

Artificial Intelligence in Online Food Delivery Platforms

Ravina Soni¹ and Samir Jadhav²

Assistant Professor, BSC IT, Suman Education Society's LN College, Borivali East, Mumbai, India¹

Student, BSC IT, Suman Education Society's LN College, Borivali East, Mumbai, India²

Abstract: *The benefits of online food delivery (FD) became clear during the global 2020 COVID-19 episode since it allowed customers to attend prearranged dinners and allowed food vendors to keep working. Online FD isn't without its critics, either; there have been tales of buyer and restaurant blacklists. Therefore, now is a perfect time to evaluate the situation and think about the wider impacts of online FD and what they entail for the concerned parties. This study offers the most recent research in this area, revealing a wealth of both favourable and unfavourable impacts using the three pillars of manageability as a focus point from which to examine the effects. Although online FD offers job and business opportunities, it has been criticised financially for the hefty fee it costs cafés and the difficult working conditions it creates for delivery workers. From a sociological perspective, online FD affects traffic patterns, overall health outcomes, and the relationship between customers and their food. The enormous amount of garbage and its large carbon footprint are ecological implications. Moving forward, partners should think about how to effectively promote and regulate the beneficial benefits of online FD to make sure it is manageable in every way.*

Keywords: Online Food Delivery (Online FD); Sustainability; Economic Impacts; Social Impacts; Environmental Impacts Introduction.

I. INTRODUCTION

Internet commerce is developing globally due to monetary growth and a growing broadband penetration. Customers are increasingly using online services as their disposable income rises, electronic payments become more secure, and the number of suppliers and the reach of their delivery networks expand. Customers are enticed to a product or service online and encouraged to complete an exchange in a remote location. This sort of internet company is known as online to disconnected. The use of online meal delivery platforms is a rapidly expanding area of O2O business. The rise of internet food delivery services has altered how many consumers and food producers interact globally, while its long-term effects are yet unclear. One of the challenges in analysing its impact has been that scholars are approaching this topic from a range of different disciplines. Consequently, this audit has three final destinations: (1) to lead an interdisciplinary study that brings together academic research on the wide range of areas impacted by the increased use of online FD; (2) to discuss the opportunities and challenges these effects pose; and (3) to highlight the opportunities for action by all partners, including on the web FD industry experts, strategy creators, customers, and academics, to amplify its beneficial effects and lessen its adverse effects. To assist put the survey's findings into context, it is essential to introduce the web-based food transportation sector before discussing the study itself.

II. OVERVIEW OF THE ONLINE FOOD DELIVERY SECTOR

Size of the E-commerce Market

Due to consumers' increasing reliance on the internet, the market for web-based businesses has experienced steady growth over the past ten years. A wide range of diverse factors, some of which are business sector or country dependent, have contributed to this change in how consumers buy. Other factors include general developments. An increase in removal pays, particularly in developing nations, longer work and driving hours, increased broadband penetration, improved security of electronic payments, the relaxation of exchange restrictions, an increase in the number of retailers with an online presence, and a greater level of consumer familiarity with online commerce are some of these changes [1].

China, the second-largest market, has had the most significant growth in internet commerce during the past several years. China accounts for 54.7% of the global internet business market on its own, which is nearly twice as much as the combined shares of the next five most important countries (the US, UK, Japan, South Korea, and Germany) [2].

Table 1 illustrates the growth of online commerce in the Asia-Pacific region. It shows the staggering increase in money spent on major online shopping days between 2015 and 2019. The primary online business platforms vary by region and include platforms with well-known names like Amazon in the United States, Alibaba in China, and Flipkart in India (India).

Online FD and Online to Offline Business

Numerous new business models, including B2B (business to business), C2C, and others have emerged due to the rapid growth of internet commerce (client to client). The subject of O2O is a marketing strategy based on information and communications technology (ICT), in which clients place orders for labour and products online and pick them up at a remote location [7,8]. The development of systems to assist with payment and delivery, together with the proliferation of smartphones and tablets, has been one of the key developments fuelling the O2O business explosion. There were 5.2 billion cell phone connections in 2019, and by the end of 2020, it is anticipated that half of all people on the world would use mobile internet providers.

O2O administrations have emerged in a variety of industries, including the purchase of various goods and administration classes, such as food, accommodation, real estate, or car rentals [10]. Online FD refers to the process through which prepared food is delivered to the customer after being ordered online. The advent of coordinated internet-based FD platforms, including as Uber Eats, Deliveroo, Swiggy, Zomato, and Maiduian, has aided in the growth of online FD. Online FD platforms provide a number of functions, including as giving customers a wide selection of food options, accepting orders and sending them to the food producer, monitoring payments, coordinating the delivery of the food, and setting up follow-up services (Figure 1) [11]. Food delivery apps, or "applications," (FDA) function within the larger framework of online FD since they enable the ordering of food using portable applications [12].

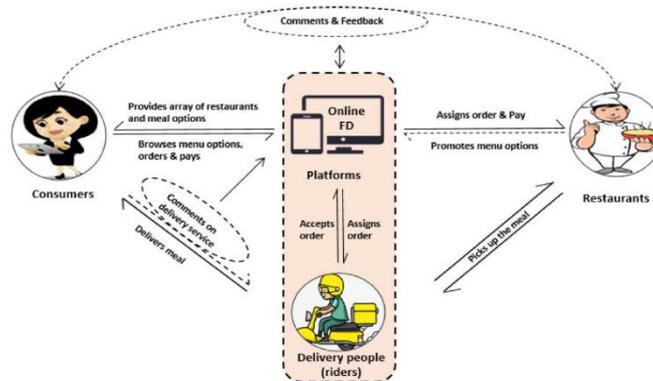


Figure 1. The functions associated with online food delivery (FD) platforms. Arrows indicate movement of information or logistic; lines indicate necessary routes; dotted lines indicate optional routes.

FD providers online and their delivery method

Delivery of coffee to customers as seen by providers like KFC, McDonald's, and Domino's, suppliers produce the food and deliver it. The request can be submitted directly through the restaurant's website or through a third-party platform. These external phases vary from nation to nation and include models like Uber Eats in the United States. Platform-to-Consumer Delivery is the interaction in which outside platforms provide online delivery services from affiliated restaurants that don't truly offer delivery services themselves. Online FD need extremely capable and adaptable continuous delivery services. Cafés can use their current employees for self-conveyance, such as using waiters in certain small restaurants, or they may use specialised delivery services that are trained and equipped for the task, as is the case with several of the major restaurant chains, like KFC, Domino's, and Xabi. However, restaurants can use publicly supported coordination's, a grouping of independent contractors that provide transportation services, as a model that provides an effective, low-cost method of handling food delivery. Online FD stages may be responsible for



recruiting and training skilled delivery drivers, or they may also rely on publicly supporting coordination's, using drivers who aren't really used by the web-based FD stage. Competent transportation workers are often prepared, and in certain cases, part of their pay is guaranteed while another part is commission-based. On the other hand, those who use free transportation and are commonly referred to as "riders" get paid on a commission basis (per request) (Figure 2).

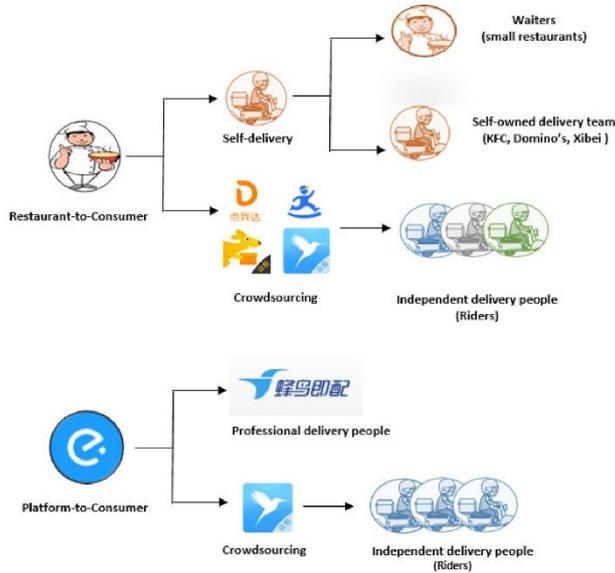


Figure 2. Online FD delivery retailers (Eleme in China, for example).

III. WORLDWIDE ONLINE FD GROWTH

There is a global trend toward the rise of online meal delivery, with most countries on earth having at least one large platform for food delivery. The internet-based FD industry has taken great initiative to expand new business sectors and change consumers' food habits. For instance, a promotion campaign by the Indian-based online FD company Food panda in 2018 provided consumers large limitations, which led to Food panda increasing the number of clients by a factor of 10 [15]. Additionally, Eleme in China spent three billion yuan (US\$443 million) over the course of 90 days in 2018 to increase its share of the sector to more than 50% of the Chinese market. [16]. Despite the fact that internet-based FD is particularly impressive in some regions, the sector is still developing globally, and major investment will be needed to fund developments and campaigns and provide sponsorship to participating cafés [17–21]. For instance, a café may run a mission on an FD stage where a customer receives 8 as a discount if the total amount asked falls within 20. In fact, this discount may only have cost the restaurant \$2 because it will receive a \$6 allowance from the FD stage (the genuine principles might differ starting with one stage then onto the next [22]). Such a strategy is profitable for a café since it will bring in more customers and orders. It is crucial for the future of online FD to shape consumers' dietary habits by educating them about choosing and purchasing food online. Online FD platforms and suppliers are enabling customers to forgo cooking at home or going out to eat by providing them the option of enjoying supper at a lower cost or by offering other sorts of help, such free delivery. Overall, web-based FD is becoming more widely accepted and welcomed by young adults, and China is the country where this trend is most pronounced. In a 2019 survey of 1000 college students in Nanjing, it was found that 85.1% of the participants used web-based FD at least once or twice a week and that 71.45% had used it for about two years [23]. Since it saves time (50.35% of 141 students in Hebei, China), is practical (44.35% of 124 students in Jiangxi, China), and can provide options that are more delectable (39.52% of 124 students) or essentially different from flask dinners, online FD has reportedly become popular with Chinese college students. Evidently, different populations across the world have different freedoms to purchase food online due to social, technological, and financial considerations, and these differences might be the cause of the disparate rates of take-up of online FD witnessed throughout the world. In comparison to China, for example, a 2019 review of 252 Greek college students aged 18 to 23 found that the majority of them cook at home and hardly ever eat

out or have food delivered (45.6%), while others typically eat at the on-campus café or cook at home (23.4%), and only 21% of the understudies studied reported having food delivered [26].

IV. METHODOLOGY

Understanding the monetary, social, and environmental sustainability impacts of online FD necessitated a comprehensive and multidisciplinary review of recent literature. Using the following search engines, more than 60 reports on 'internet food conveyance impact(s)' were discovered: The broad range of information bases searched was due to the multidisciplinary nature of the research subject and the desire to look in two languages. In addition to diary pieces, the investigation investigating also covered books and book sections, government methods, reports, working papers, and other obscure written sources. Given the novelty of the web-based FD area, our underlying inquiries revealed that a conscious audit of the scholarly literature was impracticable since there was inadequate evidence on the manageability impacts to enable definite judgements about the state of the area to be deduced. As a result, a somewhat more exploratory technique was employed, which identified themes deserving of further exploration and attempted to demonstrate them in order to enable further inquiry. Source material distributed between 2010 and 2020 that was available in either English or Chinese (language) was integrated. While our evaluation intended to grasp the consequences of online FD globally, the decision to include both Chinese and English language publications was chosen since the web-based FD sector is typically developed in China, and so, online FD in China has received the most scholarly attention to date. Without a doubt, the results of our investigation revealed that the great bulk of the literature on web-based FD provided a description of FD in a Chinese environment. To investigate and combine the findings from the studies, we used a narrative blend [27], which is a versatile tool that allows the commentators to be clever and straightforward [28] while recounting the investigations remembered for the survey [29].

V. THE IMPACTS OF ONLINE FD

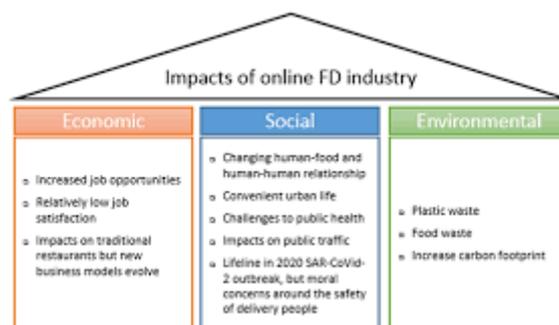


Figure 3. Message house of the impacts of online FD.

Economic Implications

The rise of the web-based FD sector has created opportunities for many people in a variety of fields, including cooks and regulatory staff at cafés, conveyance persons, and developers behind Apps/online stages. Furthermore, the internet-based FD sector has been a gold mine for assistance businesses, including those who manufacture, sell, or manage electric motorcycles, as well as those involved in the production and distribution of food packaging. Large internet-based FD stages employ a large number of workers, with Maidu and Eleme in China employing over 1.17 million people to work as conveyance personnel. Furthermore, Swiggy employs 17 thousand conveyance employees in India, and the US-based web-based FD firm Uber Eats has more than ten thousand personnel. While there is no doubt that the web-based FD industry has provided many positions, particularly in the conveyance area, there has been concern expressed about the helpless working conditions that conveyance individuals are exposed to, including the normalised idea of their work, their high responsibility, the limited training many receive, and the dangers they face to their own security during the method involved with transporting the food [33,34]. These constraints suggest that, while there are numerous vacant employments for food delivery persons, job satisfaction is typically low, and there is a high whittling down rate [18].

Online Social Impacts

FD alters the relationship between customers and their food by altering how they obtain, plan, and consume food. As a result, these advancements influence human-to-human interactions, prompting much debate over whether internet FD enhances or degrades the nature of family time and local area cooperation. Traditionally, family conversed with one another and shared the comfort of one another's company while going about the mundane tasks of food-related daily living, such as shopping for food and preparing and cooking meals at home [49,50]. To be sure, in some circumstances, it has been reported that married Korean girls are less likely to use online FD because they believe they have an honest conviction to prepare dinners for their family [10]. Various studies, on the other hand, show that some Chinese [33] and UK [33] purchasers regard internet-based FD as a way to quickly and effectively deliver suppers, allowing them to spend more time with their families. In Guangzhou, for example, a subjective report (the biggest city in South China) of people between the ages of 18 and 35 who requested action item dinners once a week discovered that they used web-based FD because it allowed them to partake in the solace of their home while still participating in the food varieties and ways of life they enjoyed, without the stress related to purchasing and preparing food [34].

Environmental Consequences

The enormous volume of plastic garbage generated and how to manage it is perhaps the most pressing ecological challenge revealed by the meteoric rise in web-based FD. The feasibility with which various nations manage the plastic trash generated by online FD is dependent on how well-established their reuse foundation is and the rate at which online FD has evolved. In China, for example, the total volume of bundling has increased as a result of an increase in web-based FD. In 2016, 19,507 batteries (including 17,285 lead-corrosive batteries) were discarded. In China, the power used during car accusing and waste management was estimated to emit an abnormal GHG emission of 73.89 Gt CO₂eq in 2016 [42]. Because to the COVID-19 pandemic, the adoption of single-use, disposable food packaging increased in many parts of the world in 2020, as many consumers accepted single-use packaging was more secure and sanitary [43].

VI. THE ADVANTAGES OF TECHNOLOGY IN THE FOOD INDUSTRY

Not just customers have felt the impact of innovation on food administrations. Food enterprises are reaping several advantages from incorporating more innovation into their daily operations. Supervisors now have a more complete picture of stock management because to the Internet of Things. Reports show customer behaviour in a certain market or the availability of goods from a manufacturer. IoT may also help predict changes in a given location and how a firm might adapt. These Organizations can rapidly communicate following facts to clients who need to know where their food is or who want refreshment while their meal is being delivered. Clients may also observe where their belongings are thanks to related gadgets and continual GPS. They can also directly report or contact a company, and employees can respond, ideally spurring more direct criticism. Aside from the backend benefits, innovation mostly impacts bringing food to customers without losing time due to the accompanying modifications.

Increases the amount of data that is available

Every customer interaction generates data that an organisation may use. All of this information is essential to companies looking for areas of development and highlighting where breakdowns occur. Man-made awareness, Internet of Things machine communication, and business gadget executives all generate massive amounts of information data for food firms. All of this data should be saved and organised in order for enterprises to successfully learn and differentiate concerns or smooth out operations. The information gathered allows firms to have a deeper understanding of their clientele and market. For example, a look at the fundamental differences in rural vs urban practises, every area's current events, and particular item interest.

Enhances Customer Communications

While customer support entries remain important to firms, there are new continuous approaches for engaging with clients that are highly useful in food delivery. Voice technology and chatbots enable businesses to communicate with their customers in new ways. Buyers might plan their meals while lounging in their lounge chairs by utilising in-home speech innovation equipment, for example, smart speakers or their cell phones. Organizations may get in front of

customers by matching typical quest questions for their food contributions by incorporating voice search features on their website. Refreshing business hours and menu data might assist a company stay towards the top of the list.

Individuals are approached in a personalised manner.

There are mechanically influence customising informing clients outside of typical contact. Individuals can be informed in a variety of ways by storing information data. Furthermore, with more tools at their disposal, food conveyance businesses may adjust their information regardless of the outlet they deliver.

When a customer submits a request, message pop-ups issued during the entire encounter now include their name. Furthermore, messages sent to customers include their name as well as grandstand standard products asked or markdown deals on their favourite items. Indeed, even social media messages can focus on a recently visited client's website and propose products they looked at. Allows you to skip lines in new ways.

Gone are the days of standing in line or rushing through a store to find what you want. Clients now have greater options for avoiding a lengthy line or failing to notice something important. Regardless matter whether it's ordering online or going to a physical location for pickup, innovation has revolutionised the way customers may save time.

Aside from home delivery, innovation has also aided the food industry in physical areas. Several businesses have moved their menus to the internet and linked them to ordering software, allowing customers to place an order quickly and have it delivered to an allocated location near their home. A few cafés even allow you to make a request by SMS. Individuals who visit actual locations can make a request themselves using self-help booths. However, it is not only dinner pickup that is changing.

Other technology that allows you to bypass the wait is supper packs or employing a staple conveyance administration, both of which make asking customary food things extremely straightforward. Customers may place orders for face-to-face obtain or conveyance directly to their front door from common supermarkets to internet organisations. People have limitless options for what they can express, from over-the-counter medications to booze; everything they need is a tick away. Being only a tick away is also advantageous for businesses.

VII. ADDS MORE WAYS TO REACH CONSUMERS

Customers may always be connected to what they need thanks to handheld technology such as mobile phones and tablets. It also permits organisations to have more control over the business gadgets distributed to their conveyance drivers. This indicates that companies can continually appear in front of their ideal interest group while maintaining excellent help quality. Regardless, this requires them to be continuously on their game. The current clientele like having alternatives that are beneficial to them. People require what they require when they require it, regardless of whether they are requesting from a conveyance application, the web, or self-administration booths. Food conveyance administrations might benefit from all-day, every day access to their clientele.

VIII. THE FOOD DELIVERY SYSTEM OF THE FUTURE

Customers are increasingly expecting restaurants to have applications for delivery or pickup management. They require a larger selection of options for obtaining meals early and changing their orders. On the client side, technology is assisting food delivery companies in delivering their products to their customers as well as placing information in front of individuals. Self-administration stands or organisation claimed telephones/tablets sent to conveyance drivers make cell phone the board even more substantial for food conveyance organisations. Furthermore, the use of technology has resulted in an increase in the amount of customer information data available to businesses for analysis and the dissemination of company improvements. Innovation has expanded client communication avenues while also providing more personalised communications to customers. New technologies enable users to reduce wait times while ordering food or retrieving items. Furthermore, these apparatuses are being used to bring easy information and innovations in front of people regardless of the time of day or where they are located.

IX. CONCLUSION

This study revealed a massive cluster of impacts from online FD that are impacting a wide range of partners in varied ways, as shown in Table 3. While an effort has been made to organise the impacts as either 'good' or 'negative,' a case

might be made for each effect to be placed in an unexpected way. For example, during the COVID-19 emergencies, online FD had a positive effect in that it allowed people to source food without leaving their homes (i.e., a positive effect for purchasers), however utilising online FD right now implied more significant openness for conveyance individuals, which raised concerns about the wellbeing of conveyance individuals. It is the first multidisciplinary assessment that brings together scholarly research on the broad range of areas affected by the increased use of internet FD. It has also investigated the opportunities and challenges that these consequences bring. Third, it provides opportunities for all parties, including online FD industry specialists, strategy developers, buyers, and academics, to increase its positive and decrease its negative consequences. The future of online food delivery is exciting, and in order to ensure that the field develops in a fair way that serves the interests of all parties engaged, we need keep thinking about what's going on, and examine if things may be done better.

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