

# Beyond the Doorstep: Optimizing Food Delivery Platform

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**Abstract**— The introduction of internet food delivery services has caused a radical change in the food industry, changing how people get their food and how eateries interact with famished customers. In this thoughtful piece, we undertake a comprehensive examination of these websites' development, examining their influence on the food sector and examining the difficulties and possibilities they offer. We investigate the past advancements, distinct characteristics, and future directions related to these online marketplaces. Furthermore, by taking into account their flexibility in response to shifting society tastes and technology innovations, we want to shed light on their critical role in transforming dining dynamics.

**Keywords:** Food searches, restaurants, delivery trends, and culinary advancement

## Introduction

Many elements of our lives have seen significant changes as a result of the internet's and digital technology's rapid development in recent decades, including how people look for food delivery services and how restaurants interact with potential customers. Among the most noteworthy developments in this field are food delivery websites, which have become game-changing instruments in the modern food service industry. Online platforms are leading this revolutionary wave of change in the way customers and food enterprises interact with one another in the digital age.

Food delivery websites gained popularity in the late 1990s thanks to platforms like Grubhub, Seamless, and Eat24, which allowed customers to explore restaurant menus, place online orders, and build digital profiles for a smooth ordering process. By streamlining the ordering process and greatly increasing the options available to customers, the user-friendly interfaces provided a considerable change from previous means of placing food orders.

These platforms had a remarkable transformation as the

internet maintained its growth and expanded. Food delivery services that catered to particular diets and cuisines began to proliferate in the middle of the 2000s. With features like real-time tracking and personalized suggestions, an increase in the number of retailers having an online presence; and a greater awareness of e-commerce by customers [1]. platforms like Uber Eats, which debuted in 2014, improved the complete food delivery experience beyond just purchasing meals. With this extra layer, patrons could experience a more individualized and effective meal delivery service in addition to discovering a wider range of culinary selections.

Furthermore, a major turning point in the development of food delivery websites has been reached with the introduction of sophisticated algorithms and artificial intelligence (AI) tools. Alternatively, restaurants can employ crowdsourcing logistics, a network of delivery people (riders) who are independent contractors, a model that provides an efficient, low-cost approach to food delivery [2]

These days, complex matching systems run on these algorithms, sifting through enormous datasets to present customers with the most pertinent restaurant listings. It was previously impossible for users to build virtual profiles that served as dynamic preferences. These technologies have made ordering food easier, increasing productivity and enabling smooth transactions. These days, dining habits change faster in response to shifts in the market, making the food service industry more dynamic. Moreover, in 2018, Eleme in China, spent three billion yuan (US\$443 million) over three months in a successful marketing strategy to increase its market share to more than 50 percent of the Chinese market [3].

Moreover, by creating more inclusive practises and providing possibilities for different eateries, meal delivery services have been instrumental in advancing diversity and inclusion

in the culinary industry. A survey in 2019 of 1000 university students in Nanjing, revealed that at least 71.45% of them had used online FD for at least two years and that 85.1% of them used online FD more than once a week [4].

while others mostly eat at the student restaurant or cook at home (23.4%), with only 21% of the students surveyed stating that they had food delivered [5]. These platforms do, however, encounter difficulties, such as worries about algorithmic bias and data privacy. Users communicate personal information on these platforms frequently, and continuing improvements are required to guarantee fairness in the food delivery process due to the ethical ramifications of bias in recommendation algorithms.

Websites that provide food are expected to become much more active in the future. To analyze and synthesize the findings from the studies we employed a narrative synthesis [6], which is a flexible approach which allows the reviewers to be reflective and critical [7]. In the pursuit of extremely specialised restaurant matching, automation and artificial intelligence are expected to become increasingly important, resulting in more efficient, individualised, and customised meal searches for both customers and restaurants. Food delivery services that are tailored to particular cuisines and tastes are when reporting on the studies included in the review [8], becoming more and more popular. These platforms provide distinct advantages to both customers and eateries operating in these niche markets.

### ***Literature Survey***

Restaurants and customers alike can profit from a variety of services provided by food delivery websites thanks to the incorporation of AI solutions that facilitate profile optimisation. These platforms utilise algorithms to improve consumer preferences and expedite the ordering process for food. They include services including menu personalization, order placement, and payment processing. The large online FD platforms employ many thousands of workers, with Meituan and Eleme in China, employing around 1.17 million people to work as delivery people [9]. These systems provide restaurant partners with a range of services, from managing the menu to reaching specific customers through promotional features.

Websites that provide food have a big social influence and change the dynamics of the culinary industry. These platforms promote inclusion in the culinary workforce by giving different eateries equal Likewise, Swiggy in India has 17 thousand delivery people [10]. Consequently, many food businesses, which did react quickly enough to this change in customer demand, by embracing online FD, suffered a decline in profitability [11]. access to possibilities. Restaurant outcomes are positively impacted by the application of AI and data-driven algorithms in the meal delivery process, which maximises customersatisfaction and order fulfilment.

According to Marjan Mansourvar's research ideas [1], food delivery portals may contribute to improving equitable access to opportunities within the culinary industry. Technology's ability to link consumers with a wide range of food selections produces favourable results and expands

restaurant operators' commercial prospects. Increases in the cost of commissions can lead to restaurants looking for other online FD platform providers, which can be difficult to find in markets where individual online FD platforms have a virtual monopoly, or restaurants may choose to no longer be involved in online FD [12]. These platforms play a crucial role in helping restaurant owners by giving them the resources they need to connect with more customers.

Pooja T. Killewale[2], looking at administrative aspects, suggests that administrators have control over the whole meal delivery portal. They are able to supervise restaurant specifications, look for appropriate food partners, and control the platform's general operation. In addition, there have been reports that online FD platforms may put undue costs onto small restaurants, such as making them or the delivery people liable for refunds for delivery errors—even if the restaurant or the delivery person was not at fault [13]. These portals' easy-to-use interfaces enable restaurant owners to quickly post and update their menus, encouraging a collaborative environment.

The integration of artificial intelligence (AI) and data-driven algorithms has revolutionized the food delivery process, resulting in a more dynamic and inclusive market for restaurants and users alike, as we examine the impact of technology on the culinary environment between platform administrators and restaurant partners. This point was especially evident during the lockdown that occurred in 2020 owing to the occurrence of SARS-CoV-2 virus, with online FD being credited for enabling many food businesses to survive [14].

The conventional approaches to recruiting and employing delivery staff in the food delivery industry were frequently laborious and ineffective. Using personal connections, posting job ads in newspapers or on job boards, and going to career fairs were some of these strategies. But the food delivery business has changed dramatically since digital technology became available, and online job boards have been instrumental in making the hiring process more efficient. Dispensing with a physical storefront has many advantages for restaurants including a reduction in the cost associated with premises, reception and wait staff, the ability to virtually limitlessly increase the diversity of menus, concepts or even brands, the ability to run multiple websites and to provide a diversity of dining experiences catered for by one kitchen [15].

With the ability to provide a centralized location for recruiting, screening, and selecting skilled delivery staff, digital recruitment platforms have become essential tools for food delivery companies. Interestingly, despite this proclamation, there still appears to be interest in ghost kitchens in China [16]. By using these platforms instead of more conventional techniques, businesses can save time and money by connecting with a larger pool of possible candidates. Digital recruiting platforms also give businesses access to insightful data and analytics, which helps them decide which candidates to hire based on their qualifications and experience. In contrast, other studies report that online FD is seen by some Chinese [17]

For food delivery businesses, digital recruiting offers advantages beyond cost and efficiency. Companies may create a strong employer brand, attracting top personnel and

improving their reputation in the industry, by utilising internet channels. Additionally, digital recruitment platforms make it easier for employers and applicants to communicate smoothly, guaranteeing a quick and open hiring process.

One important element that impacts a food delivery website's performance is its user experience (UX). While a bad UX can result in customer turnover, unfavourable reviews, and reputational harm, a good UX can raise customer happiness, loyalty, and brand advocacy. A good user experience on meal delivery services is mostly influenced by the following factors:

The usability of food delivery websites is essential to user retention and happiness. Search features, easy navigation, and user-friendly interfaces are critical for keeping people on the site and encouraging return visits. The qualitative study from Guangzhou found that at least two hours a day could be "saved" by choosing to use online FD and that these consumers liked to order on online during their commute, so that they could relax and enjoy the food on their arrival home [18]. The food menu design improves user experience and makes it simpler for customers to identify desired food with its clear descriptions, dietary preference filters, and high-quality photographs. Customers' concern can be reduced and their satisfaction can rise with real-time order tracking and transparent communication throughout the delivery process. Online FD, especially if ordered in conjunction with colleagues, saves them time and promotes better communication as they are able to share their mealtimes together, discussing which restaurants and meals to order online and chatting with each other while eating [19]. Openness, prompt updates, and proactive communication build confidence and promote constructive word-of-mouth recommendations. In general, a well-designed website for meal delivery can result in higher client satisfaction and repeat business.

Efficient business procedures are crucial for food delivery firms to succeed as they may save expenses, expedite deliveries, and boost customer satisfaction. Important factors to take into account are efficiently scheduling workers and optimising delivery routes. Data analytics, predictive modelling, and route optimisation algorithms can all be used to increase productivity. Transaction mistakes can be decreased and user experience improved by streamlining the payment process and providing safe payment options. Reduce cart abandonment and boost customer satisfaction by integrating numerous payment methods, giving clear payment instructions, and putting fraud prevention measures in place.

Managing customer feedback is essential for pinpointing problem areas and finding solutions. Food delivery firms may increase customer loyalty and create data-driven improvements by utilising feedback tools such as questionnaires, reviews, and social media monitoring to gather input. In Italy, the Just Eat Observatory, witnessed a 137% increase in orders, for delivered lunches in 15 Italian cities in 2017, which they attributed to employees increasingly ordering and eating meals that are delivered directly to their offices [20]. New developments in the meal

delivery sector include drone delivery, voice ordering, and artificial intelligence (AI). AI is being utilized to optimize delivery routes, create personalised suggestions, and automate customer care. It is anticipated that these technologies will have a big impact on food delivery in the future.

## Methodology

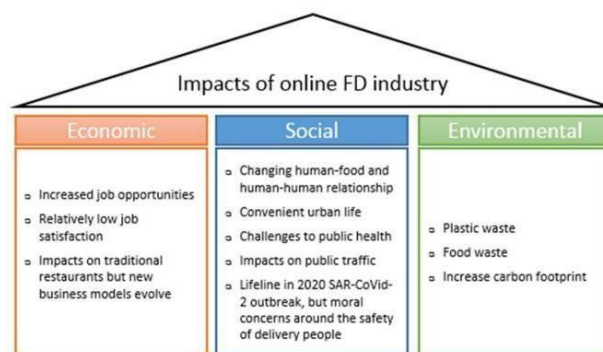
A thorough and multidisciplinary analysis of contemporary literature was necessary to comprehend the effects of online FD on environmental, social, and economic sustainability. Using the following search engines: Scopus, Web of Science, Google Scholar, and China National Knowledge Infrastructure (CNKI), more than 60 publications on "online food delivery impact(s)" were found. It does this by enlarging the range of the food environment. Traditionally, a neighborhood food environment encompassed approximately

1.6 km, equivalent to a 20-min walk from the home, workplace, or school. With online FD, the range of food service can extend out to 10 km and potentially much further [21]. The interdisciplinary character of the research subject and the want to search in two languages led to the extensive variety of databases being examined.

Crucially, government policies, reports, working papers, books and book chapters, and other grey literature sources were scanned as part of the research process in addition to journal articles. China found that the availability of "unhealthy" food outlets was four times greater than that of "healthy" outlets, and while 41.86% of the total food outlets provided food-delivery services; fast-food restaurants comprised 65.53% of these providers [22]. Included was source material that was published in either Chinese or English between 2010 and 2020. online FD could potentially be promoting a sedentary lifestyle which is harmful to health. Researchers have expressed their concerns that food delivery apps could have negative health impacts for Americans [23]. Although the goal of our study was to comprehend the effects of online FD worldwide, we decided to include papers in both Chinese and English because China has the most developed online FD industry and, thus, online FD in China has attracted the greatest amount of scholarly interest to date. As a matter of fact, our search's findings indicated that the majority of online FD literature discussed FD in relation to China.

## The Impacts of Online FD

Online FD's effects were categorized based on the sustainability framework's three pillars.



Many people now have access to a variety of work options because to the growth of the online food delivery industry, including positions as delivery drivers, wait staff, and chefs at restaurants, or as the programmers who create the web platforms and apps. Furthermore, the internet finance sector has been an enormous opportunity for supporting industries, such as those who produce, market, or maintain electric bicycles, and businesses that produce and distribute food packaging. Further, a study of 1220 university students in Beijing, China, found that a high frequency of online delivery food consumption was associated with a non-medical major, a preference for high fat and high sugar foods, physical inactivity and not surprisingly a high BMI, with 11.6% of the students surveyed being overweight or obese [24].

The sizable FD available online platforms provide jobs for thousands of people; Meituan and Eleme in China alone employ over 1.17 million individuals will be employed as delivery workers.

Similar to this, Swiggy, an Indian delivery service, employs 17,000 people [31], while Uber Eats, an online food delivery business located in the US, employs over 10,000 individuals.

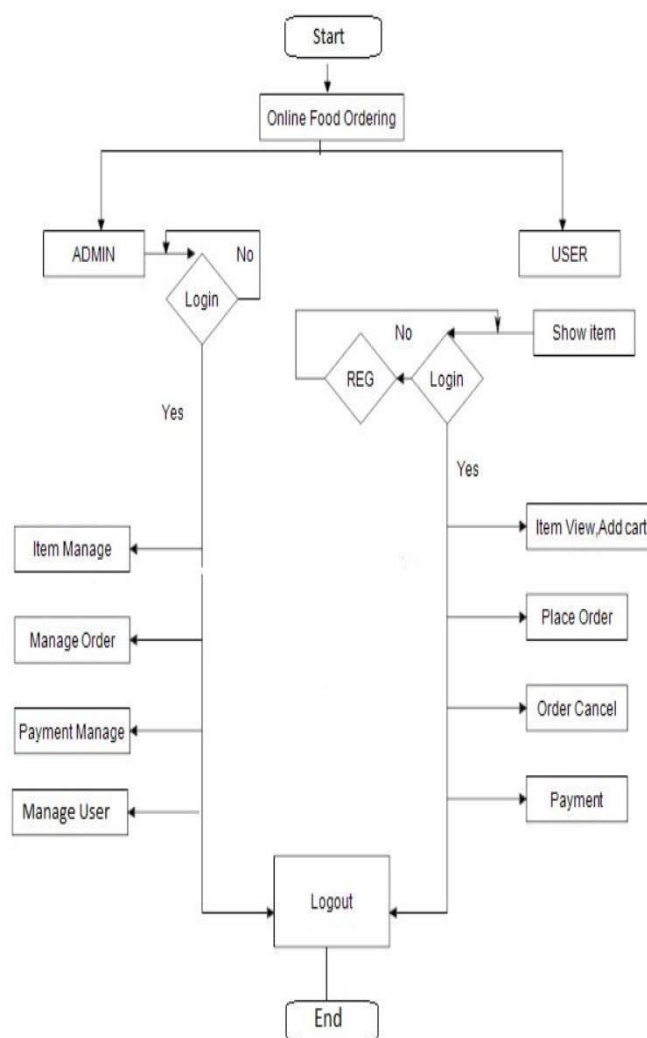
Undoubtedly, the internet-based food delivery industry has created a large number of jobs, particularly in the delivery sector. In order to control the traffic problems associated with food delivery, some university campuses in Jiangsu and Anhui province in China prohibited delivery vehicles from entering their campuses—a move that more than half (51.69%) of the students supported [25]. However, there have been concerns raised regarding the subpar working conditions that delivery workers face, such as the fact that their jobs are routine, they work long hours, receive little training, and face risks to their personal safety when delivering food [33, 34]. Due to these constraints, there are plenty of career options for food delivery workers; nonetheless, job satisfaction is frequently low, and attrition is high.

Food businesses have discovered that they can decrease their dining area, which can save them money on space rental fees and free up more space for their growing online FD services, in areas where the online FD industry is well-established. The creation of "ghost kitchens," also referred to as "cloud kitchens" or "dark kitchens," which are becoming comparatively common in the US, India, and the UK, is the ultimate manifestation of this trend. In addition, in some countries as restaurants started to open again, there was public debate about the high commissions (up to 35%) charged by online FD providers, such as Uber eats [36], and there was a public movement to more directly support restaurants by ordering and picking the food up directly from them. In addition, in the US, some online FD providers were sued during the COVID-19 pandemic for allegedly exploiting their dominance in deliveries to impose fees through higher menu prices [26].

These food delivery companies only get money from online orders; they don't even have a physical location.

Restaurants can benefit greatly from not having a physical storefront: they can save money on rent, reception, and wait staff; they can run multiple websites; they can offer a

variety of dining experiences catered for by one kitchen; and they can virtually increase the diversity of menus, concepts, or even brands. In China, for example, on the back of an increase in online FD, the total volume of packaging waste went from 0.2 million metric tons in 2015 to 1.5 million metric tons in 2017 [27]. Additionally, by taking advantage of scale, these kitchens can invest more in improving delivery management, which will allow them to deliver food to customers more quickly and affordably.



Without a doubt, doing FD online can save time that would otherwise be spent cooking, grocery shopping, or cleanup. Every online FD order saves at least 48 minutes, according to research conducted by the University of Chinese Academy of Sciences' Research Centre for Network Economy and Knowledge Management. In China, in 2016, the electricity used during vehicle charging and in dealing with the waste generated was estimated to have an indirect GHG emission of 73.89 Gt CO<sub>2</sub>eq [28]. The Guangzhou qualitative study discovered that using online FD could "save" at least two hours per day, and that these customers preferred to place their online orders during their commutes so they could unwind and savor their food when they got home.

In order to stay in business, many traditional restaurants have



had to make changes to their operations due to the direct influence of the online food delivery industry. Traditional restaurants with physical storefronts noticed a decline in in-store dining and foot traffic as the online food delivery industry began to take off. In contrast, in countries with more developed waste management systems and where the increase in online FD has not been as fast as experienced by China, the plastic waste has been relatively well managed, and it has received relatively little academic attention. For example, in the UK, in 2018, takeaway containers only account for 5.1% of littered plastic items, far behind cigarette filters (31.9%) and wet wipes (31.9%) [29]. This was primarily because more and more of their customers were ordering food online and picking it up to go—usually from their homes or places of employment. As a result, many food businesses that adopted online FD in response to this shift in consumer demand saw a decrease in profitability.

## Working

Meal delivery websites and applications constitute the intricate and ever-evolving structure at the center of the digital meal delivery scene. These platforms have completely changed how people place food orders and how eateries process them. Exploring the nuances of their functioning is necessary to comprehend their importance. In China, despite it being academically acknowledged that online FD is causing huge environmental challenges [30], This section will list the fundamental components that are required for any meal delivery platform to operate successfully.

## Food Delivery Platforms Must-Have Features

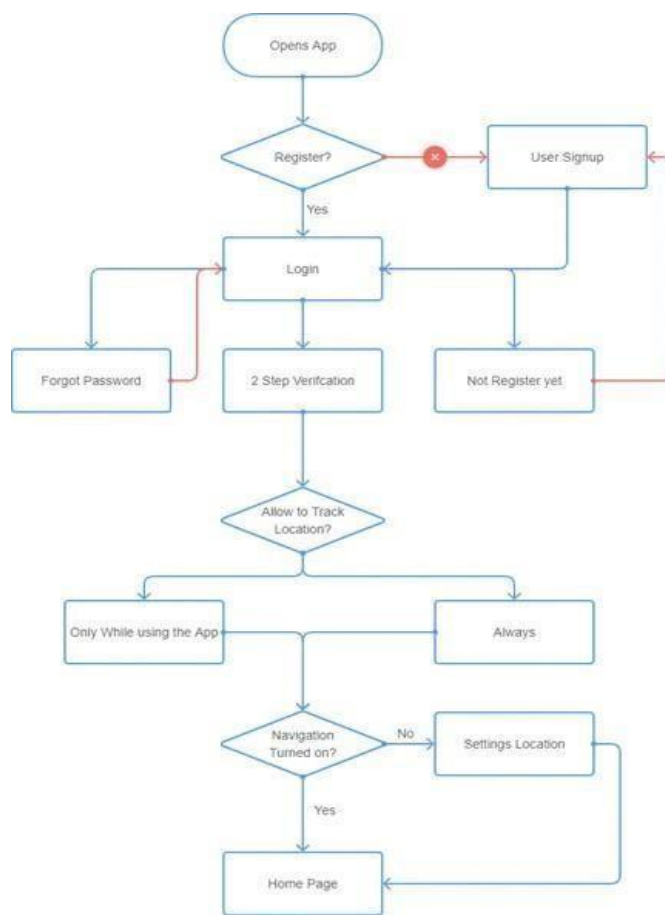
**User Registration and Profile Creation:** At the heart of a food delivery platform is the process of user registration and profile creation. It is the first step for users to create personalized profiles that include vital information such as contact information, delivery addresses, food preferences, and order history. This data is critical for customizing the user experience and ensuring smooth order placement and delivery.

**Simple Search and Filtering:** The ability for users to quickly search and filter restaurant listings is an essential feature of any food delivery service. With so many options at their disposal, users need effective tools that let them focus their search based on their own needs. Cuisines, locations, delivery times, and restaurant ratings are a few examples of these filters. In their quest for the ideal meal, this feature guarantees that users can precisely navigate through the vast array of dining options, saving them a great deal of time and effort.

**Large Restaurant Database:** These platforms' strong and large restaurant database is a crucial component of their functionality. Restaurants routinely publish comprehensive menus along with details about what's available, including dish descriptions, costs, and availability.

As a result, all users have easy access to a vast array of culinary options, from quick bites to fine dining experiences. According to a qualitative study of 19 households in the UK in 2012, home cooking in some

cases resulted in the production of more food than people need, and therefore, food ended up being wasted [31].



**Sophisticated Matching Algorithms:** To improve user experience, modern food delivery platforms frequently use sophisticated matching algorithms. To offer individualized restaurant recommendations, these algorithms examine the user's order history and preferences. To provide personalized recommendations, variables like delivery location, preferred cuisine, and previous orders are carefully taken into account. This makes the process of finding food more effective and increases the possibility of matching users with eateries that precisely meet their dietary requirements and preferences.

**Order placement and tracking done seamlessly:** Another essential component is an easy-to-use order placement process. Direct order submission, cart functionality, and menu browsing for restaurants should all be available to users on the platform. and the government is consequently putting more effort into dealing with other plastic waste, such as plastic bottles and bags [32]. Users should be able to easily navigate and complete their orders through this process, which should be clear, concise, and secure. To

further inform users about the status of their orders, real-time order tracking features ought to be offered.

**Good Communication and Feedback Systems:** Good communication is essential to establishing a connection between customers and eateries and guaranteeing a satisfying experience all around. Clear channels of communication between patrons and eateries should be made possible by platforms, enabling the exchange of feedback, updates on deliveries, and order clarification. Furthermore, it is recommended to incorporate mechanisms for collecting user feedback in order to obtain important information regarding user preferences, problems, and enhancement suggestions. However, both the government and the online FD sector are starting to take action to mitigate against plastic waste. The 'Implementation Scheme for the Classification of Municipal Waste' published by the Chinese government in 2017, clearly stipulates that 46 cities across China should implement a mandatory classification system for municipal waste. By the end of 2020, the recycling rate of municipal waste in each city must reach more than 35% [33].

**Machine learning (ML) and artificial intelligence (AI)- driven recommendation systems:** These algorithms provide individualized restaurant recommendations, promos, and menu suggestions based on an analysis of user data and order history.

**Order tracking and delivery optimization in real time:** Customers can keep tabs on their orders and get updates on their estimated arrival time and delivery status in real time. To guarantee effective and timely deliveries, delivery algorithms optimize routes and delivery times.

**Options for contactless delivery:** Due to worries about health and safety, contactless delivery methods, like doorstep deliveries or drop-offs at specified locations, have grown in popularity.

**Payment platform integrations:** Users have easy and safe ways to make payments thanks to smooth integrations with well-known payment platforms. This means that online FD food is more likely to be discarded owing to its unexpected poor taste or unexpected large portion size. A survey conducted in Changchun, China, showed that 90.1% of 884 university students surveyed left half of their food uneaten [34].

**Autonomous delivery vehicles:** By cutting delivery costs and increasing delivery areas, the use of autonomous vehicles for food delivery has the potential to completely transform the sector.

**Future developments in delivery models, consumer preferences, and technology** will probably all have an impact on the food delivery industry. Among the possible trends are:

**Drone delivery:** This method is being investigated as a potential means of delivering food to isolated locations or making rapid deliveries in urban settings.

**Dark kitchens:** As restaurants try to streamline their operations for delivery-only orders, dark kitchens—kitchens primarily intended for food delivery—are growing in popularity. A counter-argument is that food waste is decreased when using online FD, as online FD generates

less waste than cooking at home or eating out in a restaurant. According to a qualitative study of 19 households in the UK in 2012, home cooking in some cases resulted in the production of more food than people need, and therefore, food ended up being wasted [35].

**Hyperlocal delivery:** These delivery services prioritize speed and freshness by delivering meals from nearby restaurants in a very condensed area.

**Sustainability initiatives:** Using eco-friendly packaging and collaborating with regional and sustainable food producers are just two examples of the sustainability initiatives that food delivery platforms are progressively implementing.

## Conclusion

This review has outlined a wide range of impacts from online FD that are affecting a variety of stakeholders in different ways. Although an effort has been made to classify the impacts as "positive" or "negative," it is actually possible to argue that each impact should be classified differently. For instance, online FD was beneficial to consumers during the COVID-19 crises because it made it possible for them to get food without having to leave their homes. However, using online FD at this time increased delivery personnel's exposure, which was detrimental to them. Some food rescue organizations in the U.S. have begun leveraging crowd-shipping to transport surplus food more efficiently from donors to food-insecure recipients. However, the success of such initiatives relies on achieving a critical mass of donor and crowd-shopper participation [36].

Certain inferences about the study can be drawn from the research findings and responses to the open-ended research questions. We draw the conclusion that price has the strongest relationship to customer perceived value because the analysis indicates that respondents' concerns about the food delivery app's convenience, design, reliability, and variety of food options are positively correlated with customer perceived value, albeit marginally. The respondent's open-ended question contained a recommendation for the food delivery app companies: raise the price of the food offered by the app. The food delivery app allows users to choose from a variety of restaurants with different menu prices. The delivery stage (including delivery from the manufacturer to restaurant, from delivery people to consumer, from consumer to disposal unit) only accounted for 5% of the environmental impact. The most serious environmental impact in this new industry is solid waste pollution, followed by water pollution, resource consumption and air pollution [37].

The food delivery app allows users to choose from a variety of restaurants with different menu prices. For the young adult who works, they can provide a menu with options ranging from affordable to luxurious food. Furthermore, the food delivery app companies guarantee that the restaurants' food must be reasonably priced for young adults in the workforce in order for them to continue using the app. In addition, Drone food delivery is also less polluting because drones use batteries. Even though there are potential problems associated with using drones for food delivery, such as time risks, performance risks and psychological risks [38], food delivery app developers must guarantee that the restaurants featured on their app offer a variety of food options for young professionals to select from when dining out.

The meal delivery app companies may also allow young adults in the workforce to select their meal.

Without a doubt, food delivery services have revolutionized how we order and consume meals by providing convenience, variety, and tailored suggestions. These platforms are well-positioned to continue influencing the direction of food ordering and delivery because they make use of technology, cultivate relationships with restaurants, and adjust to changing customer preferences. We can anticipate even more innovative advancements that will revolutionize how we engage with food and improve our dining experiences as the industry grows and innovates.

In summary, this review has added three significant points. First of all, it is the first interdisciplinary review to compile scholarly studies on the wide range of fields affected by the growing usage of online FD. Second, it has covered the advantages and difficulties these effects present. These low-carbon transportation innovations can contribute to reducing greenhouse gas emissions, and so many food service companies are already preparing for the commercialization of drone food delivery services, such as Yogiyo in Korea and Domino pizza in New Zealand [39]. Thirdly, it draws attention to the ways that all parties involved—practitioners in the online FD sector, policymakers, consumers, and academics—can take action to minimize its negative effects and increase its positive ones. Online meal delivery has an exciting future ahead of it. To make sure the industry grows sustainably and meets the needs of all parties involved, we must keep an eye on current trends and consider how things might be done more effectively.

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