12-1-2022

The Impact of the COVID-19 Pandemic on Online Food Delivery Apps

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Bachelor of Science: Hospitality Management

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2019

A professional paper submitted in partial fulfillment of the requirements for the

Master of Hospitality Administration

William F. Harrah Hospitality College Graduate College

University of Nevada, Las Vegas

December 2022

Chair: Dr. Robert Rippee

Abstract

The restaurant industry continues to change as Online Food Delivery apps (OFD) continue to gain more popularity because of the COVID-19 pandemic. The food delivery market has grown over 52% since the start of the pandemic. Online food delivery app platforms like DoorDash, UberEats, and Postmates began to offer delivery over the past decade, rapidly growing with the help of ghost kitchens. Consumer behavior factors and intention to use OFDs have changed as more advanced app technology becomes available, and as the restaurant industry navigates the COVID-19 pandemic restrictions. Many consumers favor mobile delivery apps overall convenience and perceived usefulness. OFDs offered convenience and added safety precautions like contactless delivery during the pandemic when the fear of the virus was high, increasing the necessity to use these apps from consumers. This paper aims to examine how online food delivery apps have gained popularity in recent years, and how consumer behavior factors and intention to use these apps have been impacted by the COVID-19 pandemic.

Keywords: Food Delivery App (FDA), COVID-19, Ghost Kitchen, Online Food Delivery (OFD), Platform Structure Business

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Chapter One

The hospitality industry is constantly changing and expanding with new technological developments that benefit both consumers and employers. One of the most rapidly expanding areas of the industry is the food delivery apps on platform organizational structures. The online food delivery (OFD) or food delivery app (FDA) segment of the restaurant industry started gaining traction in the past decade. Online food apps started as a convenient way for busy consumers to order meals from restaurants and be delivered without having to contact any employees at their desired establishment (See-Kwong, 2017). Previously consumers placed phone-based or website orders, now orders can be made on smartphones. Food delivery apps have seen rapid growth in response to the COVID-19 virus pandemic. The COVID-19 virus is a severe respiratory illness characterized by fever, coughing, and shortness of breath, creating many local governments to enforce lockdowns or "stay at home" orders.

Prior to the start of the pandemic, the OFD segment of the industry was estimated to generate 107.4 billion in 2019 and 182.3 billion in 2024 (Hong et al., 2021). Delivery apps saw a significant increase in revenue due to many restaurants shutting down completely during the height of the pandemic. This made OFD apps a necessity for restaurants to survive. When restaurants were able to reopen, many operated at limited capacity, with social distancing restrictions. These restrictions forced drastic changes to restaurant operations, limiting potential revenue and consumer demand.

Over 3 million employees were out of work from restaurants during the pandemic, for 100,000 restaurants closed in the United States alone, with many never able to reopen (Luna,

2020). Causing the restaurant industry to lose an estimated 240 billion dollars in revenue by the end of 2020 (Luna, 2020). Restaurants that were able to reopen were only allowed to operate at restricted capacities requiring no or limited contact with guests and mandatory social distancing. Restaurant operators now faced an increased need to generate revenue to survive but also had to protect employees and consumers from COVID-19 exposure. Restaurants had to innovate and make operational changes to survive, which led to the drastic increase in the use of online food delivery platform users like DoorDash, UberEats, and Postmates. Contactless delivery and convenience of mobile app ordering became an emerging trend for many consumers.

DoorDash is the largest of the food delivery platforms, making over 1.9 billion in revenue from the start of the pandemic lockdowns to September of 2020 (Savitz, 2020). DoorDash occupies over half of the food service delivery app marketspace with UberEats and GrubHub behind them (Savitz, 2020). Many small businesses also acquired the help of large delivery platforms to compete with large restaurant corporations during the pandemic. Most small businesses found that OFDs were one of the only ways to generate revenue while restricted to to-go only services. For a lot of small businesses could not afford to implement an entire in-house delivery system under the crisis of the pandemic. Therefore, apps like Postmates, UberEats and DoorDash made it possible for small restaurants to compete with larger chain restaurants.

Both small restaurants and large corporations are turning to ghost kitchens, or virtual restaurants. Also referred to as “cloud kitchens,” are explained as food operations for delivery-only meals that do not offer any physical storefronts or dining areas (Volpe, 2020). Ghost kitchens are favored for their low cost and reduced staffing needs. For they produce a high volume of orders in a small space, because of limited menu options. Ghost kitchens and delivery focused restaurants are predicted to be a $1 trillion business by the year 2030 (Baltazar, 2021).

Both consumers and employers favored the opportunities that delivery apps provided during a time of uncertainty. However, as COVID-19 pandemic restriction/safety mandates are lifted, online food delivery apps are continuing to see increased demand. The pandemic changed consumer behavior, making these platforms a part of consumers daily lives and continue to grow in demand.

Purpose of Study

This paper aims to understand how the food and beverage industry has been impacted by the COVID-19 pandemic in relation to consumer behavior factors and intention to use food delivery apps. Based on the rapid growth in the food delivery app industry, the following research questions will be explored:

RQ 1. What consumer behavioral factors changed demand for food delivery apps during the COVID-19 pandemic?

RQ 2. How did the COVID-19 pandemic change consumers' intention to use online food delivery apps?

Conceptual Framework

The research was limited to mobile delivery apps, specifically related to the hospitality or food and beverage industry. The selected articles for review are from a limited number of databases: EBSCO, SAGE, ProQuest, Emerald Tourism, Hospitality eJournal Collection, ScienceDirect, MDPI, Elsevier, and Google Scholar. The search combinations used to find the articles include “COVID-19”; “Online Food Delivery”; “Food Delivery App”; and “Ghost Kitchen”; and “Platform Business Structure.”

Problem Statement

Food delivery apps have gained popularity in recent years due their convenient and vast number of restaurants available on these mobile platforms. However, the COVID-19 drastically changed how restaurants operate and how consumers place orders. Restaurant operators were forced to adapt or face permanent closure. Safety precautions specific to COVID-19 like contactless delivery and to-go only meals options made it difficult for restaurants to generate revenue. Many restaurants opted for online delivery platforms like DoorDash, UberEats, and Postmates. This paper will help examine consumer behavior factors and intention to use online food delivery apps prior to the COVID-19 pandemic and after. As conditions of the pandemic continue to change how many restaurants operate, it is necessary to determine if food delivery app users will continue to use these platform structures. This paper will also examine research surrounding food delivery apps prior to the COVID-19 pandemic, and after to determine how the COVID-19 pandemic has impacted OFDs, specifically behavioral factors and consumer intention to use.

Limitations

There are a few limitations with this research. Most of the previous research regarding consumer behavior factors and online food delivery apps happened prior to the COVID-19 pandemic and is limited. Considering the start of the pandemic was not long ago, (March 2020) research conducted during or shortly after the start of the pandemic, when food delivery apps had the highest demand is also limited. Most researchers do not have long periods of data to fully understand how the COVID-19 pandemic has affected long-term changes in customer's perception of behavioral factors in using OFDs. Another limitation to this paper is that some of

the countries where these studies examined customer behavioral factors and intention to use on OFDs are some of the first. For example, in India and Italy vast research has been conducted around e-services but not specifically OFDs (Ray et al., 2019; Troise et al, 2020).

Delimitations

This paper will examine research in multiple countries across the globe, however it will be limited to the hospitality or food and beverage industry. Since the COVID-19 pandemic impacted restaurants and consumers globally, this paper is not limited to one region. This paper will include previous studies from the United States, Europe, the Middle East, and Africa.

Definition of Terms

COVID-19: "A potentially severe respiratory illness caused by a coronavirus, characterized by fever, coughing, and shortness of breath" (Dictionary.com, 2020)

Food Delivery App (FDA): food orders made on a mobile app (Ray et al, 2019)

Ghost Kitchen: "virtual restaurants or cloud kitchens, are food operations for delivery-only meals with no physical storefronts or dining areas" (Volpe, 2020)

Online Food Delivery (OFD): "the process whereby food that was ordered online is prepared and delivered to the consumer" (Li et al., 2020) Or "services refer to internet-based food ordering and delivery systems that connect customers with partner restaurants via their websites or mobile applications." (Ray et al 2019)

Platform Structure Business- a business model (not a technology infrastructure) that focuses on helping to facilitate interactions across many participants. It is a form of short-term transactions like connecting buyers and sellers or they could involve formation of longer-term social relationships." (Deliotte, 2015)

Chapter Two: Literature Review

Online Food Delivery (OFD) or Food Delivery Apps are applications that provide food orders placed online directly to the consumer (Li et al., 2020). OFDs can also be considered a service in which internet-based orders and delivery systems are partnered with restaurants through mobile applications (Ray et al., 2019). New technological advancements have changed consumer demand and preferences for delivery services (Li et al., 2020; See-Kwong et al., 2017). Previously, consumers used restaurant-to-consumer delivery where the restaurant is responsible for all orders, payment, and transportation/delivery (Li et al., 2020). However, now consumers favor platform-to-consumer delivery, where delivery is outsourced to a third-party platform that is responsible for everything except the preparation of the food orders (Li et al., 2020). Most food delivery apps are operated through a Platform Structure Business. DoorDash, UberEats, GrubHub are all popular food delivery apps that operate through a platform structure business which is a form of technology infrastructure (Deliotte, 2015). This infrastructure allows consumers and suppliers to have interactions (in this case food delivery orders) that lead to long term social relationships (Deliotte, 2015). OFDs and FDAs now act as intermediaries between restaurants and the consumers (Pillai et al., 2022; Belanche et al. 2021). These long-term social relationships with consumers have changed from the first introductions of OFDs applications in the past decade to the present (Deliotte, 2015). The pandemic not only increased demand for food delivery but changed how consumers rely on these delivery services for they are also available 24/7 from anywhere.

Online-to-offline (O2O) delivery services have seen growth in years leading up to the COVID-19 pandemic. For Asia grossed over $150 billion in revenue since 2015 in O2O commerce (Roh & Park 2019). While India's O2O commerce grew to over $64 billion while

Japan had over $226 billion in revenue (Roh & Park 2019.) However, while O2O delivery services like OFDs were available, customers were more accustomed to placing orders over the phone or through websites prior to the COVID-19 pandemic. After these orders were placed, restaurants were responsible for preparing orders, monitoring payments, and the organization of delivery (See-Kwong, 2017; Cho et al., 2019). Yeo et al. (2017) found that over 22% of ordering from restaurants were placed over the phone in 2017, making it the most common type of ordering. While Cho et al. (2019) found that about 95% of restaurants were exclusively using paper menus and over 80% of restaurants did not offer any type of delivery prior to the pandemic. To understand the growth of OFDs and determine if consumer behavior changed during the COVID-19 pandemic, a review of previous literature is needed. This literature review will discuss previous studies and findings on food delivery apps prior to the COVID-19 and after to find conclusions about consumer behaviors with OFDs.

Models and Theories Examining OFDs

A thorough search of previous literature was conducted, and there are a few key models and theories that have been used to determine consumers' intention to use food delivery apps and their behaviors. The Unified Theory of Use and Acceptance of Technology (UTAUT), Technology Acceptance Model (TAM), and Theory of Planned Behavior (TPB) have been used to determine behavioral factors and intention of use for consumers when using food delivery apps.

Zhao and Bacao (2020) defines UTAUT as a “social cognition theory," that “predicts users' behavioral intention to use new technology systems.” The study conducted by Zhao and Bacao (2020) used UTAUT to find factors that motivate consumers to reuse FDAs in the COVID-19

pandemic continuously. Expectation Confirmation Theory (ECM) is like UTAUT, for it measures three elements: performance expectancy, confirmation, and satisfaction in evaluating technology systems (Zhao & Bacao, 2020). It was found that performance expectancy was the most relevant factor in continuing to use a delivery app service. Other factors that contributed to intention to reuse and perception were quality of service and overall satisfaction (Zhao & Bacao, 2020). In addition, the results of this study included that motivations of consumers increased when consumer expectations and the requirements necessary for optimal app functions were understood and further developed (Zhao & Bacao, 2020). Other previous research that used UTAUT2 was Alalwan (2020) which studied Mobile Food Ordering apps (MFOAs), which are like OFDs, in Jordan. Alalwan (2020) defines a MFOA as "an innovative and convenient channel to access restaurants, view food menus, place food orders, and make payments without any physical interaction with restaurant staff." UTAUT2 was used to determine the features of mobile ordering that contribute to the intention to reuse the apps. According to Alalwan (2020), online reviews, online ratings, and online tracking contributed most to consumers' intention to reuse MFOAs. Gaps in this study included not being able to determine how customers' perception of MFOAs will change over time (Alalwan, 2020).

The use and explanation of the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) were studied by Troise et al. (2020) to also determined factors most influential in OFD choices by consumers. This study was conducted in one of the most rapidly growing OFD using countries in recent years, Italy. In 2019, food delivery revenues in Italy grew 56%, and continued to increase through the pandemic (Troise et al., 2020). The main factors researched using the TPB were consumer trust in OFD platforms, and consumers' perception of risk during the COVID-19 pandemic. The study also found that TAM is directly influenced by a

user's perceived usefulness (PU) when using a OFD (Troise et al., 2020). Perceived usefulness is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Troise et al., 2020). The other findings of this study include that convenience was the main factor when consumers decide on which OFD app to use, and the variety of the products sold was as a top factor. Gaps in this research include that this study is one of the first to use an integrated approach to determine factors that influence consumer preference with TAM and TPB (Troise et al., 2020). In addition, this study does not have the data to fully understand how the COVID-19 pandemic has/if changed consumers behavior with OFDs due to the study being conducted shortly after the pandemic began.

Another theory that previous research has used to determine the behavioral factors of consumers using OFDs is the Theory of Consumption Values (TCV). Chakraborty et al. (2022) used TCV to determine not only consumer behavior but the intention to use FDAs and OFDs. The TCV theory uses social, emotional, condition and epistemic consumption values (Chakraborty et al., 2022). The functional consumption value is important to determine the perceived utility acquired from consumers. This includes the app's overall functionality, utilitarian, or physical performance (Chakraborty et al., 2022). The study finds that a consumer will be more likely to use a product or service like an FDA if they find one or more of the functional values useful for them (Chakraborty et al., 2022).

Pillai et al. (2022) also discusses consumer perception when using OFDs. However, this study found that the three biggest factors contributing to consumer attitudes and purchase intention were perceived benefits, perceived risks, and online persuasion. Pillai et al. (2022) defines perceived benefits as convenience, trustworthiness, order accuracy, and variety of choices. Other factors contributing to consumer attitude and purchase intention were satisfaction,

previous online expectancy, and reliability of OFDs (Pillai et al., 2022). The limitations in this study include that researchers are not sure how customer perception will change over time.

OFDs Prior to COVID-19 Pandemic

Research conducted prior to the COVID-19 pandemic on OFDs and FDAs included several studies that examined consumer behavior. See-Kwong et al. (2017) examined the role technology has played in the food delivery market, changing from phone-based order to new demands like OFD. The study found that these technological advancements are based on the consumers changing demands and preferences (See-Kwong et al., 2017). Consumer habits change based on the technology available. Therefore, online food delivery apps began to grow due to their diverse offerings and the overall convenience (See-Kwong et al., 2017). Consumers also determined OFDs to be cost effective and convenient. A motivating factor for business owners was the ability to increase online food delivery presence to further satisfy customer demands and needs (See-Kwong et al., 2017). This study concluded that preferences may change over time but are interdependent on the technology that is available to consumers on e-commerce platforms (See-Kwong et al., 2017). While Cho et al. (2019) study found online to offline (O2O) allowed for growth and innovation in food delivery apps. It is predicted that the food delivery market will become essential to restaurants 2-3 years from now, just as take-out windows as essential to the fast-food restaurant business" (Cho et al., 2019).

However, Yeo et al. (2017) found that the variety of food delivery platforms available to consumers started to change how consumers place food orders. A main motivation for consumers in this study was that emerging OFD technologies were overall perceived as useful and had price saving orientation. During the time that this research was conducted, many restaurants turned to

OFDs for the customization and quick delivery options. Customers are more likely to use OFDs that are convenient and can be easily navigated (Yeo et al., 2017). Another motivation for consumers was a wide variety of products/services offered on the apps. This also allowed OFDs to remain competitive in the expanding market. Since this study was conducted prior to the COVID-19 pandemic, it states that 22% of ordering from restaurants was through websites or over the phone ordering (in 2017). Making phone orders is the most common type of ordering pre-pandemic (Yeo et al., 2017). Therefore, OFD were not as popular as phone ordering before the pandemic, but the number of new daily OFD users was increasing as new technology emerged.

Another study prior to the COVID-19 pandemic, found that there are two factors that will determine FDAs survival. First, Ray et al. (2019) states that FDA must be able to serve the needs of consumers. Secondly, OFDs must compete with other FDA services in the same marketplace, for the number of food-delivery apps are rapidly growing globally. While Ray et al. (2019) studied uses and gratifications (U&G) for consumers to determine the acceptance of FDAs in India. With the intent to determine the needs of consumers, which result in the intention to use FDAs (Ray et al., 2019). This study is one of the first to explore the FDA market in India and explains that one limitation of prior research includes that vast research has been conducted around e-services but not specifically FDAs (Ray et al., 2019).

OFDs During the COVID-19 Pandemic

The COVID-19 pandemic forced many restaurants to close completely or limit their operations. Therefore, many restaurants were forced to shift their daily operations to OFDs to

survive the pandemic. Many countries were on lockdown restrictions, making it difficult for restaurants to reach consumers. Consumers had difficulty obtaining food outside the home, making OFDs a popular and safe choice to deliver. Hong et al, (2021) estimates that the OFD market is expected to generate $182 billion in revenue by 2024, while in 2019 (prior to the pandemic) the market generated $107 billion. As the OFD market continues to grow, research conducted during the COVID-19 pandemic or shortly after provides information about consumers. This includes how consumers' attitudes towards OFDs have changed. The most influential behavioral factors that consumers attribute to OFD usage was also studied during the pandemic and is still ongoing as the industry changes.

Gavilan et al. (2021) found that mobile ordering was successful during COVID-19 because of the simplification of the overall ordering process, experiential value, and fear of the virus. As previously issues mobile apps offered a high level of service in a time where services were unavailable or restricted and OFDs created a new delivery channel for consumers prior to the pandemic. However, now consumers began to use OFD not only for convenience but to distance themselves socially for fear of contracting COVID-19. Therefore, fear of the COVID-19 virus was a main factor in the increase of OFD usage. Based on this, Gavilan et al. (2021) recommends that restaurant operators use OFDs to understand customer concerns and to anticipate how the apps can innovate to help improve customer experience and experiential value as the fear of the virus decreases.

While Hong et al. (2021) discusses the popularity of OFDs, and it also challenges why consumers intend to use these services during COVID-19. This study also finds that COVID-19 had an impact on human behavior changes, meaning the pandemic had a direct effect on the increase in OFD usage compared to pre-pandemic. There were six factors that were studied to

find a consumer's intention to use (CIU) a food delivery app. Which include perceived usefulness, perceived ease of use (PEOU), price saving benefit, time saving benefit, food safety risk perception, and trust (Hong et al., 2021). The study explains that PEOU is “the degree in which a person expects mental or physical challenges in adopting new technology” (Hong et al., 2021). Customers had a perceived severity and perceived vulnerability when using mobile delivery apps (Hong et al, 2021).

Malhotra and Makwana (2021) examined food delivery apps in central India. Regarding the ease of use for food delivery, user experience has advanced rapidly. Consumers only need an internet connection and a smartphone to place orders on these OFDs. The study discusses how there are several advantages for consumers using OFDs, including timely delivery, quality food, a variety of options, and opportunities to leave reviews. Consumers with busy schedules and environmental changes were driving factors when choosing to have food delivered, versus making meals in their homes. Malhotra and Makwana (2021) also offer more insights into consumer behavior, defined as a consumer's processes that are chosen for using a particular service or product. This is important to understand how to serve consumers with what they desire (Malhotra & Makwana, 2021). Convenience and accuracy on food delivery apps have also gained consumers acceptance (Malhotra & Makwana, 2021).

In a study of FDAs in China, the number of FDA on the market have increased rapidly, expanding mostly during the COVID-19 pandemic. China had around $51 million USD in revenue from food delivery apps during the pandemic. Habib et al. (2022) concentrates on online consumer engagement (OCE) and platform preference among FDAs post-pandemic. OCE was found to influence consumers purchasing, and overall platform preferences (Habib et al. 2022). Consumers have different expectations of services offered and overall quality of food delivery

apps. Habib et al. (2022) stated that previous research has shown that platform preference can be affected by consumer satisfaction and will continue to be influenced by it. FDAs are effective in reaching new customers and many users of FDAs find their service to be value adding (Habib et al. 2022).

Ghost Kitchens and Virtual Brands

Ghost kitchens or cloud kitchens are food production intermediaries that only offer delivery. For they do not have any physical dining rooms for customers and operate online through OFDs. Most ghost kitchens take over spaces that have no appeal to regular restaurant operators like suburban areas or warehouses. Virtual brands can operate through ghost kitchens; however, the kitchens create the physical products and are marketed or organized through OFDs. According to Perkins (2022) a virtual brand is defined as “a trademarked business created for online ordering and delivery." For example, Chili’s and Red Robin ran virtual brands through ghost kitchens during the COVID-19 shut down under different virtual brand names (Perkins, 2022). Most consumers did not know they were run by these popular chain restaurants and featured different menu items. The services offered through a virtual brand cannot be purchased in the brick-and-mortar restaurant, for they are only available online (Perkins, 2022). According to Fantozzi (2019) virtual brands are “vessels" and customize their capabilities based on customer needs. Most virtual brands can produce up to five different restaurants in one vessel or kitchen (Fantozzi, 2019).

There are several previous studies that have examined how ghost kitchens effect OFD demand. According to Cai et al. (2020) ghost kitchens gained popularity before the pandemic but saw rapid growth due to consumer demand for food delivery platforms such as OFDs. It is

estimated that the ghost kitchen/OFD market will continue to increase revenue by $1 trillion dollars by 2020 (Cai et al., 2020). Ghost kitchens helped produce delivery orders with limited contact and followed social distancing requirements, making it a popular choice for consumers. This previous study examined customers' perceived benefits and perceived risks when knowing they were ordering from a ghost kitchen. The behavioral intentions of consumers and overall knowledge of ghost kitchens from consumers was also researched. The goal of this study was to understand if the intention to use a ghost kitchen changed when a consumer is aware their order is coming from a ghost kitchen versus a brick-and-mortar restaurant. The findings were that consumers valued personal benefits like convenience, quality of food choice and societal benefits highest, which contributed to their overall perception of trust in ghost kitchens (Cai et al., 2020).

Volpe (2020) also discussed the impact of the pandemic on restaurants and defines ghost kitchens and the categories of ghost kitchens. This research also discusses a few of the advantages of using a ghost kitchen like reduced costs and waste. The three main types of ghost kitchens are incubator/pop-up, commissary/shared kitchens, and kitchen pods which can produce many orders in a small space. For consumers, Volpe (2020) found that ghost kitchens will utilize the change in consumer behaviors like increased willingness to order from an OFD that uses a ghost kitchen. As previously stated, consumers order from a delivery app more frequently than before the pandemic. With an overall 77% increase in delivery orders since 2013 (Volpe, 2020).

The Future of OFDs

Even as COVID-19 restrictions for the hospitality industry continue to change and vaccines become available, previous research shows that OFDs usage is continuing to increase. Consumer

behavior has changed based on the new technology and added convenience offered by OFDs. For example, Rana (2022) states that DoorDash is looking to continue growing in profits even as restaurants reopen by increasing the services available to users including offering groceries and alcohol. DoorDash will also be investing in creating better consistency with order and tracking drivers through the order fulfillment process (Rana, 2020).

However, with the reopening of restaurants after the COVID-19 pandemic, Forman (2021) found that the top OFD platforms will see a decline in overall revenue by 23% until 2025. The number of monthly users will continue to increase by 30%. This means that despite the availability of normal restaurant operations, including dine in options, consumers will continue to use OFDs. Consumers are “forever changed by OFDs' ' because of their convenience and variety (Forman, 2021). Karunaratne (2020) also argues that OFDs will continue to be successful as COVID-19 restrictions ease, and restaurants reopen. However, many researchers are questioning if consumers will continue to use OFD services as much as they did during the pandemic. Or if they will return to visiting restaurants in person as safety concerns ease. As government lockdown restrictions have reduced, DoorDash has seen a $43 million dollar decrease in revenue, for the necessity to use an OFD for restaurants has begun to decline but overall consumer demand and intention to use has not (Karunaratne, 2020).

Summary

Online Food Delivery apps have grown rapidly due to the COVID-19 pandemic. With the growth of OFD technology consumers behavior has changed. Previous research showed that models like The Unified Theory of Use and Acceptance of Technology (UTAUT), Technology Acceptance Model (TAM), and Theory of Planned Behavior (TPB) can determine how OFDs

and COVID-19 restrictions influenced overall consumer preference. Consumers now demand simplified ordering processes and improved customer experience. Ghost kitchens attributed to the change in consumer behavior factors for these kitchens are food production intermediaries that only offer delivery. Their virtual operations and ability to produce many orders in a small low-cost facility allowed OFDs to satisfy the increased consumer demand.

Chapter Three

Food delivery apps have gained popularity over the past decade and are continuing to capture consumers with advanced delivery technology. However, with restaurants forced to close or limit operations during the COVID-19 pandemic, many businesses were forced to rely on food delivery apps to generate any profits during a devastating time for the restaurant industry. This paper examines how consumer behavior factors and intention to use have changed when using online food delivery apps due to the conditions for the COVID-19 pandemic. A literature review was conducted to examine prior studies which offered insight into conditions of the food delivery apps segment in the hospitality industry. The conditions were evaluated through research conducted before the COVID-19 pandemic, shortly after restaurants closed, and as they reopened. This allowed for the comparison between the impact the pandemic and technology available had on consumer demand.

The research questions being addressed are:

1. How did consumer behavior factors change when using online food delivery apps during the COVID-19 pandemic?
2. How did the COVID-19 pandemic change consumers' intention to use online food delivery apps?

Research found that several previous studies were already evaluating consumer behavior and intention of use of food delivery apps. The most common method used to evaluate factors most important to consumers and intention to use online food delivery apps was the Technology Acceptance Model (TAM), Unified Theory of Use and Acceptance of Technology (UTAUT), and Theory of Planned Behavior (TPB). UTUAT was used by multiple researchers to find the

motivators that contribute to consumers reusing OFDs technology. TAM was found to be directly related to a user's perceived usefulness (PU) of the technology, and overall convenience. While TPB determined a consumer's overall trust of OFDs and what the consumer's perceived risk of using the technology was.

Review of Research Questions

RQ1

The first research question addresses the behavioral factors exhibited by consumers that use online food delivery apps during and after the COVID-19 pandemic. Hong et al. (2021) stated that the COVID-19 had an impact on human behavior changes, meaning the pandemic had a direct effect on the increase in OFD usage compared to pre-pandemic. Cai et al (2020) found that consumers value personal benefits like convenience and quality of the product which contributed to the overall perception of trust in OFDs. Chakaborty et al. (2022) identified that consumers will be more likely to use a OFD, if they find one or more of the functional values useful for them. The functional values include overall functionality, utilitarian and physical performance.

RQ2

The second research question addresses how the COVID-19 pandemic changed consumers' intention to use food delivery apps. Li et al. (2020) and See-Kwong et al. (2017) found that technological advancements such as platform business structures (like OFDs) have increased demand and impacted intention to use food delivery apps. Since the pandemic increased demand, consumers are more likely to rely on these delivery services because they are available 24/7. In

addition, the restrictions and closures faced by restaurants during the pandemic made the safe, and contactless delivery offers by OFDs a necessity to consumers.

Consumer Behavior Factors

Prior to the pandemic, OFD were gaining popularity with consumers but not considered a necessity as restaurants were open and operations had not been affected by COVID-19 yet. Technology had advanced to offer mobile food orders to replace previous call-in or website orders. OFDs were becoming intermediaries between restaurants and the consumers (Pillai et al., 2022; Belanche et al. 2021). Therefore, consumers started to develop long-term social relationships from the first introductions of OFDs applications over the past decade (Deliotte, 2015). A motivating factor for business owners was the ability to increase online food delivery presence to further satisfy customer demands and needs (See-Kwong et al., 2017). Over time, the increase in OFD offerings influenced consumer behavior to change, for consumer behavior is interdependent on the technology that is available to consumers on e-commerce platforms. The Expectation Confirmation Theory (ECM) measures three elements; performance expectancy, confirmation, and satisfaction in evaluating technology systems from users (Zhao & Bacao, 2020). Performance expectancy was the most relevant factor in the intention to use a delivery app service.

As previously discussed, COVID-19 pandemic restricted restaurants from operating at a normal (pre-covid) capacity. This caused online food delivery services like DoorDash, UberEats and FoodPanda to see become a necessity for consumers to order their desired restaurants when the fear of contracting COVID-19 was high. Therefore, the COVID-19 pandemic had an impact

on human behavior changes which caused a direct effect on the increase in overall OFD usage compared to pre-pandemic.

Intention to use OFDs

Convenience, quality, and variety of services were main motivators for the intention to use OFDs by consumers during and after the start of the COVID-19 pandemic. Consumers are more likely to use a product or service if it is convenient, or perceived as useful (Triose et al., 2020). The Technology Acceptance Model (TAM) is used to determine the level of perceived usefulness from consumers in previous studies. The three biggest factors contributing to consumer attitudes and purchase intention were perceived benefits, perceived risks, and online persuasion (Pillai et al., (2022). In addition, consumers are more likely to use OFDs that are convenient and can be easily navigated (Yeo et al., 2017).

Impact of Ghost Kitchens

Ghost kitchens serve as vessels for OFDs, for consumers' place orders and the ghost kitchens are the food production intermediaries. With no physical dining rooms, ghost kitchens can produce multiple virtual brands and large numbers of food orders in a small kitchen. With the closures of restaurants across the globe, ghost kitchens became vital to OFDs, for they were able to help restaurants move to online platforms for ordering and keep up with demand. Ghost kitchens saw a large increase in demand during the COVID-19 pandemic, affecting the perception of ghost kitchens for consumers. The perception of ghost kitchens influences the intention to use OFDs, for consumer value personal benefits that ghost kitchens attribute to OFDs like convenience and quality of food order (Cai et al., 2020).

Limitations of Research

The author researched the COVID-19 pandemic to find suggestions for the hospitality industry. The research was gathered from the following databases: EBSCO, SAGE, ProQuest, Emerald Tourism, Hospitality eJournal Collection, ScienceDirect, MDPI, Elsevier, and Google Scholar. The window of research available consisted around food delivery apps prior to the outbreak, and research conducted shortly after the start of the pandemic. The use of key terms narrowed the search for previous literature, it is possible that other literature relevant to this paper may have been missed.

Questions for Future Research

During the timing of this paper, COVID-19 restrictions have decreased, and many restaurants were able to reopen to full capacity. However, the COVID-19 virus, or any unforeseeable event that may arise in the future will continue to be a threat to the hospitality industry, specifically restaurants. Restaurants now depend on OFD apps as strategic revenue, and became an alternative revenue stream, accelerated by the conditions of the COVID-19 pandemic. While OFDs are a new line of business for many restaurants and ghost kitchens, it is not yet realized if the demand seen during the pandemic will continue for online food delivery apps. Additional research in the future may be beneficial to determine the following questions for the restaurant industry and online food delivery apps:

1) Will consumers continue to use food delivery apps at the same demand levels that they did during the height of the pandemic as restaurants reopen?
2) Will restaurants continue to be dependent on food delivery apps as they reopen and operate with no or limited COVID-19 operational changes?

3) Consumer perception of food delivery apps changed during the pandemic. How will their perceptions of convenience and overall usefulness of OFDs change as COVID-19 restrictions ease?

4) How will the most prevalent consumer behavioral factors that led to the intention to use food delivery apps change long-term compared to the start of the COVID-19 pandemic?

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