5-10-2017

Operational Challenges in Servicizing the Transportation Industry

Kelly Cavanagh

OPERATIONAL CHALLENGES IN SERVICIZING THE TRANSPORTATION INDUSTRY

By

Kelly Cavanagh

Submitted in Partial Fulfillment
of the Requirements for
Graduation with Honors from the
South Carolina Honors College

May 2017

Approved:

Mark Ferguson
Director of Thesis

Carolyn Queenan
Second Reader

Steve Lynn, Dean
For South Carolina Honors College

Table of Contents

	Page #
Title Page	1
Table of Contents	2
Abstract	3
Chapter 1: Introduction to Servicizing	4
Chapter 2: The Car-sharing Revolution	4
Chapter 3: Bike-sharing in Urban Populations	10
Chapter 4: The Introduction of Scooter Rentals	16
Appendices	34
References	39

ABSTRACT

As a result of declining consumer spending, more companies have been "servicizing" their business models, moving away from the typical product-centric model and offering their goods as services. This trend has been especially popular in the transportation industry, with cars and scooters now being rented by the minute, with no transfer of ownership. Apps like Uber and Lyft have disrupted the taxi service industry, effectively side-stepping expensive regulations due to their "car-sharing" business model. While this money-saving distinction has led to their success, it can also lead to their downfall, as they face many legal battles specific to ride-sharing services. Similar companies, like Zagster and Zipcar, allow customers to pick-up a bike or a car near them and pay per hour. The success of these companies depends on their efficient inventory management and the ability to meet fluctuating demand. Following a similar business model, but in a market of its own, Zapp Ride Share has emerged on the USC college campus, to allow students to rent scooters and pay by the minute. After testing the market with a company known as Scootaway, the CEO, Frank Scozzafava, fixed the major operational issues and relaunched this concept under a new name. Although the scooter-rental idea has been met with success so far, it still faces challenges similar to those of car-sharing and bike-sharing companies. Threats to the company's operations include legal issues, matching supply with demand, and competing for market share.

CHAPTER ONE

Introduction to Servicizing

On average, a power-tool only gets 30 minutes of use in its lifetime (Baker, 2006), which poses the question: does every household really need a power-tool? They technically only need the hole that the drill would create, not the actual product. Using online platforms like SnapGoods and NeighborGoods, paying to use the power-tool on a need-be basis would be much more cost-effective in this scenario. Product ownership has become less important, with as much as 43% of consumers agreeing that "owning today feels like a burden," resulting in a 2.4% decline in U.S. consumer spending on durable goods in January 2017, compared to January 2016 (*The Sharing Economy: Consumer Intelligence Series*, 2015; Hoover's Inc., 2017).

As a result of this consumer behavior, companies are turning the threat of decreased spending into an opportunity, by "servicizing" their business models. In other words, companies are offering their products as services for rent, by the minute or by the mile, capitalizing on the need that the product itself represents (Rothenberg, 2007). In 2015, 21.7 million Americans were using sharing economy services like AirBnB and Curtsy, with 2020 forecasts as high as 40 million users ("Sharing Economy: Number of Users U.S. 2014-2020"). This product-sharing revolution has been growing in popularity on an international scale, as well, with bicycle repair and gardening services in the Netherlands, grocery delivery in Vienna and household appliance rentals in Helsinki (Baker, 2006).

CHAPTER 2

The Car-Sharing Revolution

The transportation industry has drastically redefined this consumer-object relationship, with companies like NetJet allowing customers to rent a jet by the hour, and many major cities adopting

an hourly bike-rental program. This focus on a product's usage is especially beneficial in the car industry, with the burden and cost of ownership so high and the average utilization so low; private vehicles sit unused approximately 95% of the time (Leiber, 2016). Counter this low utilization with average monthly costs that include gas, a parking pass & lease payments, it makes sense to eliminate cost of ownership and pay per mile instead. Consumers agree with this logic; in fact, 81% of shared-economy users say that product-sharing is a less expensive alternative to product ownership ("*The Sharing Economy: Consumer Intelligence Series"*, 2015). Along with being economical, 83% also agree it's a more convenient and efficient transportation option ("*The Sharing Economy: Consumer Intelligence Series"*, 2015). This trend has been growing in popularity in the U.S., with 8% of adults participating in the car-sharing industry and choosing mobility rather than ownership ("*The Sharing Economy: Consumer Intelligence Series"*, 2015*)*. On a global scale, revenue from the car-sharing industry reached $1.1 billion in 2015, and is forecasted to grow to $6.5 billion in 2024 (Leiber, 2016).

UBER: A New Ride-hailing Concept

A major player in the car-sharing industry is Uber, a ride-hailing app founded by Garrett Camp and Travis Kalanick in 2009. As of 2016, the company was valued at $68 billion, with 1.5 million drivers, in 450 cities across 73 countries. 40 million people will order an Uber each month, totaling around 1.2 billion miles, which shows how high the demand is for ride-sharing, as well as the market potential (Helft et al, 2016).

The Uber app is user-friendly and reliable; after registering your payment information, each ride is just a couple clicks away. After plugging in pick-up location and destination, the app searches for drivers in the area, lets the user know the price beforehand, and just requires simple confirmation. A driver is then selected and pulls up to the location, which is more efficient than the customer having to find a free cab driving past in a crowded urban population. Uber also has a

feature that shows the user the driver's information, including their name, phone number & license plate, with a "Report Driver" comment section in case of emergencies (Helft, et al, 2016). When comparing the sharing economy to the traditional taxi model, a recent study found that app-based transportation services offer "more 'mobility,' in fewer vehicles and miles, and that app-users waited shorter periods for their ride" (Elliott, 2016). This ease of use has greatly contributed to the rising popularity of these ride-hailing apps.

The premise of Uber's business model is making the most of excess capacity. The drivers that work for Uber use their own cars, which they have to get cleared by the company beforehand. The driver is making use of his downtime, and increasing the utilization of his/her own car that would've just been sitting in the driveway. Taking advantage of existing, paid-off assets, Uber avoids the burden and cost of owning a car, by simply employing its drivers.

Due to this difference from taxi services, Uber is able to avoid strict regulations and pricing guidelines that taxis abide by. Taxis must own expensive medallion licenses, which are very limited in number, and must also follow strict regulations when it comes to the taxi car itself (Mohammed, 2014). This "expense of compliance" can account for 35-40% of operational costs for a taxi company (Elliott, 2016). The price that taxis charge customers is also set by local regulators, a fixed one-size-fits-all rate by the mile. Uber is at an advantage here, because the company can charge higher prices during peak times, or discount prices to maintain market share in highly populated areas like New York City (Mohammed, 2014). Many have criticized this undercutting and sidestepping of government regulations, leading to protests in many countries, including Chile, Argentina, France & South Africa (Bacon, 2015).

While Uber has this advantage over highly-regulated taxi companies, it has been struggling to keep its market share with Lyft, another ride-sharing app outside the taxi service classification. Since both companies can legally set their own prices, they have been competing for market share in major

cities, like San Francisco and New York City, through a price war. In January of last year, Uber announced lower fares to compete with its rival, which ranged from ten to forty-five percent discounts in one hundred North American cities. In the same month, Lyft responded with a similar slash in prices in thirty-three markets.

Small profit margins, as a result of price-matching with the competition, make it difficult to sustain any costly projects, such as app updates and geographic expansion. Although the companies try to subsidize these fare cuts with funding—$2 billion total for Lyft and $10 billion for Uber, as of last year—the impact of large investments and competitive pricing is evident in the balance sheets. For example, in 2015, Uber invested a lot of time and money into expanding into China, India and

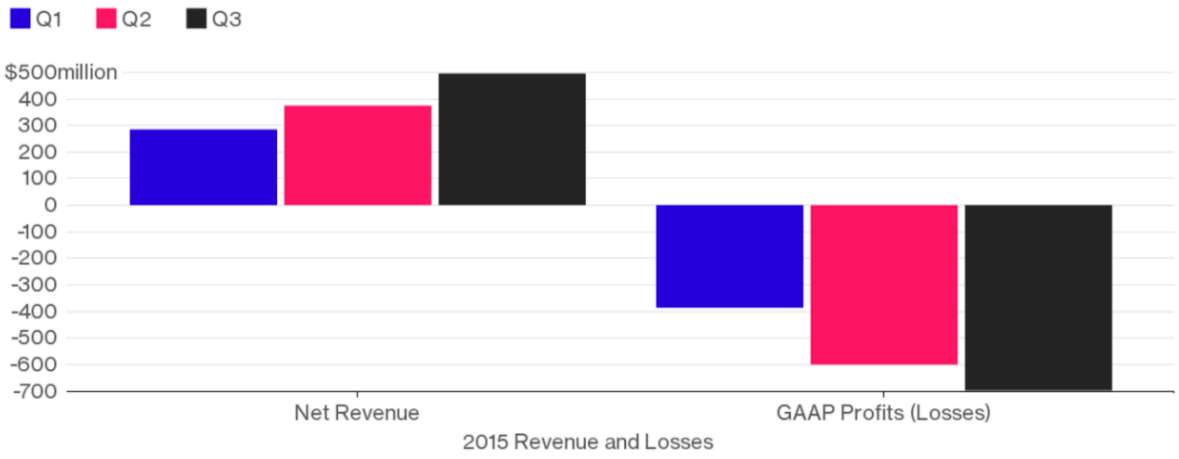


Figure 1. Uber's Growing Global Revenue (and Losses). Source: Bloomberg (Newcomer and Huet)

Southeast Asia. This investment, paired with price cuts, resulted in tremendous losses, as shown in Figure 1. Cumulatively, Uber lost $1.7 billion on $1.2 billion in revenue over the first three quarters of 2015. By lowering its prices in major cities, and spending large sums to enter new markets, ride-hailing companies such as Uber and Lyft must often sacrifice profits for growth (Newcomer and Huet, 2016).

This borderline predatory pricing has also led to many legal battles recently that threaten Uber & Lyft's distinction from the "taxi service" rules and regulations. Most cases and complaints are on the basis of the Federal Trade Commission Act, claiming that Uber and Lyft have created an

anticompetitive market, by being held to different standards than the taxis. Taxi companies can't compete with market prices when so much overhead cost is unique to only their company.

Government systems, at the city, state and national level, have been responding to these complaints with action as severe as banning operations altogether. For example, Nevada was the first state to ban Uber drivers statewide, only to repeal this decision later. Virginia requires that ride-share apps have a transportation broker license, comply with tax laws, keep rates transparent, and advertise the driver's information to each rider (Elliott, 2016). These legal battles are an uphill climb for Uber, as it must prove its distinction from taxis, or comply to expensive regulations with a higher overhead cost. This increase in operational cost would essentially level the playing field among these innovative apps and taxis, decreasing the former's competitive edge.

Along the same lines, Seattle, Washington, home to 10,000 Uber drivers, has been the first to uphold an ordinance that would give "ride-hailing drivers" the right to vote to unionize. Drivers that have made 52 trips over a 3-month period, in the past year, would be able to vote in this ordinance. This would be the first step to unionization for app-based drivers in the U.S., allowing them to petition Uber for wage changes and benefits. Uber has fought back, claiming that this is counterproductive; this ordinance would limit the freedom drivers have to choose how much they work. This would jeopardize Uber's ability to freely slash fare prices and carry that over to drivers' wages, affecting their profit margins.

ZIPCAR: Own the Trip, Not the Car

A similar app that has disrupted the transportation industry with product-sharing is Zipcar, a company owned by the industry titan Avis Budget Group, that enables customers to rent cars by the hour. After a one-time application and choosing a monthly plan, picking up a car is as simple as a couple clicks. In either the app or online, the user can reserve a car in their neighborhood, use the

app or their ZipCard to unlock the car, and then drive to their desired destination. This eliminates the cost of car ownership, as well as the hassle of traditional car rentals, where customers have to go to a specific pick-up/drop-off site, during the limited hours that the business stays open. Zipcar saw this weakness and changed the way rentals work, with cars available at all times and pick-up/drop-off locations close to the customer.

As a quicker alternative to the generic rental process, Zipcar's prices are transparent, charged monthly through the app, and also include gas and insurance. In New York, for example, users can sign up for a $7/month plan and then pay $7/hour driven, or get the $50/month plan and pay only $6.30/hour after the first 8 hours driven ("How ZipCar Works," 2017). This membership plan takes away the time spent waiting in line to pay, as well as any uncertainty regarding what the bill will be.

This monthly plan is still significantly cheaper than owning or leasing a car in many cases, and has led many people, especially college students, to share a car instead of owning one. In a recent study done by the Transportation Sustainability Research Center at UC Berkeley, which surveyed 10,000 students, faculty and staff on college campuses around the U.S., forty-two percent of Zipcar users on campus said that they are less likely to buy a car in the next few years. Thirty percent of participants said they would have had to buy a car if car-sharing did not exist on their campus (Murdock, 2016). These statistics show the rising popularity of the sharing economy and how mainstream this concept has become.

As a result of its growing popularity, ZipCar's main operational challenge is matching supply with demand at each parking location. Efficiently managing inventory using data-driven allocation is crucial to the company's bottom line. Too few vehicles in an area would be a dissatisfier, lowering customer retention and a missed sale of $7/hour. On the other hand, too many cars in one location wouldn't be taking full advantage of the asset, lowering its utilization (Hoover's Inc., 2017). Aside

from loss of sale, the psychology of consumer behavior would also hurt ZipCar's fast and reliable reputation. This negative effect is shown by a frequent ZipCar customer's comment:

> "Well, [a car not being ready] was definitely something I was really disappointed in. They just, they let me take another car for the same price of the Prius, which I think was a more expensive car. It was just like well, there's nothing we can do for you. That's not how we operate. We operate based on people are responsible to return their car on time, and it's not our fault that it's not there. Well, how are you going to have that person whose fault it is compensate me? That doesn't happen." (Bardhi and Eckhardt, 2012 pp.891)

Originally a start-up company in 2000, ZipCar had to focus heavily on its efficient allocation of limited resources, to not dissuade customers from using their services. A dissatisfied customer would cost them both their reputation and a sale, meanwhile unused resources wouldn't help pay off the high interest rates and/or overhead costs associated with cost of ownership. However, in 2013, Avis Budget Group took over Zipcar for around $500 million, which was an ingenious merger to consolidate resources and better manage inventory. The logic behind this acquisition was that ZipCar could benefit from Avis's economies of scale when purchasing cars, maintaining them, etc. and also use their supply of vehicles during peak weekend days. This consolidation would lead to an annual savings of $50 to $70 million, by being able to remarket new vehicles at ZipCar, once they are too outdated for Avis's use (Sawyers, 2013). Recognizing the importance of inventory management in the rental car industry, this decision was the perfect way to increase vehicle utilization, while being able to meet previously unmet demand and efficiently handle demand fluctuations.

CHAPTER 3

Bike-Sharing Initiatives in Urban Populations

In an effort to reduce congestion and pollution, many urban cities have started initiatives to encourage more people to consider biking as a practical method of transportation. Recognizing the opportunity, companies like Zagster, B-Cycle and Motivate have installed bike-sharing systems in

cities like Chicago, New York & Santiago (Morris, D., 2015). The concept is quick and simple: go to a bike rental station, swipe your credit card, and pay by the hour until you drop the bike off at another automatic station in the city. Most modern bike racks are equipped with information systems that collect inventory management data- number of bikes, helmets, lockers taken- so that users can check availability before their trip. True to the servicizing industry, the bike-sharing concept eliminates the burden of owning a bike, which could include finding parking spaces, vandalism, theft, repair costs, etc.

Inventory Management

Many commuters use these bike rentals as a partial transportation method, to compliment other public transit systems ex) bike one way to work, then take the train back. This decision could be due to the weather conditions that day, unusually high congestion, train delays, etc. Whatever the cause may be, this unpredictable behavior leads to a disparity in the flow of bicycles throughout the day. In the scenario above, the station lost a bike in the morning, but never gained it back in the afternoon, leading to a disproportionate rented versus returned bikes ratio. These variables in consumer behavior can either be persistent or temporary (Raviv and Ofer, 2013). Persistent imbalances in the flow of bicycles could be because of stable conditions, such as hills, which would experience lower return rates at the top. Temporary imbalances are when stations experience highs and lows throughout the day, typically based on rush-hour times. The different types of flow imbalances are important to recognize, in order to accurately predict consumer behavior and calculate optimal inventory levels.

With such fluctuating demand patterns across stations, the main indicator of success among bike-sharing companies is how well they can allocate their supply to avoid shortages. Many companies accomplish this with a fleet of trucks to reposition bicycles throughout the day (Raviv

and Ofer, 2013). Paris, the first city to introduce a public bike-sharing program, known as Vélib, manages their inventory with a fleet of employees, trucks, and even a barge on the Seine river for bike repairs (Dell, 2008). Since these relocation methods add to the variable and overhead costs of the business, it's important that they are used efficiently.

As far as knowing where and when to reallocate the bicycles, companies need to use historical data to recognize predictable trends in consumer behavior and set optimal inventory levels at each station. To account for unpredictable behavior, these optimal inventory levels shouldn't be static throughout the day; companies must proactively assess imbalances that may not be fixed through the natural flow of bicycles (Raviv and Ofer, 2013). Since most bike-sharing companies equip their bikes with Geographic Information Systems (GIS) to track their locations, companies should use this to monitor the mean time between pick-ups and real-time inventory levels. When either of those indicators exceeds the acceptable limit, employees should begin planning a bike reposition.

A recent study conducted on the Vélib bike program, in Paris, illustrated the impact efficient inventory management can have. According to the study, increasing bike availability by just 10%, would increase ridership by 12.29%. That is because each instance of bike shortage has a short-term effect of lost-sales, and a long-term effect of losing potential customers, and declining retention (Kabra et al, 2016). This impact of bike or locker shortages is why companies like Motivate and Zagster emphasize a successful inventory management system.

Another aspect that could dissuade a customer from using a bike-sharing station would be the unreliable availability of helmets. According to a study of cyclists in D.C. and Boston, four out of five bike-share users don't wear a helmet. The shortage of helmets at each station is a threat to operations because strict bike laws have led cities, like Vancouver, to shut down bike-rental start-ups. Not only is this a legal issue, but also a safety issue, increasing a biker's chance of brain damage

by 88% if he/she doesn't wear a helmet (Marcus, 2013). In cases like Tampa & Santiago, where cycling is known to be dangerous, this helmet shortage is a major hindrance to the popularity of these systems (Morris, D., 2015).

Realizing this setback, Boston engineers set out to fix the availability of clean helmets at each station. They designed a low-power, compact vending machine, named HelmetHub, that could accept, clean, and dispense helmets for rental. The first HelmetHub, equipped with 36 clean helmets, was brought to the corner of Massachusetts Ave and Boylston Street, where users were the least likely to wear helmets (Marcus, 2013). This invention allows bike-renters to rent their helmets and bikes at the same location, avoiding any shortage of clean helmets, as well as any potential legal and/or safety issues.

Site Accessibility

An important aspect that can help or hurt the company is also its site selection. In addition to bike availability, accessibility, defined as how far the user has to walk to reach stations, affects consumer decisions as well. Analyzing the Vélib company, observing 942 locations over 4 months, Kabra et al concluded that a user standing 500 meters away from the bike rental station is highly unlikely to use the bike-share system. This conclusion comes from the following data regarding distance disutility:

> For the first 300 meters, every additional meter of walking to a station decreases a user's likelihood of using a bike from that station by 0.252% (±0.092%), the effect is higher after the first 300 meters, every additional meter decreases the likelihood by 1.367% (±0.363%). A user that originates 300 meters away from a station is less than half as likely to use the system than one at the station (Kabra et al, 2016 p. 5).

This study was done on the densest bike-share system in the world (Kabra et al, 2016). If accessibility has this strong of an effect on ridership in a system with high station density, one can only assume that the disutility would be even greater with more spaced out bike-rental systems. This

data is significant because bike-rental companies have to carefully select sites that are within close proximity to hot-spot locations. If stations are too far from the consumer's starting point, ridership will decrease.

In cities where bikes are readily available and accessible, demand for bike-sharing programs has been rapidly increasing. Recognizing the benefit that bike-sharing can have on reducing congestion and green-house gases, many cities have adopted bike programs and initiatives to help local companies with this increased demand. For example, when Melbourne and Brisbane, Australia struggled with a low number of helmet users, the government provided free helmets to encourage biker safety (Marcus, 2013). On a larger scale, New York City's bike-sharing program, Citi Bike, is supported through a partnership between the City of New York and Motivate. The city provides ordinances and freedom to install stations at any public location, and has added over 500 miles of bike lanes. The NYC subsidiary of Motivate is responsible for funding and controlling the flow of bicycles. This private-public agreement has proved to be successful, with a total of 10,000 bikes, across 610 stations and 35 million trips to date ("Frequently Asked Questions", 2017). Since site selection is a key determinant in consumer behavior, government support through ordinances and awarding public space is important to the success of bike-share services.

By the same token, Vélib, Paris's public bike-share program, has revolutionized how bike-share services are financed. The city offers 20,000 bikes, employing 400 employees to run operations, and has removed vehicle parking spots to create bike stations (Dell, 2008). Although Vélib means "free bike," this large network of bikes has not been cheap for the government to finance. A report by government auditors confirmed that it costs the city 15 million euros a year to run this public bike share service. This includes 1.5 million euros in vandalism repair, 9 million to reach outer suburbs, and 3.5 million euros spent on maintenance (Gee, 2016). This annual operational budget is given to JCDecaux, the company that won the contract in 2007 to run th9e

bike-rental scheme. Later this year, their contract will be up for grabs, which should not be taken lightly by the city of Paris. Supplier selection will be crucial to better budget this green initiative, and Paris must accept competitive bids that would reduce the annual cost. With 292 million rentals over the past nine years, Vélib has become a major component in Parisian's daily transportation and should not be cut because of poor supplier selection.

Looking forward, if these operational challenges were to be addressed, these initiatives could continue to benefit the community even more. By offering a convenient method of transportation, cities with bike-share programs effectively reduce the number of miles traveled by car, which helps with pollution and congestion. In a study done on the effect of Washington D.C. and Minneapolis's bike-share programs, factoring in the miles traveled by bike repositioning vehicles, the cities saw a 151,174 and 56,314-mile reduction in car use, respectively (Figure 2; Fishman et al, 2014). This

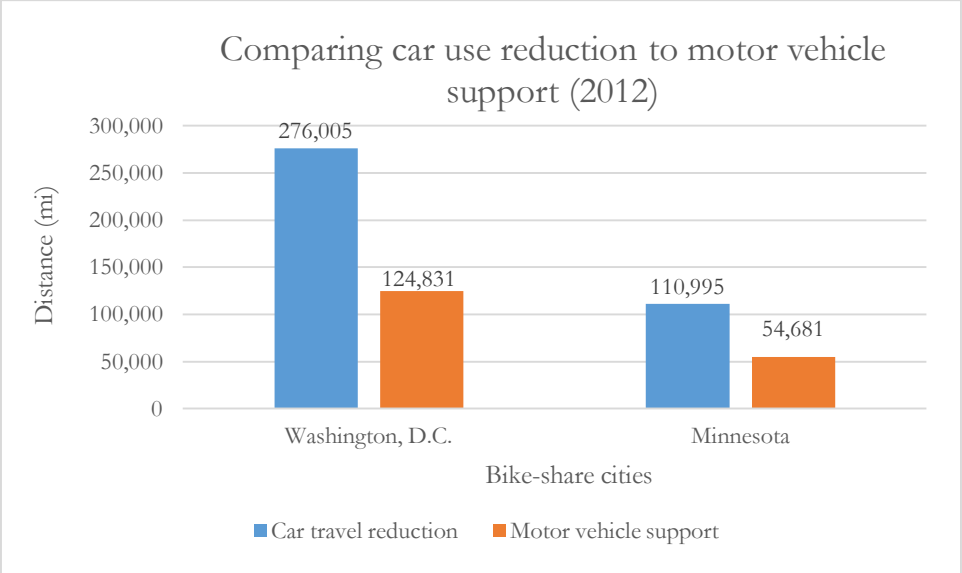


Figure 2: Car use reduction, factoring in miles from bike re-positioning vehicles. Source: Fishman et al

reduction has had a positive effect on the city's commute times, travel costs, and carbon footprint. The availability of bikes has also inspired more people to get active, in the case of San Antonio- with 43% more people cycling weekly after the city introduced their municipal bikes (Nehme and Kohl, 2014). On a national level, this increase in biking has seen a decrease in bike injuries by 28% in cities

with bike-share services. This could be explained by increased driver awareness, or even the increase in biking lanes and infrastructure (Cowling et al, 2014). Despite operational challenges that this industry faces, bike-share services stand to make a great impact on their local community.

CHAPTER 4

The Introduction of Scooter Rentals

Successful companies in the car and bike-sharing industry have had years of experience to figure out what works best in handling their operational challenges. While scooter-sharing is a relatively new concept, many of its operational challenges mimic those of established transportation-sharing companies. As the popularity of scooter-sharing gains more traction, it could benefit from analyzing the setbacks and successes of these well developed companies.

To better illustrate the relationship between the emerging and established industries, I analyze the recent introduction of scooter rentals in the University of South Carolina's campus. After detailing the company's launch, and evaluating its current business model, I assess potential threats to its operations. Then, using insights from operations management theory and lessons learned from well developed ride-sharing companies, I suggest process improvements to combat those operational challenges.

Testing the Market

After working in New York on a car-sharing start-up, Frank Scozzafava came back to his alma mater, the University of South Carolina, to introduce a new concept for the campus: scooter rentals. Many USC students currently own mopeds to get around campus, avoiding the trouble of parking, but Scozzafava's company is different: students could rent a scooter on-demand, with no transfer of ownership. Mimicking a similar business model to Zipcar, "Scootaway" allowed students

to rent a scooter for $2.99/half hour through an easy to use app, or online (Burris, 2015). Users could find one of the 38 scooters on the map, at more than 25 pick-up locations, click pay, unlock the scooter through the app, without any keys, and drive away. With college students being the target market, locations included campus parking lots, as well as businesses in Five Points and the Vista. For those users that were cautious to drive a scooter with only two wheels, the company held training sessions every Sunday with certified motorcycle instructors, so users could practice driving around in a parking lot ("Scootaway, Inc.", 2014).

Scozzafava used May to August 2015 to test out Scootaway at the University of South Carolina campus, to see how people would react to the idea, and what needed to be reconsidered before his expansion plan of 500 scooters. Three operational issues stuck out with this ride-sharing process: app functionality, scooter maneuverability, and the scooter-app connection.

The Scootaway app had hiccups and wasn't as comprehensive as originally planned. When a problem arose, the company had no way of knowing, leaving room for only delayed, reactive solutions. It also had trouble connecting to scooters, due to problems with the technology box inside the scooter itself. This operational issue could cost the company a customer, since this app-scooter communication is the only way to turn the scooter on (Esselman, 2016).

This emphasis on app functionality is common in this industry; Uber's CEO Kalanick can spend up to two weeks at at a time "jamming" a specific problem, rigorously experimenting and testing their process, coding solutions to increase app efficiency. Uber has rewritten their app's driver selection algorithm three times in just three and a half years. The company invests considerable amounts in enhancing their technologies, with the mindset that this efficiency would decrease prices and attract more riders, which would attract more drivers, lowering wait times, which would then repeat itself in a constant cycle (Helft, et al, 2016). With this continuous positive impact

in mind, Scozzafava has invested five times more than the original investment on improving the functionality of this app and how it connects with users, employees, and the scooters.

The final operational challenge Scootaway observed was the scooter itself (Esselman, 2016). At $2,500 a piece, Scootaway scooters were made in China, and then shipped to Charleston, South Carolina. The CEO spent a month overseas testing its safety, maneuverability, comfort, and endurance. Since there is no transfer of ownership in this process, the $2.99 per half hour price included gas, insurance, and helmets for the consumer. With the burden and cost of ownership on Scootaway, the mileage was an important factor to consider as well, when designing the scooter. Although great on mileage, the scooter was limited to 30 miles/hour, which proved to be a dissatisfier (Russell, 2015). Along with the app, Frank Scozzafava focused on fixing the speed and maneuverability of the scooter, based on the trial period feedback.

The Introduction of Zapp

With the valuable insights gained from the test run in mind, Frank Scozzafava didn't give up on his scooter sharing concept for the University of South Carolina. Investing five times more money in the app, and reinventing a new three-wheel scooter with better battery life, he launched Zapp Ride Share. Similar to car-share and bike rental companies, Columbia, SC residents can use the Zapp app to turn on a scooter near them, pay per minute for their ride, and drop it off at any Zapp scooter parking location (Morris, R., 2017). Since it's introduction of 50 scooters on August 8th 2016, Hoover's Inc. has estimated their annual sales to be $59,210 (Hoover's Inc., 2017).

Considering the congestion in the area, Zapp has the potential to make tremendous improvements for the city of Columbia, SC. Columbia is the most populated city in South Carolina, leading to significant levels of traffic congestion, an average of 30 hours of lost time per person each year. As for the effect of this congestion, according to Texas Transportation Institute (TTI), the

average Columbia-area driver loses an estimated $663 a year in the cost of lost time and wasted fuel ("South Carolina Transportation by the Numbers", 2015). This expensive cost of ownership re-emphasizes why servicizing transportation has become so popular. Foregoing a car, and relying on transportation-renting methods would put this expensive cost of ownership back into the customer's pocket.

On top of this congestion, the number of car owners at the University of South Carolina continues to outnumber the number of available parking spots. This parking deficit leads many students to spend time circling for spots, running out to repay the parking meter, trek across campus from their car, or pay for expensive garage spots. By providing students a hassle-free, cheap way to get from point A to point B, Frank Scozzafava has capitalized on a significant problem for university students (Burris, 2015).

Recognizing the enormous potential of this concept, Scozzafava invested time and money into making the app as user-friendly and seamless as possible. The CEO stated that perfecting the app was the biggest challenge when getting Zapp started on campus. He fine-tuned it for a year before launching it, listening to students' suggestions and adapting when needed (Scozzafava, 2017).

The "Zapp Ride Share" app is available in the Android and IPhone app store for free to download. Users have to register the first time by entering their personal information, payment method, agreeing to Terms & Conditions, connecting their phone, and uploading their driver's license information. After a quick safety video, riders can see what scooters are available for pick-up near them. A map shows the quantity of scooters, and whether they would win free bonus time for dropping off at a certain location or not (Appendix A). Clicking on a specific location would detail the address, quantity, scooter number and battery life of each low-speed electric cycle ("Zapp Ride Share", 2015).

Each scooter has a GIS locator that can register if it's out of range, in a designated spot, or in transit. If the scooter is out of range, or hasn't yet been returned, the technology box inside the scooter can communicate with the app to charge the applicable rates or fines. The technology box also works reversing the flow of communication, and allows the app to control the start and stop of the scooter (Esselman, 2016). To turn the scooter on, the rider must select the specific scooter number in the app to unlock it, then press the start/stop button, located under the handlebar on the right. The headlights will go on, and a switch controls the low/high settings. The uppermost dashboard will also light up to show the speedometer, as well as the battery level. The left side of the handlebar controls the rear brake, and this should always be used first ("Zapp Ride Share App", 2017). The right side of the handlebar has a twist throttle for acceleration, as well as a speed mode switch to change between low and high speed, with a maximum speed of 29mph (Scozzafava, 2017). The reverse button is also located on the handlebar, for help with backing out of parking spots. The left handle bar features the turn signals, a simple switch that should be left in the middle when not in use. Both sides of the handlebar also have a button to make a horn sound. In addition to all having identical mechanics, every scooter is also bright green, with two wheels in the front, one in the back, and a tall pennant flag stretching seven feet in the air. In the back, scooters also have a basket, where the necessary helmet is stored ("Zapp Ride Share App", 2017).

These "low-speed electric cycles" are sourced from China, since South Carolina doesn't currently have the resources to manufacture this product. Scozzafava has been in contact with government officials about the potential of domestic sourcing, and hopes to do so in the future to benefit the local economy (Scozzafava, 2017). If domestic scooter manufacturing became feasible in the future, it would be a beneficial partnership on both sides; the city would benefit from more jobs, and Zapp would gain the city's support, which could translate to more public space available for rental sites.

These green recognizable scooters can be found in 27 locations in the Columbia, Cayce area, with 292 parking spots to pick-up/drop off from (Appendix B). Pick-up locations include dorms, classroom buildings, apartment complexes, and businesses in the Vista and Five Points. There's an average of 10 available spots per lot. These locations span about 8 miles, from the northernmost boundary of Spirit Communications Park, to as south as Arthurtown, Columbia, SC. Appendix C also shows that the boundaries cover 7 miles from West Columbia to the eastern limit of Lake Katherine ("Rent Electric Cycles", 2017).

In order to attract college-aged students to use these environmentally-friendly scooters as an everyday method of transportation, Scozzafava had to keep prices attractive. After using $2.99/half hour in the trial run, the owner switched to a different pricing strategy: charging by the minute ("Zapp Ride Share", 2015). Scozzafava described the changeover with a hotdog analogy, claiming "When you go to the grocery store, you can never buy the same amount of hotdog buns as hotdogs, and that's a waste. No one wants to feel like they're wasting their money, and the same goes for Zapp rentals. Why pay for a half hour if you're only going to use it for ten minutes to go from the business school to Columbia Hall?" (Scozzafava, 2017). In the newest pricing model, Zapp users have to pay $0.25 per minute of driving, with discounts for large quantities of time. Figure 3 illustrates the price per quantity of time as advertised on the website, as well as the price per minute with each discounted bulk time. Zapp also advertises promotional days on their Facebook, as shown in Appendix D ("Zapp Ride Share", 2015).

Time	Price	Price per minute
1 minute	$0.25	$0.25
30 minutes	$4.99	$0.17
1 hour	$6.99	$0.12
2 hours	$9.99	$0.08
3 hours	$11.99	$0.07
6 hours	$14.99	$0.04
12 hours	$19.99	$0.03
24 hours	$29.99	$0.02

Figure 3: Zapp Pricing

Operational Challenges with Zapp

Just like bike and car-sharing, the majority of Zapp's operations depend on seamless inventory and demand management. Most students don't have round-trip journeys throughout the day, due to multiple classes in different areas of the city. A student could take a Zapp scooter from their dorm, to the business school, then to the Humanities classroom building, where they can then just walk back to their dorm. This causes an imbalance in the flow of scooters throughout the day, and possible shortages in popular pick-up locations. This is an issue because if there is demand, they need to make sure that there's always supply, otherwise the company loses out on a potential sale.

Using the GIS locators in each scooter, the Zapp app monitors inventory levels at each station, and uses an algorithm to register when a location needs more or less scooters. This algorithm takes into account historical data, such as demand during peak times, locations that are mainly used for pick-ups, etc. to predict consumer behavior and calculate optimal inventory levels accordingly. The goal is to have at least a couple scooters at every location, with actual inventory levels depending on historical demand data (Scozzafava, 2017). The app then shows a dollar sign at stations where users can earn bonus time by picking up or dropping off a scooter at that location. This tactic tries to manage demand by giving consumers incentive to go to less popular drop-off locations, where scooters are needed.

Ten minutes of bonus time are given to riders that go to those marked dollar sign locations ("Zapp Ride Share App", 2017). This means that the company values their cost of underage, if the location doesn't have a scooter, at an amount more than $2.50. If the next rider at that station uses the scooter for less than 10 minutes, the company then lost money on this relocation. In this case, it would've been better to not relocate the scooter, since the cost of overage was more. Factoring in the fact that the cost of underage also includes lost customer retention, scooter relocation and giving away incentives would be the best option for the company, so that they can keep increasing the amount of registered users.

If the demand management incentive still doesn't work to reposition inventory and correct the imbalance, the company reaches out via email to their "scooter mover" list to see if anyone will go out and do it (Appendix E). This list of registered users would be rewarded $20 if they go to a specific location and move the scooter somewhere else. The incentive is higher in this case because the list goes out to users that aren't immediately about to Zapp, but instead would go out of their way to fix the scooter levels. These requests are for relocations that the company feels are necessary, since they value the cost of underage in that location at $20, or 80 minutes of Zapp-ing. Giving away this much money to relocators signifies that the company would gain more than that by having scooters in other locations.

As a last resort option, Zapp uses one of their own vehicles, with a trailer attached, to reposition the scooters themselves. According to the owner, this is not an approach that the company will readily do, resorting to the other options first (Scozzafava, 2017). This seems to be a very reactive approach, since the app can pick up on low inventory levels pretty quickly, but then they have to wait to see if users will correct the problem. It's very possible that the user may be in a rush and that the money wouldn't be enough motivation to go to another station and risk being late.

If this is the case, and the first two incentives don't work, only then will the company respond themselves, which at that point is a very reactive solution.

Although the trucks are considered a last option, I would recommend looking into wait times to correct the problem with this three step approach, compared to using trucks and trailers as a first step option to reposition the scooters. Waiting to see if others can correct the problem may mean the loss of a sale if it takes too long. The company also has to look at cost/benefit analytics, since the cost of driving a truck would be equal to the gas and mileage consumed, while asking consumers to do it means foregoing future sales by giving them free bonus time.

Along with scooter availability, as shown in the Vélib case study, accessibility also drives demand and consumer decisions. The farther someone has to walk from their starting point, the less likely they are to choose it as a transportation method (Kabra et al, 20116). Therefore, Zapp needs to stay a quick and convenient option, with locations close to destination points, that cover a large geographic area. For Columbia, South Carolina, it was fairly easy for Scozzafava to know where the demand might be, since USC is his alma mater. Being an alumni, he knew where locations should be to increase ease of access for his target market. This led him to choose dorm buildings, classroom buildings, bars, etc. as rental locations. This location familiarity is an advantage, since Zapp's ridership depends on its proximity to popular student locations.

As far as site selection, this decision becomes more difficult with the planned expansion of the company, since those cities are unfamiliar markets to the CEO, Frank Scozzafava. In late March 2017, Zapp introduced the concept to Key West, FL, and hopes to go to Florida State University and the University of Florida sometime this year. By the first financial quarter of 2018, Zapp plans to be in eight cities total. As of now, their site selection process in new markets is based on sponsorships and requests, so that they can judge the demand in each area before expanding. For example, their decision to go to Miami was driven by a national sponsor, and their decision to go to

the University of Florida was based on students calling in. Specific site locations within each city largely depend on working with the local government, with the goal of launching rental stations in hotels, private parking lots, near schools, etc.

Deciding where to go based on customer calls, sponsor decisions, and/or informal judgement may not be the most effective approach to site selection. A more effective approach would be to use Geographic Information Systems (GIS) to predict demand using geographic databases. With programs like ArcGIS, the company can analyze the area's demographic, choosing criteria important to their business, to know where rental stations should be (Ferguson, 2017). Possible GIS criteria could include looking at where the target age demographic lives, where most people get a cab from, most common restaurants, bus stations with the most traffic, etc. Using market data, it doesn't matter if a city is unfamiliar to the CEO, because the GIS software would show demand patterns, along with popular tourist destinations, highly-populated student areas, etc.

A simplified way to analyze possible site locations would also be a scorecard, weighing each location based on important variables. First, Zapp would pick important factors when choosing a site, like its proximity to public transportation hubs or shopping centers, visibility, percentage of the target age demographic in the area, etc. Then, they would assign weights based on the perceived importance of each variable. For example, if the visibility of the site was the most important to the company, they could assign that a weight of 0.5 and the others slightly less. Then, they would rank each location based on how well it does in each variable. The last step would be to total the score for each site and then do even more cost/benefit analytics on the site that ranked the highest (Ferguson, 2017). Figure 4 shows an example of what a scorecard could look like for the Columbia, South Carolina area. Based on the weights and rankings assigned in this example, The Hub would be the better site to select if those were the important factors that Zapp considered when expanding. The main limitation to this approach is that many of the rankings and weights are subjective. What

one person could consider an eight out of ten for visibility could be ranked as a six to someone else. There is no exact way to quantify qualitative variables.

	Weight	**The Hub**	**Riverside**
Percentage of target age demographic in the area	0.5	8	7
Proximity to shopping	0.2	7	3
Visibility	0.3	6	4
Total		**7.2**	**5.3**

Figure 4: Scorecard Ranking Possible Zapp Rental Sites

Another way to fix this market unfamiliarity would be through franchising the business concept, which the company is currently looking into. If there is demand for Zapp scooters in a certain area, the burden of expansion wouldn't be all on Scozzafava. Preferably, someone familiar with the market, who knows where the need is for each site, would apply to be a franchisee and expand the business model into their local city. Scozzafava would help each franchisee in the launch of the business, provide the basic business model they must follow, and share insight based on past experience, having already realized what worked and what didn't (Scozzafava, 2017). This would rapidly expand the company, while also providing cash flow for the owner to be used for app improvements, since those could be costly. This franchising scenario would also benefit each city with better rental site selection, based on market familiarity, as well as GIS analytics.

Similar to the unfamiliarity in site selection when expanding, the target market will also change while expanding to each city. In the case of the University of Florida and Florida State University, the target demographic will stay the same as the University of South Carolina, with the target of students aged 17 – 22. Expansion to other universities seems to be the best approach, since 18-24 year olds are reported to be the most enthusiastic about the sharing economy, once they have

participated in it. Millennials also don't use their cars as much as the previous generation did at the same age, valuing them for their practical use instead of as indications of status (*The Sharing Economy*, 2015*)*. This report is significant for Zapp's market approach, because more millennials are attracted to the idea of convenient transportation, with less importance put on owning a car. This same college student-centered market approach wouldn't work, however, in their recent expansion to Key West, where the majority of residents are between the age of thirty-five and forty-four ("Race and Ethnicity in Key West, Florida (City)"). This different age demographic would mean different marketing strategies in this location, to attract an older market, or heavier focus on site selection to be close to the younger demographic. As of now, Zapp is marketing to Key West and Columbia via the same website and Facebook, with minor changes tailored to each one ("Zapp Ride Share", 2015). This change in demographic is important to recognize when expanding, in order to change the business model accordingly.

Another potential threat to Zapp's operations could stem from the fact that state traffic laws don't automatically apply to mopeds, scooters, etc., due to its distinction from motorcycles and cars. For a while this meant that riders didn't need insurance or a license, and couldn't be charged with a DUI. Fed up with its traffic-inducing low speed, and the number of accidents caused by mopeds, law enforcement called for a change in how the state regulates mopeds. In January 2016, the South Carolina House of Representatives passed a "moped bill," which is currently pending Senate approval. This bill states that those who don't have a driver's license, or have had them suspended, can't use a moped or a scooter (Smith, 2016). Currently, the Zapp app requires the user's drivers license number, along with a photo and confirmation that it isn't expired ("Zapp Ride Share App", 2017). While this is a good step towards complying with the moped bill, if the bill passes, there's not much accountability with Zapp's current method. Technically, someone could upload someone

else's information into the app, with no way of being held accountable if their license isn't real or is expired. This could complicate matters for Zapp in the case of an accident.

This same bill, #3440, also states that mopeds also must abide by safety regulations such as a helmet at all times, and reflective vests at night ("2015-2016 Bill 3440", 2015-2016). As of now, Zapp offers complimentary helmets, and warns riders that they must use them via a safety video and constant reminders ("Zapp Ride Share App", 2017). Due to the nature of the rentals, there's also no way to hold riders accountable to this law. If this bill were to be passed, Zapp would have to offer reflective vests as well, and change their app to include this safety regulation.

Because this is such a new industry, new bills are constantly being proposed to try and decide how it should be regulated and worked in to the current traffic laws. As previously mentioned with the bike-rentals, non-compliance with transportation and safety laws could lead to a ban of operations altogether. Therefore, the addition of new bills should be constantly monitored by the company so that they can adapt to them efficiently, and comply with state laws. When asked about their legal monitoring process and compliance checks, Scozzafava stated that they completely support any new laws proposed, complying religiously to safety laws, such as the license and helmet requirements, and even went as far as saying something should be done to hold drunk scooter drivers accountable. As of now, Zapp doesn't have reflective vests as a feature that comes with the rental, claiming that due to how easy it is to lose a vest, this would infringe on the safety of the next passenger, so instead they opted for a seven-foot-tall pennant on the back, to make the scooter more visible (Scozzafava, 2017). Zapp has been quick to comply with regulations, as its relationship with the government is vital to operations. This will become an even bigger challenge as Zapp expands its business into new markets, having to deal with different laws and regulations in each state.

The attractiveness of scooter rentals is the convenience of the process, as well as avoiding expensive cost of ownership. Additional steps required by strict new laws would be

counterproductive to how easy these rentals are supposed to be. If they were to require that all moped riders had a motorcycle-specific license, as previously proposed, Zapp would have to remodel a business plan that would encourage customers to get this, less their ridership would go down due to limited students fitting this requirement.

Similarly, the original bill featured a regulation that would ban scooters from any street with a speed limit over 35mph. Although vetoed, if this requirement were brought back to the conversation, it would severely hurt Zapp's business, by banning operations anywhere that requires crossing a highway. Similar to the legal battles in the car-sharing and bike-sharing industry, these new bills stand to threaten Zapp's ability to rent scooters in the Columbia, South Carolina area.

Another operational blind-spot in this scooter-rental process is the anonymity of consumption. There are 27 pick-up and drop-off sites in an eight by seven-mile radius across the city, and not nearly enough employees to constantly monitor the state of each scooter when it gets returned. This means that any mishaps- loss of a helmet, dent in the bike, etc.- are anonymous, if not reported. There's no way of knowing if it happened two users ago, or the day before.

This anonymity became a major problem for ZipCar, when drivers were leaving trash and smoking in their rental cars, since they felt no shared sense of ownership with the car to make them want to keep it clean. The result was a big brother type system of surveillance-based governance. This regulation is done by cost/benefit incentives through taxes, fees or higher prices. This system has encouraged drivers to fill up the gas, not leave trash, etc. because they know they will be fined if ZipCar happens to check, or the next person reports it (Bhardi and Eckhardt, 2012, p.892). While this exact system wouldn't apply to Zapp, something of that nature could be implemented to counteract the anonymity of the process. After all, maintenance and vandalism costs are a high percentage of the total budget in the product-sharing industry, as much as one-third in the case of Vélib (Gee, 2016).

Another barrier that Zapp has to face is competing for market share in the Columbia, South Carolina area. With its target market being college students at the University of South Carolina, Zapp has to compete with two industry titans: Uber and Lyft. While they differ in many ways, they are all competing as viable alternatives to owning a car. Since scooter-rentals are a relatively new concept, gaining market share in an established industry, with billion-dollar companies, will be a major barrier to the success and expansion of Zapp.

Similar to Uber's fundraising to subsidize its expansion into the Chinese market, Zapp has also been exploring new ways to finance itself as it expands into seven new cities. Due to the low-cost nature of the service, Zapp needs to find other ways than just Zapp rides to finance these large investments. Not only expansion, but also any slight app update would cost the company a significant amount, while not directly leading to more profit. To subsidize their operations, Zapp will soon announce a national sponsor, which will be advertised on each scooter, as well as the in-app advertisements, and will help with branding the Zapp app. According to Scozzafava, this relationship will also lead to different colored scooters, leaving behind their recognizable green for a color that will better advertise their sponsor. This sponsorship will bring substantial revenue to Zapp. Zapp has also made an agreement with Highgate hotels for free parking in hundreds of locations across the country. Trying to support their low-cost rental service, Zapp has brought in, or will bring in, revenue by means of 1) rides 2) in-app advertisements 3) advertisements on the scooters themselves 4) sponsors 5) licensing the Zapp app technology 6) franchising their business model (Scozzafava, 2017). Their budgeting strategy will be fundamental this upcoming year, as the company rapidly expands.

Looking Forward

As previously stated, the product-sharing industry has a lot of potential and has been growing quickly in the past couple of years. Zapp's future plans show that they are going to capitalize on this industry growth, by expanding its operations exponentially in the next year. With plans to incorporate electric bicycles, electric four-person jeeps, and expand into eight cities total, Zapp is looking to increase its ridership with more choices, in more markets.

Looking forward, the biggest factor that will facilitate this expansion is government help, just as the bike-sharing programs benefited from. As established, site selection and accessibility are important factors to success, and ones that Zapp heavily focuses on. To establish a parking spot in a new location, the company must request permission through the city. Scozzafava claimed that working with the city to get more locations and ultimately get more riders is their biggest challenge to date. He also stated that Mayor Benjamin, along with the City Manager, Missy Gentry and the Director of Parking, Elle Matney have been instrumental in this expansion. He would love to expand to more locations in Five Points and the Vista, so that Zapp can be a convenient option for those that live and work there (Scozzafava, 2017). More cooperation with the city means more locations, which would increase the convenience of these rentals and attract more customers. This site selection and government partnership will continue to be vital in their expansion, even in the upcoming markets they plan to reach. Moving a step further than just a positive relationship with city officials, the city of Columbia has recently made a Request for Proposals for a company to run the operations of a bike program in the area (Scozzafava, 2017). Hopefully, Zapp can win this contract, and become a private-public company that can use public space for parking in exchange for running the operations and flow of bikes. As seen with Citi Bike, with their numerous locations throughout New York City, this private-public relationship is the key to growth and site selection.

Analyzing operations within their current market, Zapp has potential to grow its ridership without expanding physically. As of right now, Zapp only works if you register a credit card on the

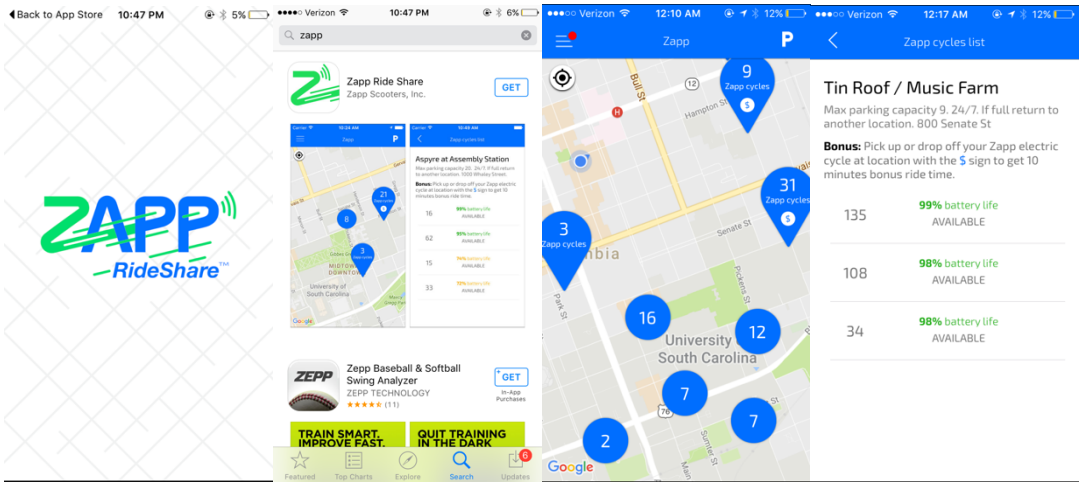
app, charging that method of payment each minute driven. This leaves out the lower class, and/or students that aren't able to sign up for a credit card. With the target market being students aged seventeen to twenty-two, this could potentially limit the company's growth by not accommodating those without a credit card. A possible solution could be a partnership with the university to accept Carolina Cash, since every University of South Carolina student has a Carolina Card. Another possible solution to look into could be a reload kiosk that accepts cash. This move to accommodate those without a credit card would not be an easy feat, as it brings problems of how to charge stolen scooter fees, overage fees for being out of the geographical limit, etc. Despite the challenges of this addition, it would be worth it, considering the market limitations with a system that only accepts credit cards.

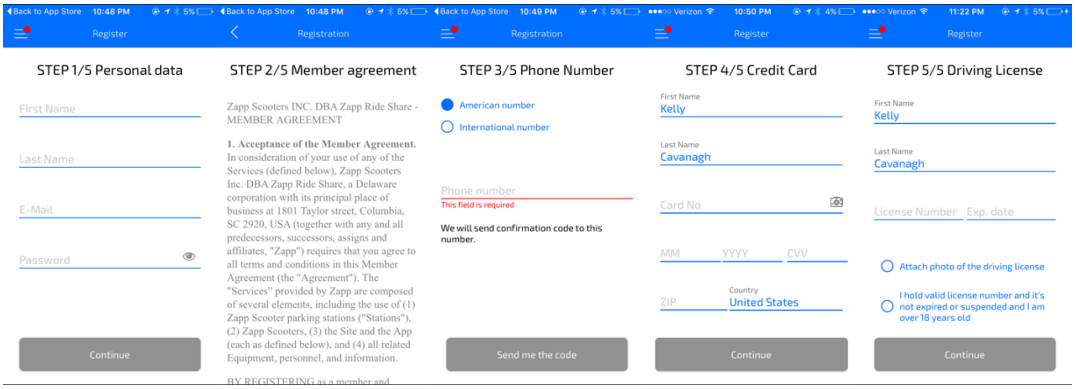
Another aspect that could prevent students from choosing Zapp over its competition is the uncertainty in availability. As of now, a user could check the availability at a station, and then it could be gone by the time they walk there. This works with drop-off sites as well, since a user is supposed to check if there's available spots at their desired destination before driving there, but there's no guarantee it will still be available once they get there. This uncertainty could affect consumer decisions, especially if they are rushed on time and don't want to deal with going to a neighboring station. To counter this limitation, Zapp could add a reservation feature to its app. If students pay more, they can reserve a spot for pick-up or drop-off. Reducing uncertainty increases the convenience of this option, which would attract more students. When discussing this idea with the owner of the company, he said that this was something that they looked into doing, and it would require about $50,000 in app-updating costs and 2 months to work on. The main challenge with this option is that it would no longer be a low-cost option, with the fee to reserve a spot, and a fee if someone doesn't show up. He predicted this may cause more problems than solve them, especially if the company doesn't price the reservation feature perfectly according to user's willingness to pay.

Instead, Scozzafava would like to see more rental locations, that way the customer wouldn't have to walk too far if there happens to be a shortage of bikes or drop-off parking spots. The company's first priority has been expanding to different locations and methods of transportation, but if there is enough demand from students, he could revisit the idea of spot reservation (Scozzafava, 2017).

With their plans to expand, along with the mentioned suggestions, Zapp has the potential to greatly impact multiple communities across the U.S. Offering a convenient low-cost option of transportation, with designated parking spots, would save consumers the cost and hassle of owning a car and the headache of looking for parking. Cities that have introduced a reliable transportation-sharing service have also seen a reduction in congestion, commute times and parking shortages. Aside from the local benefit, Zapp would also benefit the community's carbon footprint by lowering greenhouse gas emissions. All of Zapp's transportation options, from the low-speed cycles to the four-person jeeps, are electric, powered by manually pedaling and/or long-lasting batteries. That means that all 15,000 Zapp users are commuting in an environmentally-friendly way, getting more cars off the road, and reducing greenhouse gas emissions. Based on this positive impact, Zapp could be the answer to Columbia's parking and congestion problems that city officials have been looking for.

APPENDIX A: ZAPP RIDE SHARE APP SCREENSHOTS

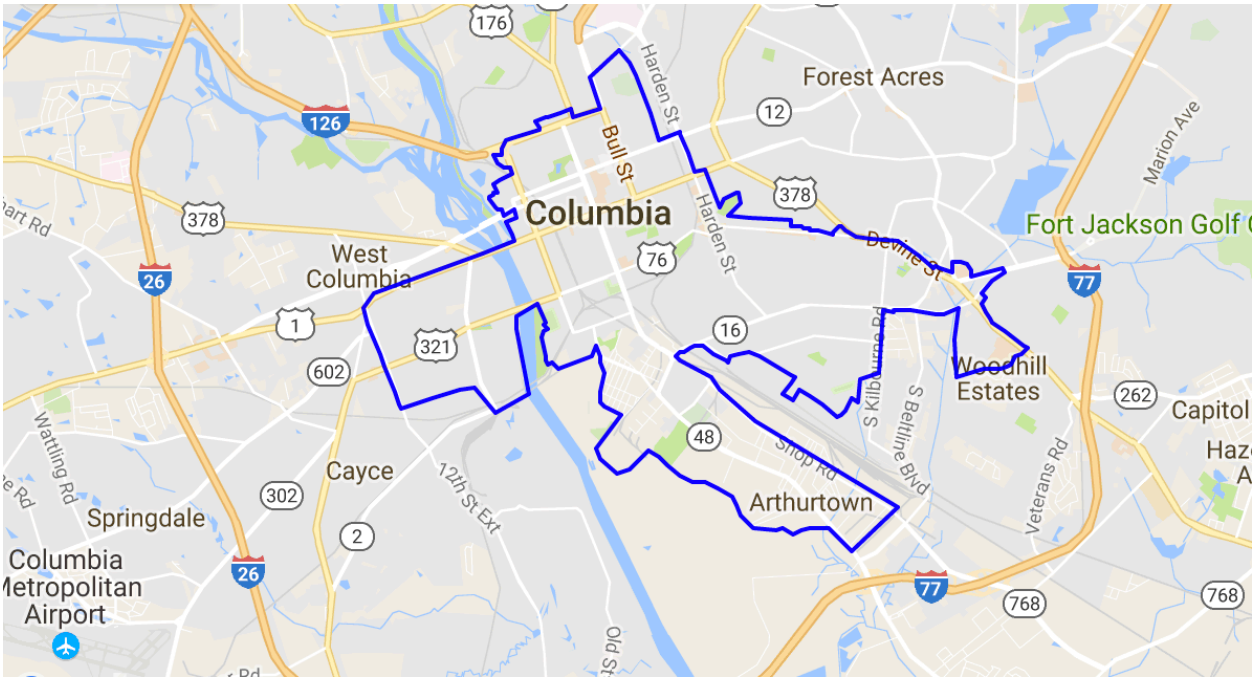




APPENDIX B: DESIGNATED ZAPP PARKING LOCATIONS

Parking Location	Address	Maximum Parking Capacity
Cayce Cove Apartments	215 Spencer Pl., Cayce	18
Park Place Columbia	937 Assembly St., Columbia	6
The Apartments at Palmetto Compress	612 Devine St., Columbia	9
Barefoot Campus Outfitter	700 Lincoln Street, Columbia	21
Strom Thurmond Fitness Center	1000 Blossom St. Columbia	6
The Mills Apartments	510 Heyward Street, Columbia	9
Aspyre at Assembly Station	1000 Whaley Street, Columbia	20
Swearingen Engineering Building	301 Main Street, Columbia, SC	7
Midlands Tech	316 S Beltline Blvd, Columbia	6
Zapp Office	Barnwell & Taylor St. Intersection	9
Barnwell Lot Stop	1200 Barnwell Street, Columbia	12
Cliff Apartments	1400 Whaley Street, Columbia	7
Bates House Dorm	1423 Whaley Street, Columbia	24
Corner of Sumter and Blossom St.	Sumter & Blossom Intersection	9
Honors Residence Hall	1215 Blossom Street, Columbia	9
Horizon Parking Garage	1501 Pendleton Street, Columbia	7
Quad Dorms	Corner of both Wheat & Sumter St.	11
Tin Roof/Music Farm	800 Senate Street, Columbia	9
Presidents Lot/C3	1400 Greene Street, Columbia	10
McCutchen House	902 Sumter Street, Columbia	4
Law Center Parking Lot	Greene St & Assembly Intersection	15
Across from Columbia Hall	900 Barnwell Street, Columbia	32
Blatt PE Center	1100 Wheat Street	8
Cool Beans	2000 College Street, Columbia	6
College Park Place Apartments	700 Pickens Street, Columbia	6
Cliff Apartments	1400 Whaley Street, Columbia	7
Blossom St. Parking Garage	1244 Blossom Street, Columbia	5

APPENDIX C: GEOGRAPHICAL BOUNDARIES OF ZAPP IN COLUMBIA, SC



APPENDIX D: PROMOTIONAL PRICING ADVERTISEMENTS

Zapp Ride Share
Page Liked · March 17 ·

Want easy Zapp Cash? Refer a friend to Zapp Training tomorrow to get $10! Training only takes 30 minutes and is from 4-6pm at the Barefoot Zapp Location. New participants get $20 Zapp Cash and a FREE t-shirt.

All your friend has to do is write down your name at training. Once your friend has completed training, you will be emailed a promo code for $10.

Like Comment Share

8 Chronological

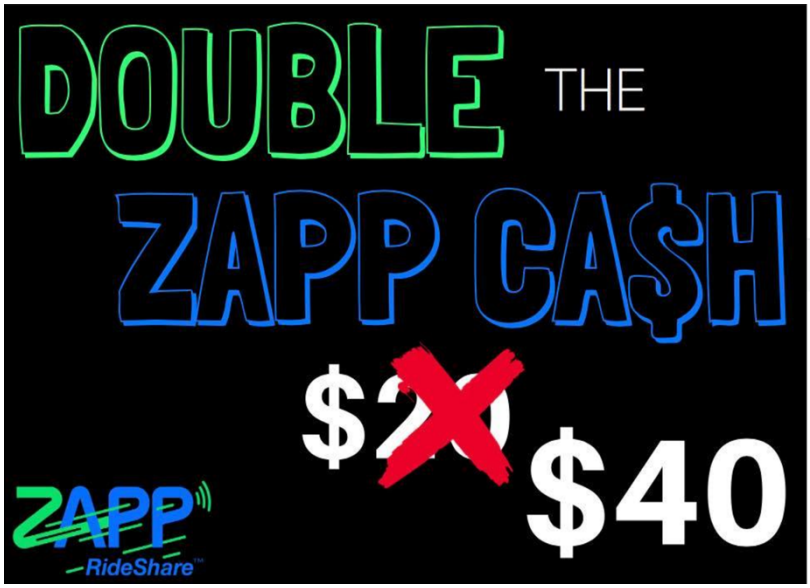
1 share 4 Comments

Kyle Lacio Where is barefoot zapp?
Like · Reply · 1 · March 20 at 2:50pm

Zapp Ride Share 700 Lincoln Street. Hope to see you there!
Like · Reply · 1 · March 20 at 3:12pm

Claire Prince Ben Taylor
Like · Reply · 2 · March 20 at 3:12pm

Write a comment...



Zapp Ride Share
Page Liked · March 28 ·

Today you can get double the Zapp Cash at training! We'll be across from Barefoot Columbia between 4-6pm so come say hi! You'll also earn a free a t-shirt👍 #ZappOn #ZappLife

Like Comment Share

Write a comment...

People You May Know See All

Kenzie Tinker
5 mutual friends
Add Friend

Zapp Ride Share
Page Liked · March 27 ·

Hey USC students and Columbia, SC residents. Anyone who downloads the Zapp Ride Share app and registers today before 11:00PM gets $50 of free Zapp Ca$h!

Email us at infoCola@zapprideshare.com with your name after you download and register and you will get your promo code within 24 hours. Share this with your friends and Zapp On! — at University of South Carolina.

Like Comment Share

1 Chronological

Callie Goodwin I downloaded last night but didn't see the email part. Commenting so I can remember to email.
Like · Reply · 1 · March 28 at 9:14am

Write a comment...

APPENDIX E: ZAPP INVENTORY MANAGEMENT E-MAIL

From: **Zapp Rideshare Move Zapps 4 Ca$h** movezapps4cash@zapprideshare.com
Subject: We Want You
Date: April 6, 2017 at 10:59 AM
To: kac@email.sc.edu

ZR

REFERENCES

Bacon, Jonathan. "Uber CEO: We Need to Get Better at Telling Our Story." *Marketing Week (Online Edition)*, 17 Sept. 2015, p. 1. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=109520734&site=ehost-live.

Baker, L. (2006). The Service Economy. E: The Environmental Magazine, 17(2), 16.

BARDHI, FLEURA and GIANA M. ECKHARDT. "Access-Based Consumption: The Case of Car Sharing." *Journal of Consumer Research*, vol. 39, no. 4, Dec. 2012, pp. 881-898. EBSCO*host*, doi:10.1086/666376.

Bensinger, Greg. "Court Upholds Seattle Ordinance Rules Allowing Uber Union Vote." *The Wall Street Journal*. Dow Jones & Company, 20 Mar. 2017. Web.

BURRIS, RODDIE. "Scooters by Phone? USC Alum Hatches Plan for Rental Business."*The State*. N.p., 25 Apr. 2015. Web.

Cowling, Krycia, et al. "Net Effects of Bicycle Share Programs on Bike Safety." *American Journal of Public Health*, vol. 104, no. 11, Nov. 2014, pp. e6-e7. EBSCO*host*, doi:10.2105/AJPH.2014.302166.

Dell, Kristina. "Bike-Sharing Gets Smart." *Time*, vol. 171, no. 25, 23 June 2008, pp. 113-115. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=32637651&site=ehost-live.

Elliott, Rebecca Elaine. 41 Iowa J. Corp. L. 727. (Spring, 2016f): 15831 words. LexisNexis Academic. Web.

Esselman, A. "What Happened to Scootaway?" *South Carolina ETV*. 03 May 2016. Web.

Ferguson, Mark. "Service Site Selection Methods" Spring 2017, Microsoft PPT file.

Fishman, Elliot, et al. "Bike Share's Impact on Car Use: Evidence from the United States, Great Britain, and Australia." *Transportation Research: Part D*, vol. 31, Aug. 2014, pp. 13-20. EBSCO*host*, doi:10.1016/j.trd.2014.05.013.

"Frequently Asked Questions." *New York City Bike Share*. New York City Department of Transportation, n.d. Web.

Gee, Oliver. "Paris Coughs up '€15 Million a Year' to Pay for Velib' Bikes." *The Local*. The Local, 14 Sept. 2016. Web.

HELFT, MIGUEL, et al. "UBER's BOLD MOVE. (Cover Story)." *Forbes*, vol. 198, no. 9, 30 Dec. 2016, pp. 58-74. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=120089637&site=ehost-live.

"How Zipcar Works." *Zipcar SEM | Zipcar*. N.p., n.d. Web.

Hoover's Inc. (2017). *ZipCar Incorporated*. Retrieved February 20, 2017 from Hoover's database.

Kabra, Ashish, et al. "Bike-Share Systems: Accessibility and Availability." *INSEAD Working Papers Collection*, no. 49, 23 May 2016, pp. 1-50. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=117535073&site=ehost-live.

Leiber, Nick (2016). Baby, You Can Rent My Car. Bloomberg Businessweek, Issue 4494.

Marcus, Jon. "One City Finally Solved Bike Sharing's Big Safety Problem." *Time.Com*, 14 Nov. 2013, p. 1. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=91976680&site=ehost-live.

Mohammed, Rafi. "Regulation Is Hurting Cabs and Helping Uber." *Harvard Business School Cases*, July 2014, p. 1. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=118426845&site=ehost-live.

Morris, David Z. "Take My Bike, Please: Cycle-Sharing Companies Reshape U.S. Cities." *Fortune.Com*, 11 Aug. 2015. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=108843416&site=ehost-live.

Morris, Robert. "Check Out John Legere's Brand New Ride From Zapp Ride Share."*Niblets*. N.p., 12 Feb. 2017. Web.

Murdock, Andy. "Car Sharing on Campuses Improves Quality of Life, Takes Cars off the Road." University of California. UC Newsroom, 07 Sept. 2016. Web.

Nehme, Eileen and Harold W. Kohl. "Municipal Bicycle Share Program Users, Uses, and Effects: View from San Antonio, Texas." *Texas Public Health Journal*, vol. 66, no. 3, Summer2014, pp. 21-25. EBSCO*host*, login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=97302450&site=ehost-live.

Newcomer, Eric, and Ellen Huet. "Facing a Price War, Uber Bets on Volume." *Bloomberg.com*. Bloomberg, 21 Jan. 2016. Web. 28 Mar. 2017.

"Race and Ethnicity in Key West, Florida (City)." *Race and Ethnicity in Key West, Florida (City) - Statistical Atlas*. Web.

Raviv, Tal and Ofer Kolka. "Optimal Inventory Management of a Bike-Sharing Station." *IIE Transactions*, vol. 45, no. 10, Oct. 2013, pp. 1077-1093. EBSCO*host*, doi:10.1080/0740817X.2013.770186.

"Rent Electric Cycles." *Zapp Ride Share*. Web.

Rothenberg, Sandra (2007). Sustainability Through Servicizing. MIT Sloan Management Review; Winter 2007, Vol. 48 Issue 2, p83-89, 7p

Russell, Sarah. "Scooting Home to Columbia." *Columbia-Metro*. N.p., Nov. 2015. Web.

Sawyers, Arlena. "Avis Budget, Zipcar to share cars; Combined business will buy, resell fewer vehicles." Automotive News Print Version. (January 7, 2013): 422 words. LexisNexis Academic. Web.

"Scootaway, Inc." *Facebook*. Scootaway, Inc., June 2014. Web.

Scozzafava, Frank. Phone Interview. 3 April, 2017

"Sharing Economy: Number of Users U.S. 2014-2020 | Statistic." *Statista*. Web.

Smith, Tim. "SC House Passes Bill to Regulate Mopeds." *The State. The Greenville News*, 14 Jan. 2016. Web.

SOUTH CAROLINA TRANSPORTATION BY THE NUMBERS: Meeting the State's Need for Safe and Efficient Mobility. Jan. 2015. TRIP. Web.

The Sharing Economy: Consumer Intelligence Series. Wiesbaden: Springer Gabler, 2015. *PricewaterhouseCoopers*. Web.

UC Berkeley Transportation Sustainability Research Center. UC BERKELEY STUDY ILLUSTRATES CAR2GO'S GROWING ONE-WAY CARSHARING SERVICE HELPS CUT TRAFFIC, IMPROVES URBAN MOBILITY. N.p., 19 July 2016. Web.

Zapp Ride Share. Computer software. *Apple App Store*. Vers 1.5.1. Zapp Scooters Inc. Web. https://itunes.apple.com/us/app/zapp-ride-share/id1139131630?mt=8

"Zapp Ride Share" *Facebook*. Zapp Ride Share, 2015. Web.

"2015-2016 Bill 3440: Moped - South Carolina Legislature Online." *2015-2016 Bill 3440: Moped - South Carolina Legislature Online*. Web.