

# COMFORTDELGRO



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# 1. Executive Summary

This report provides an analysis and evaluation of the current and prospective profitability and financial stability of ComfortDelGro in the taxi Industry. Methods of analysis include trend and population analyses for the industry, text mining and sentiment analysis for the online chatter on ComfortDelGro and its competitors as well as geographical, horizontal and vertical analyses on the company's supply and demand issues and analysis of its revenue model. Results show that although ComfortDelGro might still be the leading local taxi provider, but its market share in the taxi industry is steadily declining over recent years. Particularly, research shows that ComfortDelGro lacks online media presence and this is a key reason why it is losing its customers to more tech-savvy competitors.

This report finds that the prospects of the company in its current position can be improved upon, especially in its online media presence and technological advances to increase the convenience of booking a taxi. Recommendations discussed are mainly focused on:

1. Increasing revenue by sales and operations optimisation.
2. Increasing market share by improving customer satisfaction, online media techniques and technology.

This report also acknowledges the limitations of our analysis. Some of the limitations include:

- Market share figures that are inferred from the current taxi fleet size and percentages, which might not be representative of certain competitors like Uber and Grab where some of the taxi drivers are using their own cars.
- Data limitations when mining for online comments and reviews on ComfortDelGro from social media platforms like Facebook due to API restrictions and data policy issues.

## 2. Introduction

ComfortDelGro Corporation Limited is an established multi-national transport corporation with its activities mainly focused in Singapore. The group's operations currently extend from the United Kingdom and Ireland to Australia, Vietnam, Malaysia, as well as across 11 cities in China, including Beijing, Shanghai, Guangzhou, Shenyang and Chengdu. ComfortDelGro's business includes bus, taxi, rail, car rental and leasing, automotive engineering services, inspection and testing services, driving centre, insurance broking services and outdoor advertising.

Our group aims to perform a cross-examination on ComfortDelGro Corporation Limited, zooming into their taxi sector, in the hopes of providing solutions that will give them a competitive advantage over rising direct competitors such as Grab and Uber. Our goals are to identify the strengths and weaknesses of ComfortDelGro, and to come up with strategies that maximise profits from Comfort's taxi services.

Through our examination of the company's operations and its competitors, we hope to highlight

1. Certain differences between current competitors and ComfortDelGro.
2. Aspects of their services ComfortDelGro should target to improve its revenue and market share.

## 3. Scope of Analysis

### 3.1 Industry Profile

The taxi population in Singapore stands at 28,259 at the end of 2015, of which the majority belongs to ComfortDelGro (16,997 vehicles)<sup>1</sup>. There is an average of 5.3 taxis per 1,000 people in the city, making Singapore the largest taxi penetration rate among its global peer cities, according to statistics from Euromonitor.

#### 3.1.1 Demographics of Customers

As taxis are one of the main forms of transportation in Singapore, we have assumed taxi customer demographics to be the same as the general demographics of the population in Singapore.

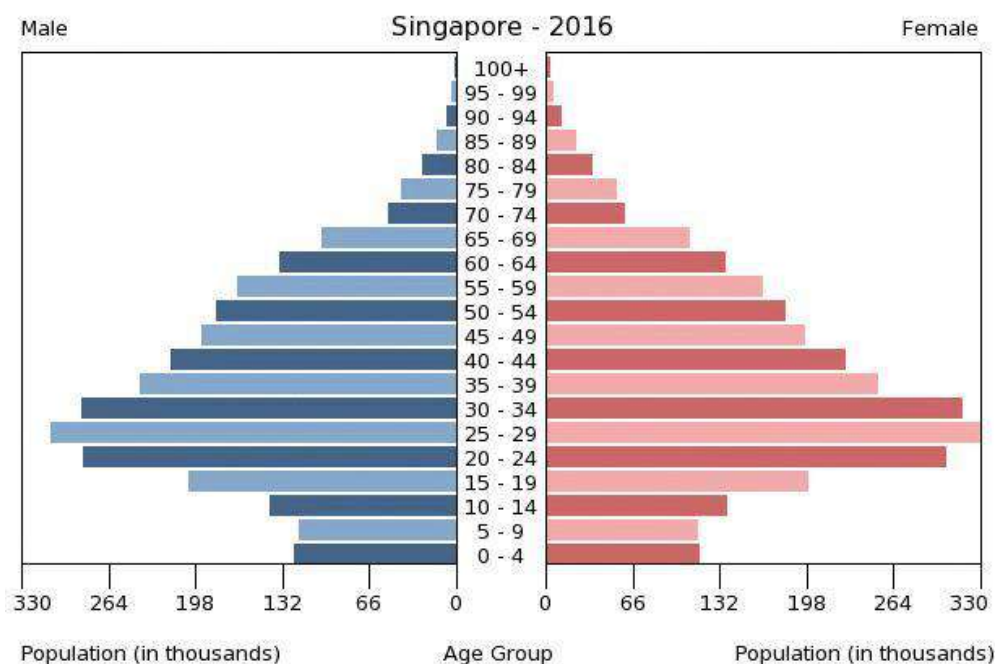


Figure 1: Population Demographics

As seen from Figure 1, most of the customers will come from the age groups between 20 and 39. People from this age group are generally tech savvy and are users of social media. Therefore, our research will mainly utilise data obtained from social media sources such as Facebook and Twitter, alongside other more traditional statistical sources such as annual reports.

<sup>1</sup>Referenced from ComfortDelGro Corporation Limited Annual Report 2015

## 3.2 Company Profile

Based in Singapore, ComfortDelGro is a market leader in the local transport industry, owning a fleet of 22,962 vehicles and managing 12,494 employees in the country. ComfortDelGro also has a significantly growing overseas presence with a global fleet size of 46,000 vehicles, ComfortDelGro is one of the largest transportation companies in the world, collecting S\$4.1 billion in global revenue and S\$450 million in profits in 2015<sup>2</sup>.

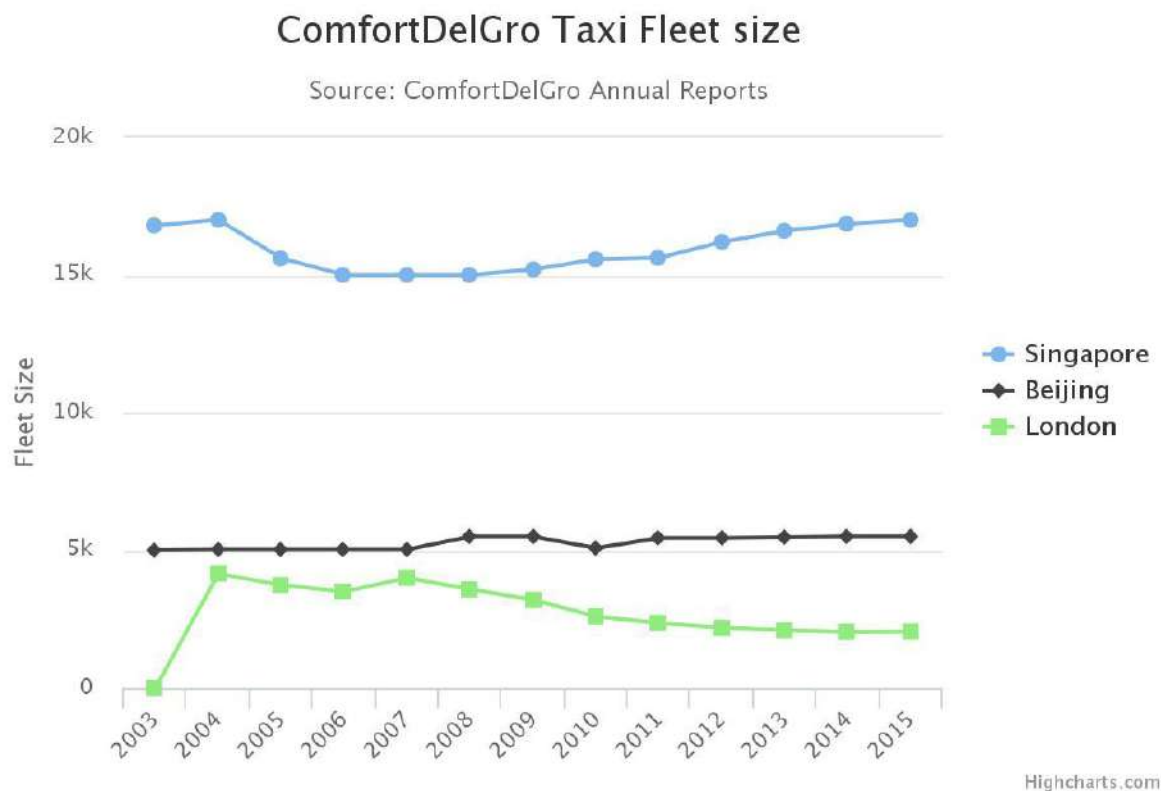


Figure 2: ComfortDelGro's fleet size over time

As seen from Figure 2, the taxi population of ComfortDelGro has remained largely stagnant over the past 10 years in cities such as Singapore and Beijing. ComfortDelGro's Singapore fleet size grew a meagre 203 from 16,794 in 2003 to 16,997 in 2015. In some cases, such as in London, the number of taxis belonging to ComfortDelGro and its subsidiaries had declined by more than half, from 4,150 in 2004 to 2,054 in 2015. This is surprising considering the high population growth rate in these cities, which would normally lead to a higher demand for taxi services and therefore result in a higher supply of taxis to meet this demand.

<sup>2</sup> Referenced from ComfortDelGro Corporation Limited Annual Report 2015

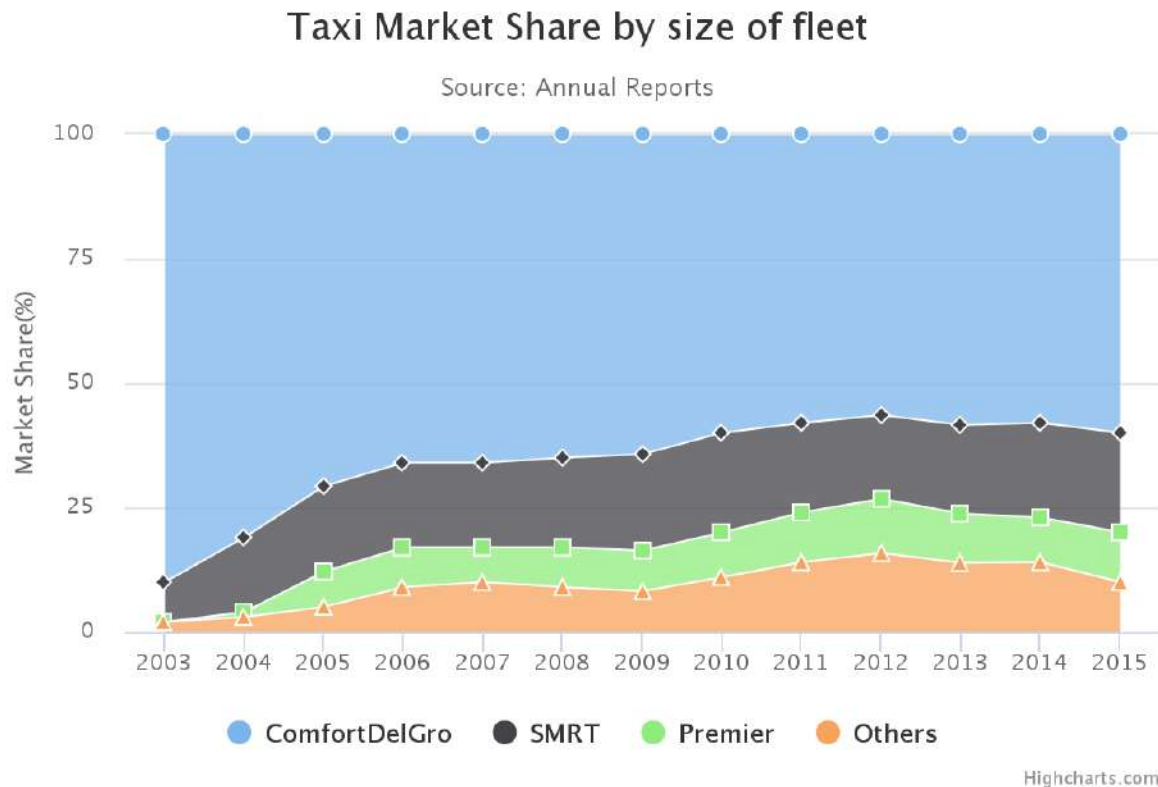


Figure 3: Singapore taxi market share

As seen from Figure 3, the market share<sup>3</sup> of ComfortDelGro in Singapore's taxi market has steadily declined over the years from an impressive 90 percent in 2003 to 60 percent in 2015. This market share value is based on the number of taxis owned by ComfortDelGro in the taxi industry in Singapore. This data was consolidated through the various annual reports of the main industry players in the taxi market in Singapore. Other taxi companies in Singapore include TransCab, Prime Taxi and Yellow-Top Taxis. One of the reasons for this decline could be the lack of growth of its taxi fleet, as shown in Figure 2, where the taxi population of ComfortDelGro has remained stagnant for the past decade.

<sup>3</sup> The taxi market share does not include Grab and Uber as they do not have physical taxi fleets.

### 3.2.1 Stock Listings

As a public listed company, stock prices can be used to gauge investors' confidence in ComfortDelGro's performance over the coming days and months and also to analyse trends from its past fluctuations. In this case, we can analyse how well ComfortDelGro has held up since the entrance of new third-party booking applications such as Grab and Uber.

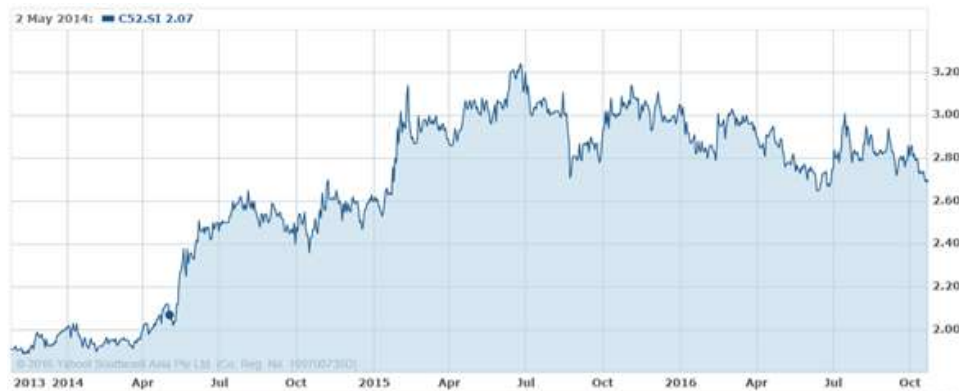


Figure 4: Stock Prices of ComfortDelGro (2013-2016)

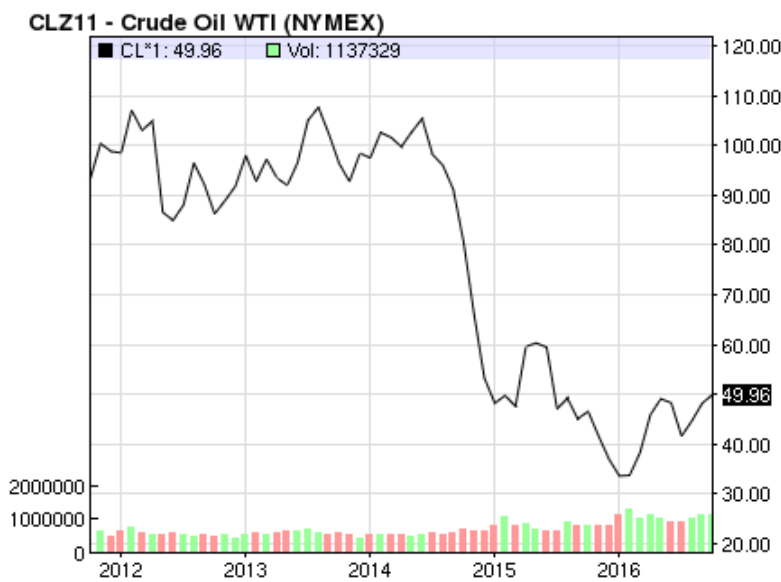


Figure 5: Crude Oil Prices (2012-2016)

Grab and Uber began their operations in Singapore in 2014. One would expect that the entry of these competition would hurt investors' confidence in ComfortDelGro. However, based on Figure 4, there seems to be an increase in stock prices from 2014 to 2015. This can be attributed to the sharp plunge in oil prices in the year 2014, as seen in Figure 5, that boosted confidence in the entire transport industry during the same period. Thus, the effects on ComfortDelGro are inconclusive when Grab and Uber entered the Singapore market.

Looking at ComfortDelGro's shares after 2015 would then give us a better insight of how ComfortDelGro is performing after a year of competition. Over the past year, the stock prices exhibited a decreasing trend, indicating that ComfortDelGro, despite having a positive increase in revenue, did not seem to have potential for huge growth in the eyes of investors.



### 3.3 Competitors' Profile

While ComfortDelGro has long had competition in the taxi market with rivals such as SMRT and Premier, it has more recently been facing rising pressures from ride-hailing services such as Grab and Uber. In its 2014 annual report, ComfortDelGro acknowledged that it faced “growing competition from independent third party booking apps”. While in 2015, the challenges seem to be growing as ComfortDelGro recorded that “the presence of disruptive technology in the taxi business has caused some uncertainty in the market” in its annual report.

Therefore, the competitors which we are comparing ComfortDelGro to are mainly focused on the two largest third party taxi booking apps - Grab and Uber.



Grab, then MyTeksi, was started in 2012 and focused on the South-East Asia market. Today, Grab is present in six countries in the region namely Singapore, Malaysia, Thailand, Vietnam, Philippines and Indonesia. As of July 2016, the number of drivers registered in the network was over 350,000, and Grab's app was downloaded onto more than 19 million mobile devices across Southeast Asia. Grab's current cash position is stated at US\$1 billion ("Tech in Asia - Connecting Asia's startup ecosystem", 2016).



Founded in 2009, Uber Technologies Inc. is an American worldwide online transportation network company headquartered in San Francisco, California. Uber currently has a reach of 520 cities worldwide. Uber reported to have made 62 million rides worldwide in July 2016, two times of ComfortDelGro's annual bookings through its application. To date Uber has raised a whopping US\$8.71 billion giving it a huge financial war chest to work with ("Uber | crunchbase", 2016).

### 3.4 Targeted Areas of Improvement

After a brief analysis of the profiles of the players in the taxi industry, we have decided to focus on two key areas of improvement that will be of interest to ComfortDelGro:

1. Increasing of Revenue
2. Increasing of Market Share

Since increasing of revenue requires us to look at both sales and costs to optimize profits, we will be including our findings together with their specific proposed recommendations to emphasize the rationale for the analysis of our findings. However, looking to increase revenue will only result in a short-term solution for ComfortDelGro. Thus, we will be looking at methods to increase market share to provide more long-term recommendations based on our findings as well.

Using a two-pronged approach, we hope to give a comprehensive solution to ComfortDelGro's current situation in the taxi industry.

## 4. Possible Solutions based on Findings

### 4.1 Increase in Revenue

Revenue generation is quintessential to any business. To maximise profits, ComfortDelGro should maximise revenue while minimising costs. There are three main aspects we have narrowed down to do so. They are namely sales optimisation, cost optimisation and operations optimisation. The combination of these three factors will result in an increase in revenue and profits for ComfortDelGro. However, cost optimisation for ComfortDelGro would not be analysed as it mostly affects the inner workings the company and not the taxi drivers or customers.

#### 4.1.1 Sales Optimisation

To optimise sales, a comparison between the pricing method and the different surcharges of ComfortDelGro with its main competitors, Uber and Grab, would provide us with better insights with regards to competitiveness of the fares of ComfortDelGro taxis. By obtaining information from their respective websites, we came up with Figure 6 to 8 listed below.

##### 4.1.1.1 Pricing

<u>ComfortDelGro</u>	<u>Hyundai Sonata</u>	<u>Hyundai i-40</u>	<u>Toyota Prius</u>
<b>First km or less + Flagdown</b>	\$3.20	\$3.70	\$3.90
<b>Every 400m thereafter or less up to 10km</b>	\$0.22		
<b>Every 350m thereafter or less after 10km</b>	\$0.22		
<b>Every 45 seconds of waiting or less</b>	\$0.22		

Figure 6: Fare breakdown for ComfortDelGro

<u>Company</u>	<u>UberX</u>
<b>First km or less + Flagdown</b>	\$3.00
<b>Per Km</b>	\$0.45
<b>Per Minute</b>	\$0.20

Figure 7: Fare breakdown for UberX

<u>Company</u>	<u>Grab Car</u>
<b>First km or less + Flagdown</b>	\$2.55
<b>Per Km</b>	\$0.68
<b>Every 45 seconds of waiting or less</b>	\$0.22

Figure 8: Fare breakdown for Grab Car

Figures 6 to 8 reflect the fare breakdowns for UberX, GrabCar and the three variants under ComfortDelGro. The base fare of ComfortDelGro taxis are not as competitive as compared to UberX and Grab Car, with an average base fare of \$3.60 which is higher than \$3 and \$2.55 of UberX and Grab Car respectively. However, for 'fee per km' when the trip is less than 10km, ComfortDelGro taxis charged \$0.55/km(estimated) which is lower than \$0.68/km of Grab Car but more than \$0.45/km for UberX. On the other hand, for trips more than 10 km, ComfortDelGro charges \$0.63/km(estimated) while the fee for the other two companies remain the same.



Figure 9: Trip fare over distance

From the tables, we came out with Figure 9 to show the price of the trip over distance. We assumed that the cars do not stop and the cars travel at a speed of 45.87km/h which is obtained by getting the average speed of cars during peak hour for 2012, 2013 and 2014 for both expressways and arterial roads from Land Transport Authority.

However, these assumptions will understate the price for both ComfortDelGro and GrabCar as they charge for waiting time. To put the distance of routes into perspective, a 20km ride takes you from Changi Airport to Suntec City as shown in Figure 10.

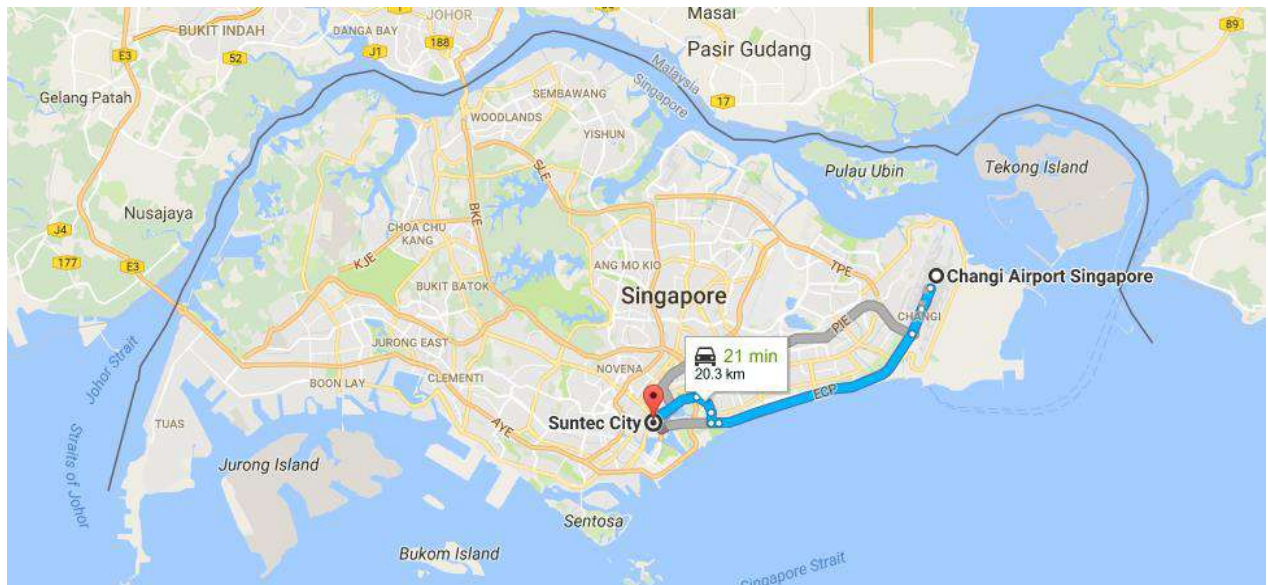


Figure 10: Example of a 20.3 km ride

Although GrabCar charges more per kilometre, their base fare is much lesser than ComfortDelGro taxis. Therefore, in a short distanced trip, GrabCar has a price advantage over ComfortDelGro. However, for a long trip, ComfortDelGro will be cheaper than GrabCar, as seen from Figure 9.

As for UberX, even though it has the lowest per kilometre fare as compared to the rest, the weakness of its pricing lies in its per minute segment. ComfortDelGro and GrabCar do not charge for waiting time when their taxis are on the move, they only start charging for time when the taxi is waiting in a stationary position. However, UberX does not make this distinction and charges for waiting time once the trip begins. Hence, the fare per km for UberX is understated. Therefore, UberX charges more when the car is moving slowly.

Despite the discrepancy in prices of taking a trip on ComfortDelGro taxis as compared to taking a trip on UberX or GrabCar, the difference is not significant. Given the small geographical nature of Singapore, distances travelled during trips are generally short, and are unlikely to create a significant difference in prices.

Furthermore, it is not beneficial for ComfortDelGro to reduce its prices to create a competitive edge, as this may lead to a price war between the three companies, and result in a lose-lose situation for all three companies, which is unsustainable in the long run.

### Recommendation 1 - Standardise flag down fee among taxi variants

From an article published by Straits Times, the public feels that the pricing of taxis are generally too confusing. Also, it will not be beneficial to cut prices as stated above. Therefore, ComfortDelGro can instead look at standardising its prices for the three types of cars listed above so that it does not confuse the commuters and make them worry about which type of car has a higher starting base fare. By doing so, commuters would be clearer about ComfortDelGro's pricing and will not need to remember different prices.

#### 4.1.1.2 Surcharge

Figure 11 summarises all the different surcharge for all three companies collected from the individual website for each company.

<u>Surcharge</u>	<u>ComfortDelGro</u>	<u>Uber</u>	<u>Grab Car</u>
<b><u>Late Night Surcharge</u></b> 12am – 5.59am	50% of metered fare	None	
<b><u>Peak Period* Surcharge</u></b>	25% of metered fare	None	
<b><u>City Area Surcharge</u></b> Monday to Sunday & Public Holidays: 5pm – 11.59pm	\$3	None	
<b><u>Area Surcharge</u></b>	<b><u>List A</u></b> Friday to Sunday (5pm – 11.59pm): \$5 All other time: \$3 <b><u>List B</u></b> \$3 <b><u>Singapore Expo Centre</u></b> \$2	None	Sentosa
<b>Booking Fee</b>	Peak: \$3.30 Non-peak: \$2.30	None	
<b>Administrative Charge for Credit and Charge card payments</b>	10%	None	
<b>Demand Surcharge</b>	None	Dynamic Pricing	
<b>ERP Surcharge</b>	Yes		
<b>Additional Waiting Time</b>	None		\$5 for every 10 minutes
<b>Additional Stops</b>	None		\$5 per stop within 5km
*Peak Period: Monday to Friday (Except Public Holidays): 6am – 9.29am Monday to Sunday & Public Holidays: 6pm – 11.59pm List A: Changi Airport, Changi Air Freight Centre, Airport Police Station, Airport Logistics Park of Singapore, Marina Bay Cruise Centre Singapore  List B: Seletar Airport Gardens by the Bay Resorts World Singapore			

Figure 11: Surcharge of ComfortDelGro, UberX, Grab Car

ComfortDelGro charges a booking fee while the other 2 competitors do not and it applies to both booking through their call centre and through their app. The booking fees significantly increase the price of the trip as it is almost equivalent to the base fare. This does not incentivise the consumers to book a cab through their app as compared to the other two companies which provides convenience to users by using their app. Therefore, ComfortDelGro will need to consider the pricing of its booking fee to make its fare more competitive.

Overall, each company implements surcharge at different times (late night, peak period and demand surcharges). However, the maximum for ComfortDelGro is 1.5 times but this varies for UberX and Grab Car as there is no cap for their dynamic pricing as seen during MRT breakdowns (Lee, 2015). Therefore, it will be cheaper for commuters to ride with ComfortDelGro when the multiplier is more than 1.5 times.

## **Recommendation 2 - Display pricing in App to show competitiveness**

However, it is not clear to all commuters that it is cheaper to ride with Comfort DelGro if the demand multiplier of the other two companies is more than 1.5 times. Therefore, to allow more commuters to make a more informed decision, ComfortDelGro can advertise the price advantage of riding with ComfortDelGro.

For instance, ComfortDelGro can implement an additional feature to its mobile app by estimating the fee required for a trip. This can effectively allow the user to compare the prices between each company by using the mobile app. However, as the conventional way of booking a ComfortDelGro taxi is through phone calls, consumers may not be aware of or familiar with the use of ComfortDelGro's mobile app compared to the other two companies' apps.

Thus, to attract more commuters to use their mobile app, ComfortDelGro can provide some incentives for commuters by waiving the booking fee or provide some discounts when booking a taxi using the mobile app. Through exposing commuters to their app with the added feature, commuters will be able to learn when the fare for riding with ComfortDelGro taxis is cheaper than its competitors and at the same time bring convenience to the commuters and increase the number of users using their mobile app.



#### 4.1.2 Operations Optimisation

To optimise operations, we analysed the movements and locations of the available taxis in Singapore at various timings. We then compared these supply factors with demand variables to study potential mismatches and identify areas to improve upon.

##### Location and Timing of Supply

Through analysing the heat maps of location of available taxis at various timings throughout the day and comparing them between the different days of the week,<sup>4</sup> our group hopes to sieve out important information with regards to how the distribution of taxis can be improved for ComfortDelGro.

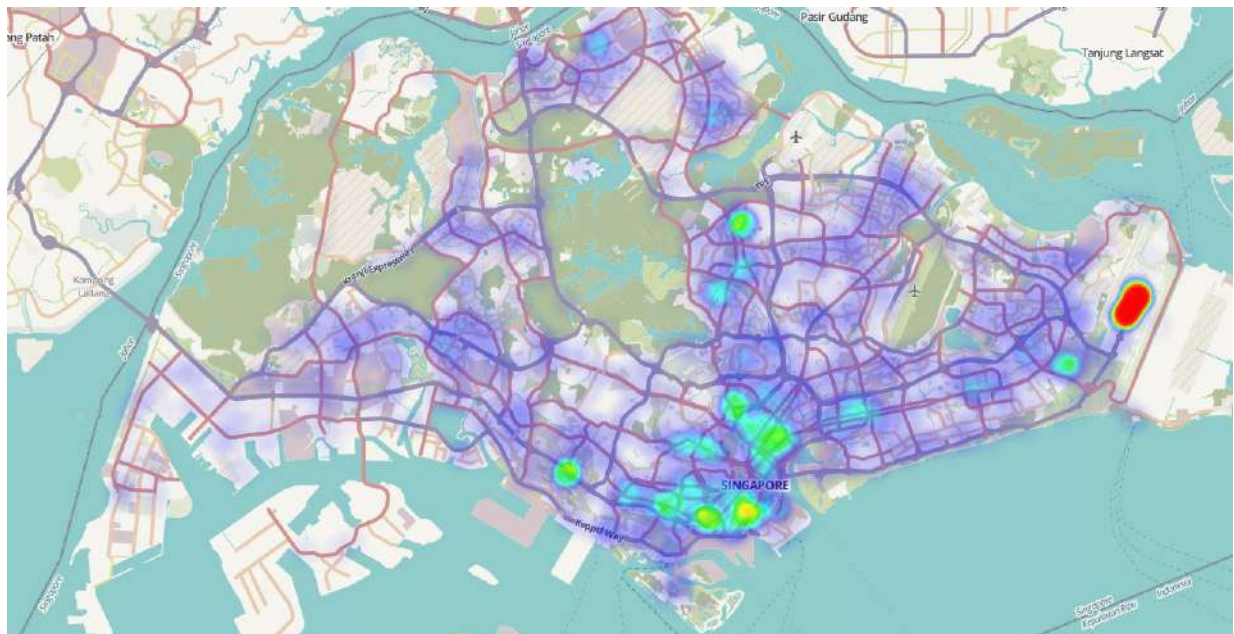


Figure 12: Aggregated heat map of available taxis

Figure 12 is an aggregated heat map of where all the available taxis are throughout the course of the day for Wednesday and Saturday. This information was extracted from the various snapshots taken through the day at specific timings (9am, 1pm, 6pm and 11pm). The compiled screenshots can be found in Appendix 7.2.1.

As seen from Figure 12, available taxis in Singapore are mostly clustered in the Central Business District (CBD) area and Changi airport. Taxi operators typically cluster around these two areas as they are likely to have the highest flag down rate due to the high concentration of people and high demand for taxis in these areas. However, as they cluster around these areas, the supply of available taxis may quickly exceed the demand of customers in the region, resulting in the scenario seen in Figure 12.

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<sup>4</sup> Source from <http://www.comp.nus.edu.sg/~josephht/taxi.html>, utilizing the API from data.gov.sg to visualise the locations of the available taxis in Singapore



Figure 13: Weekday 9AM, Island View

In the morning, taxis are distributed relatively evenly throughout the various heartlands as seen in Figure 13. This distribution is likely caused by taxi drivers targeting workers who live in the heartlands headed to the Central Business District (CBD) area for work.



Figure 14: Weekday 1PM, Island View



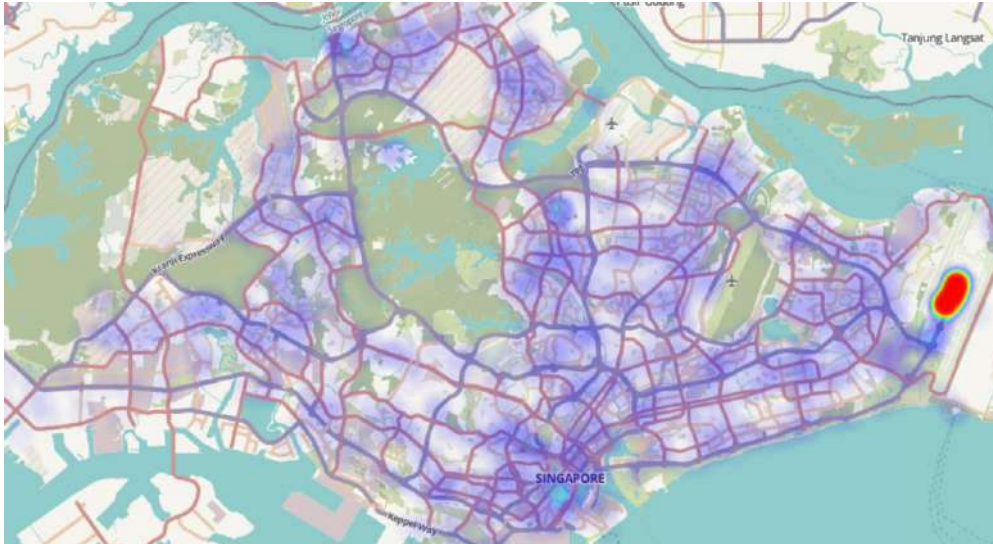


Figure 15: Weekday 6PM, Island View

In the afternoon to evening period, the taxis that congregated in the CBD area slowly disperses back into the heartlands as they send the office workers back home. This can be seen from Figure 14 as the concentration of taxis in the CBD area has become more spread out and less intense over time resulting in Figure 15. This also implies that there are the least number of available taxis between 5pm to 7pm in the day. We have also analysed a video showcasing the movement of taxis through the heat map and it supports our postulation that there are fewest available taxis between 5pm to 7 pm.



Figure 16: Weekday 11PM, Island View

On weekday nights, the taxis generally returned to the central parts of Singapore to cater to customers in the Clarke Quay and Sentosa areas as seen in Figure 16. As these areas are rich in night life, the demand for taxis would rise after 11pm. Hence these available taxis station themselves near these areas to capitalise on these customers.

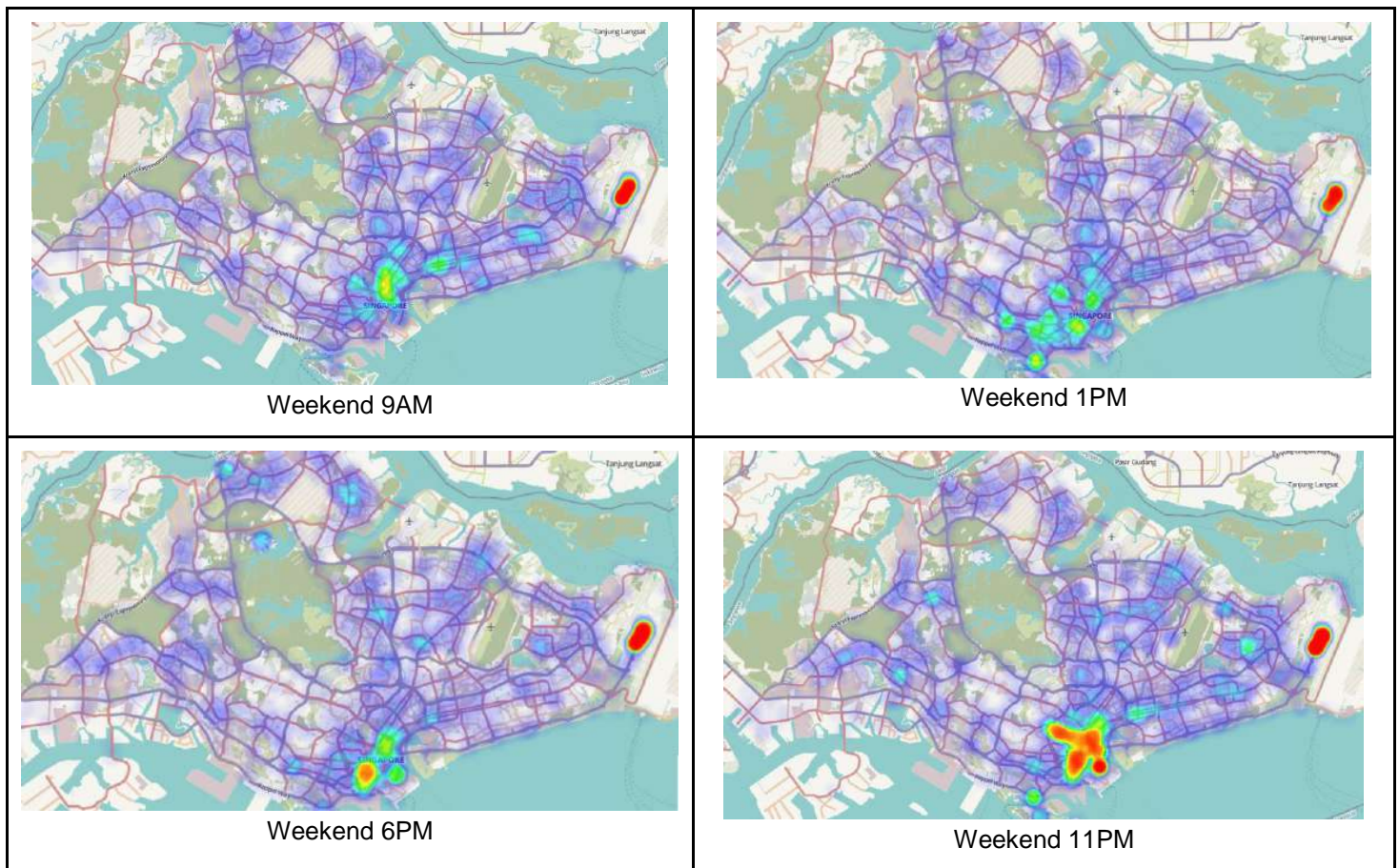


Figure 17: Overall weekend heat map of available taxis

During the weekends, however, it can be seen from Figure 17 that the taxis are mostly clustered around the CBD and airport areas throughout the entire day. This may be inconvenient for consumers looking for taxis in the heartlands.

While there is a high taxi demand in the CBD and Changi airport areas, other important venues should not be neglected as well. For example, places hosting late night events (Sentosa and Night Safaris) as well as workplaces that are not within the CBD area such as Jurong Island. Changi Airport has consistently been found to be one location with a high concentration of vacant taxis. Therefore, ComfortDelGro can redistribute the taxis at Changi Airport to other regions of Singapore to better meet demand.

### Recommendation 3 - Web Crawling to map Demand and Supply

By crawling websites such as <http://www.whatshappening.sg/>, we can extract information regarding the timing and location of daily events around Singapore. This way, ComfortDelGro can better redirect their free taxis to these locations at specific timings to improve hiring rate and coverage. For example, by utilising the information that Universal Studios Singapore (USS) is holding its annual Halloween Horror Night on Thursday (20th October) from 7pm to 1230am, ComfortDelGro can channel its taxis to the Sentosa Island area from 12am onwards to catch the crowd who are returning home. This way, ComfortDelGro will be more effective in its distribution of taxis, an improvement from the findings above.



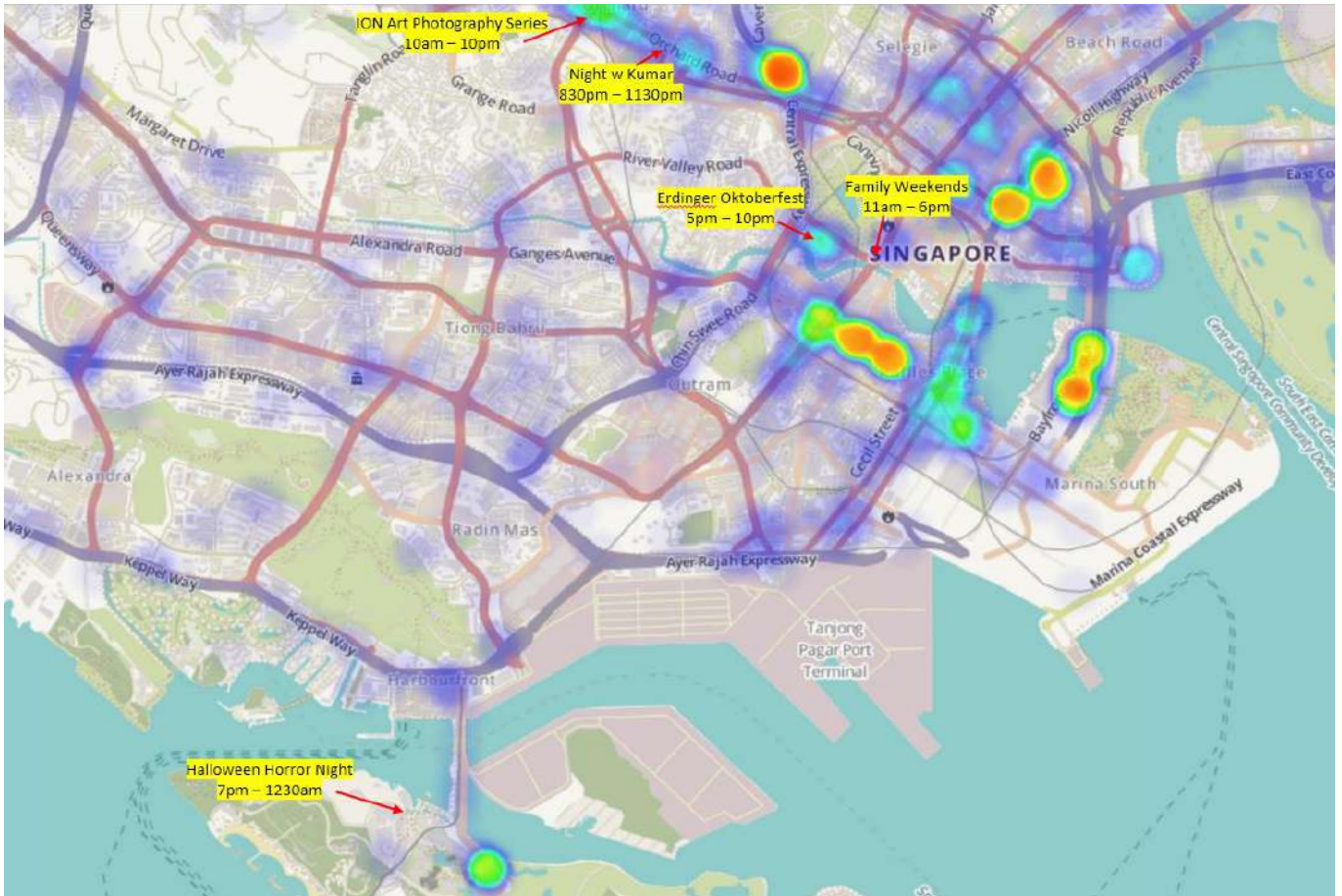


Figure 18: Example of Matching Events Demand with Supply

By combining the results of our scraping with the heat map of the current taxi locations, we can see that there is a slight mismatch between the physical locations of the taxis and the location of the events happening around Singapore (i.e. The location of the crowd). One reason for could be that the taxis are deployed to where each taxi driver feels that the crowds are at, which results in inaccuracy as they do not have complete information of the events around Singapore. Hence it is important that ComfortDelGro uses the information gleaned from scraping of events to redirect the flow of taxis to better utilise them. To further enhance the number of events to cover, ComfortDelGro can scrape social media platforms such as Twitter, Facebook and Instagram for the latest trending topics. Doing so will allow them to effectively deploy their taxis to places with high human concentrations.

#### Recommendation 4 - Demand tracking resources

There are specific areas with a high demand for taxis that face a lack of available taxis at certain timings. These areas include military camps during Friday night (standard book out timing) and movie theatres around 1-2am (when the last midnight movie has finished showing). ComfortDelGro can consider the demand of such locations and redirect their taxis there during their high peak periods to better match consumer demand.

ComfortDelGro can employ demand tracking resources to further improve its distribution of taxis. These resources can track the demand of taxis per geographical area, thus improving ComfortDelGro's taxi deployment accuracy.



Figure 19: Example of Surge Pricing in Uber

For example, ComfortDelGro can consider the surge pricing of Uber. Uber's surge pricing is a form of dynamic pricing which it uses to better match demand and supply of its users. Uber fare rates automatically increase when the taxi demand is higher than number of drivers around you, as shown in Figure 19. This is based on their own algorithm which factors in the time and location of the person trying to book an Uber ride. These surges often happen during peak hour periods, bad weather or festive occasions. By using demand tracking resources such as the live surge pricing areas, ComfortDelGro can redirect their taxis to these areas to quickly meet the rise in demand.

While ComfortDelGro may be able to optimise its taxi distribution capabilities and operations by utilising the recommendations mentioned above, ComfortDelGro will need to work on efforts to increase its market share to maximise its presence in the taxi market in Singapore.

## 4.2 Increase in Market Share

### 4.2.1 Improvement in Customer Satisfaction

As the online presence of ComfortDelGro in the social media platform is limited, we decided to mine comments from The Straits Times Facebook Page as its readers are more representative of the Singapore population and the comments seemed more relevant instead of users posting spam and chain messages like in forum pages. After gathering and sieving out comments from related articles, we performed sentiment analysis to sense the general attitude towards ComfortDelGro taxis.

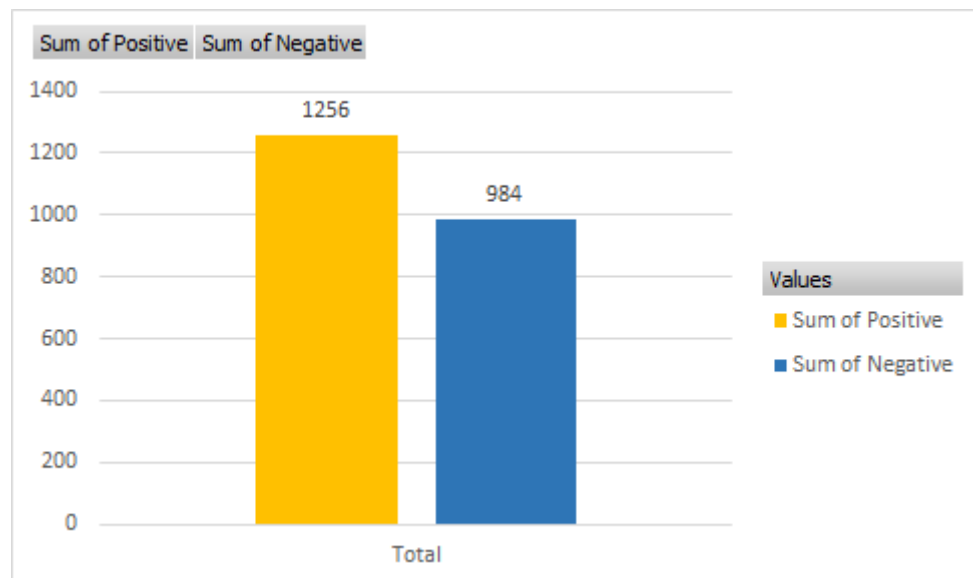


Figure 20: Total numbers of positive and negative comments based on Sentiment Analysis

As shown in Figure 20, it is evident that there are slightly more positive comments as compared to negative comments. This shows that generally, online users are split somewhere in the middle in their satisfaction with their experience with ComfortDelGro taxis. This indicates that something should be done to improve customers' satisfaction and that forms the base of our next analysis.

#### Evaluation of Negative Online Reviews

To evaluate what ComfortDelGro can do to improve their quality of taxi rides, our group decided to use online reviews where people post detailed thoughts of their experience in a ComfortDelGro taxi. Examples of such online reviews are from [www.taxiautofare.com/sg/](http://www.taxiautofare.com/sg/) and [www.taxisingapore.com](http://www.taxisingapore.com). Our group decided not to use [www.hardwarezone.com.sg](http://www.hardwarezone.com.sg) or [www.reddit.com](http://www.reddit.com) as the bulk of the comments we browsed through under threads related to taxis or ComfortDelGro are irrelevant to our project or too brief to gain any insights from. Thus, we decided to select quality reviews over quantity and analyse them instead.

After browsing through related sites and blogs, we managed to retrieve several quality reviews. We discovered that the main issues customers faced in their taxi experience are the lack of professionalism in taxi drivers and lack of courtesy shown by taxi drivers.



## Singapore has the world's worst taxi drivers

BY CHRIS REED

That's a statement not a question for a reason. It's true. Singaporean taxi drivers are the world's worst. I love living in Singapore but the one thing that winds me up no end is taxi drivers lack of ability to do their basic job, take me from point a to point b.

First question they always ask when you get in a cab, which way do you want to go. Now they don't ask this as they do in other countries where they may be asking for the choice of directions that the customer wants to go.

No, in Singapore they ask because they have no idea how to get to the destination. If I hear one more time, "I'm new, I don't know the way" when getting in a cab I will scream. My response is twofold **1)** you're not new to Singapore you have lived here all your life and **2)** it's your bloody job to know the way!

If someone came to me in my marketing job and said I would like some marketing advice please and I then turned around and said well what do you think because I haven't got a clue, what would happen? The client would walk out and not pay me. In a Singapore taxi this happens 75% of every one of my journeys.

Figure 21: Example of a review showing lack of professionalism

### Noemi Pun

I took a cab today 06/08/16 at around 11.40am from Raffles Hospital. Since i have a lot of things to load inside the taxi, it took a little time, which im sure its definitely less than 5mins. The taxi driver by the name of Robert chew poh huat which taxi number is SH 2026C, instead of helping, was yelling at us saying that he need to make money and scolded us for loading the item inside his taxi. This kind of attitude is so bad in featuring all the taxi driver in singapore. I can understand if he is on rush and decline us in the first place, but to say yes at first and scolded us for being slow and saying that he is on rush in unacceptable.

Figure 22: Example of a review related lack of courtesy

As shown from Figures 21 & 22 above, many of the reviews we encountered were related to how taxi drivers were rude to their customers, picky with whom they want to pick up and not knowing their way around Singapore. These all showed lack of professionalism and courtesy, which ticked customers off the most based on online reviews. Thus, our recommendation will be focused on rectifying these two issues.

### Recommendation 5 - Stringent Quality Checks on Taxi Drivers

Firstly, we propose that ComfortDelGro should implement more stringent checks on their taxi drivers in terms of professionalism. This means that taxi drivers should be assessed on their knowledge on which are the common routes that should be taken from place to place, and not just rely on GPS or blatantly going a huge round to get from one destination to another. Certain standard assessments should be set to ensure a minimum standard in terms of road knowledge so drivers should be the ones who suggest the optimal route to get from place to place, not the other way around.

Secondly, there should be a better or more convenient method to assess the courtesy of taxi drivers, this should not be through a hotline or posting online reviews which might be too troublesome for customers.

## Contact Us



We would like to ensure that your service experience is a pleasant one. Our hotline list guides you to the specific services you are looking for.

**Comfort Transportation Pte Ltd**  
**CityCab Pte Ltd**  
383 Sin Ming Drive  
Singapore 575717  
Tel: 6555 1188  
Fax: 6452 7742

### For Our Customers

<b>Dial-A-Cab</b>	6552 1111
<b>SMS Taxi Booking</b>	71222
<b>Limousine Taxi Service</b>	
▪ Booking	6552 2828
▪ Corporate Enquiries	6550 8746
<b>Handicare Cab Service</b>	
▪ Enquiry/Registration with the Handicaps Welfare Association	6254 3006
▪ Booking	6552 1111
<b>Customer Service Centre</b>	6552 4525
Operating Hours: 8.00am - 5.30pm, Monday to Friday. Closed on Saturday, Sunday & Public Holidays.	6552 4125 (Fax) <a href="mailto:feedback@cdotaxi.com.sg">feedback@cdotaxi.com.sg</a>
▪ Feedback/Enquiry on taxi service or booking	Click <a href="#">here</a> for enquiry Click <a href="#">here</a> for feedback Click <a href="#">here</a> for Lost & Found
▪ For other taxi operators	Click <a href="#">here</a> for LTA website

Figure 23: Hotline page for Customer Service Centre

As seen from the Figure 23 above, the ComfortDelGro hotline page is not well maintained or publicised to encourage customers to report discourteous taxi drivers that will damage the company's reputation. In fact, the operating hours for feedback of taxi drivers are short considering that taxi service is 24/7.

## ENQUIRY

All fields with \* must be filled.

### About Yourself

Name *	<div>Select a Salutation ▼</div>	<input type="text"/>
Contact	<input type="text"/>	Hp <input type="text"/> Off <input type="text"/> Home
Email *	<input type="text"/>	
Address	Block/House No.	<input type="text"/>
	Road Name	<input type="text"/>
	Building Name	<input type="text"/>
	Postal Code	<input type="text"/>
Comment *	<div><div></div></div>	

Limited to 5000 characters (5000 characters left)

☐ By providing your personal details in this feedback, you agree to our organisation contacting you for purposes of furthering the investigation into the feedback. We will maintain confidentiality of all personal particulars provided.

Figure 24: Enquiry form for Feedback on Comfort Taxi Service

Feedback/Enquiry on taxi service (Figure 24) is also available in a form format but that is especially troublesome when there are several compulsory areas to be filled. Thus, a better method to evaluate the behaviour of taxi drivers would be either an in-built small screen for customers to rate their taxi experience and select one of the pre-defined options if they are unhappy with the service provided. This is convenient for the customers as they do not have to memorise the car plate number just to lodge a complaint and the entire process will only last a few seconds. It will also act a deterrent for rude taxi drivers, as they will be compelled to show courtesy to their customers since they will be evaluated on the spot.



## 4.2.2 Improvement in Online Marketing Techniques

Online marketing involves the use of interactive spaces such as online social media to promote and sell goods and services. Being cost-effective, flexible, fast and enjoying an unprecedented global reach, online marketing has brought about incredible gains for different businesses (Yurovskiy, 2016).

### 4.2.2.1 Promotions used by ComfortDelGro and its Competitors

ComfortDelGro is no stranger in utilising online marketing in the promotion of their services. The ComfortDelGro's CabRewards promotion is the first ever taxi rewards programme. Customers are given points every time they ride with ComfortDelGro cabs provided they make use of cashless payments. Passengers are then able to redeem taxi vouchers and complimentary limousine trips with their accumulated points.

As one of the big players in the taxi industry, ComfortDelGro partners with major financial institutions in Singapore to offer discounts on ride charges. Such partners include MasterCard and NETS.



Figure 25: Example of Booking Fee Waiver from ComfortDelGro

ComfortDelGro's promotional strategy focus on the use of fee waivers, as seen in Figure 25, the use of promotional codes and lucky draws. Commuters who book and pay for their taxi ride using Masterpass on the ComfortDelGro Taxi Booking App enjoy a 10% admin fee waiver. ComfortDelGro also dangles promotional code which require the commuters to key in the codes on the ComfortDelGro Taxi Booking App to receive discount on their rides. From the period 1 June 2016 - 31 December 2016, if commuters make at least 5 taxi transaction on ComfortDelGro taxis with NETS or NETS FlashPay, they stand to win \$200 in lucky draw.

In contrast, Grab and Uber Singapore use referral based promotional codes very heavily, offering its customers and new customers great rebates and discounts when they refer Grab or Uber to their friends and family. This strategy could be attributed to their corporate objective to aggressively grow their consumer base. ComfortDelGro which has been in the business since 2003 and is one of the largest taxi companies in Singapore, would most likely prioritise retaining its consumer base and not losing them to competitors than growing.

#### 4.2.2.2 Social Media Platforms

Rank	Website
1	Google.com.sg
2	Google.com
3	<b>Youtube.com</b>
4	<b>Facebook.com</b>
5	Yahoo.com
6	Wikipedia.org
7	Linkedin.com
8	Live.com
9	Qoo10.sg
10	<b>Instagram.com</b>
11	Dbs.com.sg
12	Amazon.com
13	Reddit.com
14	Onclickads.net
15	Straitstimes.com
16	<b>Twitter.com</b>

Figure 26: Top websites in Singapore (from alexa.com)

Figure 26 shows the top 16 sites visited in Singapore. The social media sites are ranked in descending order of YouTube, Facebook, Instagram and Twitter. However, looking at ComfortDelGro social media pages, it has placed most emphasis on Twitter followed by Instagram, a newly created Facebook page, and finally a YouTube channel with 2 videos dated 2014 and 2015. This clearly reflects a mismatch in the social media strategy to reach out to the largest audiences. Therefore, we will look at these top 4 social media sites and determine what ComfortDelGro should do in each setting.

#### 4.2.2.3 Youtube

“ComfortDelGro Taxi”, possibly the official ComfortDelGro YouTube channel, has two videos:

1. ComfortDelGro Taxi Cabbie Exercise Video (1 year ago, 2828 views)
2. Thank you CabbyCare (2 years ago, 777 views)

Firstly, the legitimacy of this YouTube channel is questionable as it does not contain any description or links to its other official website. If it is the official channel, the number of views for the videos are low and indicative of a small interested audience. Otherwise, it shows ComfortDelGro’s lack of social media presence on YouTube.

Uber Singapore has a YouTube channel that has 5 uploads providing tips to its drivers regarding issues such as etiquette training, partner support and optimising their revenue. Grab also has a YouTube channel with 12 videos, one of which garnered 129,660 views, but the rest with lacklustre views. Both companies have stopped posting videos for almost a year. Instead, they have moved towards just posting short clips on their Instagram page that has more followers than their YouTube subscribers. This also ensures that the message is current and timely for the customers. For example, an Instagram video posted on 29/10/16 by Grab has already accumulated 1,471 views by the next day.

However, YouTube videos on the topic of taxis are still relevant in Singapore. In fact, some videos these videos have garnered more than a million views on YouTube as observed in Figure 27 below:

Video Producer	Title	Date	Views	Likes
Trevmonki	Types of Taxi Passengers in Singapore	Apr 7, 2014	260,393	1,083
Trevmonki	If Taxi Drivers Were Honest (Singapore)	Jun 6, 2015	145,776	1,239
Wah!Banana	16 Types of Taxi Drivers	Feb 20, 2013	1,295,172	5,111
UMeAndHara	7 Horrible Taxi Passengers	Apr 7, 2015	67,201	552
Ryan Sylvia	Murphy's Law [Sponsored by GrabTaxi]	Oct 12, 2014	1,402,766	8,061

Figure 27: List of Singapore YouTube Videos (>50,000 views) on the topic of 'taxi'

The disparity in the popularity of these videos compared to those by GrabTaxi and ComfortDelGro could indicate that Singaporeans are less keen on watching videos about taxis alone but enjoy it when placed in an original and localised comedy skit.

## Recommendation 6 - Utilising influencers to improve exposure of videos

For a higher likelihood of success, we would recommend ComfortDelGro to advertise with at least one of the above influencer channels in Figure 28 or engage other top Singapore YouTube channels to effectively reach the highest number of Singaporeans in one shot. Furthermore, the last video was made more than a year ago and it would be timely for ComfortDelGro to sponsor a video now.

Video Producer	Report Rank	Subscribers	Sub Rank	24 Hour Sub +/-	7 Day Sub +/-	Videos	Views
Clicknetwork	1	927,704	3052	830	7,284	968	233.2 M
Wahbanana	2	621,039	4811	88	1,120	188	129.4 M
Jianhao Tan	3	540,055	5600	477	3,192	171	115.1 M
Ryan Sylvia	4	506,607	6028	143	1,916	193	118.6 M
Oddbods	5	389,191	7927	3,525	29,896	184	356.5 M
Youtube Fanfest	6	370,014	8365	1,178	26,460	451	45 M

Treepotatoes	7	363,929	8519	132	894	136	44.1 M
Fzdschool	8	223,189		67	491	188	14.4 M
Naomi Neo	9	222,232		56	438	49	24.7 M
Zeenanas	10	221,124		109	662	34	121.2 M

Figure 28: Top YouTube Channels in Singapore

*Ryan Sylvia*, arguably one of the most successful YouTube channels in Singapore, should not be considered as they have previously advertised for GrabTaxi in “Murphy’s Law”. ComfortDelGro is thus also encouraged to match the numbers of GrabTaxi’s sponsored video and should engage a YouTube channel with similar or higher standings than *Ryan Sylvia*. Thus, ComfortDelGro can consider *Wah!Banana*, which has a track record of a very successful video on taxis, or *JianHaoTan*.

Considering the lack of penetration into the YouTube, this can be a good starting point for ComfortDelGro. However, there is only a limited number of sponsored videos that the influencers would produce. Thus, ComfortDelGro should also invest in advertisements on YouTube to target its large Singapore audience without the hassle of creating their own videos that only attract a small audience. Sponsored YouTube videos and advertisement posts will be financially draining on ComfortDelGro so maintaining its own Facebook, Instagram and Twitter page will be more sustainable in the long run.

#### 4.2.2.4 Facebook

Facebook Audience Insight was utilised to gain a better understanding of the demographics and user activity of Grab and Uber’s Facebook audience. The location was set to Singapore only. Surprisingly, Grab had an outreach of only 70-80k monthly active people as compared to Uber with 600-700k monthly active people.

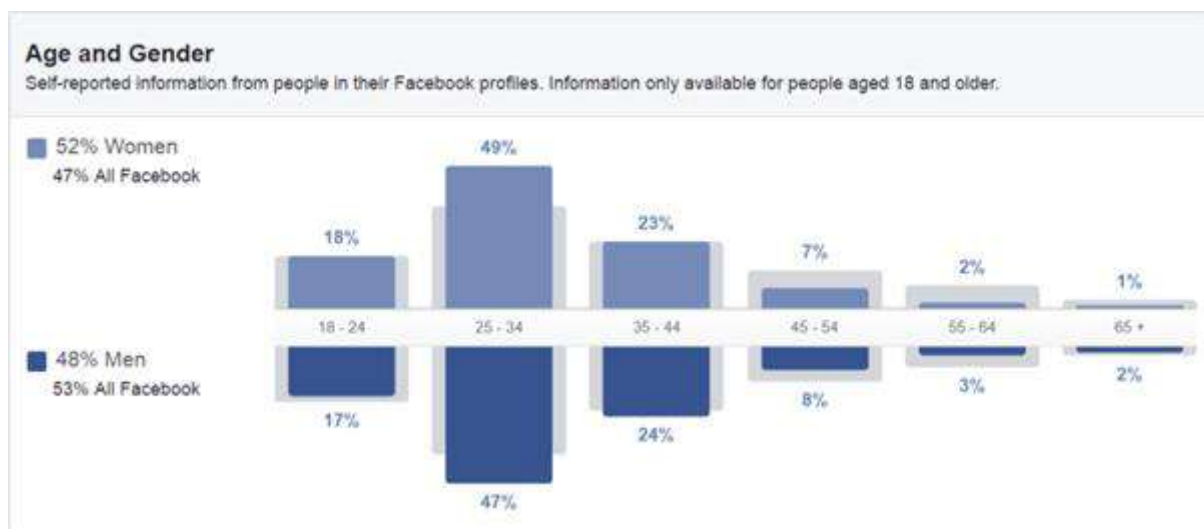


Figure 29: Grab’s User Demographics

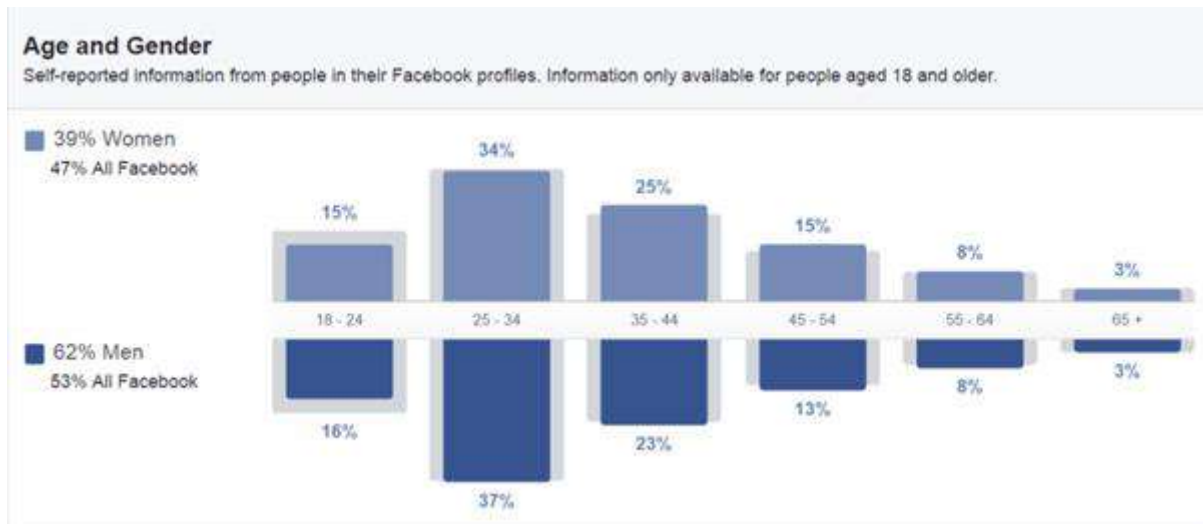


Figure 30: Uber's User Demographics

From Figure 29 and 30, users aged 25-34 formed the biggest audience for both Grab and Uber. Although Uber followed closely to the average Facebook statistics, the proportion of Grab's audience within this age group (49%) was much higher than that of the rest of Facebook at 35%. Similarly, this trend was observed for the male users of Grab at 47% compared to the Facebook average of 37%. An interesting find is that for Grab, the gender ratio is quite even at 48 women to 52 men, whereas for Uber it is 39 women to 62 men. An investigation could be done to find out why Uber's page attracts a more masculine audience.

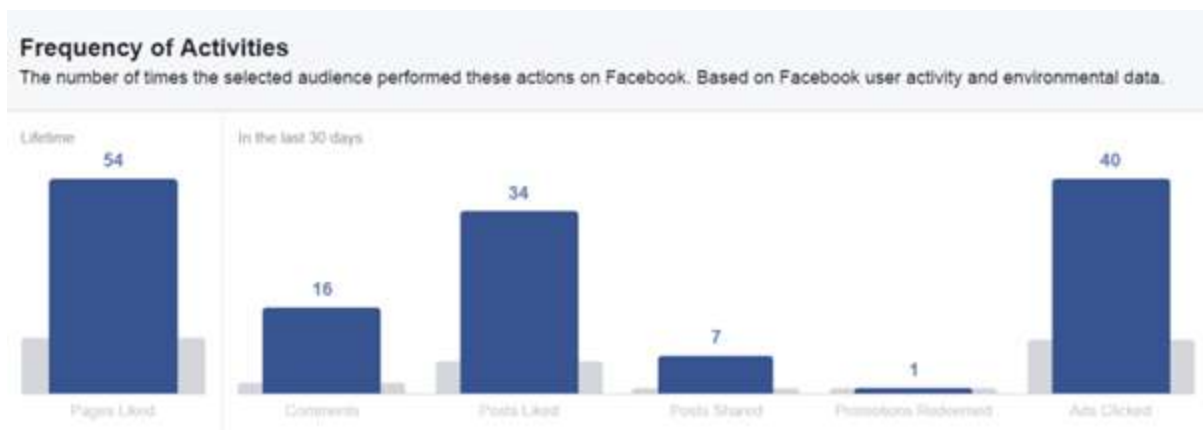


Figure 31: Grab's Audience Activities

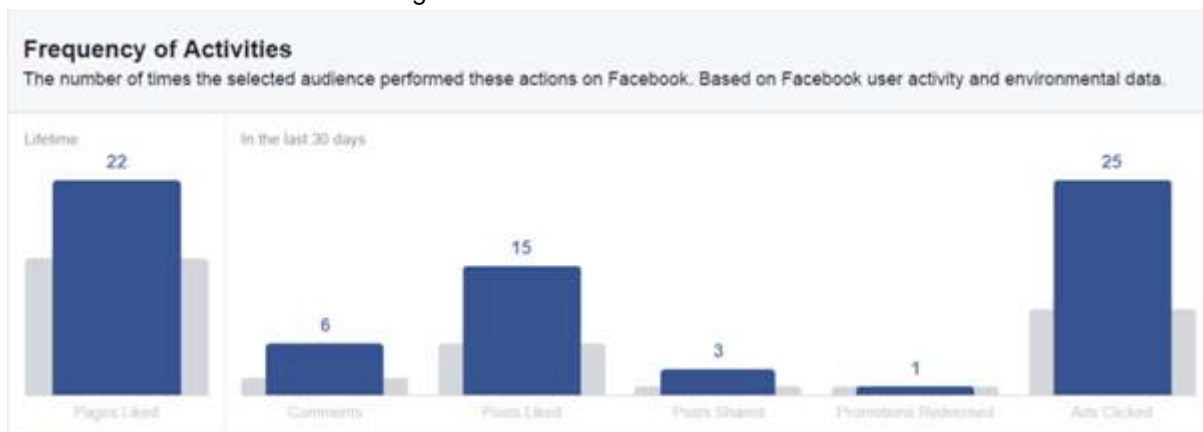


Figure 32: Uber Audience Activities

From Figure 31 and 32, both audiences of Uber and Grab consistently exceeded the average Facebook user in terms of pages liked(lifetime), comments, posts liked, posts shared and ads clicked in the past 30 days. Therefore, ComfortDelGro should consider placing advertisements on Facebook the audience is highly likely to click on it and Facebook will allow advertisements to be targeted at these 2 groups of potential customers and effectively compete with Grab and Uber for their attention.



Figure 33: How Grab's audience access Facebook

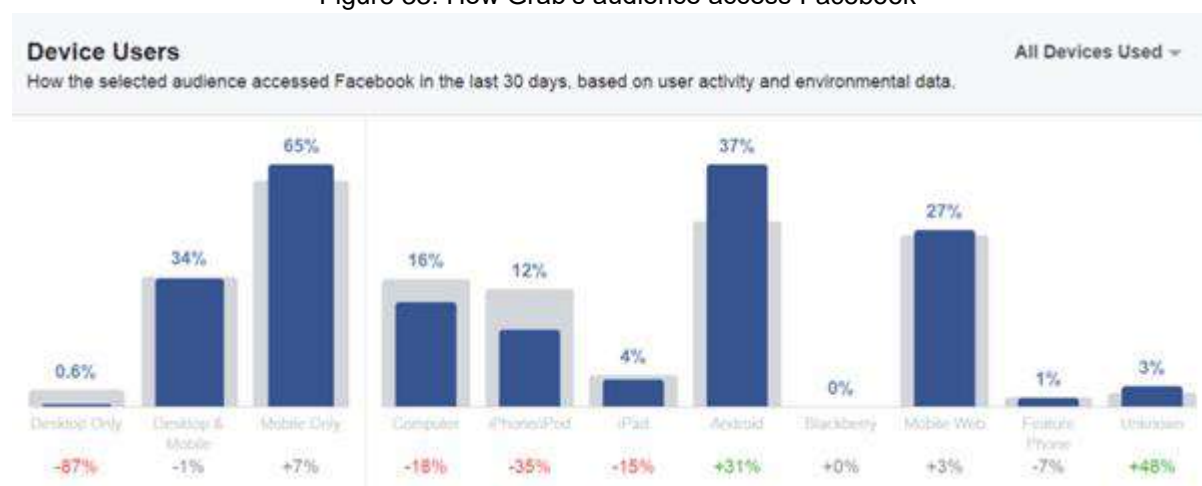


Figure 34: How Uber's Audience access Facebook

From Figure 33 and 34, the common trend is to use mobile phones to access Facebook. However, majority of Grab's audience also use desktops to access Facebook. Thus, ComfortDelGro should first and foremost work to improve its mobile application as this forms a large bulk of customers interested in taxis. All Facebook posts should be checked to ensure that they are displayed nicely on both desktop and mobile.

#### 4.2.2.5 Medium & Reach of Promotional Campaigns & Ads

Although it may seem that ComfortDelGro has various promotions and ads for its commuters, it must be noted that the reach of these promotional campaigns and ads are very limited. ComfortDelGro does post such materials on their website, Instagram and Twitter accounts. However, it does not maintain a Facebook page or account.

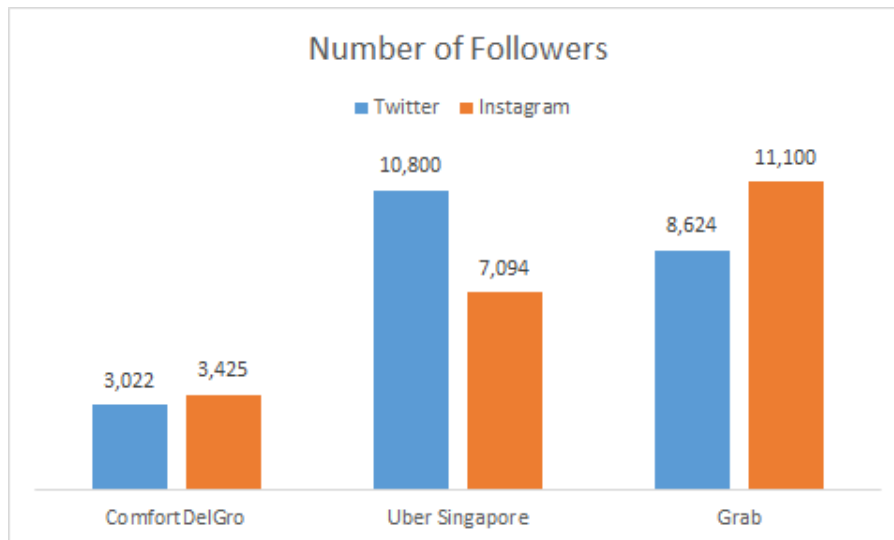


Figure 35: Number of Followers on Twitter & Instagram as of 26/10/2016

It can be seen from Figure 35 that ComfortDelGro lags behind Uber Singapore and Grab in terms of the number of followers on Twitter and Instagram. Unless ComfortDelGro pays for promoted tweets or Instagram posts, it will be difficult to reach the number of people that Uber Singapore and Grab does.

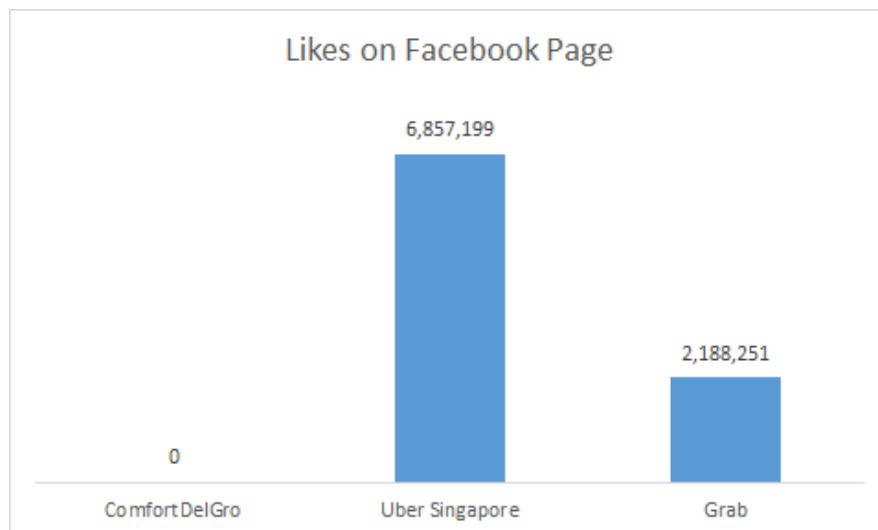


Figure 36: Likes on Facebook Page as of 26/10/2015

From Figure 36, it is astonishing to note that ComfortDelGro does not maintain a Facebook account or page (as of 27/10/2016 they officially created a Facebook page). As extracted from Facebook's guidelines, "the stories that show in your News Feed are influenced by your connections and activity on Facebook. The number of comments and likes a post receives and what kind of story it is (ex: photo, video, status update) can also make it more likely to appear in your News Feed". Therefore, the higher the number of likes, the higher likelihood it would appear on more user's news feeds.



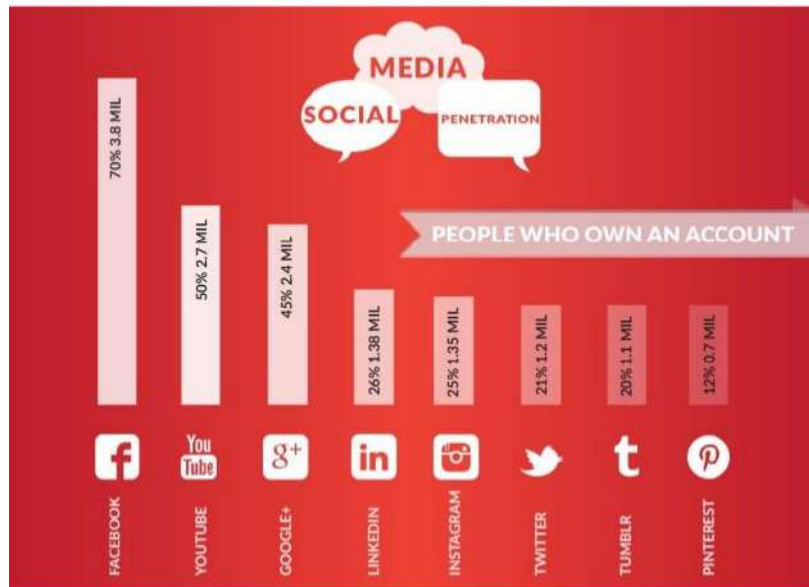


Figure 37: Social media Penetration in Singapore

From Figure 37, Facebook is the largest social networking platform, with 1.712 billion users as of September 2016 (Statista, 2016). Furthermore, as shown in the chart above, it has the largest pool of users in Singapore as well, with 70% of locals owning a Facebook account. Thus, our group feels that using Facebook data will provide us with the most accurate depiction of the consumers' perceptions and needs for taxi services as well as the popularity of ComfortDelGro Taxi services as compared to its competitors, notably Uber and Grab.

Even though Facebook provides the largest reach to online users, ComfortDelGro did not make use of this platform to advertise or promote its taxi services even when threatened by strong competitors like Uber and Grab.

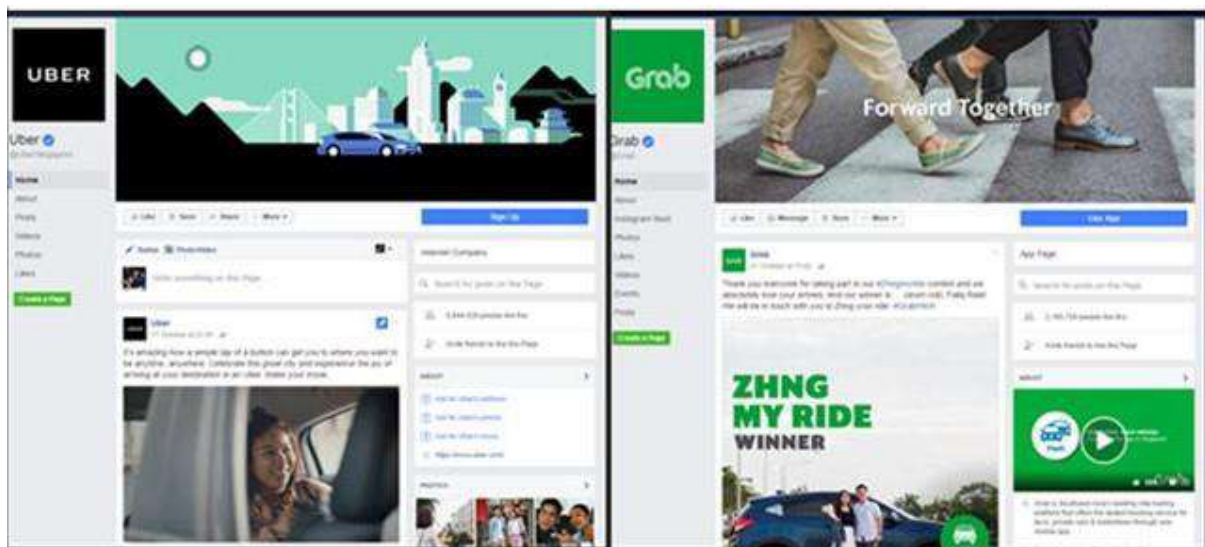


Figure 38: Comparison of Facebook pages from Uber Singapore and Grab

Nonetheless, it can be concluded that Uber Singapore and Grab have a much further reach than ComfortDelGro in pushing out its promotional campaigns and ads through their social media presence on Facebook.



## Recommendation 7 - Setting Up of Facebook Presence

From our findings, it is evident that ComfortDelGro should maintain a Facebook page to market its promotional campaigns and advertisements. At the same time, commuters could provide their feedback in a timely manner on the page for ComfortDelGro to consider. Depending on how ComfortDelGro manages these complaints, this could improve overall customer satisfaction. However, the task ahead is not as simple as creating a page and posting promotions and ads. Various considerations need to be considered. They include: (1) Frequency, (2) Timing and (3) Type, of posts.

### (1) Frequency of posts

To have an estimate on how many posts are needed to be uploaded on ComfortDelGro's Facebook page daily, an analysis was done on its main competitors Uber Singapore and Grab as well as leading brands and companies in Singapore (mainly DBS, SIA, OCBC and SingTel) to determine how they fared in this aspect. Facebook posts were extracted from the official Facebook page of the 6 companies.

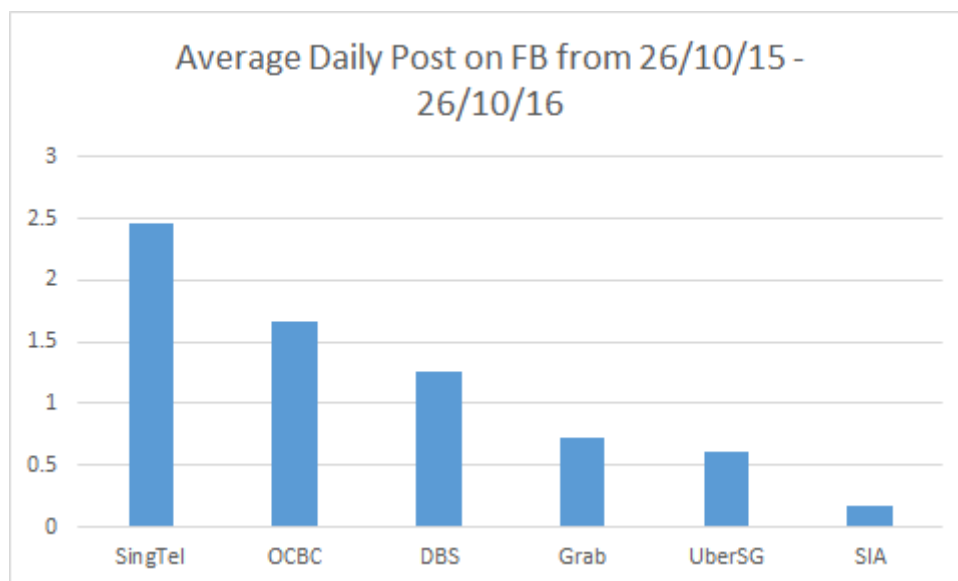


Figure 39: Average Daily Post on Facebook from 26/10/2015 - 26/10/2016

On average, these companies post on their accounts at least once every two days apart from SIA, as seen in Figure 39. This could be due to SIA's potential customers being a global audience rather than just those residing in Singapore. As such, they would most probably be making use of the print and TV advertisements to display their marketing campaigns rather than through social media as only 40% of the world's population use the internet as compared to 73% of Singapore's population. Therefore, ComfortDelGro should aim to post on their Facebook page at least once every two days.

### (2) Timing of posts

Posting regularly may help to improve the reach of promotional campaigns and ads, however to optimise such a strategy, one should consider posting at times where most of its users are active. As mentioned previously, the activity on a post (i.e. liking, sharing, commenting) increases its chances of it being displayed in social media users' newsfeed. We analysed the Facebook posts by Grab and Uber on their official pages

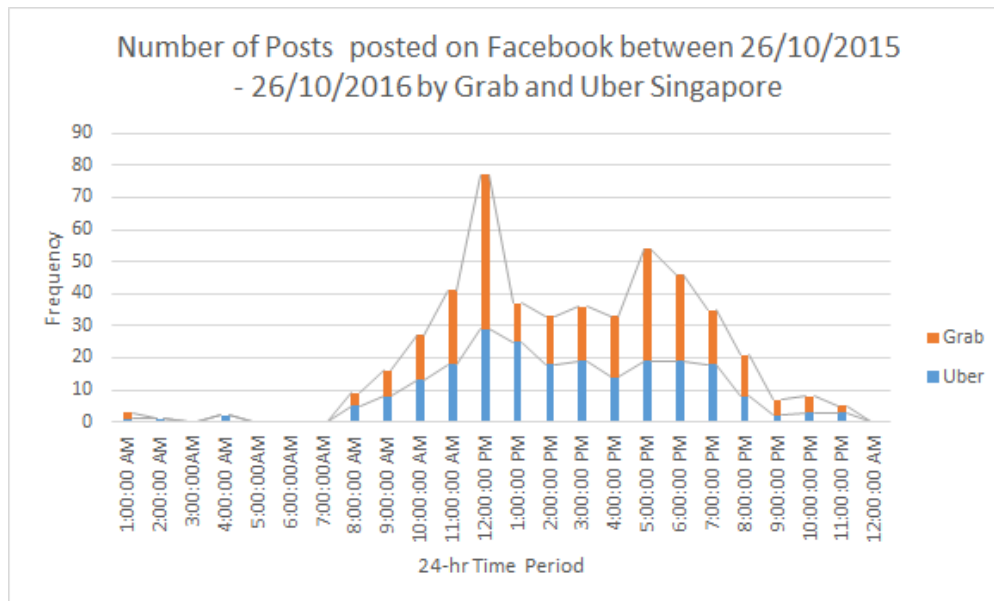


Figure 40: Number of Posts posted on Facebook between 26/10/2015 - 26/10/2016 by Grab and Uber Singapore

From our analysis as shown in Figure 40, we observed two time periods which had the most postings by Grab and Uber were:

1. 12PM - 2PM
2. 5PM - 7PM

Here, we shall attempt to decipher Grab and Uber Singapore's social media strategy. The first period could be to cater to people who use their social media accounts during lunch breaks. This group of people could most likely be office or retail staff who are unable to check and use their smartphones/company laptops during working hours. The huge spike in posts at 12PM could be due to Grab trying to build up user activity on their post and reach its busiest during the 1PM slot which is when most people are given their lunch breaks. This is an ingenious method as it would highly likely lead to the post appearing on users' news feed the moment they log on to Facebook. At the same time, it is the period at which these people can leave their offices and have a higher chance of using their services.

The second period seems to cater to office staff especially those who knock off from work around the 5PM-7PM timing and could possibly include students who end the school activities for the day. These group of people might require transport back home and would most likely search for promotions and ads on Grab and Uber Singapore on Facebook.

One may think that there is a correlation between the timing when people comment on such posts and the timing these posts were posted. However, our analysis shows that there is in fact little correlation.

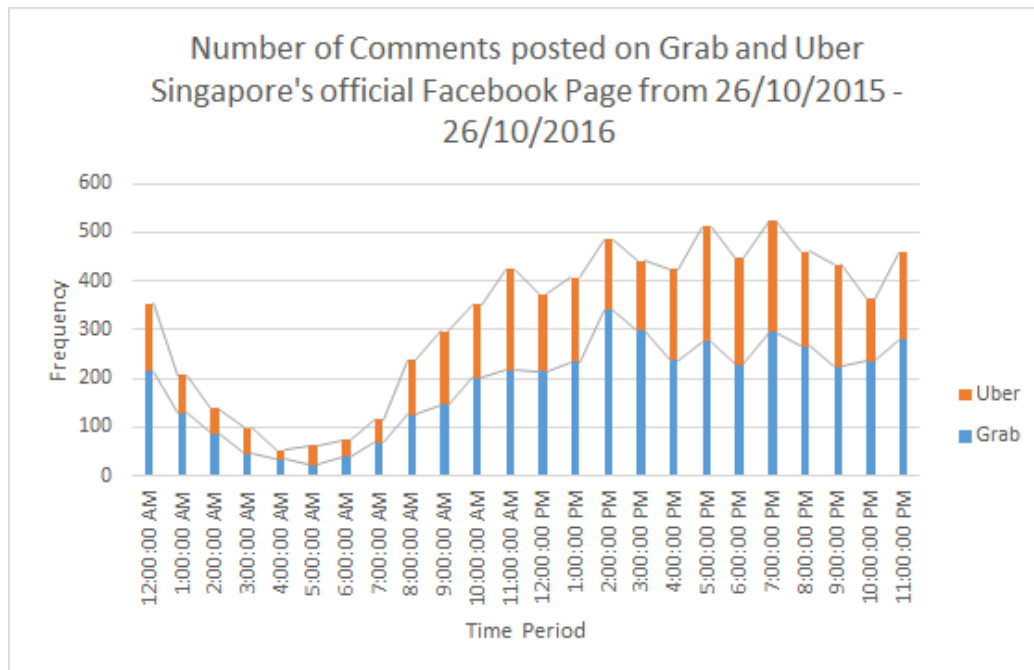


Figure 41: Number of Comments posted on Grab and Uber Singapore's official Facebook page from 26/10/2015 - 26/10/2016

The number of comments posted on Grab and Uber Singapore's official Facebook accounts by users remain consistent from 11AM-11PM, with the highest comment activity reached at 7PM-8PM period. It was interesting to note that although Grab and Uber Singapore rarely posted on Facebook after 10PM, the activity of comments was still high at 12AM-1AM period. These could be attributed to the millennial generation who are known to aimlessly surf the net and social media late into the night.

### (3) Type of Posts

Facebook allows business to create various types of content posts such as status, photo, video, events and links. We had analysed the different types of posts against activity to see if certain types of post generally created more 'buzz' than others. Our findings are as shown.

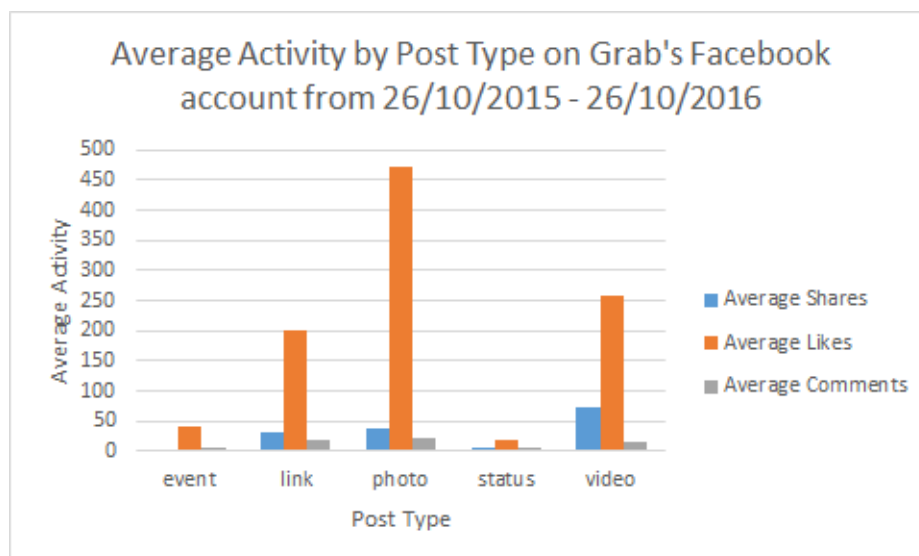


Figure 42: Average Activity by Post Type on Grab's Facebook account from 26/10/2015 - 26/10/2016

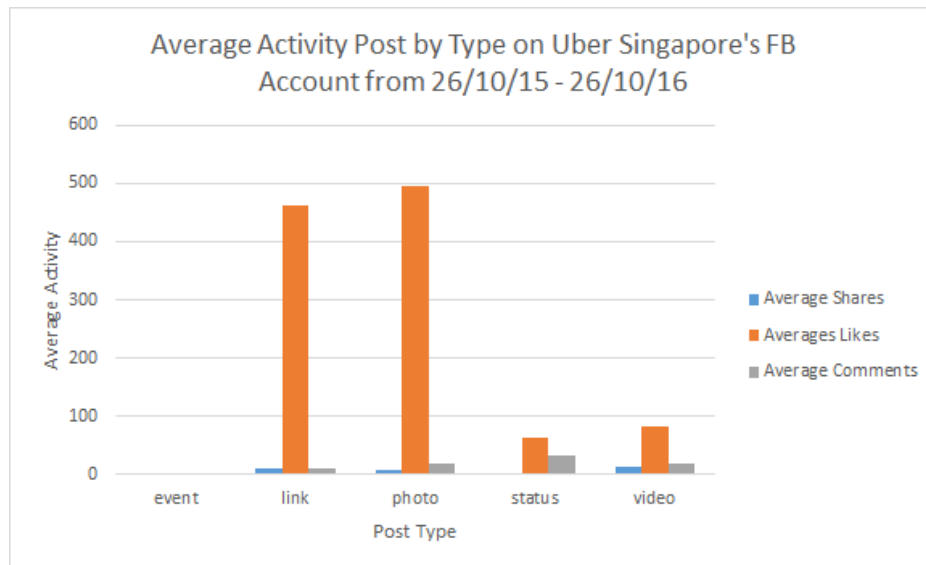


Figure 43: Average Activity on Uber Singapore's FB Page from 26/10/15 - 26/10/16<sup>5</sup>

Photos bring about a lot of activity for Grab and Uber Singapore especially in terms of likes. Photos provide more visual information and with the right images can entice customers more efficiently than status updates.

In contrast, Uber Singapore makes use of photos as much as they make use of links. On further inspection, it was noted that majority of these links redirected users to the Uber Newsroom page on the Uber website. This is an ingenious search engine optimisation (SEO) method of bringing customers to their official website thus driving improving their rankings on search engine results at the same time. Therefore, ComfortDelGro should post more pictures on Facebook for the most exposure.

Therefore, it is recommended that ComfortDelGro post once every two days so that social media users can retain the promotional message through repeated exposure. These posts should be posted any time after 11AM. As for the type of posts ComfortDelGro should utilise, it would depend on the standard and quality of ComfortDelGro's official website.

Currently, ComfortDelGro's official website is not aesthetic, not mobile optimised, unresponsive and has very poor user interface(UI) and user experience(UX) design. Therefore, it is also recommended that ComfortDelGro make use of photo posts on their Facebook page rather than redirect users to their poorly designed website. ComfortDelGro should not limit their posts to photos only but a mix of post type with photos being the dominant type. They should also concentrate on native videos as well as quoted by social marketing expert, Mari Smith,

*"Let's talk about video: Facebook is absolutely taking traffic from Youtube right now with video. What happens with autoplay, it's all psychology. They come in through your newsfeed, start to see a tiny bit of movement, boom, it draws them in. They'll stop and play your video. Make it short, quick and easy, with a call to action." ("12 Facebook Tactics Working Right Now", 2016)*

<sup>5</sup> Uber Singapore did not post any events during this period



Figure 44: Screenshot of ComfortDelGro's website as of 27 Oct 2016

With that being said, ComfortDelGro should still revamp their website so that user experience is consistent across their mobile booking app, their Facebook page as well their official website. To be cost-effective, ComfortDelGro should not include many features into their website but rather use a single interactive landing page which can be bootstrapped to display essential information.

#### 4.2.2.6 Twitter

Twitter is used extensively by ComfortDelGro, Grab and Uber to roll out their promotional codes. However, due to the nature of tweets, there are minimal likes and it is hard to gauge the popularity of a single tweet. When these companies are tagged, majority of the tweets are enquiring why a promotional code does not work. However, it is still a very efficient form of reaching out to a large group of Singaporeans. Thus, ComfortDelGro should expand its twitter reach and take a closer look at the kinds of followers that have yet to follow their page.

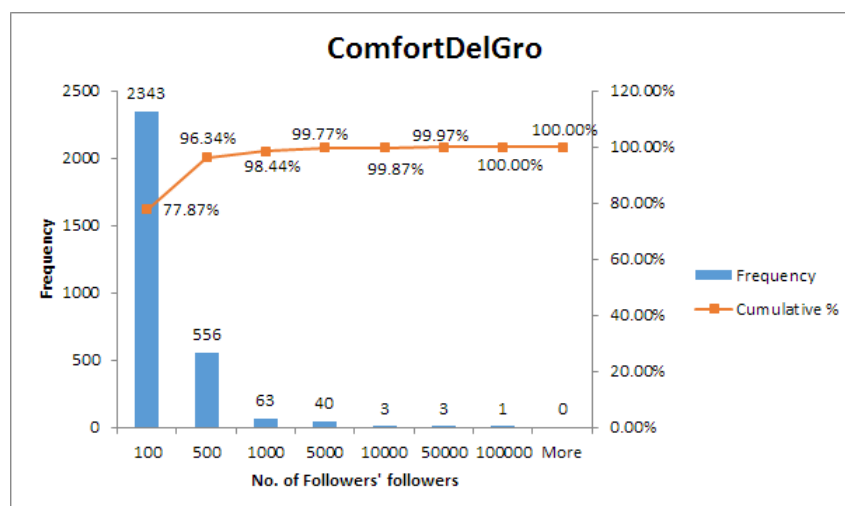


Figure 45: Social Influence of ComfortDelGro's Twitter followers have based on their own twitter followers

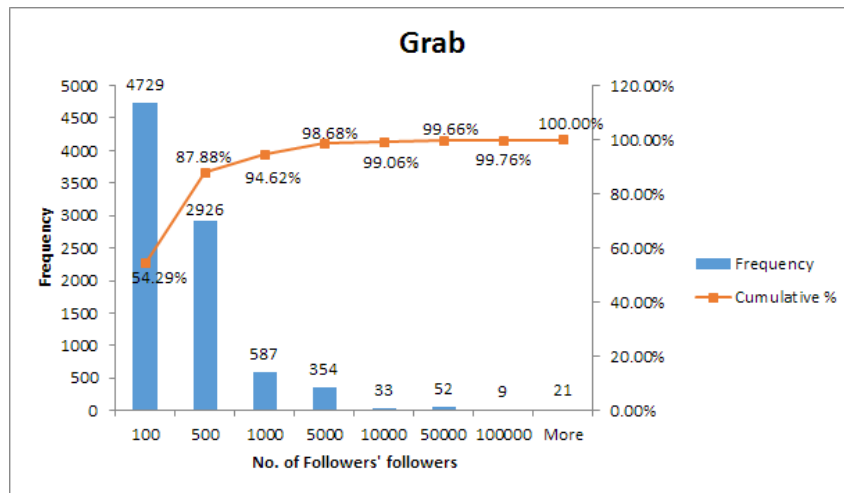


Figure 46: Social Influence of Grab Twitter followers have based on their own twitter followers

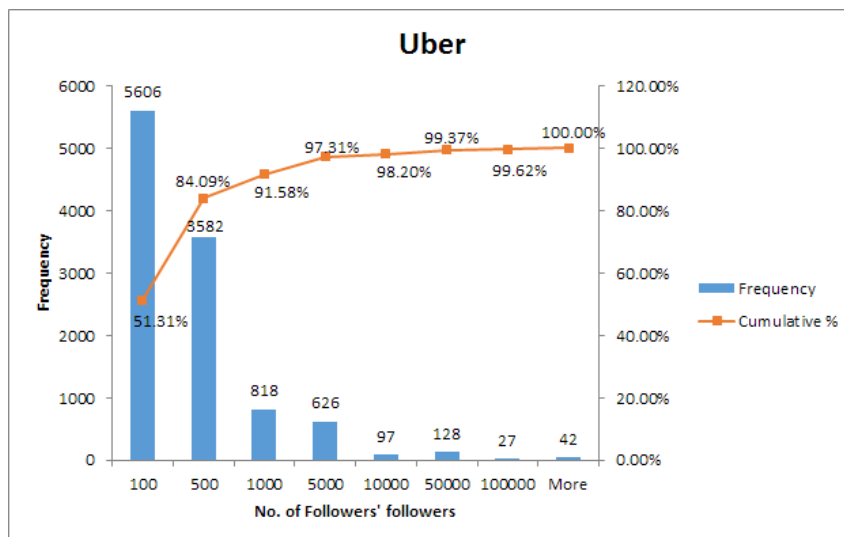


Figure 47: Social Influence of Uber Twitter followers have based on their own twitter followers

Figure 45 shows that the distribution of number of followers that ComfortDelGro's followers have is drastically skewed to the right. Majority of their followers have less than 100 followers, indicating that ComfortDelGro's followers are not very influential within their social circles or are not active on twitter. This trend is also observed with Grab and Uber's Singapore followers with a majority having under 100 followers themselves as seen in Figure 46 & 47. However, the percentage of those who have less than 100 followers is much lower for Grab (54.92%) and Uber (51.31%) as compared to ComfortDelGro (77.87%), indicating that Grab and Uber's followers are slightly more influential and active on twitter.

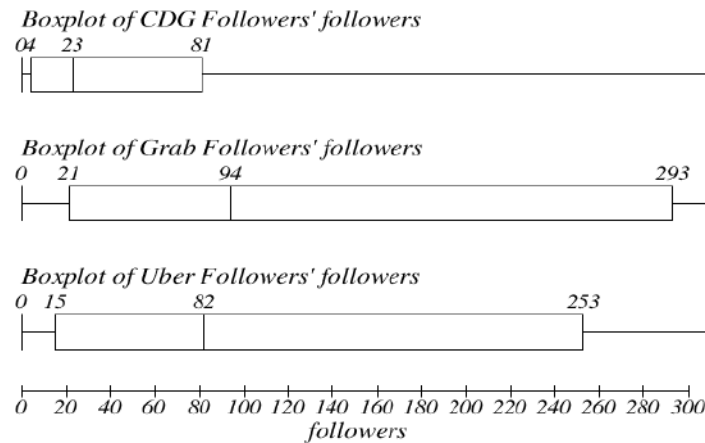


Figure 48: Boxplot of the number of followers for the average follower of the 3 companies

The three boxplots in Figure 48 shows a good comparison of the spread and medians with ComfortDelGro's followers having a median of 23 followers that is drastically lower than that of Grab(82) and Uber(94). At the extreme end, Grab and Uber have very influential accounts following them as shown in the table below:

Rank	ComfortDelGro		Grab		Uber	
	Twitter Name	Followers	Twitter Name	Followers	Twitter Name	Followers
1	Hootsuite APAC	82991	Hootsuite	7870985	MERCEDES AMG F1	1522601
2	Roger Specker	23432	Carroll Trust	2056111	Lil B THE BASEDGOD	1320195
3	ELBRIENA ISMAIL	11411	Lil B THE BASEDGOD	1320247	Helena-Reet Ennet	1310809

Figure 49: Influential followers of the three companies

Similarly, the post counts and favourite counts are much higher for Grab and Uber's followers in both areas, confirming that their followers are much more active on twitter. Thus, ComfortDelGro needs to improve on their social media penetration in Singapore and to attract more influential and active customers and followers on twitter so that word will spread faster, online and in real life, and with much more impact.

#### 4.2.2.7 Demographic analysis

To increase twitter outreach, we must first analyse the demographics that we are looking for, namely the more influential and active users on twitter. Without active followers, any promotional strategies would come to naught if followers do not see the tweets. Hence, we investigated the gender and age of the twitter followers of all 3 accounts.

##### Age

We used Microsoft's Project Oxford package to guess the age and gender of ComfortDelGro, Uber and Grab's followers through their profile pictures. Although the API did not manage to detect and guess most of the profile pictures, the results are shown in Figure 50:

Company	ComfortDelGro	Grab	Uber
No. of faces guessed	26	113	152
Median Age	32	28	27

Figure 50: Result of Project Oxford Package

This might not be a representative sample as it is only about 1% of the respective follower populations. However, it is slightly indicative that ComfortDelGro has been attracting older followers and needs to move towards targeting a younger follower group.

#### Gender

As the Microsoft Project Oxford API did not produce much results, the gender package in R was then used to guess the gender of the followers based on their first names. The year was set to 1950-2000 to accommodate most of the followers' ages that were found in the previous section.

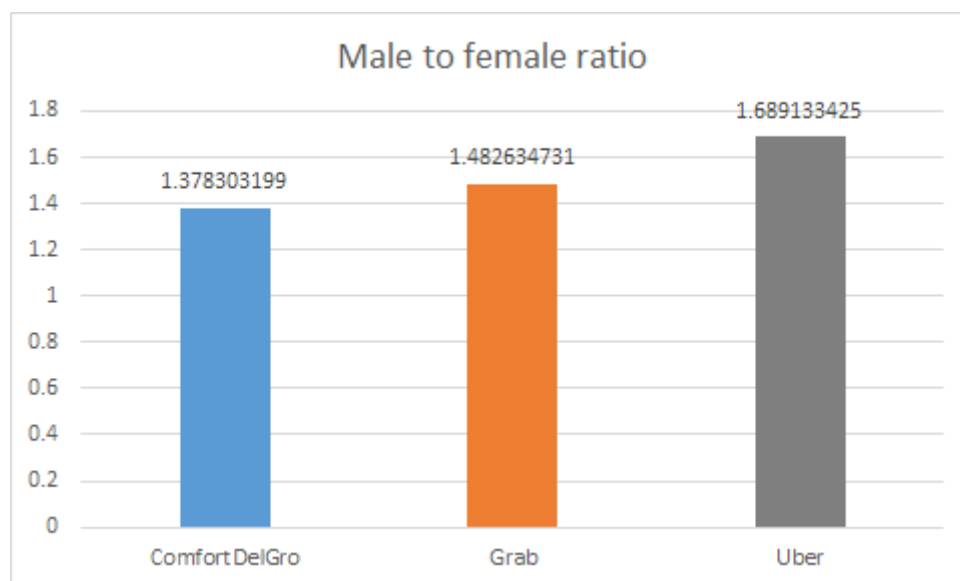


Figure 51: Male to Female ratio

Across all 3 accounts, males were consistently dominant amongst the followers as seen in Figure 51. Even after accounting for some Singaporean surnames like 'Tan' and 'Lee' which were recognised as males, it is still a clear-cut majority male demographic.

#### **Recommendation 8 - Attract Social Influencers**

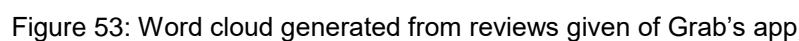
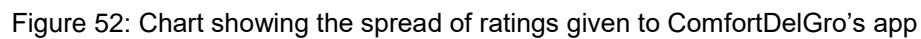
Twitter offers 3 types of advertisements - Promoted Trends, Promoted Accounts and Promoted Tweets. Promoted trends will appear on the "trending topics" box on Twitter that contain the most discussed topic on Twitter at the point in time. Promoted account will be added to the top of the list for accounts that users are suggested to follow. Promoted tweets are advertisements that appear on searches of related topics and every twitter user's timeline.

To increase the number of followers who are more active and influential, ComfortDelGro should focus on using Promoted Account to attract people on twitter to follow them and make bookings with them in



the long term. At the same time, they should also use Promoted Tweets to boost their posts, especially those with promotional codes, so that non-followers would be able to see these and be encouraged to follow them for future deals. To target the younger generation (25-28 years old) and a majority male demographic, these tweets could be advertisements catered to them which are related to clubs, dates, marriage, housing and even gyms. Promoted trends would be slightly less effective as it would require many people to participate and ComfortDelGro does not have the reach to do so.

#### 4.2.3.1 App reviews



After obtaining data of the reviews written of the ComfortDelGro's app, we stemmed them and generated a word cloud, as shown in Figure 53. As we can see, common words like "can't", "use" and "even" give us the impression that users are usually complaining in these reviews, and the general sentiment obtained from these users reflect the ratings we see from the play store ratings.

REVIEWS

Write a Review

4.4

335,807 total

Star Rating	Count
5	230,643
4	56,292
3	23,806
2	8,482
1	16,584

[illegible]

As for the word cloud generated in Figure 55, the words that appear more often in their case bear far more positive sentiments. Words such as “nice”, “great”, “good”, “love” reflect the positive sentiment of the users of Grab’s app.

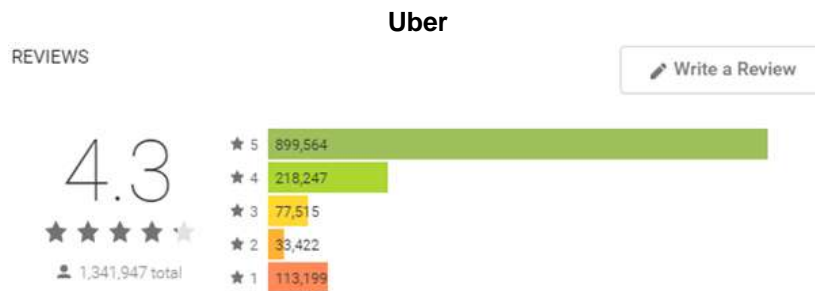


Figure 56: Chart showing the spread of ratings given to Uber's app

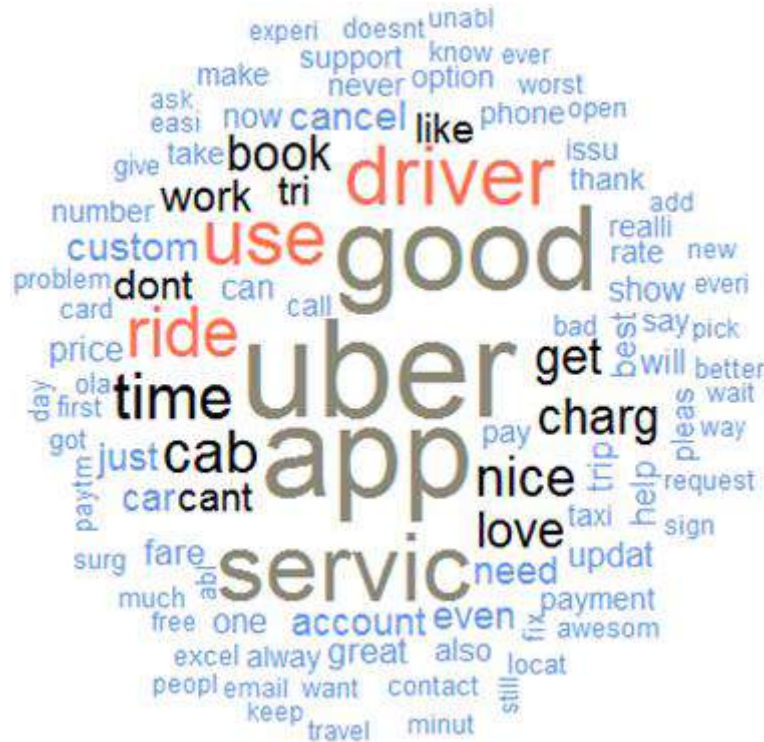


Figure 57: Word cloud generated from reviews given of Uber's app

Lastly, Uber's app received more reviews than twice of Grab's app and ComfortDelGro's app reviews added together, as seen in Figure 56. This is likely due to the scale of the companies, with Uber being the largest multi-national cab company, followed by Grab being an Asia-based cab company, and lastly ComfortDelGro which is just a local brand. The ratio of 5 starred reviews to 1 starred reviews in Uber's app is similar to that of Grab's, and a similar pattern of the number of 1-5 starred reviews can be observed between the two apps.

Likewise, from the word cloud generated from the reviews made of Uber's app in Figure 57, it can be observed that more positive words such as "good", "nice", "love" appear and in greater frequencies as well compared to other words such as "worst" and "unabl" (a stemmed version of "unable").

#### 4.2.3.2 App User Interface

With the common consumer demanding for instant service at the touch of a button, the demand for immediate response from taxi companies has been met through the provision of booking systems through mobile apps. ComfortDelGro Corporation Limited, along with its competitors Grab and Uber, all have apps that allow their users to book rides conveniently at the click of several icons. We will be comparing the booking procedures provided by these three companies in this section of our paper.

Firstly, one advantage ComfortDelGro has over Grab and Uber in its booking procedures is that they have a host of methods that consumers can use to book a taxi. While Grab and Uber are restricted to only bookings done through their app, ComfortDelGro has a call-in booking service, a SMS booking service, and other niche services: some that involve the use of NFC technology, and others using conventional methods.

We will now explore and compare the interfaces between their booking applications to elucidate if we can accord the difference in taxi hires to the user experience of their booking applications.

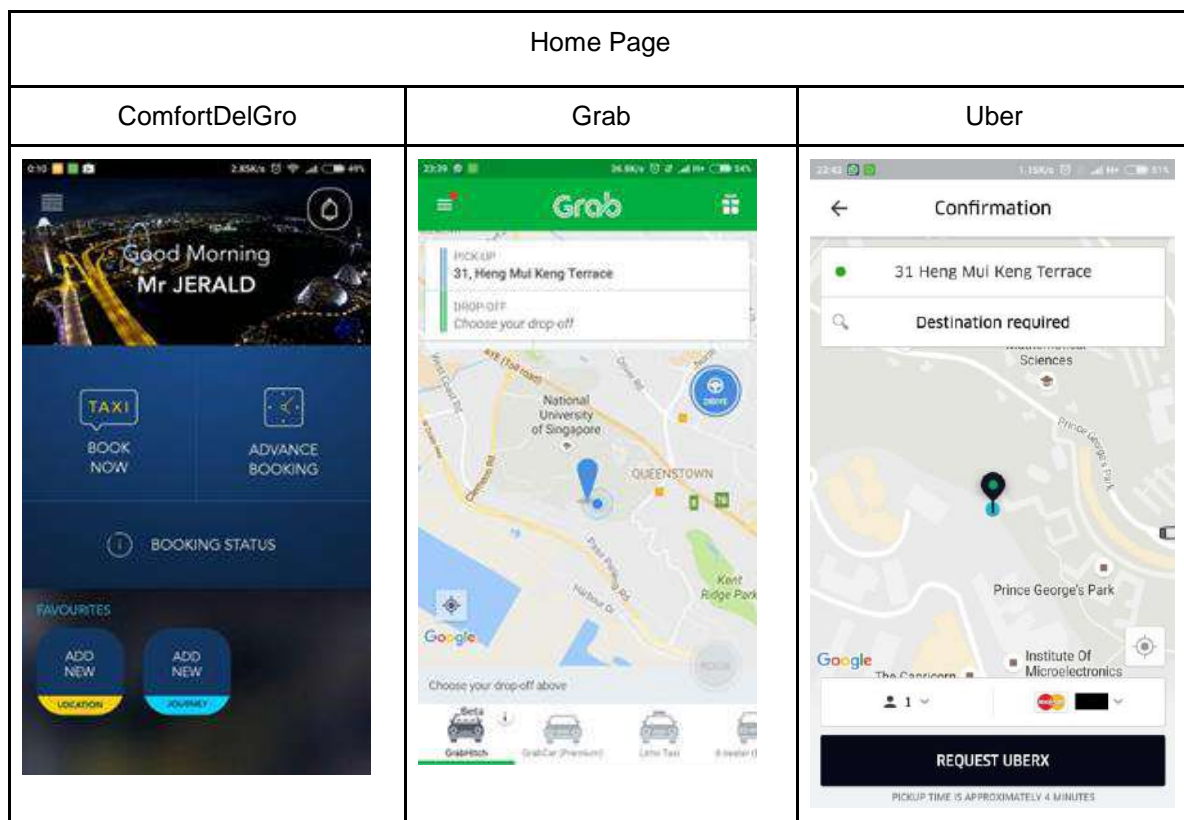


Figure 58: The homepages of the various taxi booking apps

Secondly, by comparing the home ages of each of the applications, one can immediately notice the difference between ComfortDelGro and their competitors. Both Grab and Uber provide their users with an in-built map function, which shows their user where they are at the current point in time, and allows users to easily adjust their pick-up location with the help of the map. Though a map is available on the ComfortDelGro's app as well, it requires an additional step before users are able to gain access to the map.





Furthermore, it should be noted that for Grab and Uber, dragging the map around changes your pickup location, with the pickup location always remaining in the middle of the map. On the other hand, in ComfortDelGro's booking app, users are required to tap on a location on the map to set it as their pickup location.

Another distinction between the applications is that Grab and Uber provide a fare estimate once a location is entered. On the other hand, ComfortDelGro does not give their users such an estimation at any point of the booking process.

Figure 59: ComfortDelGro's app's map view

Destination Input		
ComfortDelGro	Grab	Uber

Figure 60: Destination input screen of the various taxi booking apps

Fare estimation may not seem like much, but this simple value-added service provides assurance, especially to the growing youth consumer demographic, on an amount that you can expect to pay when using a metered fare. In Grab's case where the fare is predetermined by distance regardless of the duration of the actual journey, the fare that users see on the screen is what they can expect to pay, regardless of traffic conditions or delays. It should also be noted here that Uber and Grab allows for the booking of standard taxis through their app as well, which are the same type of standard taxis that ComfortDelGro's app allows users to book. All three apps provide users with the option of booking more expensive vehicles with greater seating capacities.

Another observation is that Grab and Uber both offer cashless payment that does not require the actual monetary exchange between the user and the taxi driver, while every taxi ride through ComfortDelGro requires payment either in the form of cash or card at the end of each trip. Grab or Uber users can simply hop on and hop off, with the payment being done in the background, transparent to users.



### 4.2.3.3 Taxi hailing procedure

Figure 61 shows the steps that an average user must go through using each app before they can hail a taxi to come to their current location.

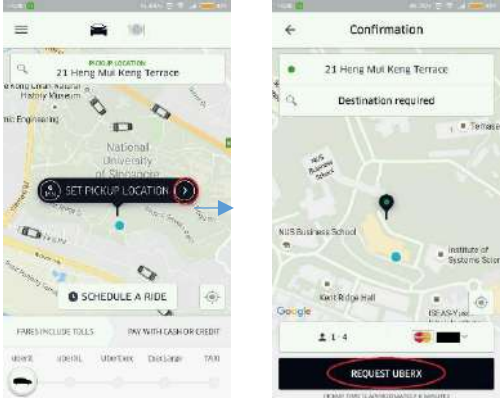
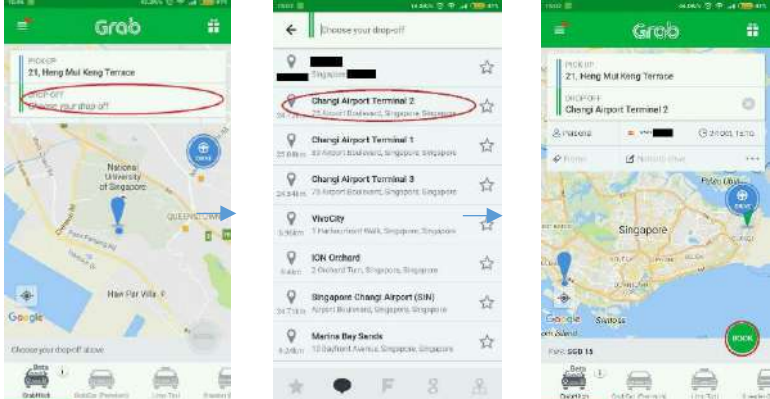
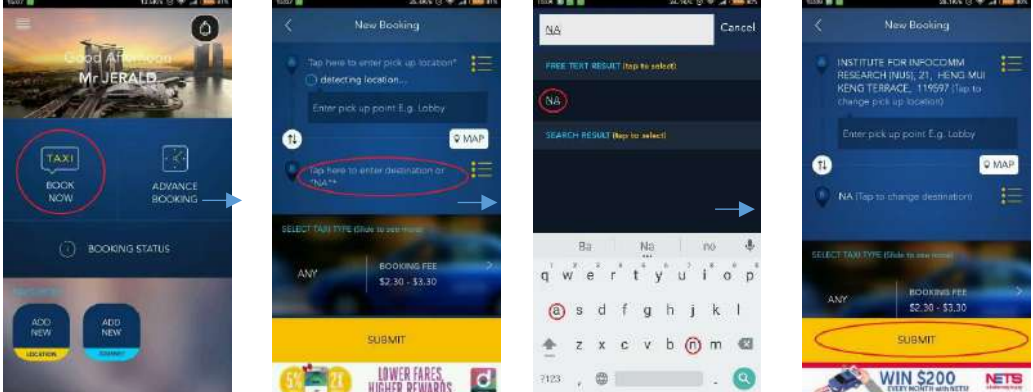
Uber's steps:	Taps required:
	2
Grab's steps:	
	3 (minimally)
CDC's steps:	
	6 (minimally)

Figure 61: The various steps it takes to hail a cab in each booking app

If no destination input is required, Uber's app is the fastest in providing users the option to hail a cab. Coming closely behind is Grab, as Grab mandates that users input a destination before giving them the opportunity to hail a cab. Lastly ComfortDelGro mandates that users specify their destination, and even if they do not wish to, they must submit "NA" under the destination input field, which constitutes to the high number of minimal taps required to hail a cab. The emphasis on the necessity for users to enter a destination on ComfortDelGro's app actually acts as a hindrance to customers, rather than serving as a form of convenience brought to their users.

#### 4.2.3.4 Booking costs

One stark difference between the three taxi companies' booking apps is the presence of the booking fee incurred by users who hail a taxi through ComfortDelGro's app. Both Grab and Uber do not charge their users any booking fees in the process of booking through their apps, however ComfortDelGro does charge a booking fee of \$2.30 for their standard taxis, and an additional premium for their executive ones, ranging from \$2.30 to \$10. For advance bookings, ComfortDelGro charges \$8 for a standard taxi, while there is no booking charge for advanced bookings done on Grab and Uber. Though users who book a taxi through the Grab or Uber app will also face the \$2.30 charge, booking a regular Grab Car or UberX will not result in the user incurring any such booking costs.

This disadvantages ComfortDelGro taxi drivers compared to Grab or Uber drivers, as customers are immediately turned off from hailing a ComfortDelGro cab to avoid incurring the additional booking fees. From the perspective of the cab drivers, they pay a commission of 40 cents plus Goods and Service Tax (GST) to ComfortDelGro every time they take up a job from their booking system, but pay only 30 cents nett to Grab whenever they take up a booking from them.

Though the booking fees incurred by customers go to the cabbies themselves, its presence acts as a deterrence for users to be using taxis over personal Grab or Uber drivers. For ComfortDelGro, the unpopularity of booking taxis may result in a lowered take-up rate of taxi rentals, as drivers find themselves losing out on the benefits of app-booking technology.

#### **Recommendation 9 - Improvements for ComfortDelGro's App**

As we can see from comparing the booking apps of ComfortDelGro and their competitors, we see a clear advantage in terms of convenience as well as user experience that the users of Grab's competitors enjoy in the use of their app. The booking fee imposed by ComfortDelGro for immediate bookings, and especially for advanced bookings acts as a deterrent for users to book taxis through ComfortDelGro app. A possible business model solution to this would be for ComfortDelGro to transfer this fee to their distance fare charges. This would allow ComfortDelGro to remove the need for having a booking fee while still being able to recuperate their losses from not having this fee. Furthermore, the \$8 charge for pre-booking a taxi is highly uncompetitive in comparison to Grab and Uber's \$0 charge for an advance booking made. We believe this charge should be reduced to a regular booking fee's charge of \$2.30, and that this charge be likewise transferred onto their distance charge instead of being a flat-out charge.

For example, ComfortDelGro currently charges \$0.22 (LTA, 2016) to passengers for every 400 meters thereafter or less for trips up to 10km in any standard ComfortDelGro taxi. This charge could be increased to \$0.32 if the cab has been booked using the app, and presuming a particular customer takes a 10 kilometre taxi ride, that \$2.30 would be recuperated. In this case, ComfortDelGro would also stand to earn \$0.20 more from this new method of charging, while also removing one of the larger barriers that holds customers back from booking a taxi through their app system.

Another recommendation we would make to ComfortDelGro in improving their app would be for the app to be able to detect the blank destination field to recognise that the user does not wish to enter a destination. This would also be helpful in bringing ComfortDelGro's app closer, in terms of the number of taps it takes to hail a cab, as compared to Grab and Uber's apps, dropping their number of taps required from 6 to potentially just 2, similar to Uber.

One last recommendation we would make in terms of improving the user experience of the app would be for ComfortDelGro to adopt the same method that Grab and Uber uses for users to assign their pickup location. This would mean that the pickup location pin is fixed in the middle of the user's screen, and users must move the map to adjust their pickup location. This implementation would be far more intuitive for users, and will also allow users to be more precise in designating their pickup point. This would be especially helpful in cases where being picked up on the opposite side of the road as to what was marked in the app would bring taxi drivers a great amount of inconvenience (as in the case of Orchard road, for example).

In conclusion, the general sentiment for Grab's and Uber's apps on the app store is far more positive than ComfortDelGro's, and these two competitors' apps receive far more downloads than ComfortDelGro's app. Most complaints of the app from reviews cite cases whereby users do not successfully manage to book a taxi due to a myriad of reasons. It would bode well for ComfortDelGro to invest more efforts into optimising their app and creating a more pleasurable experience for users to hail cabs through their app, be it through improving the app's user interface, or by placing a greater emphasis on ensuring that bookings done through their app are seen through successfully.

## 5. Summary of Recommendations

Objective	Specific Area of Improvement	Suggested Recommendations	Possible Limitations
Increase Revenue	Sales Optimisation	<ul style="list-style-type: none"> <li>Standardising pricing of taxis under ComfortDelGro to avoid confusing commuters</li> <li>Awareness campaigns for the public on their pricing methods</li> <li>Promotion to get more users to use their mobile application</li> </ul>	<ul style="list-style-type: none"> <li>Cutting of price will lead to a price war</li> <li>Proper planning and huge investments for the campaigns will be needed to make sure that the message is bring across</li> </ul>
	Operations Optimisation	<ul style="list-style-type: none"> <li>Scrape event websites to better match demand and supply of available taxis with consumers</li> <li>Employ demand tracking resources such as Uber's surge pricing and Grab's "high demand" pricing to geographically effectively track demand and redirect available taxis to these areas</li> </ul>	<ul style="list-style-type: none"> <li>Substantial investments need to be made to create, implement and update the existing ComfortDelGro system</li> </ul>
Increase Market Share	Improvement in Customer Satisfaction	<ul style="list-style-type: none"> <li>Implement stringent quality checks on Comfort taxi drivers in terms of professionalism (road knowledge) and behaviour (courtesy)</li> <li>Implement rating systems displayed on monitors in the taxi for customers to rate their taxi experience with ease</li> </ul>	<ul style="list-style-type: none"> <li>Relatively large budget and manpower will be needed to implement such quality checks and installing of the rating systems</li> </ul>
	Improvement in Online Marketing Techniques	<ul style="list-style-type: none"> <li>Create presence on Youtube through a sponsored video by a top Singapore Youtube channel and advertisements</li> <li>Use promoted tweets and promoted account to reach out to a younger and more influential audience through youthful and more masculine content</li> <li>For Facebook Presence:               <ul style="list-style-type: none"> <li>To post a minimum of one post every 2 days, which will be posted after 11am, preferably from 12pm-1pm and 5pm-7pm.</li> <li>To make more use of photos and videos.</li> </ul> </li> <li>Content should target the identified age group 25-34 (working adults)</li> </ul>	<ul style="list-style-type: none"> <li>Requires a dedicated social media and marketing team to regularly post content and come up with marketing collaterals. Associated manpower costs could be costly.</li> </ul>
	Improvement in Technology	<ul style="list-style-type: none"> <li>Adjust booking fees to charge users on top of their regular distance fares, rather than a flat booking fee.</li> <li>Reduce advance booking fees to the same amount as immediate booking fees, and increase distance fare charge instead.</li> <li>Improve destination input system to detect blank inputs instead of requiring users to type "NA".</li> <li>Improve pickup location assignment system, to have users drag the map to adjust the pickup location pin, rather than having users tap on the exact pickup location.</li> <li>Improve on the general success rate of taxi bookings made through app</li> </ul>	<ul style="list-style-type: none"> <li>Adjustment in booking fee charges is subject to viability of business model, and also on prevailing legislation of taxi fare rates.</li> <li>Reduction of advance booking fees also subject to viability of business model.</li> </ul>

## 6. Conclusion

In conclusion, ComfortDelGro is finding themselves in a unique turning point in Singapore's transportation industry, with new players adopting IT-savvy techniques to capture market share. Our abovementioned recommendations serve to attempt to help ComfortDelGro keep up with the times, in the hopes of retaining as much prevailing market share they possess, and to potentially even increase their market share through the adoption of innovative and modern techniques. Coupled with our recommendations to increase revenue through sales and operations optimisation, we hope that this report will serve to increase ComfortDelGro's profitability and market presence in the foreseeable future.

## 7. Appendix

### 7.1 Methodology

#### **Wordcloud Generation**

##### *R Script*

```
library(tm)
library(SnowballC)
library(wordcloud)
library(RColorBrewer)

#Reading the file
com.codigo.comfort <- read.csv("E:/NUS/IVLE/BT2101 It and Decision Making/Project/data/com.codigo.comfort.csv",
stringsAsFactors = FALSE)
#Generating a basic corpus
testCorpus <- Corpus(VectorSource(com.codigo.comfort$review))
#Converting the words of the corpus to lower case
testCorpus <- tm_map(testCorpus, content_transformer(tolower))
#Removing the punctuations in the corpus
testCorpus <- tm_map(testCorpus, removePunctuation)
#Creating a plain text document
testCorpus <- tm_map(testCorpus, PlainTextDocument)
#Removing the common stopwords
testCorpus <- tm_map(testCorpus, removeWords, stopwords('english'))
#Stemming words to their basic form
testCorpus <- tm_map(testCorpus, stemDocument)
#Assigning colours for this word cloud
CDC = c("#6495ED", "#FFB90F", "#00CDCD", "#5F9EA0", "#008B9B")
#Generating the wordcloud
wordcloud(testCorpus, max.words = 100, random.order = FALSE, min.freq=1, colors=CDC)
```

#### **Heatmap Generation**

##### Extracting API data from LTA Datamall

##### *Python Script*

```
import requests
import csv
import json

headers = {'AccountKey': 'mLOeuO77ThSVQLri+LAcmA==', 'UniqueUserID': 'cebff8e3-2ac8-4722-af0b-
b36b45156a43', 'accept': 'application/json'}
requests.get("http://datamall2.mytransport.sg/taodataservice/TaxiAvailability", headers=headers)
(results.get("http://datamall2.mytransport.sg/taodataservice/TaxiAvailability", headers=headers)).json()
bus_stop_url = "http://datamall2.mytransport.sg/taodataservice/TaxiAvailability"
results = []

while True:
    new_results = requests.get(
        bus_stop_url,
        headers=headers,
        params={'$skip': len(results)}).json()['value']
    if new_results == []:
        break
    else:
        results += new_results

#saving json data as csv format
resultFile = open("output271016T0932.csv", 'w')
wr = csv.writer(resultFile, dialect='excel')
wr.writerow(results)
```



## **Plotting of CSV data on map**

### *R Script*

```
library(ggplot2)
library(ggmap)

# creating a sample data.frame with your lat/lon points

df <- as.data.frame(Taxi.Availability1)

# getting the map
map <- get_map(location = c(lon = mean(df$Longitude), lat = mean(df$Latitude)), zoom = 11,
               maptype = "roadmap", scale = 1)

# plotting the map with some points on it
ggmap(map) +
  geom_point(data = df, aes(x = df$Longitude, y = df$Latitude, fill = "red", alpha = 1), size = 0.01, shape = 21) +
  guides(fill=FALSE, alpha=FALSE, size=FALSE)
```

## **Sentiment Analysis**

### *R Script*

```
#load libraries
library("e1071")
library("RTextTools")
library("stringr")
library("tm")
library("data.table")

#function to read the text files (separated by #####)
readText <- function(filename){
  result<- c()
  current.line <- 1
  con <- file(filename)
  open(con)
  tmp = ""
  while(length(line <- readLines(con, n=1, warn=FALSE)) > 0 ){
    if (current.line == 1){
      tmp = line
    }
    else{
      if (line == "#####"){
        result <- c(result, tmp)
        tmp = ""
      }
      else{
        tmp <- paste(tmp, line)
      }
    }
    current.line <- current.line + 1
  }

  close(con)
  return (result)
}

predictTest <- function(test_text, mat, classifier){
  train_mat = mat[1:2,]
  train_mat[,1:ncol(train_mat)] = 0

  test_matrix = create_matrix(test_text, language="english", removeStopwords=T, removeNumbers=T, stemWords=T,
                              toLower=T, removePunctuation=T)
  test_mat <- as.matrix(test_matrix)

  for(col in colnames(test_mat)){
    if(col %in% colnames(train_mat))
    {
      train_mat[2,col] = test_mat[1,col];
    }
  }
}
```

```

#test_mat = as.matrix(t(test_mat))
row.names(train_mat)[1] = ""
row.names(train_mat)[2] = test_text
p <- predict(classifier, train_mat[1:2,])
as.character(p[2])
}

#collating all the comments together
setwd("~/My Stuff/NUS/Y2 Sem 1/BT2101 - IT and Decision Making/Project/Straittimes mining")

file_list <- list.files()
commentst.all <- do.call("rbind", lapply(file_list, read.csv, header = TRUE))
write.csv(commentst.all, "commentsall.csv")
comments_cleaned <- commentst.all$message
write.csv(comments_cleaned, "comments_clean.csv")

#Referring to the collated comments and start the preprocessing
comments_cleaned <- read.csv("comments_clean.csv", header=TRUE)
comments_cleaned <- as.data.frame(comments_cleaned)
comments_cleaned$X <- NULL
colnames(comments_cleaned) <- "comment"

#cleaning the comments from unrelated or common words
comments_cleaned$comment = str_replace_all(comments_cleaned$comment, "[^:graph:]]", " ")
comments_cleaned$comment <- gsub(" +", " ", gsub("^ +", "", gsub("[^a-zA-Z0-9 ]", "", comments_cleaned$comment)))
newStopWords <- fread('http://jmlr.csail.mit.edu/papers/volume5/lewis04a/a11-smart-stop-list/english.stop')

comments_cleaned$comment <- removeWords(comments_cleaned$comment, newStopWords$a)
comments_cleaned$comment <- stemDocument(comments_cleaned$comment, language = "english")
comments_cleaned <- comments_cleaned[!(is.na(comments_cleaned$comments_cleaned) |
comments_cleaned$comments_cleaned == ""),]

#setting up the classifier for prediction
pos <- readText("positive.txt")
pos_class <- rep("positive", length(pos))
pos_data <- cbind(pos, pos_class)

neg <- readText("negative.txt")
neg_class <- rep("negative", length(neg))
neg_data <- cbind(neg, neg_class)

training_data1 <- rbind(pos_data[1:1000,], neg_data[1:1000,])
matrix <- create_matrix(training_data1[,1], language="english", removeStopwords=T,
removeNumbers=T, stemWords=T, toLower=T, removePunctuation=T, removeSparseTerms=0.998)
mat = as.matrix(matrix)
svm_classifier = svm(mat, as.factor(training_data1[,2]) )

#copying result into a table
result = data.frame()
comments_cleaned1 <- comments_cleaned[2093:2242,]

for (row in row.names(as.data.frame(comments_cleaned1))){
  row = as.numeric(row)
  result1 <- predictTest(comments_cleaned[row,1], mat, svm_classifier)
  print(row)
  print(result1)
  result <- rbind(result, result1)
}

sum(is.na(result$X.positive.))
# 984 are negative as NA represented those values that are negative

```

## Pulling Follower data from Twitter

### *R Script*

```
#follower list given by lecturer
library(devtools)
library(rjson)
library("twitter")
library("ROAuth")
library("e1071")
library("RTextTools")
library(stringr)
cdg <- fromJSON(file = "cdgtaxis_sg.json")

cdg <- as.data.frame(cdg, stringAsFactors=FALSE)
cdg<- (levels(cdg$cdg))[cdg$cdg]

firstuser <- getUser("speedknight")
allusers <- firstuser
allusers <- as.data.frame(allusers, stringAsFactors=FALSE)

for(i in 1:length(cdg)){
  user <- cdg[i]
  userdata <- getUser(user)
  userdata <- as.data.frame(userdata, stringAsFactors=FALSE)
  allusers <- rbind(allusers,userdata)
  count=i
}

write.csv(allusers,file='cdgusers.csv',row.names=F)
```

## Facial recognition

### *R Script*

```
#Microsoft Project Oxford
require(Roxford)
require(devtools)
load("facekey")

cdgfaces <- read.csv('cdgusers.csv', stringsAsFactors = FALSE)
cdgfaces<- data.frame(cdgfaces$profileImageUrl, stringsAsFactors=FALSE)
cdgfaces <- cdgfaces$cdgfaces.profileImageUrl

faces.gender <- "example"
faces.age <- 40
allfaces <- data.frame(faces.gender, faces.age, stringsAsFactors = FALSE)

for (i in 1:length(cdgfaces)){
  response<-getFaceResponseURL(cdgfaces[i], facekey)
  if(nrow(response) != 0){
    age <- response$faceAttributes.age
    age<- as.numeric(levels(age))[age]
    gender <- response$faceAttributes.gender
    gender<- (levels(gender))gender
    allfaces <- rbind(allfaces,c(gender,age))
  }
}
write.csv(allfaces,file='cdgfaces.csv',row.names=F)
#repeat for uber and grab
```

### Gender

```
library(gender)
cdg <- read.csv('cdgusers.csv', stringsAsFactors = FALSE)
cdg <- cdg$name
cdgusers.name <- "test"
cdgusers.gender <- "male"
cdggender <- data.frame(cdgusers.name, cdgusers.gender, stringsAsFactors = FALSE)
#cdggender <- rbind(cdggender,c(test$name,test$gender))

for (i in 1:length(cdg)){
  name <-first.word(cdg[i])
```

```

response<-gender(name , method = "ssa", years = c(1950, 2000))
cdgggender <- rbind(cdgggender,c(response$name,response$gender))
}

write.csv(cdgggender,file='cdgggender.csv',row.names=F)

```

## 7.2 Miscellaneous Figures

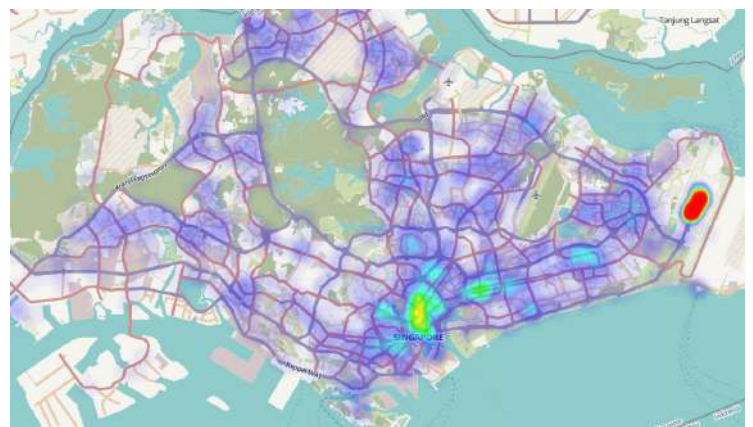
### 7.2.1 Screenshots of taxi location heatmap

**HeatMap Wednesday**



**Island View 9AM**

**HeatMap Saturday**



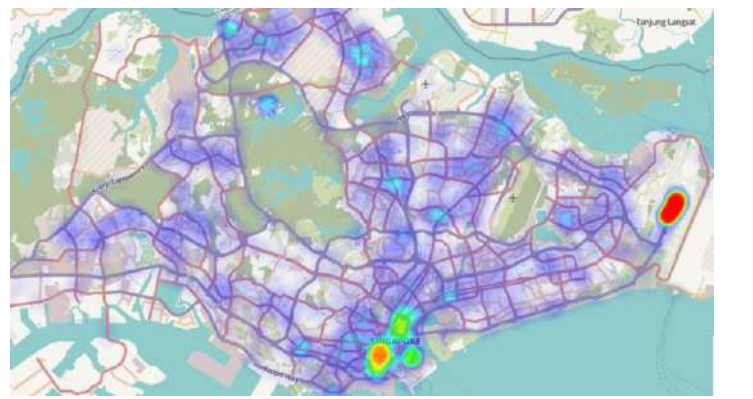
**Island View 9AM**



**Island View 1PM**

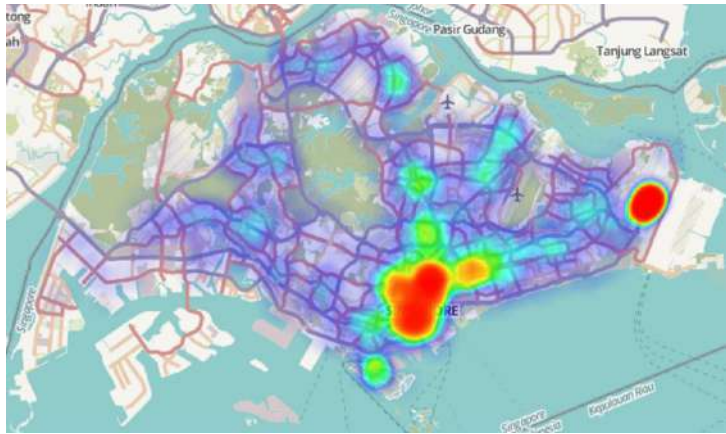


**Island View 1PM**





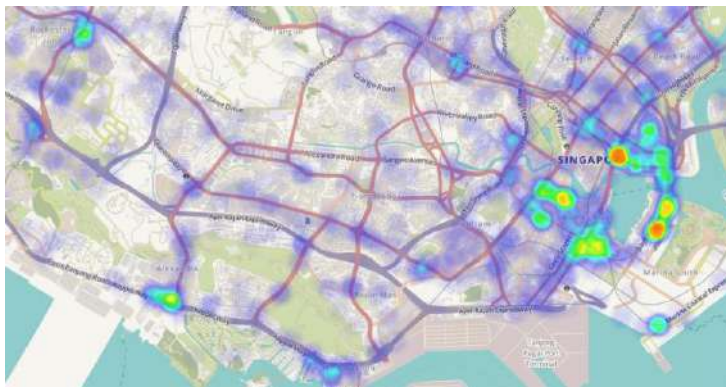
**Island View 6PM**



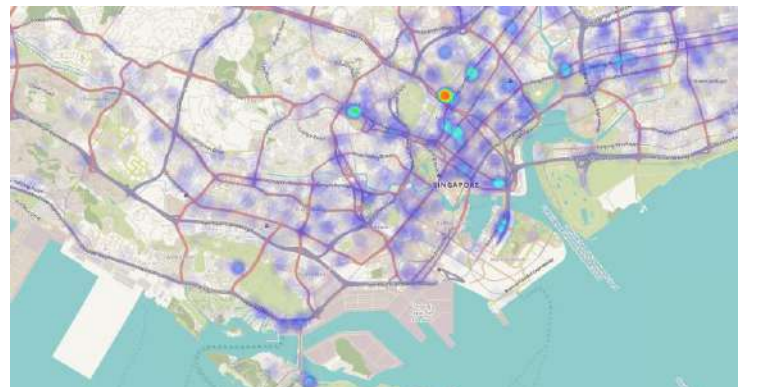
**Island View 6PM**



**Island View 11PM**

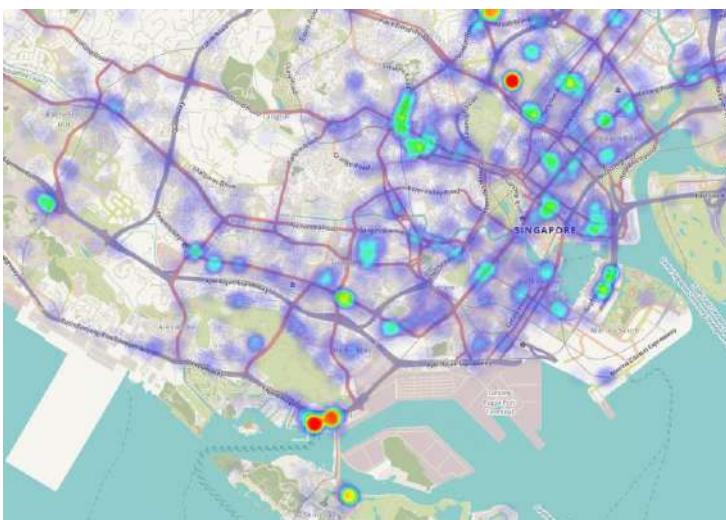


**Island View 11PM**



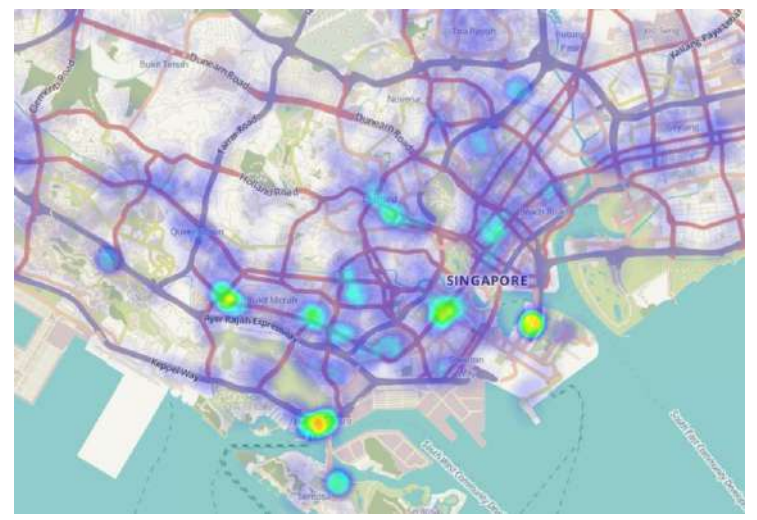
**Central Area 9AM**

**Central Area 9AM**



**Central Area 1PM**

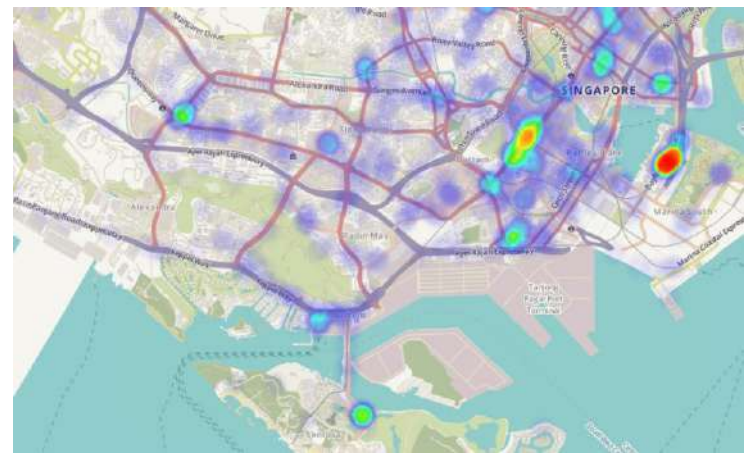
**Central Area 1PM**



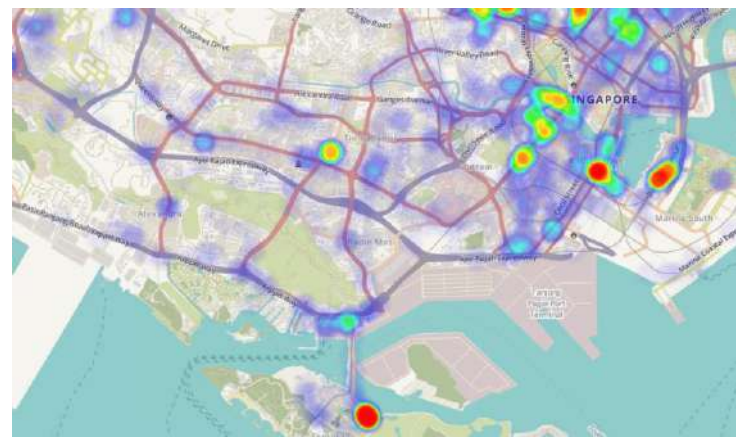




**Central Area 6PM**



**Central Area 6PM**



**Central Area 11PM**



**Central Area 11PM**



**Eastern Area 9AM**



**Eastern Area 9AM**





**Eastern Area 1PM**



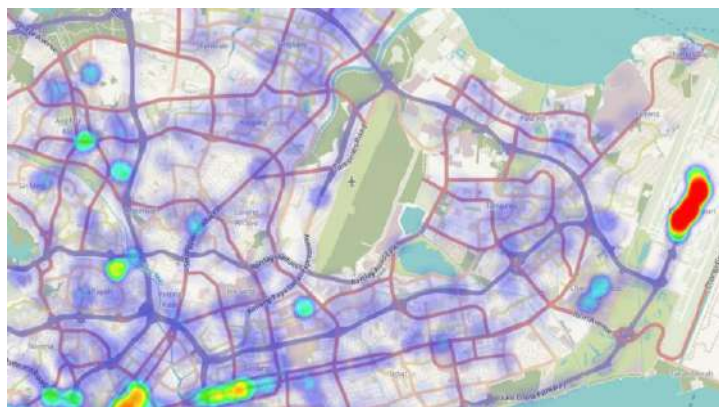
**Eastern Area 1PM**



**Eastern Area 6PM**



**Eastern Area 6PM**



**Eastern Area 11PM**



**Eastern Area 11PM**





### Northern Area 9AM



### Northern Area 9AM



### Northern Area 1PM



### Northern Area 1PM

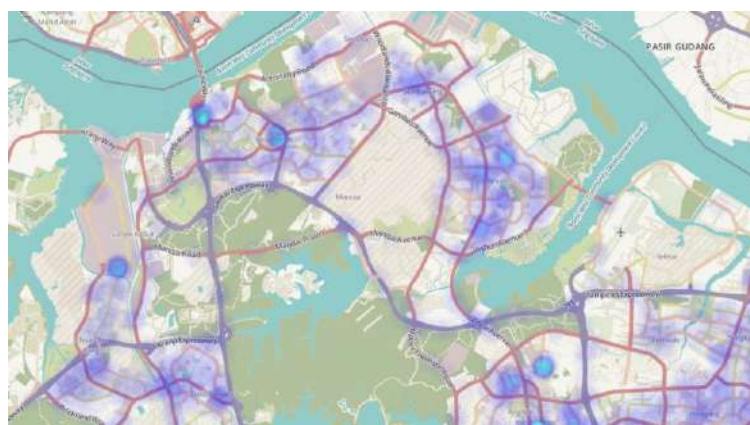


### Northern Area 6PM

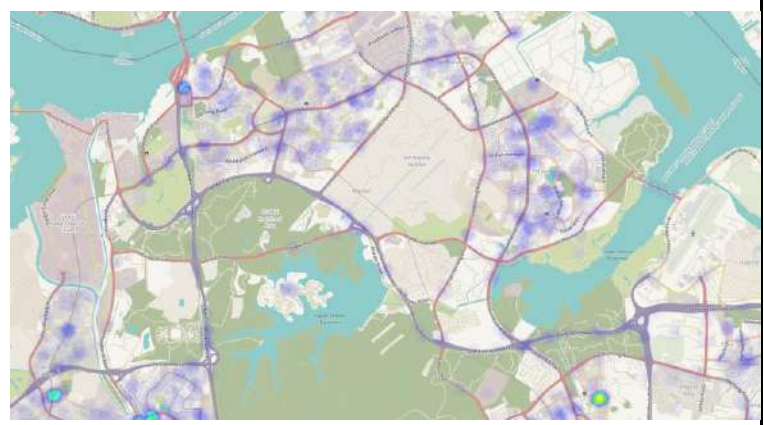


## Northern Area 6PM

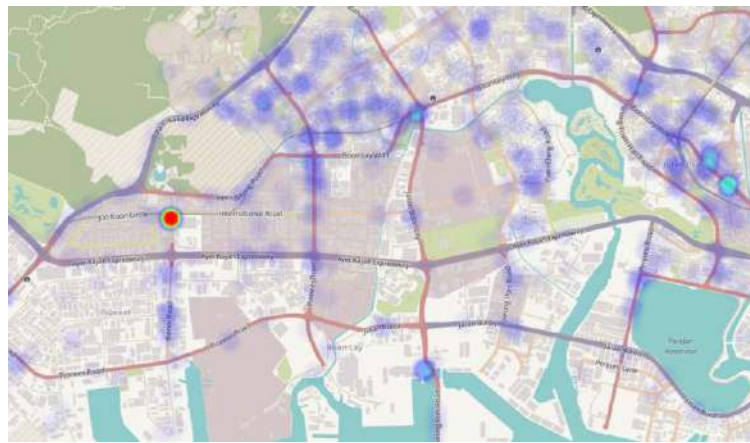




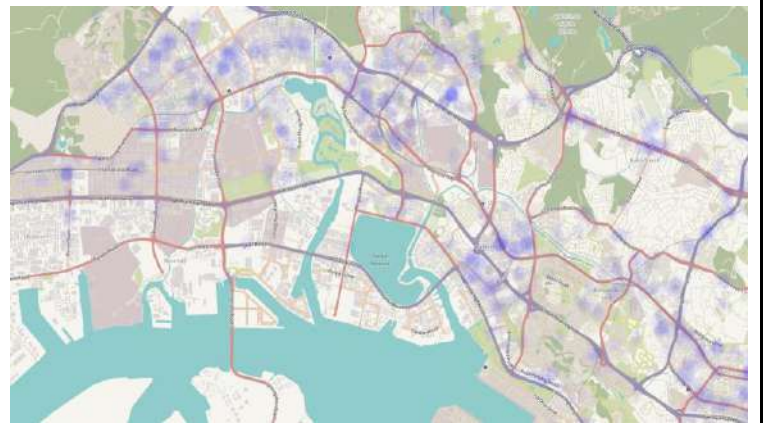
**Northern Area 11PM**



**Northern Area 11PM**



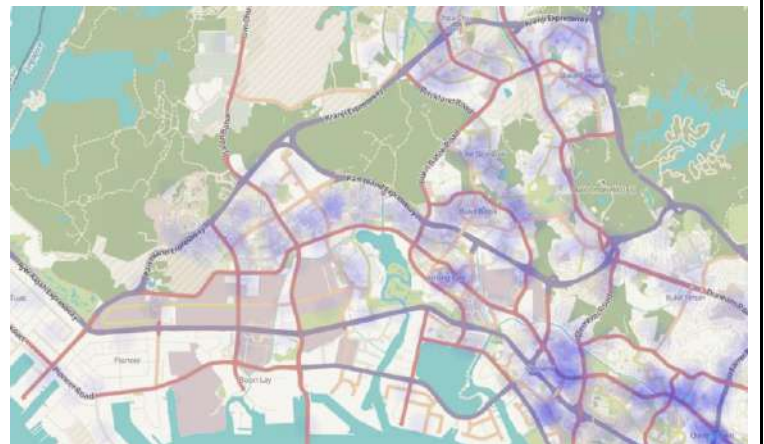
**Western Area 9AM**



**Western Area 9AM**

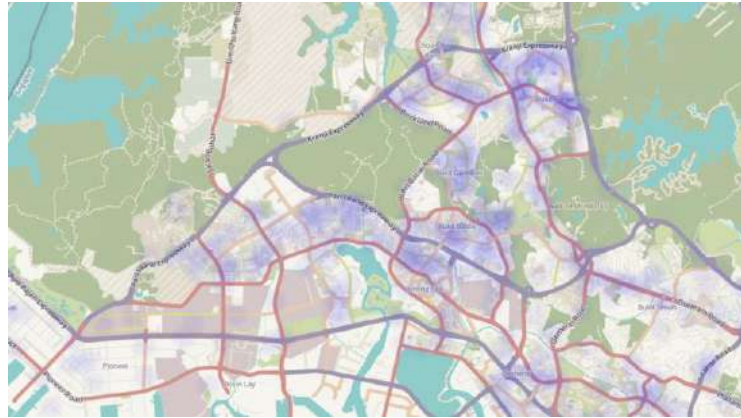


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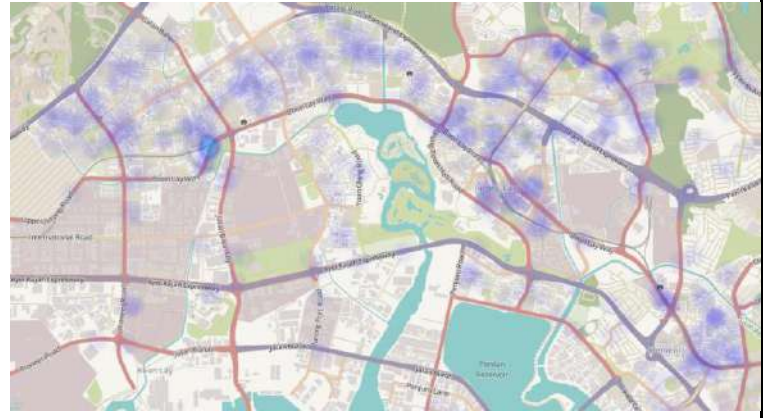


**Western Area 1PM**

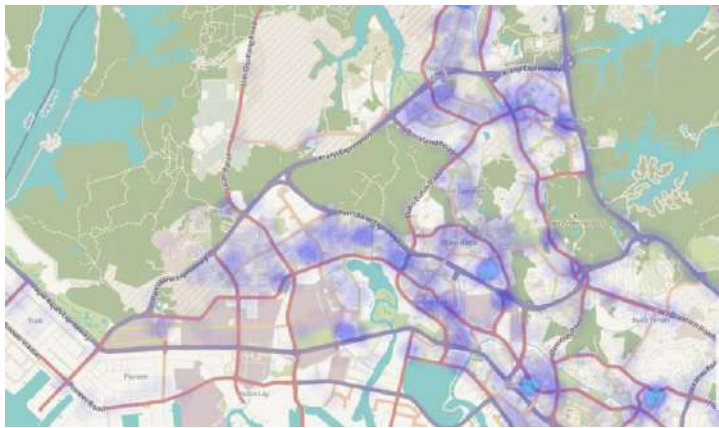




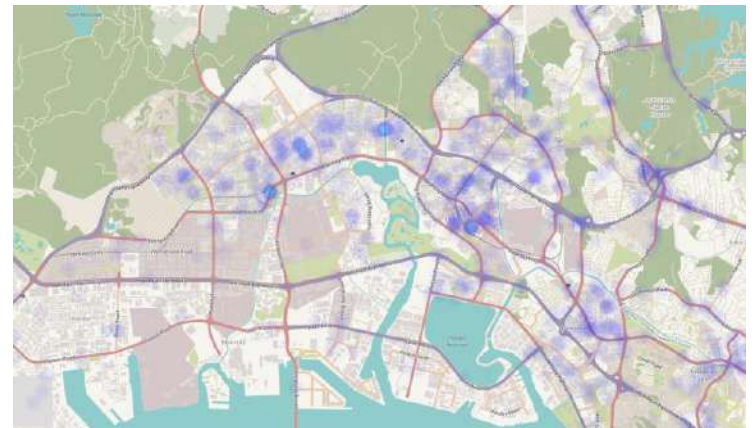
**Western Area 6PM**



**Western Area 6PM**



**Western Area 11PM**



**Western Area 11PM**

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