

# Researching the Rise and Consequences of Food Delivery Services

A Research Paper in STS 4600

Presented to the Faculty of the School of Engineering and Applied Sciences  
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science in Computer Science

In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science in Computer Engineering

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March 21, 2021

On my honor as a University Student, I have neither given nor received unauthorized aid  
on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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## Introduction

SARS-CoV-2, the virus behind COVID-19, has caused a worldwide pandemic. Since its first report on December 31, 2019, the virus has killed over one million people worldwide and has influenced every aspect of human life (Nicola et al., 2020). The Centers for Disease Control and Prevention (CDC, 2020) reports that this virus produces symptoms including coughing, and that the virus spreads through respiratory droplets or small particles produced when an infected person coughs, sneezes, sings, talks, or breathes. These droplets can be inhaled, which is the main way the virus spreads, but they can also land on surfaces and objects and be transferred by touch. This raises many pressing concerns, such as how careful people must be around each other as well as touching surfaces previously touched by others. Avoiding coming into contact with shared surfaces can be simple in some aspects, but more difficult and tedious in others, such as food. With a global pandemic looming over nearly every establishment, how do people keep themselves safe?

To mitigate the risk coronavirus poses, many people look to guidelines from official sources. With respect to restaurants and bars for example, the CDC states the lowest risk for food services are drive-through, delivery, take-out, and curbside pickup (CDC, 2019). To facilitate these methods, companies and consumers alike have developed a more pressing need for virtual platforms. “Panic-buying and fear of contagion are driving many consumers to download apps for groceries and meals during the coronavirus crisis” (Dishman, 2020). According to a survey done on grocery shopping during the pandemic, 35% of United States (US) consumers in June 2020 used online grocery delivery services, an astonishing three times more than in August 2019 (Bishop, 2020). There is also a rise in popularity of food delivery applications (FDAs). Services such as Grubhub, Uber Eats, DoorDash, and Postmates utilize online and mobile food ordering

platforms to connects users to restaurants. These services have all seen exceptional increases in users and revenue from 2019 to 2020 following the COVID-19 pandemic. This research will explore what actors spurred the growth of food delivery services and their effect on the food industry in the United States.

### **Case Context**

Even before coronavirus struck the world, food delivery services have been on the rise, and it is easy to see why. These platforms make it easy for establishments to sell their products and convenient for customers to purchase them. I will first be considering the upward trend of food delivery services. There are many reasons why people use these services. Things such as convenience, price, availability, and loyalty are all potential factors. One viewpoint is that a user's intention to use an online-to-offline (O2O) service is influenced by "societal pressure, delivery experience, customer experience, ease of use, quality control, convenience, listing, and search of restaurants" (Ray et al., 2019). Another view is on why virtual platforms is rising looks at the types of people who use them. According to Andrew Murphy (2006), these seem to be wealthy households with time intensive jobs, parents with young children, those without cars, the less-abled and elderly, those who prefer using a computer to socialization, and those for whom ordering is the best way to obtain hard-to-get items. To investigate the rise of these FDA's, it is imperative to know where to start.

First, it is easy to see that food delivery applications have been increasing in size over many years. This can be displayed by a simple bar graph showing the revenue total of food delivery apps in the United States. This gives an overall idea of the growth of FDA's but does not give us very specific information. To look more closely at the growth of virtual platforms, I

narrowed the search by determining which virtual services held the most market share in the food delivery business. Figure 1 offers a visual representation of the most prominent companies' share of the market for food delivery applications. As shown in Figure 2, there are four main delivery services to analyze: Uber Eats, Postmates, DoorDash, and Grubhub. As of December 1, 2020, Uber acquired 100% of Postmates Inc (Uber Technologies Inc, 2020), so while there are four main delivery services, since December 2020 there are only three companies backing them.

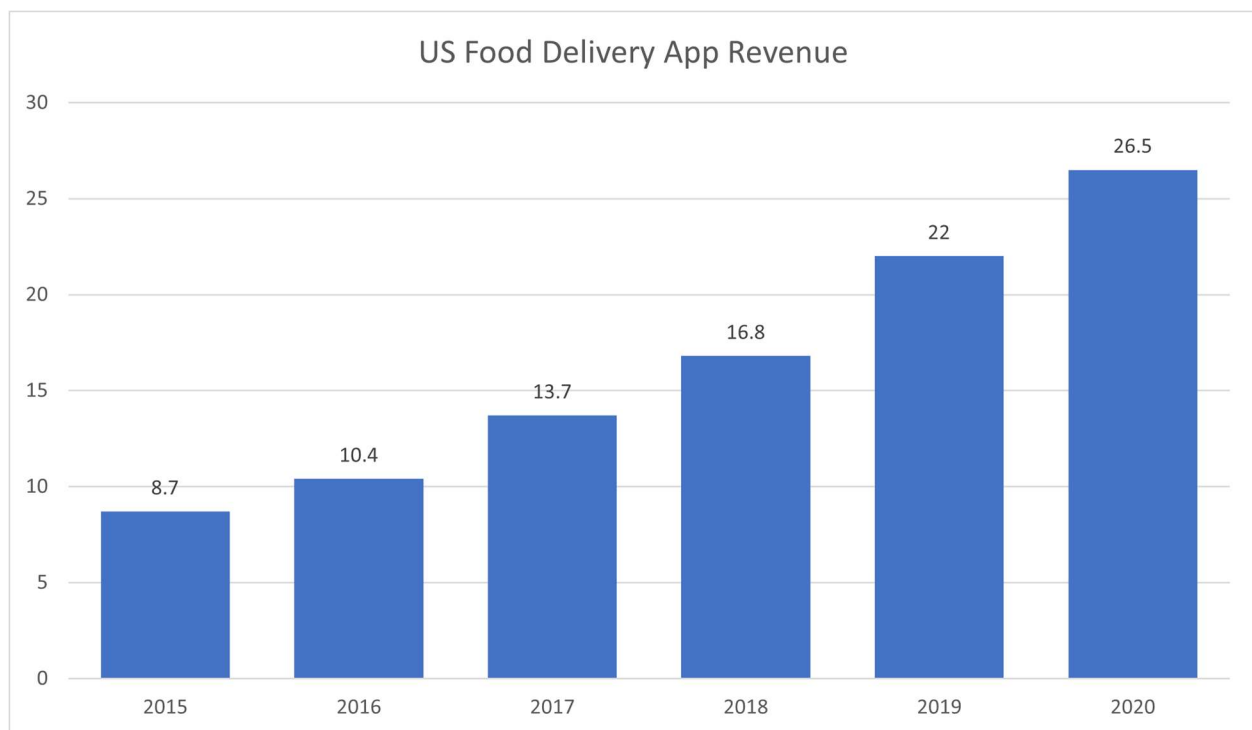


Figure 1. US Food Delivery App Revenue

## US Food Delivery App Market Share

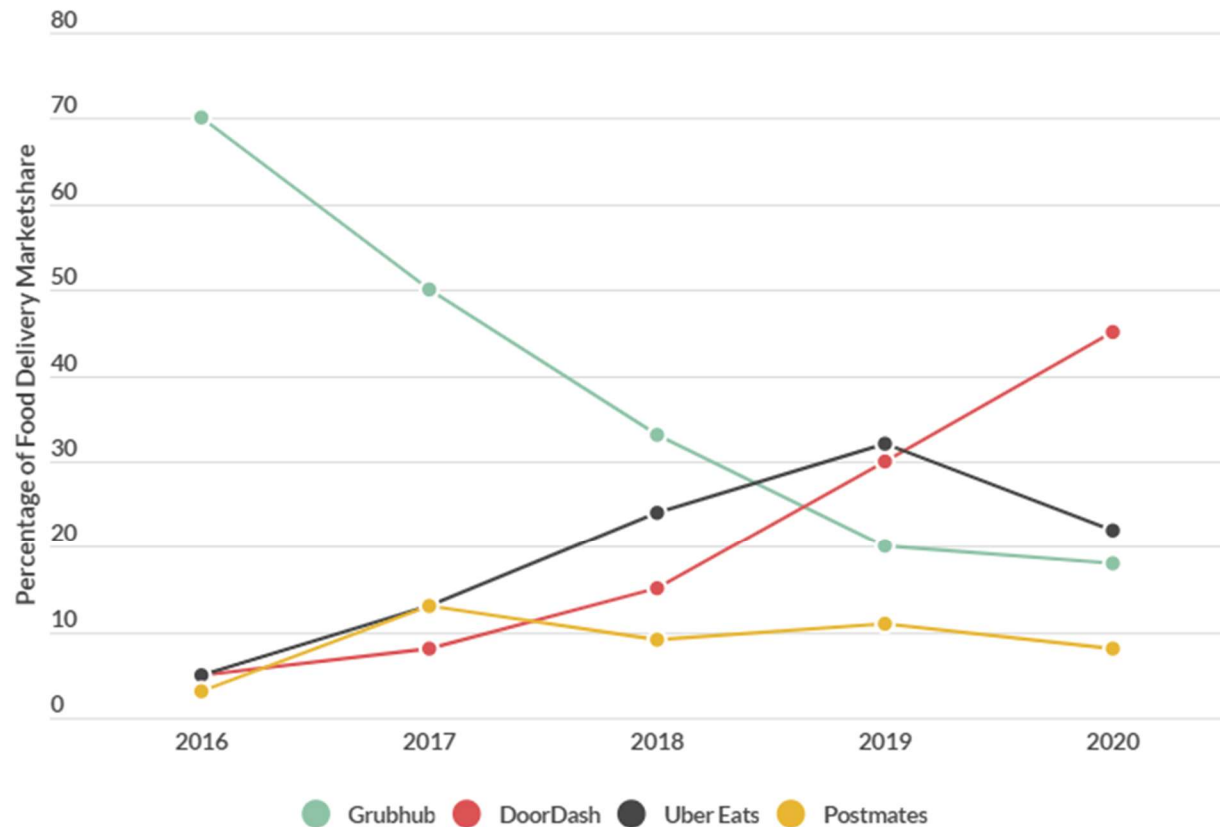


Figure 2. US Food Delivery App Market Share (Curry D. 2021)

Now that it is clear which companies are prominent in the industry, it is important to understand how businesses and individuals are affected by services. One ethical concern is that restaurants must invest in digital platforms to stay afloat amongst their competition. Because of this, restaurants that are not typically suited for food delivery, often due to how quickly the quality of food deteriorates, are joining this trend. (Kell, 2017). Additionally, the ease of access these platforms provide has facilitated ordering food, particularly unhealthy pleasure foods. One article claims that frequency of eating food from outside the home is positively correlated with body mass index, which is supported by a survey showing that the most frequently ordered items mainly consist of calorie-dense dishes (Stephens, 2020).

## **Actor Networking FDAs**

This research utilizes actor-network theory (ANT). In this approach, I analyze possible actors such as the internet of things, internet accessible devices, consumers, employees, business owners, large and small businesses, and more. I analyze both human and non-human actors and how they translate, shift, or delegate the work they have been given. In this section, I will develop an understanding of how these actors inter-relate in various complex ways, and how they can come together in networks to cause greater change.

These actors consist of human and non-human actors. As Bruno Latour did in “Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts” (1992), I look at how many of the technological artifacts used in the food industry replace human action, as well as how they compel and constrain choices available to humans. In this research I investigate how these non-human actors replace and shape human action, and what responsibilities humans have delegated to these non-human actors.

Next, I analyze how these actors enforce programs of action. These include a wide variety of actions the creators of these non-human actors intend for the end user, as well as the programs of action the human actors in the network have for themselves. These often combine to form a new program of action. Another aspect to explore is the ways many of these actors can discriminate against specific groups of people. These actors can affect groups of people differently through intentional and unintentional choices made by humans. This can happen directly, such as some actor directly prohibiting some group from using its service. But this can also happen indirectly, such as design choices which make it inconvenient, and therefore not probable for a group to use such a service. To investigate discrimination, I ask specific questions such as how types of software discriminate against people of different regions, socio-economic backgrounds, and

other factors. Secondary factors, such as what types of people are in these backgrounds, and if there is consistency between different companies, will also be explored.

Finally, the progression of anthropomorphism will be discussed, beginning from human figurative to non-human, non-figurative, non-sign. Anthropomorphism, the attribution of human characteristics or behavior to non-human things, is incredibly common in the 21<sup>st</sup> century, so much so that it is often completely overlooked. There are many ways which anthropomorphism takes place among the actors of today's world. These non-human actors have been created by humans, they are substitutes for the actions of people, and they shape human action by delegating back what sort of actions people can take. For one example, software for any application was in past times a human performing the same task, but throughout the times these tasks have been delegated to non-human actors. Additionally, many non-human actors have been prescribed human characteristics normally given to humans. These characteristics can be given for a multitude of reasons, such as humor, correlation, or attempt to give the non-human actor appear more human-like. Features such as an automated customer service have been designed to replicate human speech and responses to best serve the customer when it past times users would speak to another person about their problems. Other minor examples include intuitive logos on applications such as a person to represent a user's self and their profile.

While ANT is incredibly useful, it does come with faults. Some critics have argued against the ANT approach because it requires the researcher to judge which actors are important enough to be included in the network. These critics claim that the importance of actors cannot be realistically determined without "out-of-network" criteria (Amsterdamska, 1990). Another area of critique argues that actor-networks risk degenerating into endless counts of connections. This critique is supported by the six degrees of separation argument – a collection of studies that

indicate everyone is a small number of connections from one another. To keep the actor network clear, I ensure that the actors chosen for ANT are important and supported by evidence suggesting so, as well as detail and limit the networks between these actors so that it does not run the risk of dissolving into a meaningless mix of relations.

## **Research Question and Methods**

This research will answer the following question: what actors spurred the growth of food delivery services in the last decade and what effects have these services had on the food industry in the United States? This issue is more pressing than ever, as the COVID-19 pandemic has accelerated the rise of virtual platforms. The research topic will be analyzed through the scope of actor-network theory by identifying important actors in the food industry and determining how they relate to and affect each other. I plan on using data from past surveys to gain an understanding of why food delivery services have risen in popularity. Studies including participant observation and numerical statistics will provide concrete evidence about who is using these services and why they are. Additionally, I will analyze prior literature to further support my assertions. I plan to investigate articles contemplating specific effects food delivery services have had, as well as articles covering lawsuits these companies are facing. These articles will help form a better understanding of the role of FDAs in the food industry. To collect this research, I will be using specific groupings of keywords or phrases to discover and select evidence. Phrases such as ‘virtual platform’, ‘food delivery’, and ‘application’ will be grouped together with as one category. These will be cross referenced with another grouping of phrases such as ‘service’, ‘restaurant’, and ‘food quality’. This would result in literature with at least one phrase from each group. This cross reference is displayed in Figure 3.



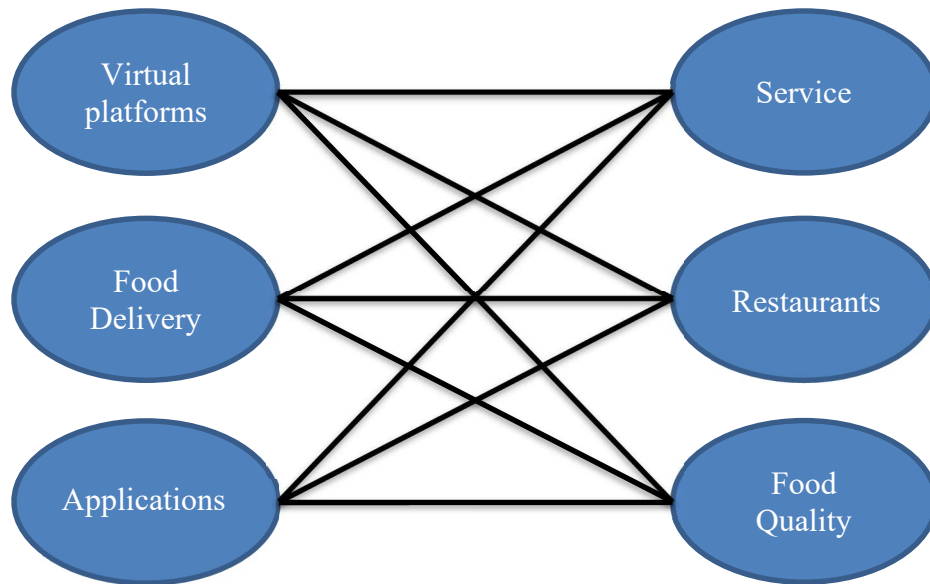


Figure 3. Research Key Words.

Furthermore, I will investigate quarterly reports of certain online to offline food services to see how the companies have fared over time. I will specifically be researching DoorDash, Grubhub, Uber Eats, and Postmates, as these companies hold roughly 99% of the market share for food delivery services. These reports will be compared to certain events to see if these events are significant actors and should be included in the network. I will then be organizing the information I collect thematically. I will first investigate information relevant to the rise of virtual platforms in the food industry. Next, I will look at the effects these platforms have had, such as the high-level effect on businesses, and smaller effects on individuals. These will include articles documenting dissatisfaction with FDAs among various restaurants, as well as lawsuits and legal matters against FDA's.

## Results

To gain a better understanding behind the rise of food delivery services, I first investigated what drew people to these services. One study looks at the uses and gratifications (U&G) behind using food delivery applications (FDAs). This study hypothesized that there are eight main gratifications behind the use of FDAs: convenience, societal pressure, customer experience, delivery experience, search of restaurants, quality control, listing, and ease-of-use (Ray et al., 2019). This study surveyed a broad range of FDA users through a study of series of questions related to each of the study measures. The independent variables were put through statistical analysis to determine their effectiveness and relation to the dependent variable: a user's intention to use an FDA. The beta values (the relation of each independent variable to the dependent variable) are shown in the following figure.

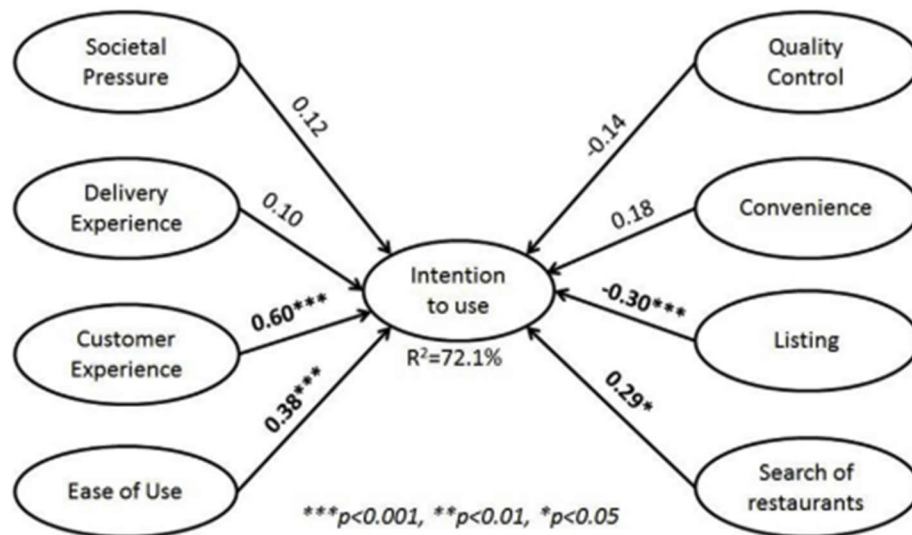


Figure 4. Results of the Structural Model (Ray, et al. 2019)

Figure 4 presents various relations of these gratifications to a user's intention to use. Customer experience, ease of use, and search of restaurants are the strongest positive factors

influencing a user's intention to use, while listings have a strong negative influence on a user's intention to use. While the positive influences confirmed the authors initial hypotheses, listing having a negative relation to intention to use went against the initial hypothesis. The authors theorize that this "could be that listing the restaurants using different themes might result in a complicated interface, which results in negative intentions among consumers toward FDAs" (Ray et al., 2019).

To investigate the growth of these companies, I have compiled revenue for Uber Eats, DoorDash, Grubhub, and Postmates into a bar graph for visual representation. Additionally, Liyin Yeo has compiled the monthly sales of meal delivery services and displayed them in the following image.

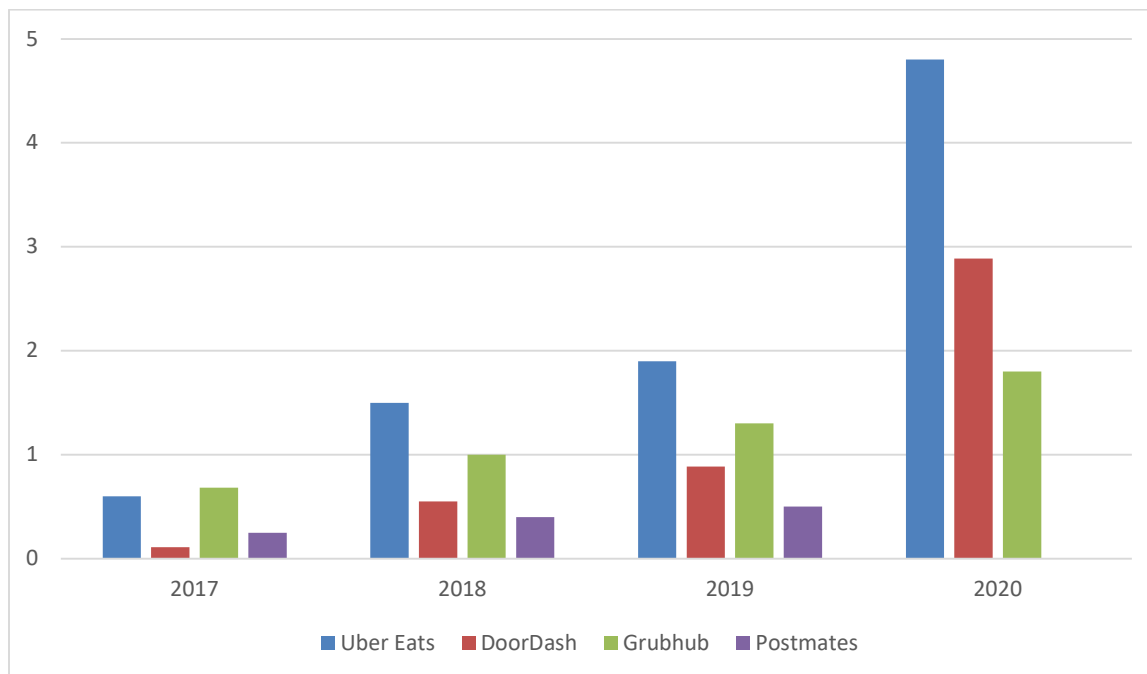


Figure 5. Food Delivery Apps Revenue

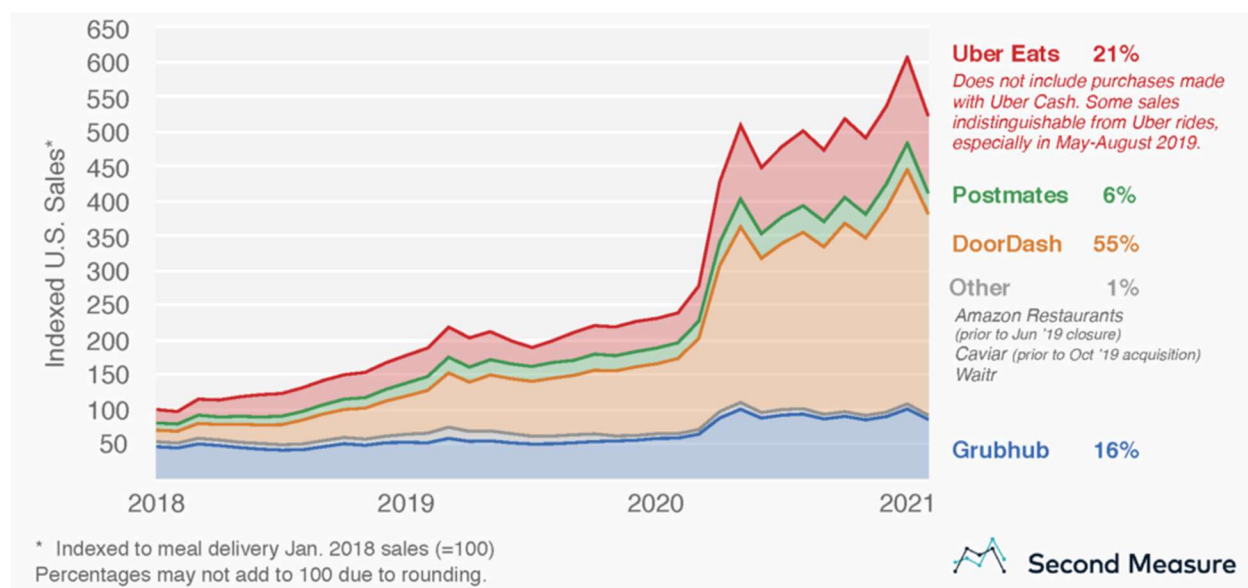


Figure 6. Meal Delivery – Monthly Sales (Yeo, L. 2020)

As shown by the images, these services have been continuously on the rise. Grubhub expressed that “growth in all metrics was primarily attributable to increased product and brand awareness by diners largely as a result of marketing efforts and word-of-mouth referrals, better restaurant choices for diners in our markets and technology and product improvements” (Grubhub Inc, 2020). DoorDash credited their growth to “increased retention and engagement of existing consumers, the addition of new consumers, and an increase in the number of orders completed through Drive” (DoorDash Inc, 2020). Finally, Uber stated in their 10-K “Delivery revenue increased primarily attributable to an increase in Delivery Gross Bookings of 87%, on a constant currency basis mainly due to changes to our service fees in U.S. and Canada and continued expansion into international markets” (Uber Technologies Inc, 2020).

While there has continuously been an upward trend, there was a sharp spike in the beginning of 2020. This corresponds to January 2020, when the United States had its first confirmed Coronavirus case (Centers for Disease Control and Prevention, 2020), and DoorDash, Grubhub, and Uber have attributed this spike in sales to the pandemic. In Grubhub’s 10-K report

covering the year 2020, they stated “While the Company initially experienced somewhat reduced order volume at the onset of the pandemic ..., the Company saw significantly improved trends in subsequent quarters as new diners and new restaurants joined the Platform and existing diners increased ordering as a substitute for in-restaurant dining.” (Grubhub Inc, 2020). DoorDash had something very similar to say in their 10-K report. They stated their upward trends were “...accelerated in part due to the effects of the COVID-19 pandemic, which resulted in in-store dining shutdowns and the adoption of shelter-in-place measures” (DoorDash Inc, 2020). Uber’s report stated, “Delivery revenue increased primarily attributable to ... an increase in food delivery orders and higher basket sizes as a result of stay-at-home demand related to COVID-19” (Uber Technologies, Inc. 2020).

Each of these companies credited the spike in their app’s usage to the COVID-19 pandemic. Additionally, DoorDash stated “The circumstances that have accelerated the growth of our business stemming from the effects of the COVID-19 pandemic are not likely to continue following a widespread rollout of the COVID-19 vaccine, and we expect the growth rate of Total Orders to decline in future periods” (DoorDash Inc, 2020). Not only did these companies attribute to an increase in customer use of their platforms to COVID-19, DoorDash even went as far as to say once most people are vaccinated and COVID-19 infection declines, they expect the growth rate of their orders to similarly decline. As shown, the COVID-19 pandemic is a major actor in the rise and increase in use of food delivery services.

While food delivery services can be convenient for the consumers, they often have adverse effects on restaurants that are hidden from the customers. One such affect is the increase in food waste from quick service restaurants (QSRs). QSRs offer a high speed of service; it is what they are known for. To deliver on this, they pre-cook most of their food, but they can only

hold it for a short amount of time. To avoid food waste, QSRs have become increasingly reliant on demand forecasts: the process of estimating future customer demand in a targeted period. However, food delivery services and other online food ordering platforms impact this demand forecasting, and with the rapid increase in their usage it is harder than ever for QSR's to accurately forecast demand for food ordering.

These food delivery services have also been defendants of various lawsuits. A lawsuit in filed in New York alleges Grubhub, Uber, DoorDash, and Postmates have violated antitrust laws and have monopolistic power (Baron, 2020). The main accusation here is that these apps would only list restaurants on their apps if the restaurants signed contracts which favored the FDA. The four companies I analyze use their monopolistic power to “prevent competition, limit consumer choice and force restaurants to agree to illegal contracts that have the ‘purpose and effect of fixing prices,’” (Baron, 2020). Some examples of this are requiring restaurants to keep dine-in prices the same as delivery prices and pay commissions to the delivery firms at exorbitant prices, which forces many establishments to increase their dine-in prices to not lose money from decreasing delivery prices.

Another problem has been Grubhub charging restaurants fees for phone calls that did not result in food orders. This lawsuit claimed Grubhub would simply charge restaurants a fee for calls lasting longer than 45 seconds, regardless of what the call was about (Dugan & Fickenscher, 2019b). This included anything a customer inquired about; menu items, the restaurants hours of operations, refunds, etc. could all incur a fee. In response to this, Grubhub doubled the window for restaurants to receive a refund for fees such as these, but many say this policy is not enough, or even “absurd” (Dugan & Fickenscher, 2019a).

A second lawsuit against Grubhub surrounds listing restaurants without their permission. In October 2020, a group of restaurants filed a class-action lawsuit against Grubhub for allegedly including 150,000 restaurants as available to order from without their permission, or even despite permission being denied. (Saxena, 2020). Grubhub does not even deny doing this. In fact, they explicitly made this part of their business strategy. In October of 2019, CEO Matt Maloney said the company would be piloting expanding its restaurant network without officially partnering with eateries (Fickenscher, 2019). According to a statement made to Eater, Grubhub is doing this “so [they] will not be at a restaurant disadvantage compared to any other food delivery platform” (Saxena, 2019). While one may initially believe this to be beneficial to the unpartnered restaurants, it causes “significant damage to their hard-earned reputations, loss of control over their customers’ dining experiences, loss of control over their online presence, and reduced consumer demand for their services” (Saxena, 2020). Furthermore, plaintiffs in the lawsuit cited that Grubhub would often list outdated menus, incorrect prices, unavailable items, or even restaurants that do not offer takeout (Saxena, 2020).

## **Discussion**

This research proved insightful into the growth and effects of food delivery applications in the food industry. As shown in the research, there were many actors contributing to the rise of FDA’s. The gratification study revealed four actors with significant effects on a user’s intention to use an FDA. Customer experience, search of restaurants, listing, and ease-of-use all play an integral role in the rise of these companies. COVID-19, the most prominent actor of this research, spurs people towards FDA’s. These actors come together with people to create FDA users, which contributed to the growth of Uber, DoorDash, and Grubhub. These FDA users,

which are the human actors, were able to connect to their food delivery service through various non-human actors. An application, a smart device, internet service, and other factors came together to provide the FDA user access to this service.

These nonhuman actors translate, shift, or delegate work. For example, a user ordering food from an FDA would have at one point been ordering from another human being. But instead, the application has translated the work of listening, recording, and understanding the user's order from something the employee on the other end of the phone must do to something the application handles. In these ways, the technological artifacts in the food industry network replace human action. While this seems obvious at first, it opens the door to a new way of looking at these artifacts. Because the work has been translated, it is no longer the same. A user cannot make special requests, argue with, or do other actions with an application like they could have with a normal human being. The artifacts in this way compel and constrain choices available to the FDA user. These technological artifacts constraining a user's choices is in part enforcing a program of action: some intended series of actions planned out by the person(s) behind the technology. One such example is ordering food on a mobile application. The human in the network has their own program of action: eating food. This program of action is blocked by some factor, such as a lack of access to food or laziness. The delivery application mediates and translates this program of action based on its own program of action – the function of connecting a user to a food provider. These programs of action combine to form a new action: money transferred from the user to the restaurant and delivery service and food delivered to the user.

As my research has shown, FDA's have seen an upsurge in users and income. With the companies' growth, it just makes the negative affects on small businesses more worrisome. The results of these lawsuits will prove pivotal in protecting smaller businesses from abuse.



Additionally, with COVID-19 vaccinations becoming more common, it will be interesting to see whether the user-base these FDA's have acquired will stick around, or if FDA's will see a decline in usage and income. The strength of user loyalty, and how the FDA's handle customer retention will be pivotal in their survival and growth. The surge in income could have been enough for these services to use as a springboard for further development, but with every company on the rise I expect to see further competition between Postmates, Uber Eats, Grubhub, and DoorDash.

This research does have its limitations. Because of the time period of this research, it was largely dominated by coronavirus as the most prominent actor. This not only changed user's responses, but also how FDAs interacted with restaurants amongst COVID-19 regulations. It is also difficult to predict the outcomes of the lawsuits, and how that will change how food delivery applications do business.

If I were to repeat my research, I would target one aspect of this topic rather than spread myself out. I believe that because I researched the rise and effects of FDAs my research was shallower than it had the potential to be. Doing this again, but only looking at either reasons for FDAs rising or the effects of FDAs, would allow me to go further into depth. This research can also be expanded upon by looking at companies in different regions of the United States to see if there is a difference in how they interact with the food industry, or even in other parts of the world.

This research is useful for myself to advance my engineering practice. As a computer science major, working on food delivery applications at some point in my career is very plausible. From what I have learned about how these services are taking advantage of many restaurants, I will have to make meaningful moral decisions about the work I choose to do and

keep in mind what kind of people it will affect. Even if I do not work on food delivery applications specifically, this research will be applicable to whatever software I work on.

## **Conclusion**

This research shines a light on the rise and various threats of food delivery applications. Further steps that can be investigated is if there is a geographical difference in how these services interact with the local food industries. Other potential research could focus on services outside of the United States and compare them to research I have done here to see if this is a distinctly American problem, and to identify potential cultural aspects that may influence any differences. Finally, I believe looking into how these companies operated when they were first conceived compared to practice changes over the years would provide insight to ways to prevent negative influences on industry.

In conclusion, the rise of these food delivery services and their effects on the food industry have gone overlooked for an extended period. The lawsuits discussed are step in the right direction towards preventing these companies from hindering many local businesses. Many local laws are being put into place to cap the fee rates these monopolistic companies are imposing as well. These are great steps in the right direction, but more can be done. Food delivery applications should be transparent with their customers about any charges they add to a restaurant's menu price. Users should know and understand the effects of the apps they use on their favorite restaurants. In total, people from the everyday user to law makers should understand how these companies operate to make just and moral decisions.

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