25). Online Food Delivery. Preuzeto sa internet stranice Statista: <https://www.statista.com/outlook/374/100/online-food-delivery/worldwide#market-age>
- Statista. (2020). Statista Digital Markets Outlook, New York, US.
- Strowel, A., & Vergote, W. (2019). Digital platforms: to regulate or not to regulate? In B. Devolder, *The Platform Economy. Unraveling the Legal Status of Online Intermediaries* (pp. 1-30). Cambridge: Intersentia.
- Takagi, S. (2020). Literature survey on the economic impact of digital platforms. *International Journal of Economic Policy Studies*, 14(2), 449-464. doi:10.1007/s42495-020-00043-0
- Täuscher, K. (2016). *Business Models in the Digital Economy: An Empirical Study of Digital Marketplaces*. Leipzig: Fraunhofer MOEZ, Fraunhofer Center for International Management and Knowledge Economy.
- Täuscher, K., & Laudien, S. M. (2018). Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, 36(3), 319–329. doi:10.1016/j.emj.2017.06.005
- Thamaraiselvan, N., Jayadevan, G. R., & Chandrasekar, K. S. (2019). Digital Food Delivery Apps Revolutionizing Food Products Marketing in India. *International Journal of Recent Technology and Engineering*, 8(2S6), 662-665. doi:10.35940/ijrte.B1126.07825619
- Townsend, L., & Wallace, C. (2016). *Social Media Research: A Guide to Ethics*. Aberdeen: The University of Aberdeen.
- Tribhuvan, A. (2020). A STUDY ON CONSUMERS PERCEPTION ON FOOD APPS. *International Journal Of Advance Research And Innovative Ideas In Education*, 6(4), 208-243.
- Voinea, L., Vranceanu, D. M., & Filip, A. (2019). Research on Food Behavior in Romania from the Perspective of Supporting Healthy Eating Habits. *Sustainability*, 11(9), 1-26. doi:10.3390/su11195255
- Williams, G., Tushev, M., Ebrahimi, F., & Mahmoud, A. (2020). Modeling user concerns in Sharing Economy: the case of food delivery apps. *Automated Software Engineering*, 27(1), 229-263. doi:10.1007/s10515-020-00274-7
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