

A Service Quality Study on the In-Demand Motorcycle Hailing Applications

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Abstract

Public transportation is defined as transportation by a conveyance that provides continuing general or special transportation to the public. As public transport organizations grow older and matured, the quality of service dwindles down with public being left with no option but to accept what is offered with the current economic status. In conducting the study on how to effectively examine a certain type of public transport service is by using quality service metrics and identifying the various failure points within the whole service process. It is said that high-volume consumer is equal to a high degree of innovation. Transport service is always evolving and companies have always an idea on how to create a service that is efficient and well suited to the modern technology. The satisfaction people experience when using motorcycles as transport services is influenced by (a) Road Traffic, (b) Road Accidents and (c) Service Quality. Solving these matters will affect and decrease the potential risks that occur within the process of service delivery. The researchers used a conservative approach with a conscious effort to avoid any subjective tendencies when assigning value to both costs and benefits for the purpose of a cost-benefit analysis. The researchers may conclude that even if the costs incurred in the process of implementing the said plan of actions: (i) Motorcycle Taxi Booths, (ii) Personal Protective Standardization, (iii) C2X Software, (iv) Training Programs for Safety and Security as well as Training Programs for Health and Hygiene increases per year the benefit will increase as well. With the overall findings, the significance of patronizing motorcycle hailing applications with best service quality will be very viable among every citizen.

Keywords

Motorcycle Hailing Application, Service Quality, Road Accidents, Road Traffic, Personal Protective Equipment

1. Introduction

Public transportation is defined as transportation by a conveyance that provides continuing general or special transportation to the public. (Tran & Kleiner, 2015) Economic globalization has developed the course of residential suburbanization, and the increase in household revenue. It is said that nowadays, economic growth is related to transport demand, and this also influences transport safety, as, simply put, if traffic on the roads is higher, then, sadly, the probability of an accident is also higher. Relationships between driving behavior on how drivers cope with traffic and road accident occurrences are proposed as results of data analysis. The accident mechanisms of specific accidents, in which the subject ranked careless driver involved, can be explained in terms of driving behavior, which is determined by his cognition and/or judgment when he is facing specific environmental situations. (Masaru Ueyama and Sumio Ogawa, 2001) One of the main reasons of motorcycle accidents was traffic congestion.

Table 1. Distribution of accidents by cities and municipalities in Metro Manila from January – December 2016 (MMARAS, 2016)

City	Fatal	Non Fatal Injury	Damage	Grand Total
Caloocan	36	888	2935	3859
Las Piñas	15	751	2473	3239
Makati	14	1004	11487	12505
Malabon	14	432	674	1120
Mandaluyong	1	503	5219	5723
Manila	66	1148	10093	11307
Marikina	16	1167	3530	4713
Muntinlupa	14	968	2907	3889
Navotas	9	212	550	771
Parañaque	37	1041	4286	5364
Pasay	13	723	4962	5698
Pasig	23	1179	7157	8359
Pateros	-	9	26	35
Quezon	116	4755	28846	33717
San Juan	6	250	1569	1825
Taguig	21	591	4773	5385
Valenzuela	25	795	993	1813
Grand Total	426	16,416	92,480	109,322

According to MMARAS, motorcycles road accidents have the highest fatality accident rate with 218 involved. Looking at the data, cars may have the highest frequency of road accidents, but the highest number of fatal incidents came from motorcycles. Comparing the occurrence of fatal and non-fatal injuries of both cars and motorcycles, it is visible that motorcycles have the higher risk of mortality.

Table 2: Actual distribution of number of vehicles involved in a road crash from January to December 2016(MMARAS, 2016)

Vehicle Type	Fatal	Non Fatal Injury	Damage to Property	Total No. of Vehicles
Cycle-Pedicab	23	882	491	1,396
Motorcycle	218	11,456	11,431	23,105
Motor Tricycle	21	1,399	2,353	3,773
Car	98	7,544	100,665	108,307
Jeepney	44	1,922	9,191	11,157
Taxi / Fx	13	973	7,374	8,360
Bus	31	719	8,813	9,563
Van	34	1,332	17,406	18,772
Truck	103	1,459	18,052	19,614
Train	14	11	9	34
Kuliglig	-	12	33	45
Animal-drawn vehicle	-	-	3	3
Heavy Equipment	-	3	1	4
Unknown Vehicle	25	558	5,826	6,409
TOTAL	624	28,270	181,648	210,542

Based on Table 1, Makati City is the 2nd highest contributor in road accidents considering that Makati is a major traffic generator for the greater Metropolitan Manila Area and it is the primary Central Business District of the country. It attracts a large amount of vehicle traffic due to its relatively large resident population and its primarily service-oriented economy. Thus, the City regulates the in-bound and out-bound movement amid the morning and evening crest hours respectively. Mobility and accessibility, is one of Makati's imperative requirements.

Every year, there is a high rate of road accidents in every of the world. Most accidents occur due to over speeding, driving while drunk, irresponsible drivers that does not obey road rules. Other accidents may lead to death due to the impact of the victim's body. One of the accidents involve is motorcycle riding. Though motorcycle accidents have much more fatalities in the past, as one of the most affordable travel mode choices, which is raised each year, many still use it as a transport to their destinations. (NHTSA, 2008)

To reverse this trend, some governmental and local authorities are now attempting to implement actions that could contribute to the generation of positive user attitudes towards public transport. (Matas, 2014) Transport service is always evolving, and companies have always an idea on how to create a service that is efficient and well suited to the modern technology. In Belgium it is found that a 10 per cent shift from cars to motorcycles could reduce travel time by an average 8 minutes. (Mike Hanlon, 2012)

In conducting the study on how to effectively examine a certain type of public transport service is by using quality service metrics. It is said that high-volume consumer is equal to a high degree of innovation. (Valia T Petkova, Peter C Sander and Aarnout Brombacher, 2000) Previous studies have evidenced that individuals' mobility decisions largely depend on the psychosocial dimensions associated with their attitudes, perceptions, and preferences (Gehlert, 2013). Surprisingly, one of the most important findings of these studies is that the satisfaction people experience when using motorcycles as transport services is influenced by different factors. One is traffic accidents, it is long been known as an iceberg for comprehending the discrepancies of traffic management and entire transportation systems.(Ignatius Pulung Nurprasetyo, 2014) Second, motorcycle contribution to road accidents, there is another

phenomenon that exacerbates the traffic accident problem: the motorbike mode. Motorcycles are vulnerable road users and overrepresented in road accidents and fatalities in many countries. (DfT, 2015) One of the studies says that satisfaction people experience when using motorcycle as means of transport service is influenced by quality improvements specifically on safety issues. There are plenty of billion-dollar service companies that offer on-line booking application as their means in providing transport service (Angkas, 2016). It is generally accepted that the delivery of superior service quality in an industry is a vital tactic for success and business survival. (Ramseook-Munhurru, 2010)

2. Methodology

The methodological discussion of this research is to describe the approach applied to comply with the objectives of the research study. The study is focused on public transportation service specifically; Motorcycle Taxis that uses an on-line booking application. This research is using qualitative research as the base of methodological discussion. Qualitative research is designed to explore the human elements of a given topic, while specific qualitative methods examine how the customers see and experience the service quality of this Motorcycle Taxis via on-line booking application.

2.1 Questionnaire Design

Slovin's formula is used to calculate an appropriate sample size from a population. Statistics is a way of looking at a population's behavior by taking a sample. It is usually impossible to survey every member of a population because of money or time constraint. With the said constraints, the researchers will use Slovin's Formula to evaluate the appropriate sample size that will be considered in answering the research surveys.

$$n = \frac{N}{1 + Ne^2}$$

n = no. of samples

N = total population = 592, 602 e =

error margin / margin of error = 10%

**The researchers used 10% margin of error due to time constraints.*

The population that the researchers considered is the population of the 2nd highest city that is involved in road accidents, a central business district city and a city, which uses hailing applications the most; Makati City.

$$n = \frac{582,602}{1 + (582,602(0.10)^2)}$$
$$n = 99.98 \approx \mathbf{100}$$

Slovin's computed sample size is used by the researchers in conducting the following surveys:

- Service Quality Survey
- Quality Function Deployment
- Failure Modes and Effect Analysis

A total of 100 respondents answered the above surveys to collect data regarding the Motorcycle Taxis via on-line booking application.

2.2 Data Collection

A. Smartphone users in the Philippines

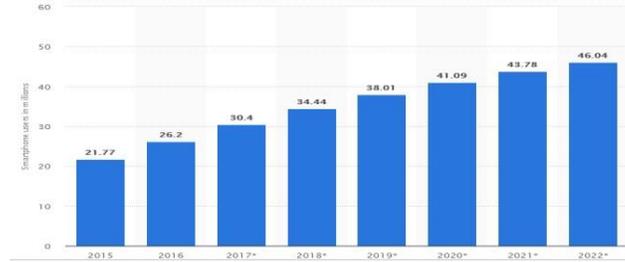


Figure 1. Smartphone users' growth in the Philippines

In a milestone for smartphone growth in the Philippines, the nation is now the third largest market for smartphones in Southeast Asia. Based on Figure 1 shows the number of smartphone users in the Philippines from 2015 to 2017 with forecasts for 2018 to 2022.

B. Benchmarking

Table 3: Companies with Motorcycle Taxis via on-line booking application comparison

INDICATOR GROUP	KPIs	UBER	GRAB	ANGKASPH	GOBOUNCE	KBIKE	RATINGS (1 lowest-3 highest)				
Company Background	Year Started	2016	2015	2016	2016	2017	0	0	0	0	0
	Countries being offered	Thailand, India	Philippines, Thailand, Vietnam, Indonesia & India	Philippines	Philippines	India	2	3	1	1	1
Service	Types of Motorcycle services offered	UberMoto	GrabBike	Angkas	GoBike	Kbike	0	0	0	0	0
	Operating hours	24 hours	24 hours	24 hours	24 hours	8am - 5pm	3	3	3	3	2
	Motorcycle capacity	1	1	1	1	1	0	0	0	0	0
Financial	Base fare (2km)	27.37	38.75	50.00	60.00	15.79	2	2	1	1	3
	Additional fare per excess base km	5.43	7.75	10.00	10.00	3.95	2	1	1	1	3
	Insurance amount covered	488243.00	927558.28	200000	200000	N/A	3	3	3	3	0
Safety gears	Helmet	YES	YES	YES	YES	YES	2	3	1	1	0
	Face mask	YES	YES	YES	YES	YES					
	Hair cap	YES	YES	YES	YES	N/A					
	Poncho	YES	YES	YES	YES	N/A	3	2	2	2	1
	Vest	YES	N/A	N/A	N/A	N/A					
	Kneepads	YES	N/A	N/A	N/A	N/A					
Environment	Motorcycle gas emission (CO2/km)	260	260	260	260	260	0	0	0	0	0
	Age model requirements	5 years below	5 years below	5 years below	5 years below	5 years below	0	0	0	0	0
							1.06	1.06	0.75	0.75	0.63

Table 4: Metrics for Benchmarking

METRIC RATINGS	1	2	3
Countries being offered	= , < 1	2 - 4	= , > 5
Operating Hours	1 - 8 hrs	9 - 16 hrs	17 - 24 hrs
Base Fare (php)	60.00 - 41.00	40.00 - 21.00	20.00 - 1.00
Additional fare per excess base km (php)	10.00 - 6.68	6.67 - 3.34	3.33 - 1.00
Insurance coverage	< 200,000.00	201,000.00 - 499,00.00	> 500,000.00
Basic safety gears requirements	1 - 2	3 - 4	5 - 6

In creating results on how to develop a better-quality service for the motorcycle taxi via online-booking app, the researchers conducted an analysis by benchmarking about online booking applications from all over the world. The researchers discovered the following online booking app like UberMoto, Grabbike, Angkas PH, Goride, Kbike. Uber is what sets apart as the largest company of booking application. They later added UberMoto, which serves in Thailand and Indiathat starts at 27.37 pesos for the first 2km and 5.43 in every kilometer added. Another online booking app is GrabBike that serves in various cities in Southeast Asia namely Bangkok, Nonthaburi, Pratumtani, SamutPrakan, Hanoi, Ho Chi Minh City and Jakarta. It starts at 38.75 pesos and 7.75 for every kilometer added. In the Philippines, AngkasPH is the most active motorcycle taxi app that serves in metro manila. The fare starts at 50 and 10 pesos for the succeeding kilometer. Another application in the Philippines is the GoBounce that only started last September 2016, it might not be as popular as the Angkas PH, but it will soon be recognized if commuters would support the motorcycle booking applications. Motorcycle taxi is also known for a long time in India, the On-line booking

application that is operating in the city of Rajarhat and Kolkata is the KBike. The price starts at 15.79 pesos and 3.95 for every additional kilometer.

Based on the metric ratings provided the motorcycle hailing application that received the highest ratings are UberMoto and GrabBIKE. Both UberMoto and GrabBIKE are close in terms of ratings, what made them best compared with other motorcycle taxis is their capacity in complying with the basic safety gear requirements even if their price is a bit higher compared with other motorcycle taxis. This is where we can observe that the presence of a complete safety gear really matters for customers.

C. Road Network System: Makati City

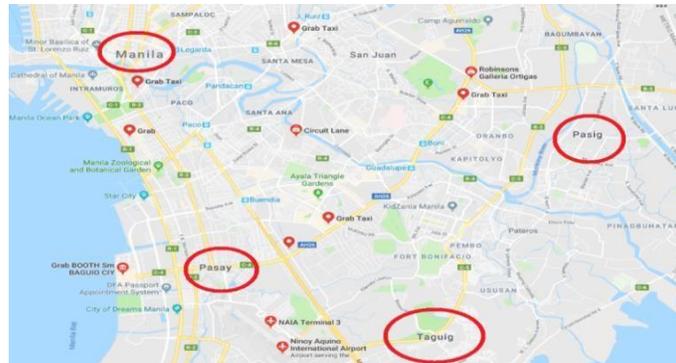


Figure 2. Road Map

The City road network is part of a system of circumferential and radial roads of Metro Manila. Traffic congestion within Makati is compounded by the fact that major expressways exist in north and south of Metro Manila, but they are not interconnected. As a result, north and south through traffic is fed to major roads that are at the same time the major gateways to Makati. These gateways are Roxas Boulevard, Osmeña Highway, EDSA, and C5. Among these roads, EDSA is the busiest with 170,000 vehicles per day along the stretch from Guadalupe Bridge to Sen. Gil Puyat Avenue. Next is C5 with 136,000 vehicles per day within the vicinity of Kalayaan Avenue and Fort Bonifacio. Osmeña Highway has 115,000 vehicles per day within the Don Bosco area, while Roxas Boulevard has 75,000 vehicles per day within the segment south of Sen. Gil Puyat Avenue. Based on 2011 estimates, Makati generates 594,872 vehicle trips daily equivalent to about 13% of the 4.5 million Metro Manila vehicle trips.

3. Results

A. Result of Time Study

The researchers conducted a time study on how much time difference does riding a GrabCar versus Angkas takes. Considering Ayala Triangle Makati as the starting point, the researchers considered the five cities surrounding Makati City, namely: Manila, Pasay, Taguig, Pasig, Mandaluyong.

For Manila, the researchers picked Manila City hall as the location, for Pasig; Eastwood Mall, for Pasay; Mall of Asia, lastly for Taguig the researchers picked the Venice Grand Canal Mall. Unfortunately, Mandaluyong was under the constraint of “no riding in tandem law”. According to Ordinance No. 550, S-2014 only first-degree relatives and children up to 10 years old are exempt from the “no back-rider” policy. Those who will be caught violating the policy will be fined P1,000 for the first offense, P2,000 for the second, and either a P,3000 fine or a 3-month jail term (or both) for the third – depending on court’s ruling. For this reason, the researchers only conducted time study on four cities; Manila (City hall), Pasay (Mall of Asia), Pasig (Eastwood Mall), and Taguig (Venice Grand Canal Mall).

B. Service Quality Survey

Looking at the results of the service quality survey answered by 100 respondents of motorcycle taxi via on-line booking application users, the researchers found out the reasons and factors on why there are existing unsatisfied customers of the motorcycle hailing applications.

Table 5: Service Quality Survey Result

		PERCEIVED	RECEIVED	
TANGIBLES	1	5.74	5.47	-0.27
	2	5.39	5.15	-0.24
	3	6.22	5.32	-0.9
	4	6.74	4.96	-1.78
RELIABILITY	1	6.32	5.39	-0.93
	2	6.43	5.27	-1.16
	3	6.69	5.2	-1.49
	4	6.58	5.15	-1.43
	5	6.55	5.03	-1.52
	6	6.62	6.7	0.08
RESPONSIVENESS	1	6.07	6.09	0.02
	2	6.15	6.29	0.14
	3	6.18	6.19	0.01
	4	5.95	6.72	0.77
	5	6.08	6.3	0.22
ASSURANCE	1	6.44	5.58	-0.86
	2	6.68	5.39	-1.29
	3	6.03	6.05	0.02
	4	6.61	5.28	-1.33
EMPATHY	1	6.12	6.16	0.04
	2	6.23	6.31	0.08
	3	6.35	6.51	0.16
	4	6.15	6.23	0.08
	5	6.69	6.32	-0.37

C. Failure Modes and Effect Analysis

Based on the survey conducted, the researchers identified the potential failure points and the highest contributor within the process of service delivery. These potential failure modes that happened in the process of completing the service give customers unsatisfactory experience. Thus, considering these points will be able to figure out the reoccurring failure points that can be decreased or eliminated to increase the level of service quality.

Table 6: Failure Modes and Effect Analysis

POTENTIAL FAILURE MODES	POTENTIAL CAUSES/MECHANISM(S) OF FAILURE	POTENTIAL EFFECT	SEVERITY	OCCURRENCE	DETECTION	RISK PRIORITY NUMBER	Recommended Actions
RIDE BOOKING							
Requests ride	Long waiting time	Cancellation of booking	8.59	8.11	4.49	312.80	Increase in rider and motorcycle rate
Input pickup and drop off location	Wrong input of location	Inaccurate pickup and destination	8.2	7.03	6.02	347.03	Maintain updated and precised maps
Accepts booking request	Long waiting time	Cancellation of booking	8.87	8.19	7.69	558.64	Increase in rider and motorcycle rate
Tracks motorcycle location status	GPS difficulty	Inaccurate pickup and destination	5.98	6.97	5.28	220.07	Maintain updated and precised maps
RIDE PROPER							
Driver's arrival	Long waiting time	Cancellation of booking	8.59	8.7	6.31	471.57	Increase in rider and motorcycle rate
Checks driver's and motorcycle's info	Information do not matched	Cancellation of booking	7.72	2.11	5.27	85.84	Strict implementation on employment application
Greets customer	Fails in interpersonal skills	Low service rating	8.46	6.41	4.31	233.73	Trainings and activities for drivers' interpersonal improvements
Provides safety gears and instructions	Fails in providing complete set and instructions	Unease customer/ High risk in safety	9.2	8.2	8.56	645.77	Additional PPE for safety
Travel experience	Reckless driving	High risk in safety/ Customer complaints	8.44	7.89	7.03	468.14	Additional PPE for safety
END RIDE							
Payment process (cash)	Lack of coins/money for customers' change	Adds waiting time/ Unsatisfied customer	8.15	7.06	6.7	385.51	Provide at least once a month seminar and collaboration with employees
Payment process (credit)	Conflict with customers' credit information	Adds waiting time/ Unsatisfied customer	7.26	5.67	3.43	141.19	Mandatory check credit line system

D. Result of Quality Function Deployment

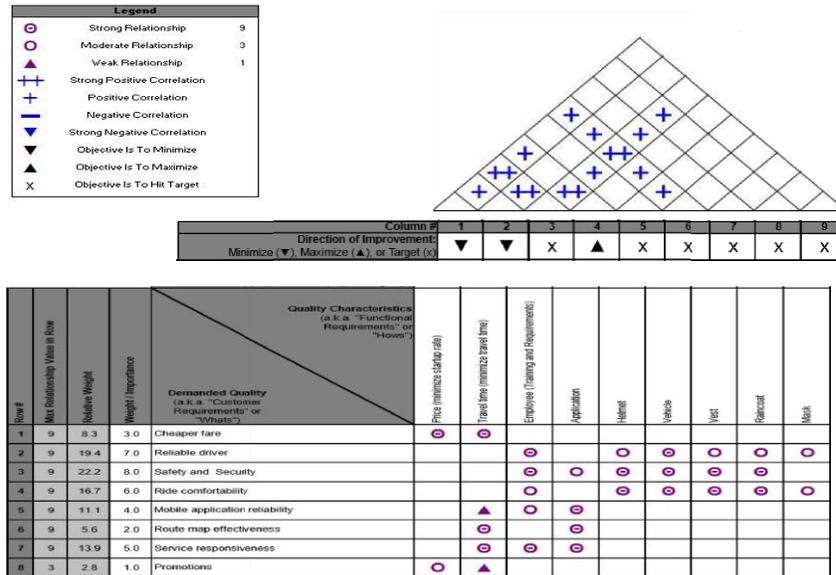


Figure 3: Quality Function Deployment

To be more quantified in getting the customer satisfaction of a motorcycle taxi service, the researchers created a house of quality to relate each demanded quality and functional requirements. All of the customer requirements as well as its rankings are based on a survey. The correlation variable comes from the researchers' own idea of what is connected to each characteristic and what is not. Quality characteristics are the general terms that are visible to the online booking of motorcycle taxi, which has its direction of improvement.

4. Discussion

A. Time Study Result

Based on the gathered data of the time study conducted, it is evident that using motorcycle hailing applications travel faster than car hailing applications. During the time trial the researchers observed that the biggest factor on why motorcycles travel faster is their ability of being a 2wheeled vehicle, which allows them to take shortcuts and cut through lines. The said factor can neither be positive nor negative for a customer. Arriving on time or earlier than the required time is what make a customer satisfied but also risking the safety of cutting through lines and traffic congestion gives a low satisfaction rate to customers.

B. Service Quality Survey

In a transportation industry, the target population is the passengers. A motorcycle taxi has always connected on the safety issue. (Fukuda 2007). Safety issues are about the equipment provided as well as the training methods for drivers. In an application, the design, application management, integrated security, the data capacity that it consumes when used and connection capabilities are one of the technical features required (McGarvey 2014). Based on Table 3.1 Tangibles category that got the highest number of negatives out of the others, T4 received the highest negative value of -1.78, which states that Materials (helmet, face mask etc) are in good and hygienic condition. Followed by T3, Riders are neat and presentable in appearance with a value of -0.9. Next is, T1: Excellent transportation services have modern looking equipment with -0.27 and lastly T2, which describes how physical equipment is visually appealing. For the Reliability, R5 received the highest negative value of -1.53, which states that Performed and delivered service right at the first time. Followed by R3 that says when a customer has a problem the driver shows sincere interest in solving it that got a value of -1.49, which also affects T4 and T2 that involves the sincere interest of the company in solving the problem and doing what is promised by the company. Lastly T1, which says that when a driver promised to do something by a certain time, they do get a value of -0.93. For the Assurance, A4 got the

highest negative value of -1.33, which states that riders are knowledgeable to answer customer questions regarding the whole service delivery. Second, A2 that received -1.29, which describes how customers feel safe within the course of service and lastly A1 with -0.86 that states how the delivered service instills confidence to customers in terms of how they felt safe. For the last category, which is Empathy, only E5 received a negative value that states on how Motorcycle hailing applications understand the specific need of customers.

C. Failure Modes and Effect Analysis

Table 7: Ranking Summary of Failure Modes and Effect Analysis

RANK	RISK PRIORITY NUMBER	POTENTIAL FAILURE MODE	POTENTIAL CAUSES/MECHANISM(S) OF FAILURE	POTENTIAL EFFECT
1	645.77	Provides safety gears and instructions	Fails in providing complete set and instructions	Unease customer/ High risk in safety
2	558.64	Accepts booking request	Long waiting time	Cancellation of booking
3	471.57	Driver's arrival	Long waiting time	Cancellation of booking
4	468.14	Travel experience	Reckless driving	High risk in safety/ Customer complaints
5	385.51	Payment process (cash)	Lack of coins/money for customers' change	Adds waiting time/ Unsatisfied customer
6	347.03	Input pickup and drop off location	Wrong input of location	Inaccurate pickup and destination
7	312.8	Requests ride	Long waiting time	Cancellation of booking
8	233.73	Greets customer	Fails in interpersonal skills	Low service rating
9	220.07	Tracks motorcycle location status	GPS difficulty	Inaccurate pickup and destination
10	141.19	Payment process (credit)	Conflict with customers' credit information	Adds waiting time/ Unsatisfied customer
11	85.84	Checks driver's and motorcycle's info	Information do not matched	Cancellation of booking

Table 7 is all about the failure modes that are in need of an alternative on how to be eliminated or decreased to increase the satisfaction rate of customers. These risks involve either long waiting time or instill low safety confidence to the customers. The highest risk priority number that got a value of 645.77 is the service delivery process where in safety gears and safety instructions were provided to the customers. As the researchers interviewed random respondents of the survey, the respondents mentioned that they had an experience where the drivers are not capable of providing them a shower cap or even a raincoat. There are also claims that some rides use only brain-bucket helmets where in only the skull or top-head part is protected. The next category that got the 2nd and 3rd highest value are confirmation of booking request and driver's arrival time, which got 558.64 and 471.57 respectively.

D. Quality Function Deployment

Results show that employee has the bigger weight with relation to the reliable driver, safety and security, ride comfortability and service responsiveness. Followed by vehicle, which should be at least 5 years old and below to avoid accidents during working time. There are three characteristics in a tie spot, helmet, vest, raincoat that needs to be provided on a daily basis. The modular helmet must be the protective head gear, reflective vest for visibility especially during the evening and a poncho raincoat for rainy days. These customer "what's" mostly defines a motorcycle taxi service quality.

E. Cost Benefit Analysis

Nearly every business decision requires a cost-benefit analysis. Such an analysis can point out the risks and rewards of decisions or actions. The researchers used cost-benefit analysis in order to evaluate the risks and rewards of projects under consideration. The researchers used a conservative approach with a conscious effort to avoid any subjective tendencies when assigning value to both costs and benefits for the purpose of a cost-benefit analysis. During the second year, it is evident that a total benefit of 4,374,387.90php is incurred while for the following year there is a total 94,103,048.54php. The researchers may conclude that even if the costs incurred increases per year the benefit will increase as well.

Table 8: Cost Benefit Analysis Table

NON-RECURRING COSTS		YEAR 0	YEAR 1	YEAR 2	YEAR 3
Motorcycle Taxis Booth	Infrastructure (12 sqm)	160000.00	0.00	0.00	0.00
	Telecommunication Equipment	56000.00	0.00	0.00	0.00
	Furniture and Fixtures	12000.00	0.00	0.00	0.00
	Labor	18000.00	0.00	0.00	0.00
C2X Program	C2X Software	11818.50	0.00	0.00	0.00
PPE Standardization	Modular-typed helmet	4800000.00	0.00	0.00	0.00
	Motorcycle reflective sticker	4000000.00	0.00	0.00	0.00
	Airbag jacket	60000000.00	0.00	0.00	0.00
TOTAL NON-RECURRING COSTS		65457818.50	0.00	0.00	0.00
RECURRING COSTS		YEAR 0	YEAR 1	YEAR 2	YEAR 3
Motorcycle Taxis Booth	Office booth Leases (rent: 3500/sqm/mo)	4032000.00	4435200.00	4878720.00	5366592.00
	Help Desk Labor (booth)	2042560.00	2246816.00	2471497.60	2718647.36
C2X Program	Software Maintenance and Upgrades	12000000.00	13200000.00	14520000.00	15972000.00
PPE Standardization	PPE Maintenance and Check up	16000000.00	17600000.00	19360000.00	21296000.00
Training Programs	Safety and Security Training Program	3150000.00	3465000.00	3811500.00	4192650.00
	Health and Hygiene Training Program	3150000.00	3465000.00	3811500.00	4192650.00
Insurance	Insurance Cost	36000000	36000000	36000000	36000000
TOTAL RECURRING COSTS		76374560.00	80412016.00	84853217.60	89738539.36
BENEFITS		YEAR 0	YEAR 1	YEAR 2	YEAR 3
Revenue (2000 riders with average trip: 10/day)		0.00	93600000.00	102960000.00	113256000.00
Accident Cost Avoidance (max 200000/customer)		0.00	36000000.00	39600000.00	43560000.00
Reduced Ride Turnover Cost		0.00	18720000.00	20592000.00	22651200.00
TOTAL BENEFITS:		0.00	148320000.00	163152000.00	179467200.00
COST BENEFIT SUMMARY					
YEAR 0	YEAR 1	YEAR 2	YEAR 3		
-141832378.50	-73924394.50	4374387.90	94103048.54		

5. Conclusion

The findings have shown the relationship with the in-demand motorcycle hailing applications in our society today. Among the significant variables is how our existing road traffic affects the behavior of drivers, which may lead to road accidents resulting to low satisfaction rate for motorcycle hailing applications due to risking the safety and security of customers. One of the main reasons of motorcycle accidents was traffic congestion. Mixed traffic between trucks and cars in a same road is what causes a heavy traffic. Motorcycle riders would then go between vehicles to avoid being stuck in a lane. Road traffic is in addition to the energy sector and the industry one main source of air pollution and carbon dioxide emissions. Although most countries and manufacturers agreed to environmental regulations to reduce the pollutant emissions, particularly in urban areas with high traffic density, the impact of road traffic emissions on the environment and human health has been growing in importance steadily. Motorcycles show potential as a more sustainable mode of transport than cars in that they utilize less space and fuel and emit fewer harmful emissions. Motorcycles show potential as a more sustainable mode of transport than cars in that they utilize less space and fuel and emit fewer harmful emissions. From this perspective, it is tempting to promote motorcycles as a substitution for car trips, with the aim to improve the sustainability of the system.

Based on the results, it is evident that using motorcycle hailing applications travel faster and cheaper than using car hailing applications. The researchers gathered time data showed the time travel difference between travelling with the use of motorcycle versus car. After looking at the road traffic factor that affects the travel time, the researchers now gathered data on how customers rate the service quality of the said motorcycle hailing applications. The researchers used the RATER survey to be more specific and precise on what identifying what category needs alternatives and improvements. The result showed negative values on Tangible, Reliability, Assurance and one factor with Empathy. With the said results and the will of researchers in improving the service quality of motorcycle hailing applications, here are the alternatives and improvements that should be considered by motorcycle hailing application companies.

With the overall findings, the researchers may conclude that decreasing the existing road traffic rates will also decrease the road accident rates. One of the factors of decreasing road traffic is decreasing the number of private vehicles and the use of 4-wheeled vehicles, wherein the significance of patronizing motorcycle hailing applications with best service quality will be very viable among every citizen. Establishment of a motorized lifestyle provides convenience and allows cheaper accommodation and decreased in travelling time (Knoflachner, 2013).

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