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Case Study
Brown University
Business Management & Entrepreneurship
December 2016

An Analysis of the Entrepreneurial Aspects of Uber's Driver-Partner Platform

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INTRODUCTION

In the Spring of 2016, Brown University professor Patrick McQuown decided to do what he teaches aspiring student entrepreneurs. He wanted to follow “Genchi Genbutsu,” a key principle of the Toyota Production System which argues that the best way to understand a company, business method or indeed any situation, is to go and immerse oneself in the “genba”—the “real place” where the work happens.

In this case, Professor McQuown was interested in understanding how the ride-sharing giant Uber works from the perspective of its most important asset: the drivers.

With the summer break approaching, Professor McQuown signed up for another job and became an Uber driver. Working as a driver full time for five weeks and part time for eleven weeks, McQuown logged more than 500 passenger rides in Connecticut, Rhode Island and Massachusetts. Thanks to the service’s much-touted ratings system, which lets passengers score their drivers after a ride, McQuown was able to follow his progress as he became one of the service’s best-rated “microentrepreneurs” in his area.

With an average rating of 4.84 stars, out of a possible five stars, McQuown was rated among the top ten percent of drivers in Connecticut. The financial rewards of this driving were far less tangible, however. McQuown calculates that he, with his Volvo XC90, earned less than minimum wage in return for his hundreds of hours of driving time as an “Uber Partner.”[1]

With this experience in mind, McQuown and his students studied the Uber business model and interviewed 110 active Uber drivers for a broader understanding of Uber from the driver’s perspective. The resulting portrait of the popular ride service, presented in student reports completed in November, is far different from the image that it has sought to cultivate with economists, the media and with Uber’s customers and drivers.

From a consumer perspective, the appeal of Uber is simple. Hail a ride, from anywhere to anywhere, with the simple push of a button on a user’s smartphone. No cash is necessary, as the cost of a fare is billed to a customer’s credit card, which is on file with Uber.

For potential drivers, the service seems equally appealing. Uber bills to those interested in driving for the company as an opportunity to let them “be their own boss,” and determine their own working hours.[2]

McQuown and many of the drivers interviewed by the students found that this promise falls far short in reality. Drivers, in some instances, end up losing money on fares. More prevalent is a system designed to ensure Uber’s control over the experience that can come at the expense of the drivers, as they learn that they have far less control over their working hours and driving time than expected. Simply put, Uber’s business model puts into practice technologies and policies that frustrate and belittle drivers while not living up to its marketing on the financial rewards.

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[1] See Appendix, Exhibit A.

[2] Brenda. "Be Your Own Boss: Drive on the Uber Platform." UBER Newsroom. May 30, 2015. Accessed December 11, 2016. https://newsroom.uber.com/us-louisiana/be-your-own-boss-drive-on-the-uber-platform/.

For drivers, as McQuown found, it's as easy and seamless to sign up as a driver partner with Uber as it is to become an Uber passenger. To work as a driver for the company, all that's required is that drivers have insurance and a registered vehicle. After a basic background check, drivers can start within two days of submitting this information.

The average driver is with Uber for less than a year, before they realize the reality behind the paycheck.[3] Research has shown that while Uber drivers themselves estimate their income to be $14.76/hr, it only comes to $9.23 in practice. Uber, the ride-sharing giant, continues to dominate the marketplace by taking advantage of their drivers and piggybacking off of the promise of partaking in the sharing economy. Regardless, consumers, investors, and the media alike have dubbed Uber the posterchild of the nascent and growing sharing economy, while authors and scholars often praise Uber drivers as "microentrepreneurs."

In NYU Professor Arun Sundararajan's book "The Sharing Economy," Sundararajan points out that Uber drivers cover expenses such as gas and repairs.[4] In exchange for these ownership responsibilities, Sundararajan claims that drivers are able to build their "transportation microbusiness." Uber promotes a similar notion by referring to its drivers as entrepreneurs.[5] In fact, however, driving for the ride service has almost nothing in common with business ownership — particularly because drivers are unable to financially differentiate themselves in the marketplace.

THE "SHARING ECONOMY"

Uber drivers are drawn to the service by a simple and appealing prospect: the company claims that they will be able to choose their own hours, dictate their general geographic market, and earn money in the process. As such, the Uber marketplace is perceived by many in industry, media and academics to exist in the same realm as other modern "sharing" economies, such as Ebay, Etsy and Airbnb. For the Uber driver, however, this analogy could not be further from reality. This is especially apparent in the misleading claim that Uber drivers are "their own bosses." When a driver chooses to become an "Uber Partner," as McQuown and his students found, they work primarily at the will of Uber.

When a driver accepts a ride request, Uber provides no information regarding the ride destination. A ride could be less than a mile or more than 100 miles. The driver has no idea and is only presented with the destination once they arrive at the pickup location and the passenger(s) get in their car.

Because drivers are not presented with this destination information ahead of time, they can lose money on rides. Uber is aware of this, yet the app continues to send drivers on unprofitable trips. Based on McQuown's and interviewed drivers' experiences, it is not uncommon for drivers to drive 15 or more minutes to pick up a rider only to take them on a five minute trip, resulting in a payout of about $3 before any driver expenses.

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[3] Frizell, Sam. "Uber Just Answered Everything You Want to Know About Your Driver." Time. January 22, 2015. Accessed December 11, 2016. http://time.com/3678507/uber-driver-questions/.

[4] Sundararajan, Arun. *The Sharing Economy: The End of Employment and the Rise of Crowd-based Capitalism*. Cambridge, MA: MIT Press, 2016.

[5] Kalanick, Travis. "Financing 100,000 Entrepreneurs." UBER Newsroom. February 16, 2016. Accessed December 11, 2016. https://newsroom.uber.com/financing-100000-entrepreneurs/.

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Conversely, a driver may arrive to pick up a rider only to learn the ride will be 45 minutes in the opposite direction from the driver's base.

The inability to determine ride direction or distance to any given-drop off results in drivers gambling on whether or not a fare will be profitable after expenses. Uber extensively tracks the rate at which drivers accept ride requests within the first 15 seconds after they put themselves on the app. The expected acceptance rate is 80 percent, while it is recommended that drivers promptly accept every incoming ride request.[6] Drivers who decline too many rides will cause drivers to be temporarily kicked off the system.

For any entrepreneur or business owner a key tenant is the seller's ability to differentiate their product or service and to financially differentiate themselves because of their product or service. Airbnb, Ebay, Etsy and other sharing companies enable product distinction and allow sellers to set their price, Uber, by contrast, "works both sides of the market" giving the company total control over the buyer and seller, in the words of Brown University Economics Professor Matthew Turner.

Uber's ability to not only control the supply to drivers, but to also be aware of the exact number of rides demanded in a particular area enables the company to optimize pricing to their advantage. Utilizing a surge pricing model, Uber incentivizes drivers in selected areas. Uber relays the message to all the drivers nearby which can cause a significant influx of drivers into the area. By the time drivers arrive, the supply of drivers can increase to the point where there is a greater supply of drivers than customers.

While Uber controls both sides of pricing, they also control both sides of the rating system, dictating that maintaining a positive rating is significantly more important for drivers. Although a poorly rated customer rarely faces a penalty, a driver can be fired if his or her average rating falls below 4.6 stars[7] Uber's rating system is a key component of its entrepreneurial image, but for drivers, it can be akin to the sword of Damocles hanging over their heads. For every one star rating a driver obtains (usually for starting a trip too early or poor navigation) it needs nine five star ratings to return to the 4.6 star level, at or above which a driver keeps their job.

In other familiar examples of the sharing economy, such as AirBnB and Ebay, Uber has been compared to these other companies in terms of how ratings work. Princeton Economics professor Alan Krueger recently compared Uber driver ratings to Ebay seller ratings, noting the relationship between seller ratings and sales. In this case, Krueger follows conventional wisdom in the assumption that higher ratings are expected to correlate to increased sales. Because these other sharing economy companies allow sellers to set their own prices, a higher rating typically does positively influence demand, enabling sellers to increase the price of their product or service. However, Krueger overlooks the fact that a strong Uber rating does not translate to more rides or higher fares. Based on Professor McQuown's experience and interviewed drivers experience, ratings

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[6] Cook, James, 2015 Feb. 11,. 2016. "Uber's Internal Charts Show How Its Driver-Rating System Actually Works." *Business Insider*. Accessed November 14.

[7] Rosenblatt, Joel. "Uber, Lyft Driver Settlements Signal Gig Economy Victories Ahead." Bloomberg.com. June 2, 2016. Accessed December 11, 2016.
https://www.bloomberg.com/news/articles/2016-06-02/uber-lyft-driver-settlements-signal-gig-economy-victories-ahead.

are more prophylactic than revenue generating, with a positive rating basically only allowing drivers to keep their job as an independent contractor for the company.

As one driver put it, "The driver [financial] support is really frustrating. I am a top rated driver in New England - I know because I received an email notifying me - and I receive no compensation for that." While a driver with subpar ratings can be removed from Uber, there seems to be no such ban in place with riders, as drivers routinely pick up riders with a rating significantly less than 4.6.

DRIVER RELATIONS

From most drivers' perspective, Uber has placed its complete focus on serving as a readily available service for their riders, and has put forth minimal effort toward improving driver relations. We verified the lack of transparency by speaking with drivers who have spent more than three months working for Uber. They had similar complaints about the company's policies and how it disadvantages drivers relative to passengers.

The Uber system also requires its drivers to venture into unfamiliar areas, which can result in navigation mistakes. This, in turn, leads to poor driving ratings which can eventually jeopardize a driver's employment with the service. For drivers, this can create an atmosphere of urgency and stress, adding another element of discomfort to the working lives of Uber's drivers, many of whom rely on Uber for their livelihood.

Should a driver choose to cancel a trip because they have determined that the trip would not be profitable, they are given a warning when their cancellation percentage exceeds 10 percent. If the trend continues, the drivers risk deactivation. Moreover, if more than one trip is cancelled within a short period of time (5 minutes), Uber forces a mandatory "timeout" onto its drivers, during which time they are removed from the platform and he or she will earn no money.

Often, drivers are asked to wait for customers. While parked outside a grocery store, apartment building, or other temporary stop on a rider's trip, drivers are only earning a per-minute charge. In traditional taxi cabs, shouting the classic phrase "keep the meter running" demonstrates the customer's understanding that the price of the trip increases at a rate of 35 cents per minute. However, Uber's per minute fare can be as little as 11 cents per minute depending on the market, more than 3 times less than a regular taxi cab's fare.

Uber requires that when a driver arrives at the pickup location, they must wait up to 5 minutes for the rider before they begin a ride and are finally presented with the drop off destination. During that time they earn no money. Moreover, while a ride is underway, Uber riders may request their driver to wait while they do a task, such as stop at a convenience store.

In some markets, Uber charges an astoundingly low rate of $0.11 a minute, amounting to $4.95 per hour for the driver itself.[8] Our research indicated Uber drivers earn significantly less than their taxi driving

[8] Whittle, Dave. Comment on "Does Uber Charge on Waiting, for Example If I Ask the Driver to Wait for Me While I Go to the Supermarket?" *Does Uber Charge on Waiting, for Example If I Ask the Driver to Wait for Me While I Go to the Supermarket? - Quora* (blog), November 1, 2016. Accessed December 12, 2016.
https://www.quora.com/Does-uber-charge-on-waiting-for-example-if-I-ask-the-driver-to-wait-for-me-while-I-go-to-the-supermarket

counterparts. New York City taxi drivers earn $0.50 per minute of waiting or driving slowly.[9] However, at the time of this paper, UberX in NYC charges only $0.35 per minute. After Uber claims its 25% commission, drivers are left with only $15.75 per hour compared to the $30 per hour for a taxi driver makes. Similarly, taxi drivers in Washington, D.C. charge $35 per hour to wait, while UberX drivers make $13.50 an hour while waiting after Uber takes its cut. This is a considerable difference in charges to riders and payouts to drivers, a disparity only exacerbated by Uber's complete lack of employment benefits.

During waiting times, drivers are at the mercy of their riders. There are several unwanted factors as a result of this that go beyond the obvious inconvenience this causes in terms of scheduling new rides and making money. For example, drivers forgo the opportunity to capitalize on potential surge pricing and in major metropolitan areas are likely to run into traffic snags, like having to park somewhere else or needing to drive around the block multiple times. In the meantime, the driver earns comparatively little, and will be rated poorly for the already accepted trip should he or she decide to cancel it. Based on driver interviews, being left to wait for customers is one of the most dreaded scenarios for any Uber driver.

This dissatisfaction leads to high turnover. One in six drivers in any given month is new to the company, however more than half of participants exit within 12 months.[10] While this high-turnover rate can somewhat be attributed to decreasing unemployment in the overall economy, it becomes clear through experience and driver interviews that Uber policies and their restrictive marketplace is a factor in driver's no longer opting to partake on the Uber platform. For example, nearly half of all drivers interviewed cited Uber Driver Relations, or not knowing rider destinations, as their most significant issue with Uber.[11]

Despite the high turnover rate, the constant influx of new drivers has not dried out Uber's market for Uber Partners. The opaque nature of Uber's relationship with its drivers is characterized by Professor Turner's estimate that it "may take ten years for Uber drivers to realize the nature of these work contracts". Until drivers understand the reality of their wages after expenses and the limiting nature of their contracts, Uber will continue to dominate the marketplace with unhindered access to new drivers.

TIPPING

Uber's exclusion of a tip feature further restricts the ability of drivers to be compensated for distinguishing themselves and thereby increasing their revenue. In a truly open and free market, an entrepreneur or business owner would be able to distinguish their service and product, and the market would adjust the price accordingly. Because Uber drivers cannot adjust their prices, tipping would be the only way for an exceptional driver to earn more than a subpar one. Many driver's provide excellent service, yet Uber's lack of an in-app tip option also hinders this form of driver distinction, further curtailing a driver's ability to act as an entrepreneur. In hopes of receiving a high rating, some drivers provide water, have a subscription to Spotify Premium, or offer other "extras" that go beyond a typical Uber ride. However, as avenues for tipping to justify these extra perks and services have not been established, these are mostly in vain.

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[9] "NYC Taxi & Limousine Commission, RATE OF FARE." NYC Taxi & Limousine Commission - RATE OF FARE. 2016. Accessed December 11, 2016. http://www.nyc.gov/html/tlc/html/passenger/taxicab_rate.shtml.

[10] Farrell, Diana, and Fiona Greig. *The Online Platform Economy: Has Growth Peaked?* Report. 1st ed. Vol. 1. New York: JPMorgan Chase Institute, 2016.

[11] See Appendix, Exhibit D.

A recent lawsuit involving 385,000 current and former drivers was settled with an agreement stating that drivers will be allowed to solicit tips and be allotted payouts based on the miles that they have driven.[12] Only after the class action lawsuit were drivers able to solicit tips during the ride. Despite these changes, of the 110 riders that were interviewed 76 percent stated that they have either never received a tip or that only 10 percent or less of their riders have tipped them during their time working for Uber. 22 percent stated that merely 11-20 percent of their riders tipped, and only one driver claimed to receive tips on more than 20 percent of rides. This stems from the issue that tips can only be in cash, which is inconvenient for drivers and riders alike. Uber's platform is a convenient cashless transaction performed in the app, and tipping in cash is counterproductive to their goal of convenience. Of the drivers interviewed, 26 percent drove for Lyft and Uber, and 90 percent of those who drove for both Lyft and Uber preferred Lyft, largely due to Lyft's in-app tipping option.

Roja Garimella '16, a frequent Uber rider, commented:
"Most of my Uber rides are unplanned (i.e. going downtown for last minute dinner plans) and that makes tipping pretty inconvenient. Though I would always tip Uber drivers if it were possible to do so on the app. Last summer, I was working for a consulting firm where my colleagues and I took many Ubers to work, sometimes up to 4 to 6 times a day. We didn't tip often, if at all. I know drivers prefer cash tips often, but in this day and age, and especially for work expenses, it is a lot more convenient and customary to tip with card."

ADDITIONAL FINDINGS

Professor McQuown and his students began investigating Uber from the perspective of entrepreneurship. However, during their research they discovered a number of additional items which reinforce that Uber's priority is not the driver. Uber's use of surge pricing and how the user interface presents it to drivers are particularly frustrating.

Uber's method of adjusting its prices according to supply and demand is an elaborate, idiosyncratic surge-price system. Other than serving as a mechanism to equilibrate demand and supply directly, surge pricing is a significant perk that Uber uses to attract drivers to work for them instead of competitors, due to the higher payments it ostensibly offers.

To facilitate drivers' journeying to areas with high demand, Uber has put into place a "heat map" illustrating areas with high concentrations of customers using different color gradients. This surge rate is calculated in proportion to the demand for Uber cars in the area and responds to the areas' number of drivers. Theoretically, surge pricing is intended to reduce waiting times for customers in busy areas who are willing to pay a higher fare, while providing drivers with greater income. In practice, Uber surge pricing further contributes to overall driver dissatisfaction due to the adversative consequences of the asymmetrical distribution of information among drivers and riders that it entails.

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[12] Rosenblatt, Joel. "Uber's Drivers Win the Backing of U.S. Labor Watchdog." Bloomberg.com. November 2, 2016. Accessed December 11, 2016. https://www.bloomberg.com/news/articles/2016-11-02/u-s-labor-panel-backs-uber-drivers-in-class-action-fight.

The macro heat-map, seen by the driver while waiting for incoming rides, indicates in red and yellow that surge prices are present in certain areas. These areas are marked with the appropriate multipliers (i.e. by what factor the customer is charged more) of the fare in those regions. This looks as follows:

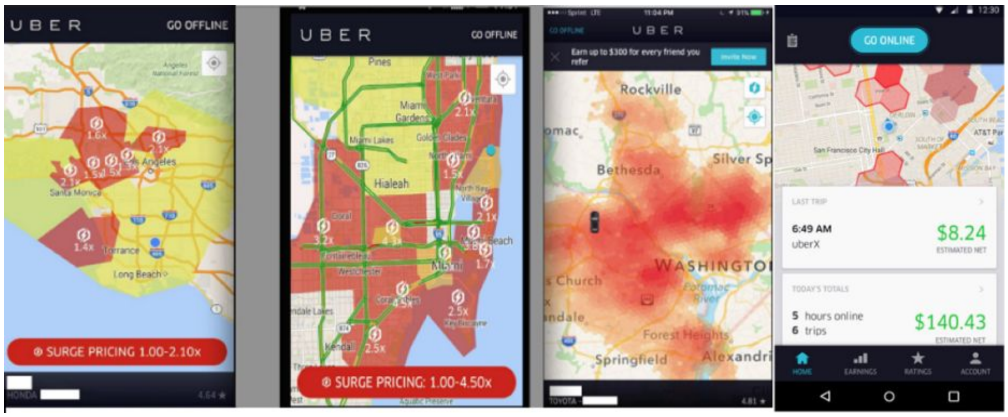

Exhibit A: Heat Map on Driver Interface

The screenshots of Exhibit B illustrate two different pick-up alerts for a driver in CT. The left screen does not indicate a surge whatsoever on the map itself. However, upon close inspection, a multiplier of 7.0x (in the smallest font on the screen) becomes visible next to the rating. The right screen is strongly tinged in red, causing drivers to understandably assume that there is a surge fare, as the macro maps of Exhibit A are colored red where there is a surge fare. However, there is no multiplier in place where it would be found next to the rating, meaning that these areas do not, in fact, offer surge. Professor McQuown only noticed the false-positive surge pricing after completing 200 rides, upon trying to reconcile Uber's payout with his own estimations. Uber's support team advised him to ignore the color and focus on the multiplier.

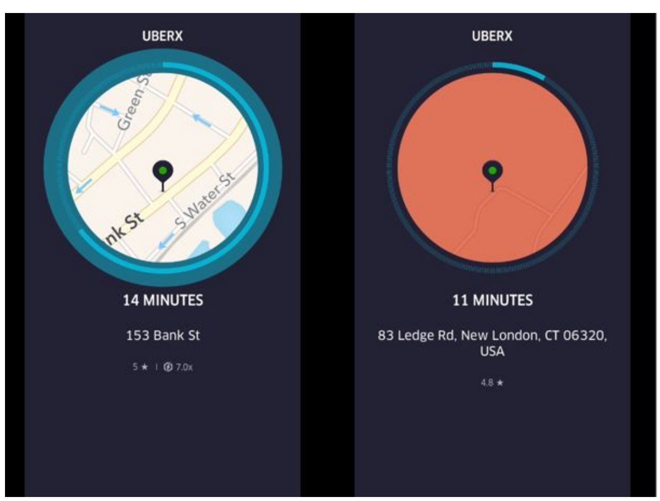

Exhibit B: Ride Request on Driver Interface

User interface frustration is coupled with a lack of information regarding the estimated duration of surge pricing. In the 110 driver interviews, drivers revealed they did not understand surge due to the lack of transparency on the driver application. Regarding surge, one driver online commented:

"I don't chase anymore. EVERY time I've run to a surge it has disappeared JUST as I hit the boundary. I've had 2 surge fares but at the time was in a busy area and didn't even realize it was surging. But going to the orange or red or surge has not ever helped me that I could see. I've driven right thru red as I was going home and got nothing."[13]

The user interface (UI) surge system is in practice quite difficult to interpret for drivers, rendering it close to useless. Due to the fact that surge pricing is recalculated multiple times a minute and no indicators exist as to the estimated duration of a surge, many drivers set-out to pursue surges that may or may not be there only to be greeted with a suddenly dropping fare. Inexperienced drivers in particular may unknowingly incur losses because of this, driving to distant locations with reportedly higher fares that are either not there or extremely volatile.

Associate Professor and vice chair of the Brown University department of computer science Thomas Doeppner confirms that the driver surge interface shown in Exhibit B is misleading and would be considered insufficient if something like it had been submitted for coursework in his class. His student and former Uber intern Valentin Perez '18 worked on the customer user interface over the summer of 2016. He reports: "I worked at Uber helping to program the rider app and I only have good things to say about my experience while working at Uber. This driver UI is not consistent with my understanding of how Uber programs their app and their UI."

RECOMMENDATIONS

Driver Relations

Uber is a company powered by machine learning, collecting data on requested rides and driver locations and using it to optimize almost every aspect of the business. For example, Uber can calculate the expected fare and how long it will take the driver to arrive at the pick-up location.

For trips where the driver is likely to lose money, earn an exceedingly low wage, or be left in a low driver requested area, the rider should have to pay a higher fare. A new form of pricing that takes these costs into consideration should be applied to these types of rides in order to compensate a driver for the significant costs incurred on the way to pick up a rider and for potentially relocating significantly far away from his/her home base.

[13] "Do You Trust Uber's HEAT MAP?" Uber Drivers Forum. January 20, 2016. Accessed December 18, 2016. http://uberpeople.net/threads/do-you-trust-ubers-heat-map.11984/.

Ratings
Uber should switch over to a binary rating system, as the current rating situation only harms the driver's overall rating. A binary system would serve to decisively differentiate rides: the ride was fine or there was a problem.

If the latter option is chosen, the rider would be able to report the complaint to Uber, and the issue can be solved from there. It is clear Uber does not intend to incentivize its drivers with high ratings, thus the binary system would be sufficient.

Moreover, it is clear from our driver interviews that drivers want real rewards from a business-critical rating system not empty "compliments" as a pat on the back. If the current five-star rating system is to stay, it could be converted into an more effective and motivational rating system by offering perks to top drivers. Drivers who rank in the top percentile could receive a monthly bonus or tangible items as a reward.

Tipping
The fact that almost every interviewed driver preferred Lyft over Uber for the simple fact that it allows tipping, customers should absolutely and unequivocally be given the option to tip through the app and even be encouraged to tip for excellent service.

SUMMARY
Uber has displayed considerable success since 2009. The online transportation company services ride requests in 66 countries and 507 cities worldwide, and the numbers only continue to grow. The company undoubtedly facilitates ride-shares and reduces drunk driving. While McQuown started driving for Uber hoping for an enjoyable job, after servicing over 500 rides, he learned the truth behind Uber's promises. Uber's focus on benefiting the rider stands in stark contrast to how they treat drivers. Uber assumes the supply of drivers is inexhaustible, and rider satisfaction is independent of driver satisfaction.

Uber continues to masquerade as a vessel for entrepreneurship by allowing drivers to set their own hours, driver their own car, and "be their own boss." However, Uber creates a work environment for drivers which is not entrepreneurial. Operating as an Uber Partner, one cannot set a price or receive a higher wage for distinguished service or performance. Uber continues to overlook driver satisfaction, as suggested by unpopularity of the company's expectations for acceptance rates, waiting policies, and underdeveloped partner app interface. Most urgently, Uber should address ride compensation and driver relations. To rectify driver satisfaction, the company should focus on the rating system, compensation structure, and increasing transparency between drivers and ride requests. In agreement with a report from JP Morgan, Uber needs to ameliorate driver relations to combat their paltry driver retention rate and continue growth.

While Uber continues to work on their driverless technology, the company will not be able to shift to this technology any time soon. Until then, Uber must embrace its drivers, enhance their experience, and bolster their compensation.

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DISCLOSURES

In the spirit of full disclosure, Professor McQuown is a member of the Board of Advisors for Rally. Rally connects people who are going to the same place, then delivers high-end buses to get them there and back. Users of Rally choose from preset trips to popular events and destinations or they create their own trip and share it with friends. As a Board of Advisors member Professor McQuown maintains equity holdings in Rally.

ACKNOWLEDGEMENTS

This paper would not be possible were it not for the assistance, collaboration and expertise of our fellow Brown University colleagues. The authors would like to thank Professor Matthew Turner of the Department of Economics and Associate Professor Thomas Doeppner Jr. of the Department of Computer Science. Harry Campbell and his site TheRideshareGuy.com served as an invaluable source during our research. Our good friend and professional colleague Mike Musgrove also helped us immensely. Lastly, this paper was made possible by the collaborative efforts put forth by students in Brown's famed ENGN0900 course. The authors would like to thank Ajith Gokul '20, Alexander Matthew '20, Allsop Nick '20, Andre Alex '20, Banuelos Erika '18, Beaudoin Brent '20, Bolton Andrew '20, Breyer Daniel '17, Bryant Isaiah '18, Buron Veronica '20, Carnevale Jay '20, Charnov Brandon '20, Choi Esther '20, Chretin Sam '20, Clark Austen '20, Collier Will '20, Deckey Ben '20, Deng Frank '20, Dillon Carter '20, Dyne Brendan '20, Flannery Henry '20, Fox Georgia '20, Garimella Roja '17, Gaylord Henry '20, Giuttari Zachary '20, Goepferich Dawson '20, Goldstone Alec '20, Gomez Jonathan '20, Gros Maya '20, Hemmingway Spencer '20, Hinduja Vedika '19, Hoecht Mike '20, Huang Richard '20, Hughes Alex '20, Jaworski Reed '20, Kane Nick '20, Khademi Elahen '20, Kim Donghan '20, Kim Kyunghan '20, Lee Iris '20, Logie Emerson '20, Lokhande Anagha '20, Luo Angela '20, Lynch Phil '20, Martin Jake '20, Mercer Brian '20, Migliori Nicholas '17, Nash Olivia '20, Nguyen Catherine '20, Noonan Samantha '20, Odul Anna '20, Oppenheim Brian '20, Ostertag Sven '19, Oyeka David '20, Page They '20, Pedroza Naomy '20, Perez Melissa '20, Perry Kyra '20, Pierre Elijah '20, Prall Jakob '20, Rabine Daniel '17, Reed Christina '20, Rutiz Isaac '20, Saker Isabella '20, Schifrin Elisabeth '20, Seneor Verda '19, Shleifer Daniel '20, Sopher Max '20, Spalter Amelia '21, Stelian Bianca '20, Sudarshan Nitya '19, Tait Rory '20, Tang Alan '20, Tang Stephen '20, Trehan Akhil '20, Tu Karen '20, Wang Tina '19, Wells Jamie '20, Wolff Adrienna '20, Xiao Cece '20, Young Cody '20, Zhang Elvina '17

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APPENDIX

Exhibit A

UBER ECONOMICS of Professor McQuown’s time as an Uber driver			
16 Weeks	401 Hours	$5,552.09 (gross earnings)	$13.85/hr
8,000 miles in service to Uber	20 MPG @$2.06 per gallon	$4,728.09	$11.79/hr
Depreciation	$429	$4,299.09	$10.72/hr
Maintenance	$408.80 @ *$0.0511 per mile	$3,890.29	$9.70/hr
Tires	$78.40 @ * $0.0089 per mile	$3,811.89 (net earnings)	$9.51/hr
Insurance	$111	$3,700.89	**$9.23/hr**
* Rates provided by AAA which is undoubtedly less than the actual cost for a Volvo XC90 ** Connecticut Minimum Hourly Wage ($9.60)			

Exhibit B

Statistics from 110 Uber driver interviews	
Estimated Driver average take-home hourly wage before expenses	$14.76
Average Length on Uber Partner Platform	9.9 months

Exhibit C

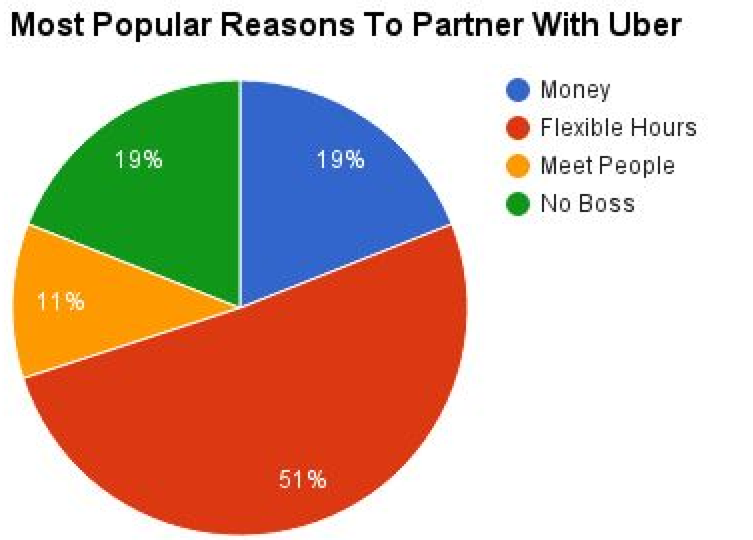


Exhibit D

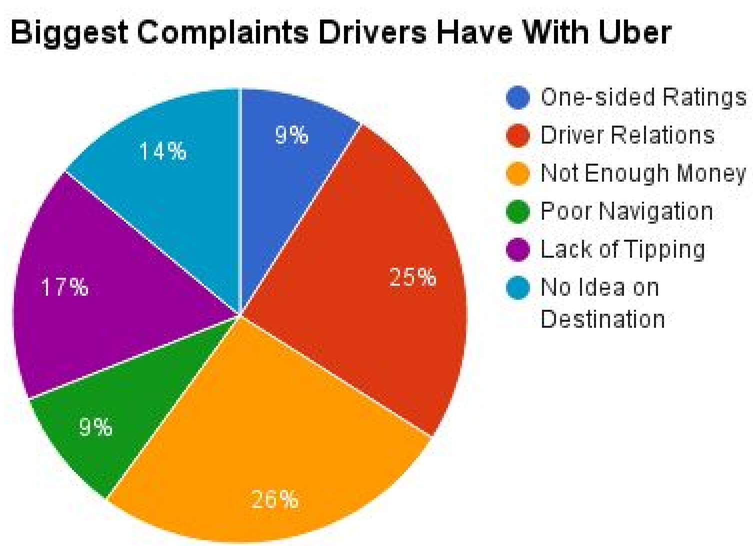
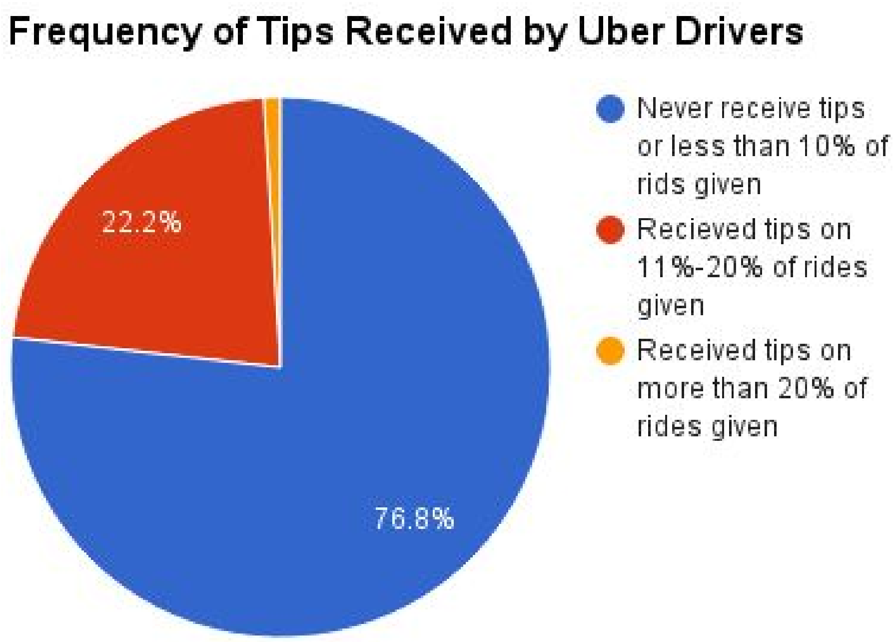


Exhibit E



***Exhibits B, C, D and E are from 110 Uber driver interviews conducted by the team**

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Bibliography

Brenda. "Be Your Own Boss: Drive on the Uber Platform." UBER Newsroom. May 30, 2015. Accessed December 11, 2016. https://newsroom.uber.com/us-louisiana/be-your-own-boss-drive-on-the-uber-platform/.

Campbell, Harry G. "What's The Real Commission That Uber Takes From Its Drivers? [Infographic]." The Rideshare Guy Blog and Podcast. July 25, 2016. Accessed December 11, 2016. http://therideshareguy.com/whats-the-real-commission-that-uber-takes-from-its-drivers-infographic/.

Cook, James. "Uber's Internal Charts Show How Its Driver-rating System Actually Works." Business Insider. February 11, 2015. Accessed December 11, 2016. http://www.businessinsider.com/leaked-charts-show-how-ubers-driver-rating-system-works-2015-2.

"Do You Trust Uber's HEAT MAP?" Uber Drivers Forum. January 20, 2016. Accessed December 18, 2016. http://uberpeople.net/threads/do-you-trust-ubers-heat-map.11984/.

Farrell, Diana, and Fiona Greig. *The Online Platform Economy: Has Growth Peaked?* Report. 1st ed. Vol. 1. New York: JPMorgan Chase Institute, 2016.

Frizell, Sam. "Uber Just Answered Everything You Want to Know About Your Driver." Time. January 22, 2015. Accessed December 11, 2016. http://time.com/3678507/uber-driver-questions/.

Kalanick, Travis. "Financing 100,000 Entrepreneurs." UBER Newsroom. February 16, 2016. Accessed December 11, 2016. https://newsroom.uber.com/financing-100000-entrepreneurs/.

"NYC Taxi & Limousine Commission, RATE OF FARE." NYC Taxi & Limousine Commission - RATE OF FARE. 2016. Accessed December 11, 2016. http://www.nyc.gov/html/tlc/html/passenger/taxicab_rate.shtml.

Rosenblatt, Joel. "Uber, Lyft Driver Settlements Signal Gig Economy Victories Ahead." Bloomberg.com. June 2, 2016. Accessed December 11, 2016. https://www.bloomberg.com/news/articles/2016-06-02/uber-lyft-driver-settlements-signal-gig-economy-victories-ahead.

Rosenblatt, Joel. "Uber's Drivers Win the Backing of U.S. Labor Watchdog." Bloomberg.com. November 2, 2016. Accessed December 11, 2016. https://www.bloomberg.com/news/articles/2016-11-02/u-s-labor-panel-backs-uber-drivers-in-class-action-fight.

Sundararajan, Arun. *The Sharing Economy: The End of Employment and the Rise of Crowd-based Capitalism*. Cambridge, MA: MIT Press, 2016.

Whittle, Dave. Comment on "Does Uber Charge on Waiting, for Example If I Ask the Driver to Wait for Me While I Go to the Supermarket?" *Does Uber Charge on Waiting, for Example If I Ask the Driver to Wait for Me While I Go to the Supermarket? - Quora* (blog), November 1, 2016. Accessed December 12, 2016. https://www.quora.com/Does-uber-charge-on-waiting-for-example-if-I-ask-the-driver-to-wait-for-me-while-I-go-to-the-supermarket.

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