T.C.
ISTANBUL SABAHATTİN ZAIM UNIVERSITY
GRADUATE EDUCATION INSTITUTE
URBANISM AND URBAN TRANSFORMATION

EMERGENCE OF TRANSPORTATION NETWORK COMPANIES: AN ANALYSIS OF URBAN MOBILITY, REGULATION AND FUTURE ROLE IN URBAN MOBILITY ECOSYSTEM

DOCTORAL THESIS

Kaan YILDIZGÖZ

İstanbul
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Prof. Dr. Hüseyin Murat ÇELİK

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THESIS APPROVAL

This study has been approved in fulfilment of the requirements for Ph.D. Degree in Urbanism and Urban Transformation Doctoral Programme

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DECLARATION OF SCIENTIFIC ETHICS AND ORIGINALITY

Hereby I declare that I have complied with scientific ethics and academic rules in the process from the beginning to the end of my doctoral study, which I have prepared as a doctoral thesis under the name, "**Emergence of Transportation Network Companies: An Analysis of Urban Mobility, Regulation and Future Role in Urban Mobility Ecosystem**", and that I have obtained all the information in this thesis within the framework of scientific ethics. I also declare that I have prepared my thesis in accordance with the thesis writing rules, that I have indicated the source of the citations which I have made in this study, that I have not listed any sources, which I have not cited, in the references section, and that all the sources I have benefited from are the ones specified in the references section.

Kaan YILDIZGÖZ

PREFACE

I would like to express my deepest gratitude to my thesis supervisor, Prof. Dr. Hüseyin Murat Çelik for his invaluable support and cooperation throughout my research. I also wish to extend my special thanks to Prof. Dr. Ahmet Korhan Binark and Prof. Dr. Adem Esen. I am also indebted to the UITP Experts, Lidia Signor and Jaspal Singh for their precious support during the literature review. I would like to thank the UITP and İstanbul Metropolitan Municipality for their help and cooperation during my research. A special thanks to Abdulla Sultan Al Sabbagh, Yousif Al Ali, Tony Heng, Joe Ma, Alpay Kılıçkaya, and Siti Faradillah for their time and participation in the face-to-face interviews.

Kaan Yıldızgöz

Istanbul-2022

ABSTRACT

EMERGENCE OF TRANSPORTATION NETWORK COMPANIES: AN ANALYSIS OF URBAN MOBILITY, REGULATION AND FUTURE ROLE IN URBAN MOBILITY ECOSYSTEM

Kaan YILDIZGÖZ

Doctoral Thesis

Supervisor: Prof. Dr. Hüseyin Murat ÇELİK

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The taxi, be it individual or shared, is an essential element of the multimodal urban transport system. It is a kind of chameleon mode taking different forms according to the environment and context it operates. Having emerged in the last ten years and spread rapidly all over the world, the TNCs has had a serious impact on mobility, causing a great change in the taxi industry. This transformation has also led to certain changes in legal and organizational structures, business models, and business forms in many countries.

Within the scope of that doctoral thesis, an analysis of the current situation of taxi transportation for İstanbul was conducted together with the taxi users survey in İstanbul and the Mobility as a Service readiness assessment. For the purpose of this study, a survey was conducted for the transportation authorities from different regions of the world in order to evaluate the current approaches towards the TNCs and their results. This survey was accompanied with in-depth interviews with top level executives of traditional taxi operators and focus group meetings.

This thesis has aimed to develop relevant recommendations that can be used by both the transportation authorities of different cities on a global scale and the traditional taxi companies, as well as specific recommendations for the case in the city of İstanbul. It includes further recommendations for a regulatory approach towards the TNCs and specific recommendations for the traditional taxi industry to be followed in the aftermath of the introduction of the TNCs so that they can be used by authorities and

taxi operators in any part of the world. Finally, it includes a detailed a taxi reform proposal for İstanbul with a list of actions in various areas.

Keywords: shared mobility, regulation, taxi, technology, transportation network companies.

ÖZET

YOLCULUK SATIŞ UYGULAMARININ GELİŞİMİ: KENT İÇİ ULAŞIM, YASAL YAPI VE GELECEK ULAŞIM EKOSİSTEMİNDEKİ YERİ AÇISINDAN İNCELENMESİ

Kaan YILDIZGÖZ

Doktora, Şehircilik ve Kentsel Dönüşüm

Tez Danışmanı: Prof. Dr. Hüseyin Murat ÇELİK

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İster bireysel ister paylaşımlı olsun, taksiler çok modlu kent içi ulaşım sisteminin temel bir unsurudur. Faaliyet gösterdiği ortama ve bağlama göre farklı biçimler alan bir tür bukalemun olarak da düşünülebilmektedir. Son on yılda ortaya çıkan ve hızla tüm dünyaya yayılan Yolculuk Satış Uygulamaları (TNC'ler) ise ulaşım üzerinde ciddi bir etki yaratarak taksi sektöründe belirgin bir değişime neden olmuştur. Bu dönüşüm aynı zamanda birçok ülkede yasal ve kurumsal yapılarda, iş modellerinde ve iş biçimlerinde de kayda değer değişikliklere yol açmıştır.

Bu doktora tezi kapsamında, İstanbul'daki taksi kullanıcıları anketi ve MaaS hazırdurumdalık değerlendirmesi ile birlikte İstanbul'da taksi ulaşımının mevcut durumunun analizi yapılmıştır. Bu çalışmanın amacı doğrultusunda, TNC'lere yönelik mevcut yaklaşımları ve bunların sonuçlarını değerlendirmek üzere dünyanın farklı bölgelerinden ulaşım idarelerine yönelik bir anket gerçekleştirilmiştir. Bu ankete, geleneksel taksi işletmecilerinin üst düzey yöneticileriyle yapılan derinlemesine görüşmeler ve odak grup toplantıları eşlik etmiştir.

Bu tez, hem küresel ölçekte farklı kentlerin ulaşım idareleri hem de geleneksel taksi şirketleri tarafından kullanılabilecek ilgili önerilerin yanı sıra İstanbul kentindeki duruma özel de öneriler geliştirmeyi amaçlamıştır. Ayrıca bu tez, TNC'lere ilişkin düzenleyici bir yaklaşıma yönelik tavsiyeleri ve dünyanın herhangi bir yerinde faaliyet gösteren yetkililer ve taksi operatörleri tarafından kullanılabilecek TNC'lerin tanıtılmasından sonra izlenecek geleneksel taksi endüstrisine özel önerileri içermektedir. Son olarak bu tez, çeşitli alanlarda yürütülebilecek birtakım faaliyetler ile İstanbul kenti için ayrıntılı bir taksi reformu önerisi sunmaktadır.

Anahtar Kelimeler: taksi, yolculuk satış uygulamaları, paylaşımlı ulaşım, regülasyon, teknoloji.

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LIST OF ABBREVIATIONS

CAN:	Canadian Dollar
CEN:	European Committee for Standardization
DH:	Dirham
EU:	European Union
HGS:	Fast Pass System
IATR:	International Association of Transportation Regulators
ICT:	Information and Communications Technology
ISO:	International Organization for Standardization
JMD:	Jamaican Dollar
LTA:	Land Transport Authority (in Singapore)
MaaS:	Mobility as a Service – Integrated Transportation Platform
OGS:	Automatic Toll Collection System
RMB:	Renminbi
RTA:	Roads and Transport Authority (in Dubai)
SGD:	Singapore Dollar
SPAD	Suruhanjaya Pengangkutan Awam Darat
SPS:	Small Passenger Services Guide
TCDD:	Turkish State Railways
TfL:	Transport for London
TNCs:	Transportation Network Companies
TransAD:	Abu Dabi Taxi Transport Regulation Centre
TUHİM:	Directorate of Public Transport Services
UITP:	International Association of Public Transport
İBB:	İstanbul Metropolitan Municipality

İETT: Directorate General of İstanbul Electric Tram and Tunnel Enterprises

ÖHO: Privately Owned Buss

CHAPTER I

INTRODUCTION

The role of taxis in urban transportation is growing in importance day by day. Not only the opportunities and possibilities offered by urban transportation for taxis, but also the global developments indicate that the role of taxis in urban transportation should be well reviewed. With digitalization, one of the biggest transformations and changes in urban transportation is undoubtedly witnessed in the taxi industry, and it would not be wrong to say that this will gradually continue to do so. It is, therefore, of great importance for the taxi industry to keep up with this transformation so as to be able to turn it into an opportunity.

With digitalization, it is possible to encounter many opportunities to increase efficiency, improve quality, reduce costs, create new income sources, enhance customer experience, and ensure customer loyalty. Digitalization is the main factor leading to the development and emergence of new services, actors and business models in taxi transportation. “Transportation Network Companies (TNCs)” can be considered the most controversial actor in the process of transformation in taxi transportation. Having emerged in the last ten years and spread rapidly all over the world, the TNCs have had a serious impact on urban transportation, causing a great change in the taxi industry. This transformation has also led to certain changes in legal and organizational structures, business models, and business forms in many countries. In this respect, many experts in the industry describe such a change as a “revolution”.

In addition to the TNCs, developments in shared mobility, mobility-as-a-service (MaaS), and autonomous mobility axis have also shown a great impact on the taxi industry. Such concepts have not only become the most controversial topics in urban transportation today, but also driven decision makers to work on in many leading cities of the world. In Turkey, taxi transportation has been discussed much more in the urban context, especially since 2017. In this sense, the fact that the Uber platform, the world’s most well-known transport network company, started to operate in İstanbul, albeit limited, has caused the society and media to show intense interest in the issue, besides

municipalities and operators. Likewise, coronavirus disease, which has been spreading rapidly around the world since the beginning of 2020, and turned into a pandemic, has also influenced taxi transportation in many aspects.

This thesis was written exactly at the time when such debates were most intense. In the first stages of this thesis, many discussions arose about the operation of Uber in İstanbul, while in the finalization stage, there were different discussions about increasing the number of taxis in İstanbul.

In the literature review, the role of taxi transportation in urban transportation, as well as taxi types, legal and organizational structure of taxi transportation, methods for calculating the ideal number of taxis in cities, taxi fare policies, fare structure and levels, costs, taxi drivers and vehicles, and taxi transportation service quality management were all analysed with different examples taken from all over the world. The literature review actually focused on the latest developments related to taxi transportation such as shared mobility, mobility-as-a service (MaaS), and autonomous mobility, which are also known as new mobility services, and finally the TNCs, which have recently been on the agenda of the taxi transportation industry.

Based on the literature review, an analysis of the current situation of taxi transportation for İstanbul was conducted within the scope of research questions. From this standpoint, the current situation was defined with reference to the management structure for taxi transportation in İstanbul, restricted license plate application, pricing system, drivers and vehicles, taxi stands, mobile applications, and service quality. The results of the taxi users survey in İstanbul were analyzed and evaluated. Moreover, MaaS readiness assessment and analysis was made to determine the MaaS readiness in İstanbul.

For the purpose of this study, a survey was conducted involving 20 cities around the world in order to evaluate the current approaches towards the TNCs and their results. The results of the survey revealed enlightening information about how the TNC regulation should be done. Another research study carried out within the scope of the thesis was in-depth interviews with top managers of traditional taxi operators from different parts of the world. The interviews, on the other hand, contributed to the choice of future strategy for the taxi industry. The last component within the scope of the research was the focus group meetings. The discussions held at those meetings

turned out to contribute both to the development of proposals for the regulation and policy approaches of the relevant authorities, and to traditional taxi operators in order for them to be able to develop strategies from the start of the TNCs onwards.

Finally, this thesis has aimed to develop relevant recommendations that can be used by both the transportation authorities of different cities on a global scale and the traditional taxi companies, as well as specific recommendations for the case in İstanbul. Also, the regulation approach model and basic principles to be adopted by transportation authorities have been identified upon the emergence of transportation network companies. In addition, the main elements that should be included in the TNC regulation have been specified. The recommendations developed within the scope of this thesis are presented as a strategy proposal that can be valid not only for transportation authorities, but also for all taxi companies around the world. Finally, a detailed and comprehensive reform proposal for taxi transportation in İstanbul is included in this thesis about legal and organizational structure, fare management, supply and product structure, taxi drivers and vehicles, booking and TNCs, service quality and integration.

CHAPTER II

LITERATURE REVIEW

2.1 Taxi Transportation and Its Various Forms in Urban Transportation

Taxis are an important component of urban transportation, providing door-to-door transportation. They operate on demand-based, that is, without any predetermined routes and timetables. They are transportation services that are accessible to all, but are usually used individually or as a private group. Taxi transportation is an important part of multimodal transport for cities. In this respect, the integration of taxi transportation with public transport is of particular importance. Taxis can be called from or stopped by a passenger at certain taxi stands, on the street, or by using tools such as a call center/mobile application. Taxi vehicles, depending on the legal regulations of the countries, can usually accommodate 3-8 passengers other than the driver.

The fact that public transportation does not provide any door-to-door transportation at all increases the importance of taxis even more. Integrated and well-planned taxi transportation system can be a good match for public transportation so that last mile services can be well offered. Considering that high-capacity public transportation systems are generally concentrated in city centres, the importance of taxis increases in regions outside the city centre where demand is not intense. Taxis also play a critical role in meeting the transportation needs of tourists while they are travelling around a city. It is believed that a serious competition exists between taxi transportation and public transportation in many cities with the increase in the share of taxi transportation causing the share of public transportation modes to decline. However, the Mobility in Cities Database conducted by UITP reveals that the public transportation supply does not decrease as the taxi supply increases in a number of cities (UITP, 2016). Figure 2.1 below shows the comparison of public transportation and taxi supply in various cities that explains public transport market share is not decreasing when taxi supply is increasing.

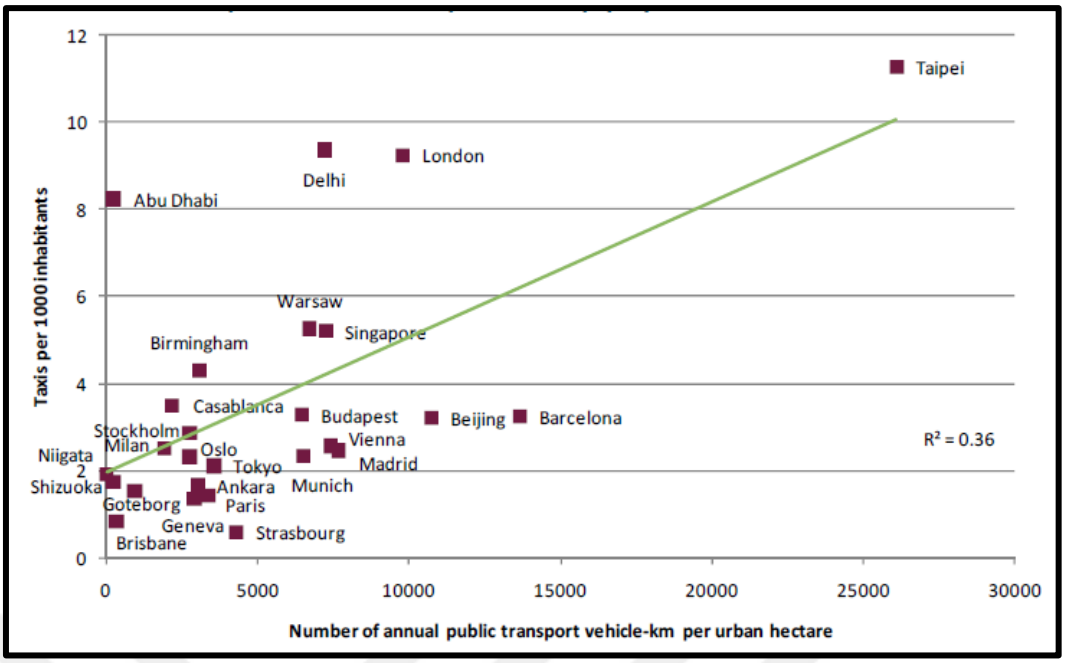


Figure 2.1: **Comparison of Public Transportation and Taxi Supply in Various Cities**

Source: UITP, 2016

There is no difference between driving on land or on the sea for a vehicle to meet the taxi criteria. As an example, in cities such as İstanbul, New York, London, and Hong Kong, sea vehicles that use the sea as a road undertake the duty of taxis.

Picture 2.1: A Sea Taxi in İstanbul

Source: RaillyNews, 2021

Similarly, taxi vehicles can also be 3-wheeled. For example, in South Asian countries such as India and Thailand, Tuk-Tuks have been offering taxi services for many years.

Picture 2.2: **Three-Wheeled Tuk-Tuk Taxis in Bangkok**
Source: Dauby, 2013

Despite being few in number nowadays, rickshaws that work with human power in India, or pedicabs frequently seen in many tourist attractions can also be considered as taxis. Today, especially in South Asian countries, motorcycle taxis are gaining great prevalence. Motorcycles are generally common in urban transportation in these countries, where they are also used for the purpose of taxi transportation. In this case, even though limited passenger capacity and system safety problems arise, the speed and affordable fees attract the customers. This system is currently being implemented in some European countries by developing system security measures as much as possible.

Picture 2.3: **Three-wheeled Taxis in Johannesburg**

Source: Personal Archive

2.2 Organizational and Legal Structure in Taxi Transportation

The issue of legal structure regarding taxi transportation seems to be dealt with on the basis of completely different models encountered in various cities of the world. In this respect, it is possible to divide the legal structure models basically into two (Yıldızgöz, 2013):

- **Deregulated Market:** Taxi transportation in this kind of market structure was left to the free market initiative. In this model, public authorities play a very limited role. In many sectors, when a normal workplace is opened, the case that public administrations do not impose restrictions or limits in areas such as the number of workplaces, price, etc. is also valid for taxi transportation.
- **Regulated Market:** Taxi transportation is considered important in the public interest and cannot be left to the initiative of the market. Public authorities play a major role in areas such as planning, control, and regulation.

Apart from these two main legal structure models, many hybrid models are also implemented. These models may show similarity to the deregulated model in some areas and to the regulated model in others. It seems necessary to examine which elements can be regulated by the legal structure. There are 3 basic elements that can be regulated by the legal structure in taxi transportation: (Yıldızgöz, 2013)

- Pricing
- Quantity
- Quality

While various legal arrangements have already been made for these three elements in a number of cities around the world, no relevant regulations exist in some countries. We can cite the Scandinavian countries as an example (European Commission, 2016). In some cities, on the other hand, there are legal regulations for only some of these three elements. As an example, in Singapore, while taxi supply and prices are deregulated, that is, left to the free market initiative, there is still a serious legal regulation and authoritative control in the field of quality (Teo, 2016). The issues of at what level this legal structure is followed by which institutions can be seen in the context of different practices in a variety of cities. In this sense:

- Country, state, regional administrations,
- Taxi commissions,
- Customer relations departments,
- Police departments,
- Transportation authorities,
- Ministries

may be responsible for complying with the legal structure in taxi transportation.

Picture 2.4: Yellow Taxicabs in New York

Source: The Verge, 2016

In New York, for example, the NYC Taxi and Limousine Commission, established in 1971, is responsible for licensing and regulating the taxis, as an agency of the New York City government. There are 50,000 vehicles and approximately 100,000 drivers under the responsibility of the Commission (New York Taxi Commission, 2017).

Furthermore, TransAD is a dedicated authority for taxi transportation in Abu Dhabi, United Arab Emirates. In London, on the other hand, Transport for London is a local government body, which is responsible for most of the transport throughout the city.

Within the framework of taxi transportation, there is no uniform service and license type in other countries of the world, as is the case in Turkey. There are different "chauffeur-driven car hire" services in different cities in conformity with legal regulations. This categorization can be differentiated according to criteria such as reservation type, vehicle type, service level, price, etc. Figure 2.2 shows different types of taxi licenses used in different countries.

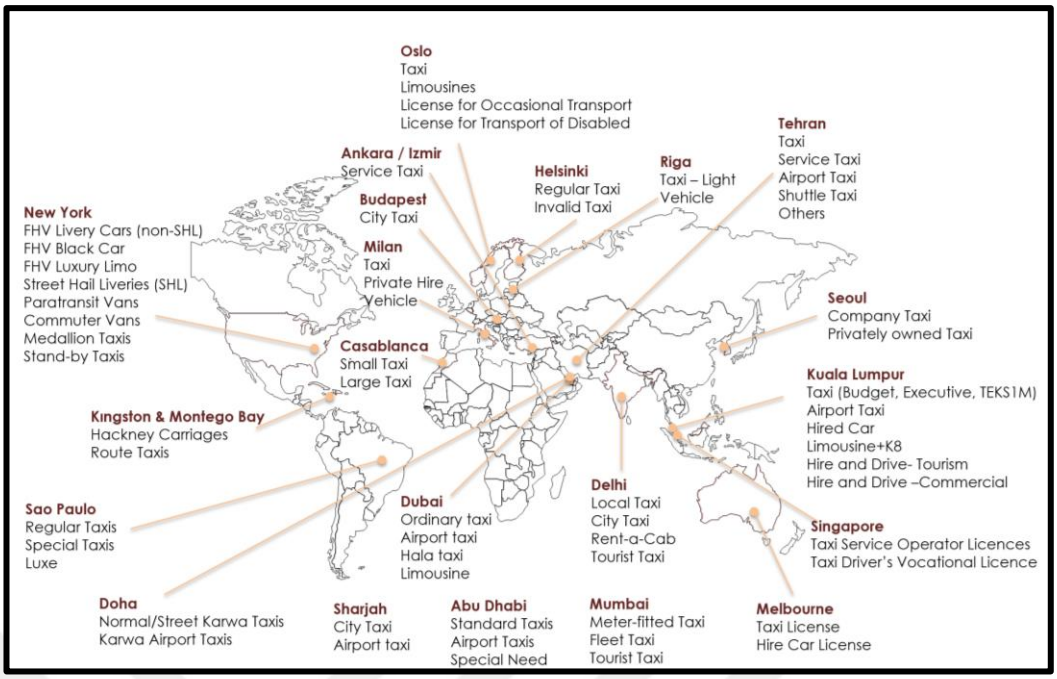


Figure 2.2: Types of Taxi Licenses

Source: UITP, 2015

One of the major factors to consider while examining the types of taxi licenses is the taxi license period. In some cities, the licenses are valid for an indefinite period, while in others, these licenses are given for a certain period of time. Currently, the main trend around the world is to issue these licenses for a fixed period of time, and to convert the old indefinite licenses to term licensing as much as possible.

Another matter of differentiation is related to whether the transport operation is carried out by individually owned taxis or taxi companies. Currently, serious studies are being carried out to corporatize the individual taxi business in many cities around the world.

Table 2.1 below shows the validity period for individually owned taxi licenses in different cities around the world, whereas Table 2.2 presents the durations of operation agreements made with taxi companies.

Table 2.1: Duration of Licenses for Individually Owned Taxis

City	Duration
Ankara	Indefinite
İstanbul	Indefinite
Helsinki	Indefinite
İzmir	Indefinite
Kingston & Montego Bay	1 year
Kuala Lumpur	7 years
Melbourne	1 year
Milan	Indefinite
Oslo	6 years
Sao Paulo	1 year
Seoul	Indefinite

Source: UITP, 2015

Table 2.2: Taxi Operation Contract Periods Signed Between Taxi Operating Companies and Authorities

City	Duration
Abu Dhabi	5 years
Delhi	5 years
Doha	5 years
Dubai	3 years
Mumbai	5 years
Sharjah	3 years

Source: UITP, 2015

Table 2.3 below shows the numbers and names of operators, and the number of taxis operating in different cities where companies function as operators. As can be seen in the table below, some taxi operators actively function in more than one city/country.

Table 2.3: Taxi Operators in Different Cities and Number of Taxis They Operate

City	Taxi Operators and Number of Taxis
Budapest	6*6 (423) / City (811) / FŐTAXI (1091) / Max (160) / Mb Elite (91) / RT5 (500) / T2000 (261) / Taxi4 (310) / Taxi Plus (470) / Tele5 (136)
Kuala Lumpur	Uptownace (M) SDN BHD (2,588) / Public Cab SDN BHD (1,299) / Innovasi Timur SDN BHD (852) / Destination Transport (M) SDN BHD (747) / Konsortium, Teksi Bandar Kuala Lumpur SDN BHD (703)
Sharjah	Sharjah Taxi (1178) / Emirates Cab (1200) / Union Taxi (1187) / Citi Taxi (1146)
Mumbai	Meru Cabs (2,100) / TABcab (2,000) / Mega Cabs (800) / Easy Cabs (300) / Mumbai Gold (500)
Singapore	Comfort Transportation Pte Ltd. (12,668) / CityCab Pte Ltd. (4,344) / SMRT Taxis Pte Ltd. (3.550) / Trans-Cab Services Pte. Ltd. (4.947) / Premier Taxis Pte Ltd. (2,017) / Prime Car Rental & Taxi Services Pte Ltd. (856)
Milano	024040 (1,900) / 028585 (1,400) / 026969 (1,000)
Delhi	Meru Cabs (1,459) / Easy Cabs (1,386) / Mega Cab (1,016) / WynCabs (185) / Yo Cab (50) / NTL Taxi (55) / Magic Sewa (10)
Abu Dhabi	National Taxi (1,706) / Arabia Taxi (1,334) / Al Ghazal (1,093) / Emirates Taxi (1,246) / Cars Taxi (1,022) / Tawasul (1,022) / Airport Taxi (222)
Helsinki	Helsingin Taksi-Data Oy (1249)
Oslo	Oslo Taxi (1034) / Christiania Taxi (240) / Norgestaxi Oslo (299) / ByTaxi (56) / Taxi 2 (72)
Dubai	Dubai Taxi (4,773) / Cars Taxi (1,800) / National Taxi (1,425) / Arabia Taxi (927) / Metro Taxi (755) / City Taxi (35)
Doha	Mowasalat Karwa Taxi (895) / Al Million Trad. & Cont. (800) / Al Ijarah Holding (915) / Profit Trad. / Cars Taxis (499) / Ibn Ajayan Capital Taxis (258)

Source: UITP, 2015

2.3 Identifying the Ideal Number of Taxis

One of the most controversial issues regarding taxi transportation is about determining the ideal number of taxis in cities. The number of taxis to serve in the cities should be determined on the basis of demand. In the event that the supply and demand balance cannot be achieved, poor service quality, traffic congestion, or financial losses may occur. The results arising from the relationship between supply and demand balance are presented in Table 2.4 below.

Table 2.4: Possible Consequences of Taxi Supply-Demand Relationship

		Taxi Supply	
		Low	**High**
Taxi Demand	**High**	*Low Supply* Increased Waiting Times Passenger Dissatisfaction Decreased Transportation Availability Negative Impact on Economic Development	*Balance* Supply and Demand Balance
	Low	*Balance* Supply and Demand Balance	*High Supply* Traffic Congestion Excessive Competitiveness Low Income Low Quality

Source: Al Ali, 2013

Two basic indicators are necessary for maintaining the taxi supply and demand balance. The first of these is related to the factors affecting the demand, and the other to the outputs of the existing taxi operations. One of the factors affecting the demand is the number of taxis per person living in a city. The outputs of the existing taxi operations can be analysed by considering the factors such as the passenger-kilometre measurement and taxi availability.

2.3.1 The Number of Taxis Per Capita and Other Factors Affecting Demand

As a result of the research data of the Global Taxi Benchmarking Study conducted for different cities by UITP in 2015 as shown in Figure 2.3 below, the average number of persons per taxi was 291. In İstanbul, that figure was 804. Among the cities within the scope of the research, İstanbul turned out to have the highest figure after İzmir.

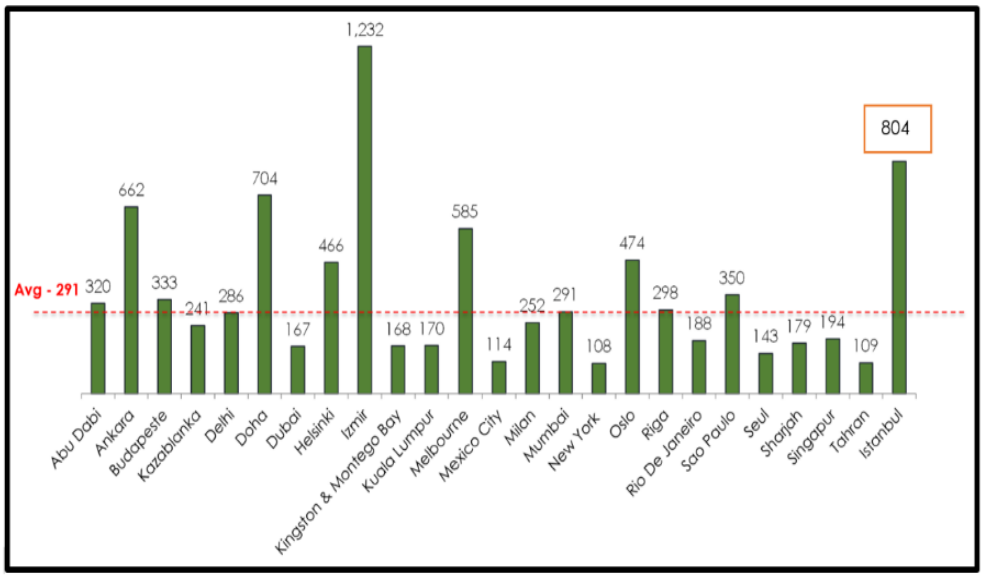


Figure 2.3: Number of Persons Per Taxi in Different Cities

Source: UITP, 2015

Such results indicate that İstanbul's current taxi supply remains below world standards in meeting the total travel demand. Considering the benchmarking presented in the figure above, there is a clear need for a new taxi supply in İstanbul. Despite that, when determining the number of taxis to serve, it would not be correct to estimate it only by taking into account the number of people. Apart from the number of taxis per person, two other critical parameters, namely the ratio of passenger-kilometres to total distances driven and taxi availability, should be addressed to determine the taxi supply. Evaluation of these other parameters is of great importance in terms of determining the correct number of taxis. Besides the fact that the demand for taxis in cities cannot be determined by population only, such a demand is also likely to differ as to a number of criteria ranging from private vehicle licensing policies, public transportation

alternatives, availability of parking lots in city centres, fuel prices, presence of illegal taxis, and the number of tourists.

A model called Hara Associates Taxi Demand Model has also been developed to determine the appropriate number of taxis. With this model, an analytical approach has been introduced to determine the ideal number of taxi licences in the city, for which the following basic variables are taken into account (Hara Associates, 2013).

- Population
- Low-income citizen population
- Taxi Fare Levels
- Cost of private vehicle ownership and use
- Number of passengers working in the city centre, but not living in the city centre
- Climate

2.3.2 The Ratio of Passenger-Kilometres to Total Distances Driven

This parameter is calculated by dividing the number of kilometres travelled with the passenger to the total kilometres driven. As an example, the target for this ratio is 58% in Dubai, while it is 65% in Singapore. Exceeding the target value is regarded as an indicator of the need for taxi supply. Table 2.5 presents the values such as the total daily distance travelled by taxis in different cities of the world, the income generating mileage rate and the rate of taxi working in double shifts.

Table 2.5: Taxi Total Kilometres and Passenger-Kilometres Travelled in Different Cities

City	Daily Distance (km)	Commercial Service	Double Shift Working Rate
Abu Dhabi	324	49%	10%
Ankara	210	--	70%
Delhi	220	52%	22%
Doha	314	56%	42%
Dubai	675	58%	100%
İzmir	250	35%	100%
Kuala Lumpur	280	40%	40%
Milano	150	66%	8%
Bombay	225	53%	35%
New York	308	--	90%
Oslo	223	47%	--
Sao Paulo	220	--	24%
Seoul	244	56%	--
Sharjah	293	--	0%
Singapore	440	68%	68.1%

Source: UITP, 2015

It is also necessary to consider the number of shifts of the vehicles when looking at the ratio of the distance travelled with passengers to the total distance travelled. In some cities, all taxi vehicles work 24 hours, while in some cities they work in a single shift, which is closely related to the demand that changes day and night.

2.3.3 Taxi Availability

When customers want to hire a taxi, the time to reach the taxi service is absolutely an important parameter. Two issues should be taken into account as given as follows:

- Taxi Waiting Time: Average taxi waiting time by customers on the road for the arrival of a taxi.
- Waiting Time After Reservation: The time for the taxi to reach the customer is calculated after the reservation with the Call Centre or Mobile App.

Table 2.6 shows the number of calls coming to the call centre in different cities and those that are actualised, as well as the average time the taxi arrives at the customer.

Table 2.6: Call Centre Performances

City	Number of calls	Number of realised trips	Percentage of calls realised as a trip	Average arrival time after reservation
Abu Dhabi	10,000	9,800	98%	7 min
Doha	1,333	645	48%	15-20 min
Dubai	20,186	17,508	87%	14 min
Seoul	57,000	--	--	10 min
Sharjah	1,700	822	48%	12-15 min
Singapore	91,685	93,659*	102%	5 min

*Including mobile app bookings

Source: UITP, 2015

Singapore Land Transport Authority (LTA) has set specific standards for taxis with call centre reservation, by placing rules on taxi availability on operators in a similar fashion. These standards are indicated in Table 2.7.

Table 2.7: Standards of the Land Transport Authority for Call Centre Reservations and Waiting Times in Singapore

Performance Indicators		
	Large scale business (No of vehicles >1000)	**Small scale business (No of vehicles ≤ 1000)**
Availability of taxis during peak hours via call centre reservation		
Response rate of calls	95%	90%
Waiting time for the call to be Answered	90% in 20 sec	
Ratio of received calls to work actualised	min 92%	min 80%
Waiting time for booking confirmation	90% in 5 min	
The time a passenger waits for a taxi to arrive	95% in 10 min	95% in 10 min

Source: Teo, 2016

For determining the ideal number of taxis in cities, a distinction can be made according to the regions within the city. In Hong Kong, for example, there are 3 different coloured taxis with their operating regions differing from each other. Taxis can carry passengers from their own regions to others, but cannot pick up passengers from those regions.

Picture 2.5: Use of Different Taxis in Different Regions in Hong Kong
Source: Eastasy, 2016

Similarly, in some cities, there are private taxis only for *airports*, which only take passengers from the airport and cannot take passengers from other regions.

2.4 Pricing and Fare Management in Taxis

Fare Management is another important element in taxi transportation. Although the taxi fares are determined by relevant authorities in many countries, the initiative in some cities is left to operators. In Singapore, as an example, taxi fare levels are determined by the taxi operators, which is an important factor in keeping taxi fares low due to competition. As an expected result of this, different fare levels are designated separately in different operators and different services, even in different time periods, leading to confusion for passengers. However, as can be seen in Figure 2.4, the difference is not high, with minor differences.

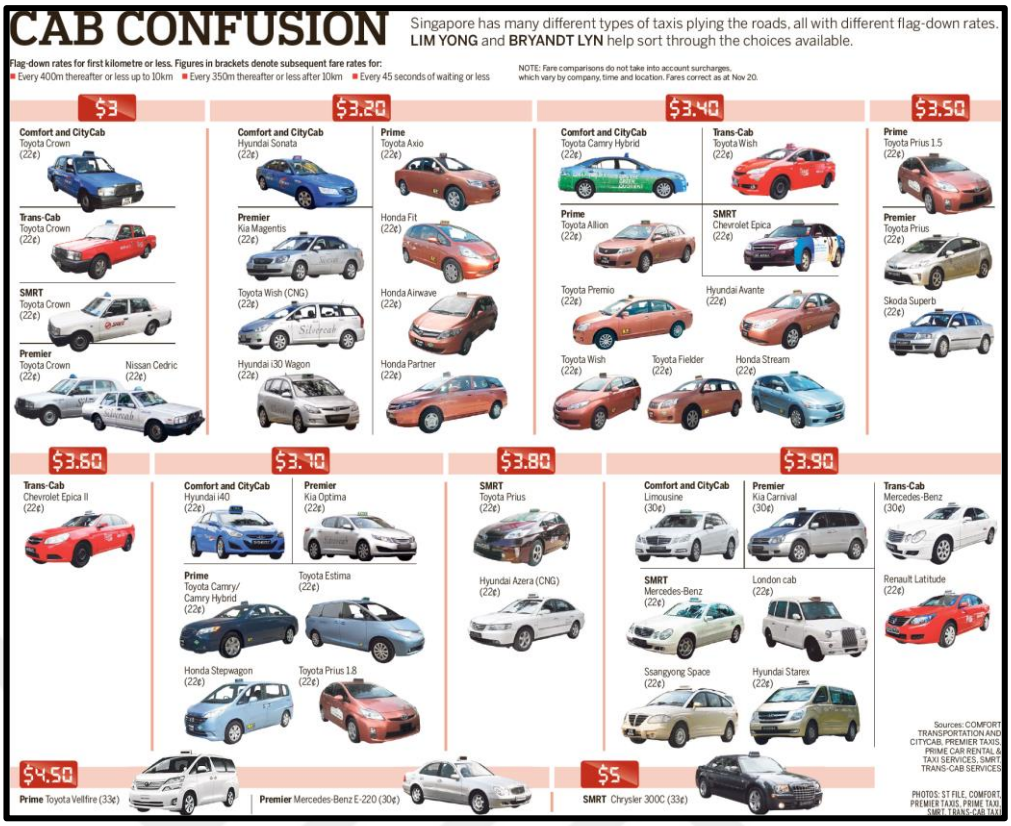
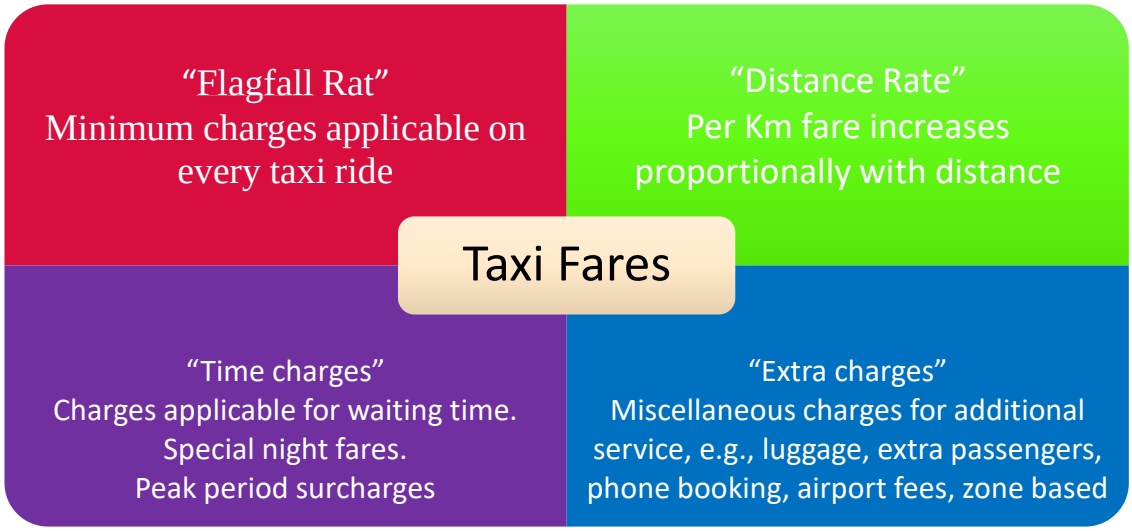


Figure 2.4: Taxi Fares in Singapore by Different Types and Operators

Source: Strait Times, 2013

As presented in Table 2.8 below, taxi service pricing strategy consists of 4 main elements, namely, Minimum Fare, Distance Fare, Time Fare, and Extra Fare. Not all of these are used in every city since there are different practices in every city.

Table 2.8: Taxi Fares Matrix



Source: Yıldızgöz, 2013

The factors affecting the level of taxi fares and the components of pricing differ from each other, a situation which is directly related to certain factors such as salary levels, licensing costs, and energy expenses in every country. Figure 2.5 shows the cost index of Dubai Taxi Company, owned by the Transport Authority RTA in Dubai. While the commission and salary rate paid to the drivers is the most important cost item with a level of 41%, the plate price and fuel expenses constitute 20% of the costs.

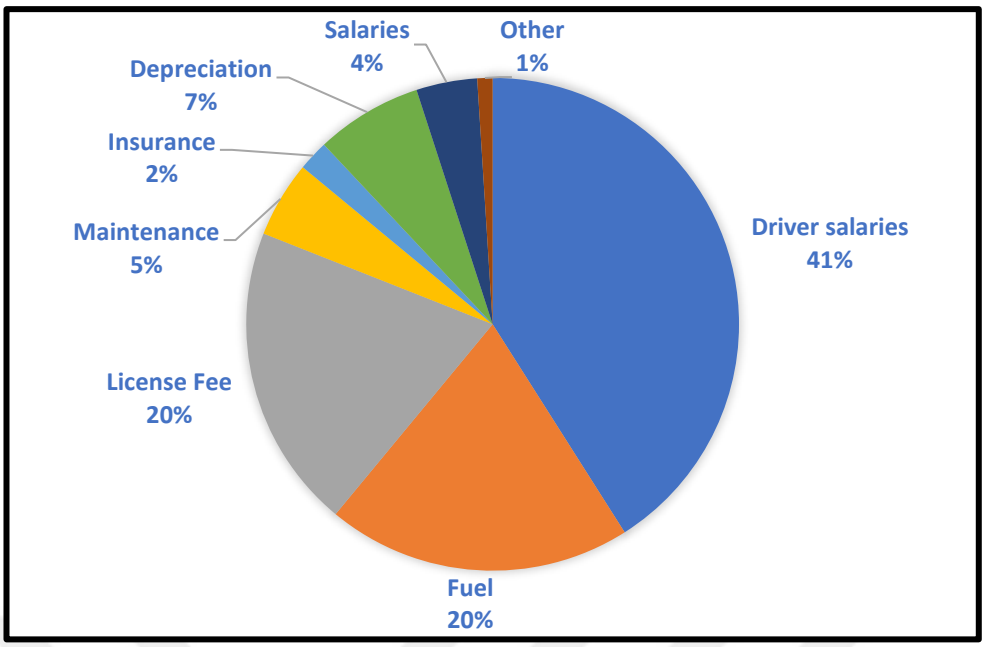


Figure 2.5: Taxi Cost Analysis of the Dubai Taxi Corporation

Source: Al Ali, 2015

Figure 2.6 below demonstrates the cost of taxi transportation for a distance of 5 km in different cities of the world comparatively. In the light of this comparison, the most expensive taxi fare appears in Helsinki, Finland, while the lowest fare is in Kingston Bay, Jamaica. The average fare for the use of taxis during the day is 5.79 USD; whereas it is 7.02 USD for a 5-kilometer journey during the night.

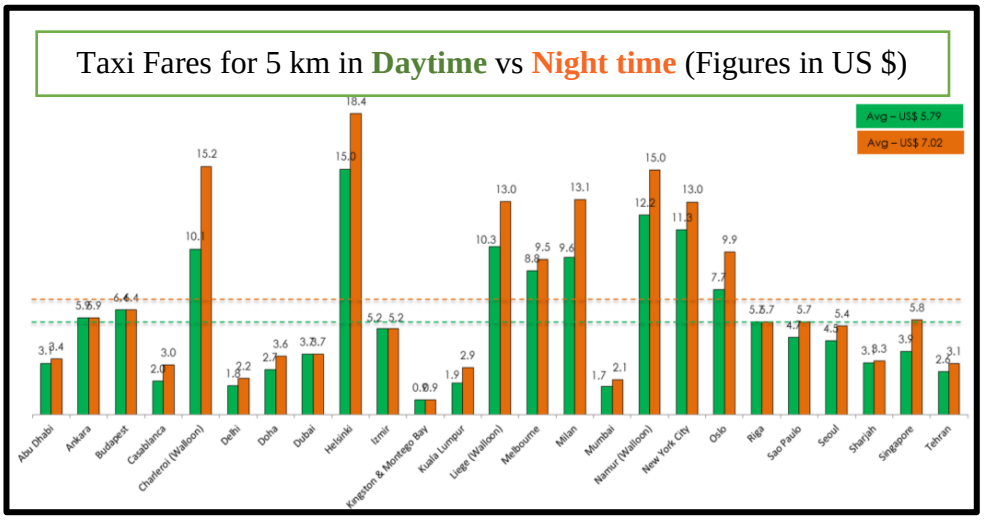


Figure 2.6: Taxi Fares in Different Cities

Source: UITP, 2015

In Table 2.9, the pricing strategy in a number of cities is presented according to a variety of criteria, in relation to both day and night tariffs. Some cities seem to have similar taximeter opening fares and minimum fares, while others have different. In some cities, however, it is clear that there is not only a difference between the day tariff and the night tariff, but the pricing is also different based on different night hours.

Table 2.9: Taxi Pricing Strategy in Different Cities

Pricing Strategy	**Kuala Lumpur**	**New York**	**Seoul**	**Kingston & Montego Bay**	**Sharjah**	**Singapore**	**Casablanca**	**Milan**
Daytime	RMB	USD	Won	JMD	AED	SGD	DH	EUR
Taximeter Start	2.00	2.50	3000	82.50	3.50	3.20	7.50	3.3
Minimum Fare	2.00	2.50	3000	82.50	10.00	3.20	7.50	3.3
1 km Fare	1.25	1.60	704	4.50	1.61	0.55	2.50	1.09
Extra Fee for the Call Centre Booking	2	-	1000	0	5	2.30	0	0
Free Waiting Time (min.)	0	0	0	0	10	0	0	0
Taxi Waiting Fee (hours)	0	30	10285	0	30	17.6	12	28.32
Night tariff	2400-06:00 -	20:00-06:00	24:00-06:00	Night	23:00-06:00	24:00-06:00	Night	21:00-06:00
Taximeter Start Fee	3.00	2.50	3600	82.50	4	4.8	11.25	6.5
Minimum Fare	3.00	2.50	3600	82.50	10.00	4.8	11.25	6.5
1 km Fare	1.88	2.10	844.8	4.50	1.61	4.8	3.75	1.09

Table 2.9: Taxi Pricing Strategy in Different Cities (Continued)

Pricing Strategy	Kuala Lumpur	New York	Seoul	Kingston & Montego Bay	Sharjah	Singapore	Casablanca	Milan
Extra Fee for the Call Centre Booking	2"	-	1000	0.00	5	2.30	0	0
Free Waiting Time (min.)	0	0	0	0.00	10	0	0	0
Taxi Waiting Fee (hours)	0	30	10285	0.00	30.00	17.6	12	28.32
Additional Fees for Special Events and for Certain Regions	12				20	3	250	0

Source: UITP, 2015

2.5 Taxi Drivers

One of the major components of taxi transportation is definitely taxi drivers. Factors related to taxi drivers can be grouped under 3 main headings:

- Prerequisites to become a taxi driver
- Taxi driver trainings
- Taxi driver performance management

Although the prerequisites for becoming a taxi driver vary from country to country, certain criteria such as age (minimum/maximum), driver's license and experience,

basic English skills, good health status, basic education, work experience and having no criminal record can constitute the main qualifications.

Table 2.10 presents the age requirement and other conditions for becoming a taxi driver in different cities around the world. In Singapore, for example, anyone under the age of 30 is not allowed to work as a taxi driver. The reason for this is that Singapore's human resources planning policy aims to direct young population to start working in different fields instead of starting their life as a taxi driver, which is an easily accessible job. In Tehran, Iran, on the other hand, the main requirement to be a taxi driver is to be married.

Table 2.10: Preconditions to Become a Taxi Driver in Different Cities

City	Age	Validity	Other conditions
Abu Dhabi	21-50	1 year	Medical test / No criminal record
Ankara	40	Lifelong	--
Budapest	21	5 years	PÁV II (special exam for professional drivers)
Casablanca	23	5 years	--
Delhi / Mumbai	20	3 years	Police record
Doha	20-45	5 years	Eye examination / A letter of no objection from sponsor
Dubai	21 – 60	10 years	Medical test / Driver training
Helsinki	18-70	--	No criminal record for 5 years retrospectively
Kingston	21	5 years	Police record / Letter of recommendation
Kuala Lumpur	23	1 year	No accident record
Melbourne	18	--	Melbourne driver knowledge test
Milan	21	5 years	Not having committed a serious crime
New York	19 <	1 years	Drug use screening test / Medical test
Oslo	18	Lifelong	--
Riga	21	--	3 years of driving experience
Sao Paulo	18 -65	1 year	--
Seoul	21	1 year	5 years of commercial driving experience without any accidents
Sharjah	23-55	6 months	Medical certificate
Singapore	30	3 years	No criminal record
Tehran	23	1 year	Being married/ Diploma or university degree

Source: UITP, 2015

Table 2.10 also shows the validity period of taxi driver licenses, some of which are valid for life in some cities, whereas there are remarkable restrictions in many other cities. Similarly, in Table 2.11 shown below, criteria for becoming a taxi driver and the relevant trainings conducted in Singapore, New York, and London are compared in detail.

Table 2.11: Preconditions to Become a Taxi Driver in Singapore, London and New York

Singapore	New York	London
Being between the ages of 30 – 75	Being at least 19 years of age	Being at least 21 years of age
Achievement in the medical test	Accident-free driving record	Being of good character
Additional health report for those aged 70-73	Health report from doctors accredited by the relevant authority	Criminal records check
Being a citizen of Singapore	Drug test	License penalty points
Being a valid Class 3/3A driver's license holder	Fingerprinting	The right to live and work in the UK
Minimum 1 year of driving experience	Advanced English	Health report: DVLA Group 2 Standard
Achievement in the English test	Knowing New York City, locations and rules well	Advanced English
A clean driving record	Defensive driving techniques course	'Knowledge Test' – 3 years and 7 stages
Studying at the Training Academy in Singapore	Completed training at accredited institutions	Passing the driving test of the driver standards unit
Passing the post-training exam	Payment of applicable fees	Disability awareness training
Refresher trainings every 6 months		Payment of applicable fees
Payment of applicable fees		

Source: Nohra, 2015

The duration for the training of drivers also differs in many cities. One of the most well-known and longest processes is the "Knowledge" system implemented in London. This training lasts 4 years. The stages related to this program are stated below (Tfl, 2021):

- Stage 1: Self-assessment
- Stage 2: Written Examination

- Stage 3-5: Appearances
- Stage 6: Suburban Examination
- Stage 7: License Application and Pre-licensing Talk

Picture 2.6: Driver Candidates at Knowledge Training

Source: Chapman, 2016

As can be seen in Picture 2.7, all candidates participating in the Knowledge program are trained on motorcycles while preparing for the exams in which they are given their licenses.

Picture 2.7: Taxi Driver Trainings on Motorcycles

Source: TfL, 2021

Within the scope of the exam held for those who have completed the Knowledge:

• Written examination

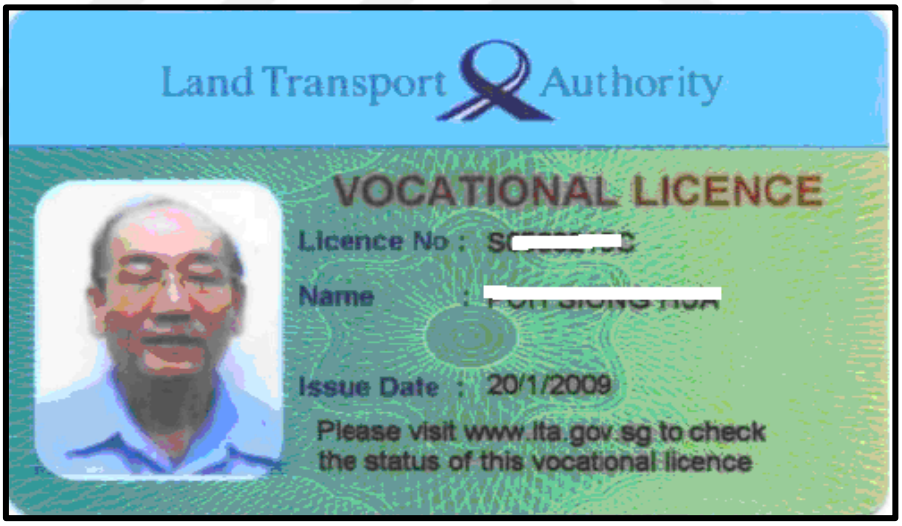
• One-to-one oral appearances

• Candidates are given imaginary service routes and are asked to find the shortest one between any two points in London.

Though it does not take as long as it does in London, the training of taxi drivers in Singapore is also worth examining.

The prerequisites for those who want to become a taxi driver in Singapore (Teo, 2016) are as follows:

- Being between the ages of 30 -75
- Being a citizen of Singapore
- Being a valid Class 3/3A driver's license holder to be valid for at least a year
- Understanding and speaking basic English



Picture 2.8: A Taxi Driver's License in Singapore

Source: Teo, 2016

All drivers in Singapore are required to have a Taxi Driver's Vocational License. The terms and conditions of this license are as follows:

- License validity is 3 years
- Special medical test for those over 50
- Refresher trainings every 6 months

- Resitting the exam every 3 years after the license period

As of 2016, there are 100,330 Licensed Taxi Drivers in Singapore. The performances of the taxi drivers are investigated with the Vocational License Demerit Points System. Relevant clauses regarding this have been included in the Road Traffic Act in Singapore, and specific penal sanctions have been determined for the violations to be made by each taxi driver. The related process is distributed to all drivers as a handbook. The relevant system is carried out by the Land Transport Authority in Singapore (Theo, 2016). In the event that a driver reaches the 6-20 penalty points within a 24-month period, the license is suspended, and in the case of exceeding 20, the license is to be cancelled. Table 2.12 displays the relationship between penalty points and duration of suspension.

Table 2.12: Taxi Drivers' Penalty Scores and License Suspension Period in Singapore

Penalty points	**Duration of suspension**
6 – 10	2 weeks
11 – 15	4 weeks
16 – 20	8 weeks
21 or more	License revocation

Source: Teo, 2016

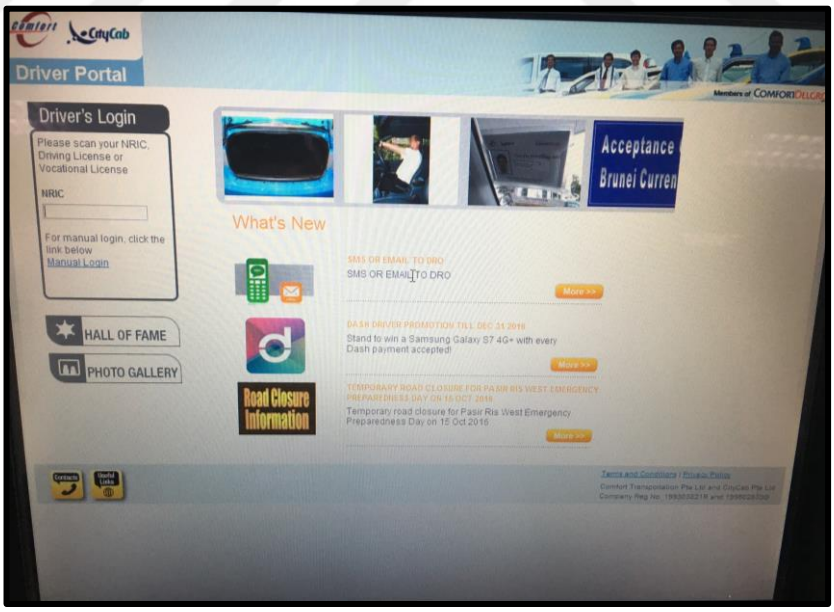
In practice, a separate penalty point is issued for each of the violations made by taxi drivers. Drivers are not only given penalty points, but they can also be fined. Table 2.13 shows the amount of penalty points and fines to be given for different violations.

Table 2.13: Improper Actions and Penalty Scores of Taxi Drivers in Singapore

Violation	Penalty
Turning away the passengers	6 penalty scores & 300 Singapore Dollars fine
Mistreating the passengers	12 penalty scores & 500 Singapore Dollars fine
Overcharging the passengers	12 penalty scores & 500 Singapore Dollars fine

Source: Teo, 2016

Different practices are carried out by taxi operator companies to improve the performance of drivers, especially in cities where taxi management is institutionalized. ComfortDelGro system in Singapore has established a driver portal, enabling its drivers to access this portal from anywhere via the internet or from driver kiosks in the office environment. This portal contains information in many areas such as payments, new applications, maintenance tracking, changes in regulation, and campaigns, etc.



Picture 2.9: ComfortDelGro Driver Portal

Source: Yıldızgöz, 2016

ComfortDelGro provides free and affordable gym use for its drivers. In Dubai, likewise, there are some facilities such as a cafeteria, barbershop, courier office and internet cafe for drivers in the taxi garage section.

Picture 2.10: Promotion of a Sports Centre for ComfortDelGro Taxi Drivers
Source: Yıldızgöz, 2016

Companies can also allocate performance-based rewards in order to increase the drivers' performance. The taxi operator, CARS Taxi, in Dubai, for example, sends its most profit-making drivers to Umrah. ComfortDelGro in Singapore organizes sweepstakes for drivers who meet certain goals. The given targets are to fulfil the reservations received by the call centre.

Picture 2.11: Promotion of ComfortDelGro for Better Driver Performance

Source: Yıldızgöz, 2016

In countries such as Austria, Czech Republic, France, Hungary, Estonia and Ireland, the main requirement to become a taxi driver is to pass the exam held by relevant authorities. Driver candidates in Denmark, in particular, must complete training programs approved by the Danish Road Traffic Authority and be successful in the exam organized by the same Authority. Taxi drivers must acquire a taxi driving certificate from the Central Office for Motor Vehicle Driver Testing in the Netherlands, where different examination procedures (theoretical and practical tests) are available: The A-Type taxi driver training enables drivers to deliver a taxi service in all types of taxis, while B-Type training is designated to deliver such a service in taxis that can work on certain routes and hours, and C-Type training is for serving such groups as the disabled and children (European Commission, 2016).

2.6 Service Quality Management

Service Quality Management is of particular importance for managing the quality of services in taxi industry. The EN 13816 European Union Service Quality Standard in Public Passenger Transport, which is used in public transportation, can be used as a reference in this context. The EN 13816 covers the service quality standards to be

acquired by the institutions operating in the public transportation sector in the European Union (EU) countries, and their customers while providing service. Approved by the CEN (European Committee for Standardization) on December 30, 2001 and referred to as EN 13816 Service Quality Standard in Public Passenger Transport, this standard includes the definition of service quality in public transport institutions and of measurement systems, as well as the target specifications. This standard can be used both by public transport authorities for the supervision of the performance of operators and as a tool by the operators for the management of their own performance (CEN, 2002).

EN 13816 standard covers a wide range of services such as buses, subways, trams, ferries, sea buses, etc. as the modes of urban public transportation; taxis, shuttles, airport bus services, etc. as the modes of intermediate public transportation; suburban trains, airlines, intercity trains, high-speed trains and intercity buses, etc. as the modes of public transportation between cities/countries (CEN, 2002).

Apart from this, a service standard specific to taxis has been developed throughout the country in the Netherlands. Being an ISO-based quality system, TX-Keur quality scheme for taxi transportation bring a standard and inspection system to drivers and their services. Planned and unplanned inspections are carried out by an independent organization, as a result of which successful taxi companies can carry the label of the relevant quality standard in their vehicles.

Picture 2.12: TX-Keur Quality Standard Display in Dutch Taxis

Source: Hofstadtax, 2017

In Tokyo, Japan, an assessment system has been established by the transportation authorities to monitor the quality of taxi companies and to increase the competition among them. Taxis are inspected according to various criteria such as compliance with the rules and maintaining customer service and safety, as a result of which, they are ranked from AA, A, B to C. Taxi companies ranked with AA and A can share these grades with their customers by sticking the stickers on their taxis as is seen in Picture 13 (Tokyo Taxi Centre, 2017).

Picture 2.13: Label of Excellent Taxi Service in Tokyo

Source: Tokyo Taxi Centre, 2017

In cities where contracts are made between taxi companies and transportation authorities, such authorities also inspect the performances of operators according to certain basic performance indicators. Depending on the results, various penalties or rewards are placed. Table 2.14 shows the key performance indicators used by transportation authorities in Dubai, Abu Dhabi, and Singapore (UITP, 2015).

Table 2.14: Key Performance Indicators Implemented by Different Taxi Authorities

RTA – Dubai	Trans AD - Abu Dhabi	LTA – Singapore
Complaints /100,000km	Complaints /100,000km	The number of calls handled by call centre agents
Driver fines /100,000km	Driver fines /100,000km	Average speed of answer
Accepted Reservation Rate	Accepted Reservation Rate	The number of reservations finalized
Accidents/ 100,000km	Accidents / 100,000km	Time taken for call centre's taxi confirmation
Customer satisfaction	Time to reach the customer	Time of arrival of the taxi to the passenger
Fleet Utilization	Customer satisfaction	Success rate at the initial inspection
Driver satisfaction	Total number of CNG vehicles	Accident rate
	Driver satisfaction	Offense
	Mystery Shopper	
	Fleet Utilization	
	Rate of Female Taxi Drivers	

Source: UITP, 2015

In this regard, Customer Satisfaction Survey, Mystery Shopper Survey and Direct Performance Measurement methods are used as the basis for measuring service quality.

2.7 Taxi Vehicles

It is a fact that one of the most basic components of the taxi transportation service is undoubtedly the taxi vehicles used in the service delivery. Taxi vehicles have a direct impact on many areas in this sense such as passenger satisfaction, operational performance, efficient use of the city roads of limited capacity, and environmental impact. Different requirements are determined for taxi vehicles in different cities. In

all European Union countries, for instance, the minimum length of taxi vehicles, the number of doors, the number of seats and the baggage area are determined by the relevant authorities. The features related to taximeters are regulated by the Directive 2004/22/EC of the European Union. In the same way, there may be separate regulations in each country on issues such as the colour of taxis and advertisements. In England and Wales, the authority to set standards for taxi vehicles has been given to local administrations, resulting in the emergence of more than 300 different standards. For this reason, there is an attempt to set a standard for system safety for taxi vehicles across the country. London sets the most detailed standards in this area with the use of TX or FX taxi vehicle models. In Paris, on the other hand, taxi vehicles must be at least 4.2 meters long, 1.65 meters wide, at least 1.35 meters in unloaded height, and less than 0.55 meters high from the ground. The boot space in taxi vehicles with at least 4 doors is indicated as minimum 400 cubic dm (if the vehicle has a capacity of more than 5 seats, this capacity can be achieved by folding the additional seats) (European Commission, 2016).

According to the UITP Taxi Report, the most preferred taxi vehicle models around the world today are various models of Toyota and Hyundai. Certain factors such as comfort, efficiency, and vehicle depreciation are important in choosing these models (UITP, 2018). Figure 2.7 presents various taxi models used in different cities operating around the world.

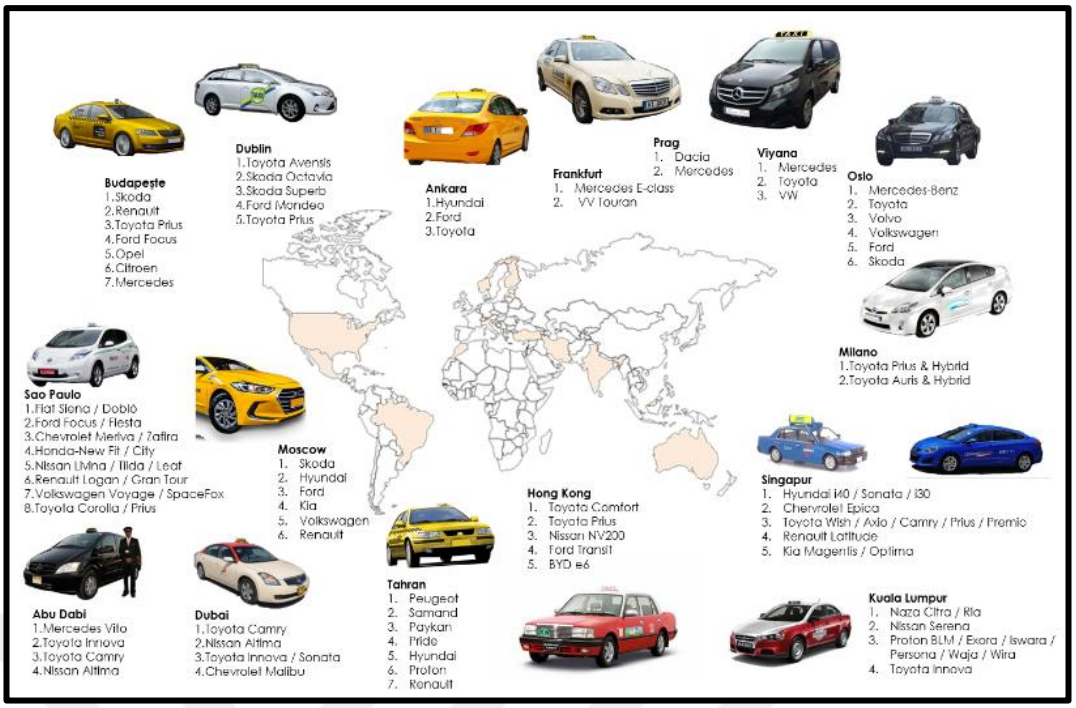


Figure 2.7: Taxi Vehicle Models in Different Countries

Source: UITP, 2018

In like manner, the average age of the fleet and the age of the oldest vehicle for taxi vehicles serving in cities also differ. The average fleet age in Casablanca is 17, while the oldest vehicle is 40. On the other hand, the average vehicle age is 4 in cities such as Dubai, Sharjah, and Singapore where taxi services are utilized extensively, yet, the oldest vehicle is 4 years old in Sharjah, in particular, where such services are dominant (UITP, 2015). Figure 2.8 shows the ages of taxi vehicles in different cities.

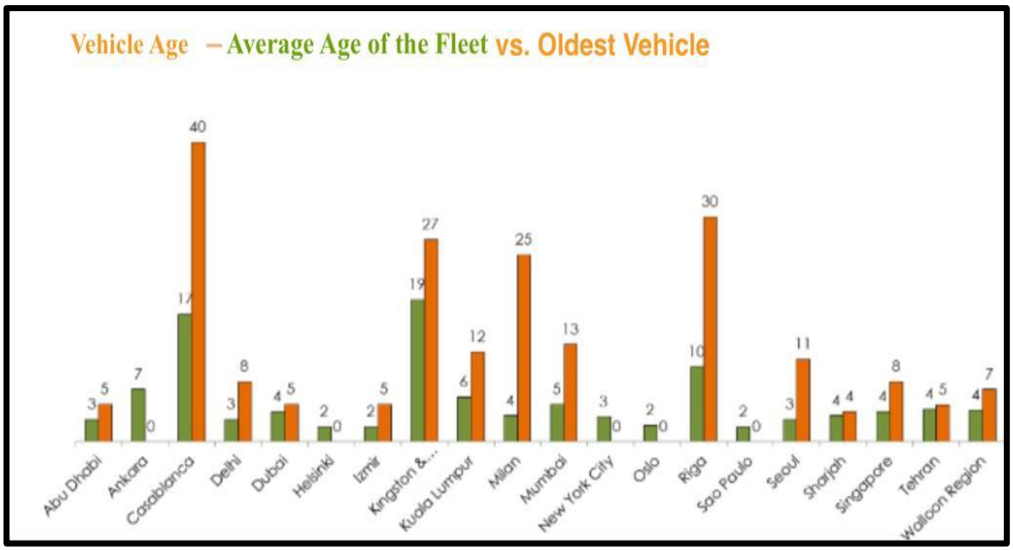


Figure 2.8: Ages of Taxi Vehicles Used in Different Cities

Source: UITP, 2015

2.8 New Mobility Service

As a means of urban transportation technology far beyond automobiles, smart phones are today the main factor that leads to the development and emergence of new services, actors and business models in urban transportation. With the recent technological advancement and innovations, the basic elements that have been discussed in relation to urban transportation can be listed as follows: (Yıldızgöz, 2017)

- Shared Mobility: All transportation alternatives other than traditional public transportation and private vehicles,
- Mobility-as-a-service (MaaS): Combining route planning, reservation and payment opportunities of different transportation modes with an application or interface,
- Autonomous Mobility: Eliminating the need for the movement and management of the transportation vehicles by a human inside them.

These concepts have nowadays become the most controversial topics in urban transportation, on which decision makers work in many leading cities of the world. New developments in this context are now called “New Mobility Services”.

2.8.1 Types of Shared Mobility Services

All transportation alternatives other than traditional public transportation and transportation by private vehicles can be examined under the umbrella term of shared mobility that include practices such as using a common vehicle fleet based on the principle of using and leaving a vehicle at different stations, or carpooling that bring together the vehicle owner and the passenger who wants to share the journey, or demand-based applications and parking lot sharing. Although some of the shared mobility types are claimed to attract passengers and compete directly with taxi transportation, the potential for taxis is likely to be much higher for the passengers who give up their private vehicles since the development and widespread use of shared mobility may reduce the use of private vehicles. In this respect, the integration of shared mobility types and taxis is of great importance, as is integration with public transportation.

2.8.2 Mobility-as-a-Service (MaaS)

Mobility-as-a-Service is the provision of mobility services in the form of a single mode in a demand-based manner by integrating different transportation modes. This approach, called Mobility-as-a-Service (MaaS), offers a single purchasing platform for all transportation services. As a matter of fact, the main purpose here is to enable easy access via the integration of all transportation modes that will provide door-to-door transportation and without the use of private vehicles (Flood & Mulligan, 2016).

Similar approaches have actually been developed for a long time, often in different industries. When we register with a GSM operator, for example, we are offered alternative packages prepared for different needs. These packages consist of a blend of various services such as “total talking minutes, total text messages, internet usage, and international usage”, allowing users to choose according to their needs, so that there is no need to purchase separate services and be charged for each service. MaaS also draw on this approach to meet urban transportation needs (Yıldızgöz, 2017).

One of the most well-known MaaS system today is Whim, which was founded in Finland in 2015 and operated by MaaS Global. Whim enables its users to plan, book and pay for all travel modes from start to finish. MaaS Global has already started operating in other countries besides Finland and is taking the lead to become a

multinational MaaS Operator. As can be seen in Table 2.15, Whim service comprises a variety of transportation options such as public transportation, taxi, car rental, carpooling, and bike sharing. Within the scope of Whim, there are pay-as-you-go, economical and unlimited mobility packages (MaaS Global, 2018).

Table 2.15: Whim Package Options

	Whim to go (pay-as-you-go)	**Whim Urban (Economic package)**	**Whim Unlimited (Unlimited Package)**
Monthly payment	Free	49 Euros	499 Euro
Public transport	Pay As You Go	Unlimited	Unlimited
Taxi (circa. 5 km)	Pay As You Go	10 euros per trip	Unlimited
Carsharing	Pay As You Go	49 Euros per day	Unlimited
Bike sharing	Not applicable	Unlimited (up to 30 min)	Unlimited

Source: MaaS Global, 2018

Integration levels within the scope of Maas can be examined under three main headings (Kamargianni, 2016):

- Ticketing and Payment Integration: A smart card or ticket is valid for all types of mobility covered by MaaS and a single account pays for all.
- Mobility Package Integration: Customers can prepay for a certain amount (in terms of time or distance) of different mobility services
- ICT Integration: Availability of a single mobile application or internet interface to access information for all modes of mobility

It should also be noted that the widespread use of the MaaS will result in a separate market for taxis. Since the increase in the number of the MaaS users will reduce the use of private vehicles, it is highly likely that the potential for taxis will be much higher for passengers who give up their private vehicles. In this sense, considering the usage

habits of Whim subscribers, this figure was found to increase to an average of 4.5 taxi journeys after Whim was introduced, though only one taxi ride was made monthly before Whim (Anescot, 2017). Figure 2.9 demonstrates the number of taxi trips before and after Whim.

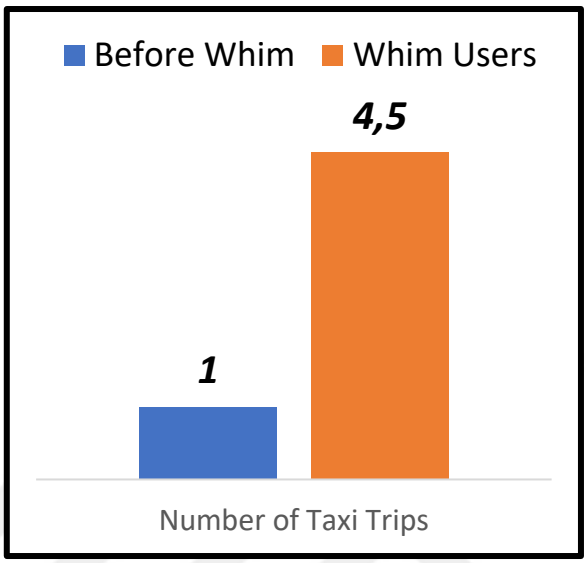


Figure 2.9: Impact of the MaaS on Taxi Trips - An Example of Whim

Source: Anescot, 2017

2.8.3 Autonomous Mobility

The world's leading vehicle manufacturers and technology companies have been doing serious work in the field of autonomous mobility. The introduction of autonomous vehicles will undoubtedly have serious impacts on drivers, business models, business management, etc., across the taxi industry. Automation levels have been classified into different categories by the Society of Automobile Engineers (SAE), and these categories have also been accepted by the American National Highway Traffic Safety Administration today (NHTSA, 2016). More information is presented in Table 2.16 below.

Table 2.16: Automation Levels in Autonomous Vehicles

0		**No-Automation**	Zero autonomy; the driver performs all driving tasks.
1		**Driver Assistance**	Vehicle can sometimes assist the human driver with either steering or braking/accelerating, but is controlled by the driver.
2		**Partial Automation**	Vehicle can itself actually control both steering and braking/accelerating simultaneously under some circumstances, but the human driver must continue to pay full attention.
3		**Conditional Automation**	Vehicle can itself actually control both steering and braking/accelerating, constantly monitors the road with its sensors, but the driver must be ready to take back control at any time.
4		**High Automation**	Vehicle can itself perform all driving tasks, but asks for assistance from the human driver in certain necessary circumstances, and continues to work even if it does not receive a response. They are not in mass production and are not yet legal.
5		**Full Automation**	Vehicle can perform everything that a human can do. No steering wheel is required. At the prototype stage.

Source: NHTSA, 2016

Today, companies such as Audi, BMW, Ford, General Motor, Lexus, Mercedes-Benz, Nissan, Tesla, Volkswagen, Volvo, Google, Uber, Bosch, Didi, and Grab have autonomous vehicle projects carried out by themselves or with their partners.

Uber and Google are the leading companies among those that accelerate their work on autonomous mobility. In the fall of 2016, Uber proved this with the tests carried out in the city of Pittsburgh as well as in other cities of the USA. During the tests, a group of passengers was offered the option to travel in autonomous vehicles. The tests were carried out in vehicles with the presence of drivers sitting at the steering wheel but planned to take control in case of a malfunction (Moon, 2015).

Today, driverless transportation is seen in different transportation modes in some cities. Test drives of driverless taxis have, for instance, started in Singapore as well as in Dubai.

Keolis, a global public transportation operator in Lyon, France, collaborated with the city's transportation authority SYTRAL and autonomous vehicle technology firm Navya, to launch NAVLY, a test facility with two vehicles, in September 2016. Vehicles with a maximum capacity of 15 persons served on a route of 1.3 km for a trial period of 12 months (Tabary, 2016).

Picture 2.14: Driverless Minibus Service in Shenzhen

Source: Basar, 2018

In our time, the effects of autonomous vehicles on urban transportation and especially on traffic congestion is a hot topic of discussion. Research shows that autonomous vehicles can meet today's transportation needs since they are expected to account for 10% of existing private vehicles and parking spaces (Rigole, 2014).

The policy report prepared by the UITP in 2016 emphasized the likelihood of autonomous vehicles to reduce the number of private vehicles in urban transportation and designate different options to be used as autonomous vehicles (UITP, 2016).

In this context, two main scenarios for autonomous vehicles are presented in the UITP policy report. In the first scenario, there is the assumption that autonomous vehicles

can be used in the form of private ownership, like today's private vehicles. If this scenario becomes a reality, it may be inevitable that the traffic and inefficiency in urban transportation will increase even more. The other scenario is that autonomous vehicles are operated in the form of shared fleets rather than individual ownership. In this scenario, on the other hand, the preferred option is the full integration of shared private vehicle fleets with public transportation. Only in this way can a sustainable transportation approach be achieved. In this regard, two main points have been underlined by the UITP:

- Using autonomous vehicles as shared fleets, and
- Ensuring that they are well integrated with public transportation.

These conditions are significant in that they can curb the increased traffic issue in urban transportation.

2.9 Transportation Network Companies

The issues related to taxi transportation should also include the "TNCs" as the most debatable actor in this field recently. Developed in the last five years and spread rapidly all over the world, the TNCs have had significant impact on urban transportation. As an alternative to traditional taxi transportation, the TNCs bring together passenger demand and driver vehicle (traditional taxis and/or people who open their private vehicles for passenger transportation) through mobile applications. People who own a driver's license and vehicle, and who comply with some other specifications, can start to serve using the relevant TNC applications. One of the most important features of TNCs is that people can carry out their services with a "zero" fleet without the necessity of owning a vehicle fleet of their own. Consequently, this is the major reason why these applications are growing so rapidly around the world. Such applications take a certain amount of commission from the vehicle owner for each trip, and this rate is usually around 20%. (Yıldızgöz, 2015).

A variety of terminologies are used in different parts of the world for the TNCs: "Transportation Network Companies" in the USA, "E-hailing / Ride-hailing apps" in Malaysia, Japan, Hong Kong and many African countries, "Taxi Reservation Network" in China, "Ride-Selling Applications" in many European countries, "Third

Party Taxi Booking Service Providers" in Singapore, "App-Based Ride Sharing Companies" in Indonesia and Vietnam, and "Commercial Transport Intermediaries" in Canada (Yıldızgöz, 2018).

Today, the most well-known among these companies is undoubtedly the US-based Uber, which started to serve with only 3 taxis in San Francisco in 2009, and spread all over the world in quite a short time. Having taken the decision to establish Uber when they could not find a taxi on a snowy evening in Paris, Travis Kalanick and Garret Kamp- the founders- succeeded in turning a difficult situation into an opportunity (Kalanick, 2010).

Although the most well-known TNC company is Uber, the largest in terms of number of trips is China's Didi Kuaidi, which was formed by the merger of two separate applications, Didi Dache (owned by Tencent Holding Limited) and Kuaidi Dache (owned by Alibaba Group). It offers a wide range of services such as taxi calling, private car calling, driver supply, bus services, and ride sharing in more than 400 cities in China (Chen & Li, 2016).

It is a widely acknowledged fact that dissatisfaction and passenger complaints about traditional taxi operators have continued in many cities around the world for years. Finding and paying for taxis has been one of the major problems in the sector for years. The TNCs, on the other hand, offer clear benefits and added values that can overcome such problems encountered in this field: (Yıldızgöz, 2018).

- Easy vehicle reservation,
- Easy payment with credit card,
- Convenience to track the vehicles,
- Convenience to see the driver history and the scores given by other passengers,
- Convenience to use the same application in different countries and cities

The vast majority of such services have not yet been offered in many cities in the traditional taxi business though they are of great importance for gaining passenger satisfaction and loyalty in addition to increasing operational efficiency. It is obvious that although there are many taxi call-centres in many cities, the number of workers is likely to decrease with the use of the TNCs. In like manner, the TNCs reduce the number of equipment and complexity in vehicles even more. They also aim to reduce

the operation and communication costs while increasing the value created for passengers since passengers can access information such as the photos of the driver's and the vehicle, as well as the license plate, and likewise, drivers can access the photo of the passenger in the same way so that they can find each other easily.

The University of California at Berkeley conducted a study with the users of UBER, Lyft and Sidecar in San Francisco in 2014 (Rayle, 2016). The results of the study show that despite the similarities between traditional taxi services and the TNCs, clear differences exist in terms of user profile and expectations. The TNC users were found to have shorter and more consistent wait times, in addition to the fact that they were younger with lower vehicle ownership rates. As can be seen from Figure 2.10 below, the main reasons for passengers to opt for the TNCs include the ease of payment and shorter waiting times.

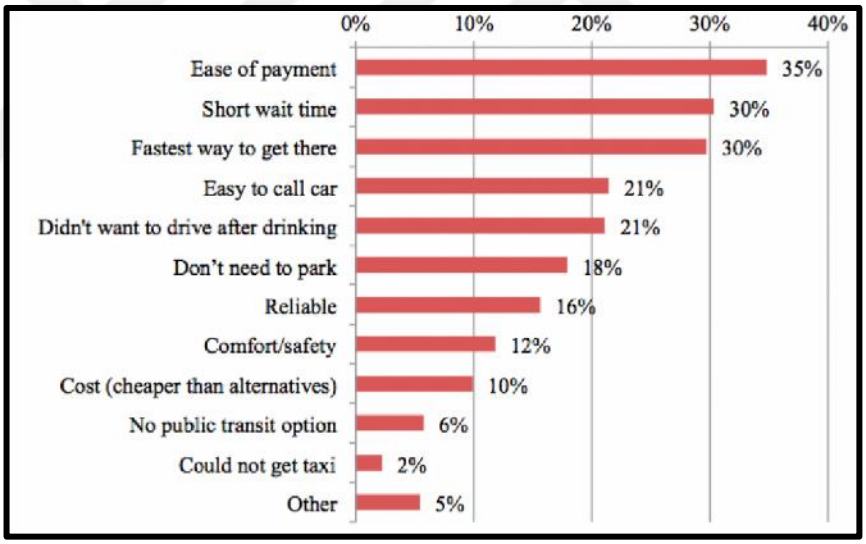


Figure 2.10: Reasons to Use the TNCs

Source: Rayle, 2016

2.9.1 Financial Situation

Since the operations of the TNCs are growing considerably and rapidly around the world, so are their financial values. According to the study conducted by Pitchbook in May 2018, Uber's market value was estimated USD 69.9 billion. In a similar sense, the market value of Didi was estimated USD 56 billion, whereas that of Lyft's was

USD 11.7 billion, Grab's was USD 6 billion, and GO-JEK's was USD 5 billion, respectively (Pitchbook, 2018). The company that is best known for its investments in the TNC industry around the world is Japanese SoftBank, which has shares in Uber, Didi, Ola, and Grab due to its investments. Softbank has invested around USD 20 billion in the TNCs since 2014 (Economist, 2018).

There are many different reasons why investors invest in the TNCs (Singh, 2017):

- Rising income levels,
- Increasing taxi usage rate,
- Changing consumer behaviour,
- Demographic characteristics,
- Alternative to private car ownership, and
- Ability to integrate into the main transportation network.

2.9.2 Service Portfolio

Considering the services offered by the TNCs, it seems that they can utilise both traditional taxis and private vehicles. These services mostly meet the need for chauffeur-driven vehicles, but apart from this, bicycles, boats, buses, etc. can also be found in the vehicle inventory of the TNCs. In the same way, the TNCs also offer a variety of services to different target audiences by making serious segmentation. Uber, for example, has different service range and brands such as UberTaxi, UberX, UberXL, UberBlack, UberSUV, UberLUX, UberPOOL, UberBoat, UberRUSH, UberFRESH, UberEATS (Yıldızgöz, 2018).

The Chinese company Didi can also be presented as another example since it provides different services in hundreds of Chinese cities. These services include taxi calling, private car calling, ride sharing, driver rental services as well as bus and test drive services, etc.

Subscription-based services have also been offered to a great extent by the TNCs lately. With the "Ola Share Pass" offered by Ola Cabs, passengers have the opportunity to make a certain number of trips at a fixed price (Ola, 2017).

In addition, Ola signed a contract with the Bengaluru Metro Rail Corporation Limited (BMRCL) and set up reservation stands at 7 different metro stations. In return, a monthly payment is to be made by Ola to the BMRCL. Uber, likewise, has signed a similar agreement for 12 subway stations (Deccan Herald, 2017).

GrabCoach, on the other hand, provides coach services with a capacity ranging from 13 to 40 people. The one-way price for 13-seat coaches is US$46, US$67 for 23-seaters, and US$106 for 40-seaters. Passengers can make reservations 7 days in advance according to their demands (Chan, 2017).

Uber Elevate White Paper was prepared and published by Uber in October 2016. A new team was formed by Uber for this service called UberElevate, to conduct necessary studies with the aim of developing demand-based air transportation (Uber, 2016).

Didi- China's leading app-based transportation service provider- has set up reservation kiosks in many regions, targeting those who will use it for the first time and those cannot use a smartphone. Relevant kiosk areas have also become areas for drivers to wait for passengers. Chauffeur hire only is also available with a new service launched by Didi. With this application called Didi Driver (Didi Daijia in Chinese), customers can hire drivers to use their own vehicles. Rented drivers go to the meeting point by public transport or by folding bike. A special application called *eDaijia* has been designed for this service (Singh, 2017).

Another area that the TNCs has paid attention lately is bike sharing systems. Uber started to offer a bike sharing service by purchasing the bike sharing system, JUMP, in New York in 2018 (Hawkins, 2018). Uber's competitors around the world are also interested in bicycle systems for their business purposes. Ola also introduced their bicycle rental system in India in December 2017. Didi in China and Grab in Southeast Asia has also introduced bike rental services in the last couple of months.

2.9.3 Impact on Urban Transportation

The impact of the TNCs on urban transportation is an important topic of discussion today, with conflicting research reports and opinions in this area. A study conducted by the University of California, Berkeley in the spring of 2014, examined many aspects

of the TNCs and their role in urban transportation, and revealed that the they meet the existing demands for convenient and point-to-point transportation. In spite of the similarities between classical taxis and the TNCs, there are still many differences.

The TNCs appear to offer their services with shorter waiting times and higher reliability to their users from the younger segment with low vehicle ownership rates. In 2016, Sun et al. examined the impact of the TNCs on taxis in Yiwu, China. After the TNCs entered the market, full mileage rates of taxis decreased from 69% to 62%. Taxi companies' rental fees for drivers decreased by 19.3%, thereby leading to decreased income levels for taxi drivers by 23.4% (Sun, 2016).

The study conducted by the Pew Research Centre (2016), 15% of adults in the US used the TNCs, but a third of these adults had never heard of such applications, revealing that there is still a serious market potential in this field, even in the USA. That study also shows that the TNC users have lower vehicle ownership rates than others (Pew Research Centre, 2016). Figure 2.11 presents the travel frequency and vehicle ownership status of passengers using the TNCs.

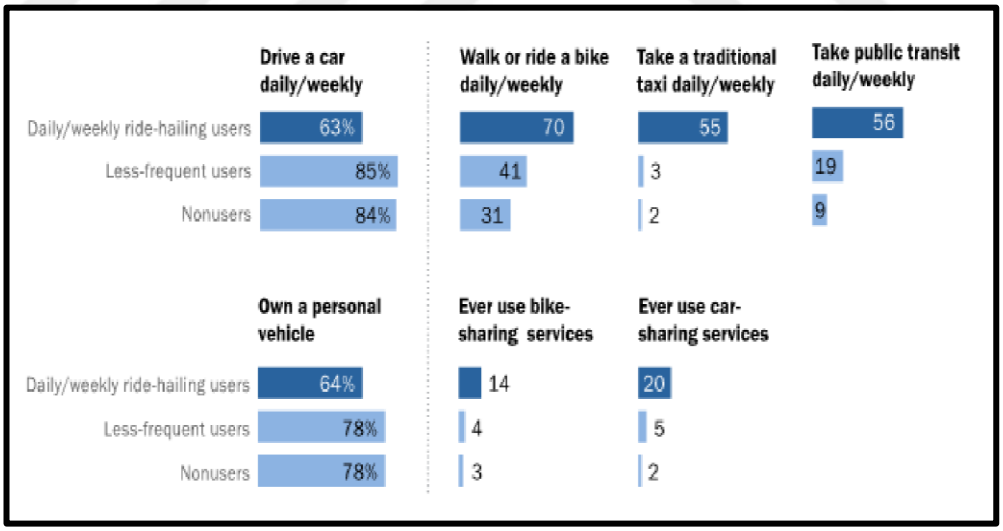


Figure 2.11: Travel and Vehicle Ownership Status of Passengers Using the TNCs

Source: Pew Research Centre, 2016

Uber's pick-up locations in New York are mostly near public transportation stations, which can be presented as a proof of the above-mentioned situation (Silver & Baum,

2015). In Paris, on the other hand, 65% of Uber journeys start and end within 200 meters reach of metro stations (UITP, 2016). Another example is London, where the London Underground changed its working hours and started night services as of the summer of 2016. The number of journeys starting near metro stations at night increased accordingly by 22% (Roa, 2016).

Apart from the positive examples mentioned so far, there are many studies stating that the TNCs have a negative effect on urban transportation and traffic congestion. In particular, the TNCs are controversial and said to be resulting in the loss of public transportation passengers due to the competition, causing kilometres of vehicle traffic on the streets and non-transparent price policies, as well as endangering public safety.

Wagner asserted that even though the TNCs seem to reduce traffic congestion by providing passengers with a more efficient transportation opportunity, they also cause traffic congestion since it attracts passengers of public transportation (Wagner, 2017).

Matt Daus, the former chairman of the New York Taxi and Limousine Commission, states that since the TNCs are growing very fast, such rapid growth is likely to pose a serious problem especially for dense cities. Uber has grown from 0 driver in 2012 to 160,000 active drivers in 2014 in the USA. Figure 2.12 reveals the increase in the TNC drivers in the USA after 2012 (Daus, 2016).

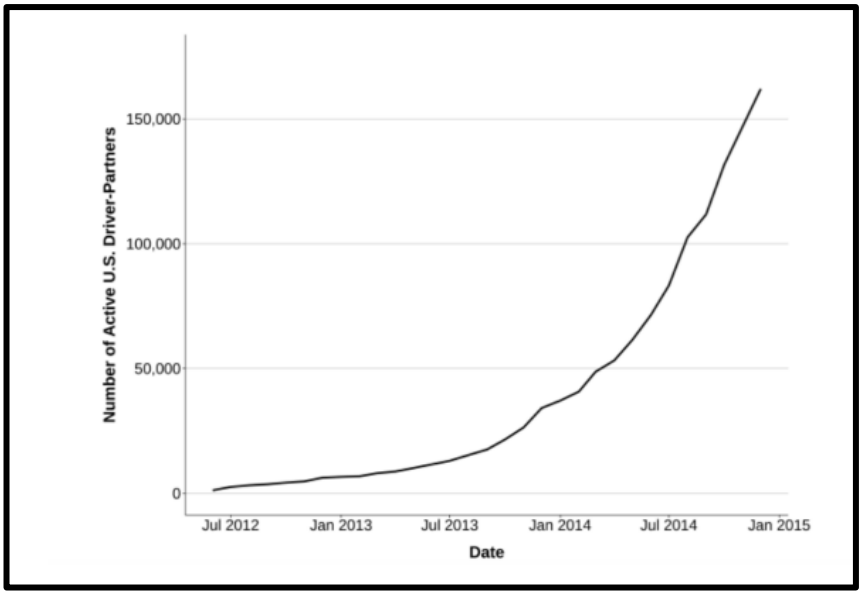


Figure 2.12: Change in the Number of Active TNC Drivers in the USA

Source: McBride, 2015

According to Jarret Walker, a transportation expert, the TNCs pose a serious threat to urban transportation and it is not possible for them to offer a specific capacity recommendation (Walker, 2016).

The efficient use of limited urban spaces is another issue of concern. Despite the fact that public transportation modes use limited urban spaces much more efficiently than the use of private vehicles, and that the TNCs do not boost the efficiency in this area and operate with low-capacity vehicles, a comparison of public transportation with private vehicles in terms of urban area usage can also be made for the TNCs. Bruce Schaller, a taxi expert in New York, stated in his study specific to New York that the use of the TNCs doubled every year, reaching 133 million passengers in 2016, which is quite as high as the number of passengers served by New York yellow taxis. Considering the decrease in the number of yellow taxis, the TNCs seem to have both received customers from yellow taxis and gained 52 million additional passengers (Schaller, 2017). Schaller also calculated the vehicle kilometres. A total of 19% additional vehicle mileage is accounted for by the TNCs in New York's yellow and black taxi vehicles, creating more vehicle traffic on the roads. The change in the number of passengers carried by public transportation is also of great importance. In New York, Uber and Lyft grew rapidly in 2015, with the taxi/chauffeur-driven rental segment gaining 17 million additional passengers. Waterborne and bicycle systems, on the other hand, increased by 11 million trips, while bus journeys decreased. This decrease can be seen even more clearly in 2016. In addition to buses, metro passengers also decreased in 2016. The TNCs increased the number of their passengers, whereas most of these passengers were subway and bus passengers (Schaller, 2017).

2.9.4 Different Legal Regulations of the TNCs

Legal regulations for the TNCs differ significantly from each other in many countries. In some countries, however, the existing legal structure was changed after the TNCs were introduced, while others adopted a strict attitude in this regard, prohibiting or restricting the work of the TNCs.

2.9.4.1 The United States of America

As the birthplace of the TNCs, the USA is one of the countries where the most debates take place in this field. The USA seems to have adopted different approaches in its different states, yet has made legal arrangements for 34 states and 69 different cities as of January 2017 (Daus, 2017).

- In New York, the Taxi and Limousine Commission has published a guide for licensing and rules guide for e-hail applications (New York Taxi & Limousine Commission, 2015).
- A bill focusing on insurance was issued in San Francisco (Public Utilities Commission, 2014).
- In Texas, the relevant authority introduced fingerprint control requirements for drivers, which was not welcomed by the TNCs (Hawkins, 2016).
- A new guideline has been published for the TNCs in Maryland and a fingerprinting requirement has been introduced (Maryland Public Service Commission, 2016).
- The TNC drivers in Springfield are required to produce a background check clearance certificate (The Missouri Times, 2016,).

2.9.4.2 Canada

In mid-2016, the TNCs operated to the extent that they served more than 50% of the population in Canada, comprising 14 cities, namely, Calgary, Edmonton, Toronto/GTA, Ottawa, Montreal, Quebec City, London, Guelph, Waterloo, Kitchener, Niagara, Windsor, Hamilton, and Kingston (Licorish, 2016).

- With the new regulation enacted in January 2017 in the city of Hamilton, it was declared that the TNCs with more than 100 vehicles would pay a fixed annual fee of $50,000 and a fee of 6 cents per journey. The TNC drivers were prohibited from picking up passengers on the road, and they were only allowed to pick up those who called via a mobile application (Craggs, 2017).
- With the law enacted, Edmonton became the first city to legalize the TNCs, and as of March 2016, the TNCs have been subject to rules in certain matters such as

insurance, annual vehicle inspection, background check clearance certificate for drivers, and minimum pricing per journey (Stolte, 2016).

2.9.4.3 Brazil

The federal government in Brazil is working on a legal regulation that will be valid throughout the country, in addition to the individual initiatives taken by the cities on their own.

- With the regulation enacted in Sao Paulo, the TNCs were legalized but taxed with a fee of 10 centavos ($0.03) per km driven. The money collected is to be transferred to the municipal fund (Woody, C., 2016,).
- In Rio de Janeiro, on the other hand, the TNCs are prohibited from working with unlicensed taxis, but still, that did not hinder the operation of Uber, because this situation is expected to change with the new legal regulation to be enacted by the federal government (Brazil Business, 2016).

2.9.4.4 Mexico

In Mexico City, the city council has approved a legal regulation on this subject, determining a 1.5% tax on the income of all trips besides an annual license fee. The tax is transferred to the newly established “Taxi, Mobility and Pedestrian Fund” (Haldevang, 2015).

The Tijuana city council also legalized the TNCs and required that 1.5% tax be paid on the TNCs total income. In addition, insurance procedures that can cover up to USD 150,000 of damage against passengers and 3rd parties are obligatory, and require that vehicles be not older than 6 years old and be worth more than 8,000 USD (Singh, 2017).

2.9.4.5 The United Kingdom

London taxi transport is always cited as an example around the world. The transport authority in London- TfL- enacted a new legal regulation in June 2016, and along with this, drivers were required to speak English, to have a panic button in the vehicles, to enable passengers to know the driver and vehicle details before the trip, and to estimate the correct fare.

A regulation was put into effect that required cameras to be placed inside the vehicles and a 26% sales tax per trip was introduced. In the same manner, regulations such as the driver's status as a worker, minimum wage, and the right to sick and vacation leave were clearly specified. UBER's operating license in London was not renewed by the TfL at the end of 2017 (Chapman, 2017).

2.9.4.6 The United Arab Emirates

Uber and Careem operate as TNCs within the network of Dubai taxi services. Dubai is the first city in the United Arab Emirates to take a step in this field, as a result of the separate agreements between the transportation authority, the RTA, with Careem and Uber. Both applications are only allowed to work with limousine operators and are prohibited from using other types of vehicles. The price of limousine services was designated to be at least 30% more than the normal taxi fare (Al Ali, 2017).

2.9.4.7 South Africa

The National Land Transport Act (NLTA) in South Africa has defined six categories of passenger transport, namely, buses and minibus taxis, metered taxis, rental services, taxis and traditional tuk-tuks. There is no regulation addressing the TNCs. The government made a revision in the NLTA and added the TNCs as a subcategory and regarded them as taxi operators with a taximeter. According to this regulation, smart phones can be used as taximeters, distance and fare are to be estimated in advance, and driver details are to be shared before the journey (National Land Transport Amended Bill, 2016).

2.9.4.8 Australia

The TNCs were legalized by the Australian Capital Territory (ACT) in October 2015, under certain conditions such as background clearance check, vehicle inspection, and insurance obligation for drivers. A fund called the "industry adjustment package", amounting to 250 million Australian Dollars, was established by the relevant authority for the use of existing taxi drivers, with the aim of compensating the damage to the taxi drivers (Yıldızgöz, 2018). In particular, South Australia legalized Uber-style services in July 2016. The TNCs are required to comply with the safety rules in the Passenger Transport Act. For taxi services, on the other hand, a compensation of AUD 30,000 per license was paid, and a sales tax of AUD 1 was charged for each trip made with the TNCs to fund that amount (Fare, 2016). In Western Australia, however, the approach of deregulation of the taxi industry has gained importance. Within the scope of this plan, a conversion support package of AUD 27.5 million has been prepared to pay taxi license holders AUD 20,000 (ABC News, 2016).

2.9.4.9 New Zealand

"Small Passenger Services Guide" has been published by the Ministry of Transport in Zealand. Services such as taxis, limousines, shuttle vehicles, ride sharing, driver calling are comprised in the same category. Taxis are called as an "SPS", that is, a small passenger service, and are to continue operating in conformity with their old systems according to the guide. Technology and mobile application-based businesses are also defined as SPS and have to be an approved transportation operator. With the new law, drivers' background clearance check has been facilitated for the TNCs, and some safety requirements such as the obligations to pass the English and knowledge test and to place cameras in the vehicles have been removed. With the law, the TNCs have become obliged to ensure vehicle inspections, keep fuel bills, and collect passenger logbooks (New Zealand Ministry of Transport, 2016).

2.9.4.10 Singapore

Singapore is one of the most important cities to pose an example when it comes to taxi transportation around the world. The Land Transport Authority (LTA) in Singapore

enacted on September 1, 2015, the "Third-Party Taxi Booking Service Providers Act". In this framework, it is obligatory to register with the LTA and obtain a license for every institution that provides this service with more than 20 taxis (Teo, 2016). The basic conditions are presented as follows:

- Institutions that provide this service without registering with the LTA are sentenced to 10,000 Singapore Dollars and/or imprisonment for less than 6 months.
- Passengers are clearly informed in advance of the amount of fare and possible additional charges for the journey.

Another regulation put into effect by the LTA in February 2017 determined the issues for drivers working in this field. Drivers' criminal background check, periodic training, and registration with the LTA are among the innovations brought in this context.

2.9.4.11 The Philippines

The Philippines was the first country in South East Asia to authorize the TNCs. With the regulation enacted in May 2015, the Department of Transportation and Communications created a new category within the existing law. Within the scope of the new classification, the TNCs were specified as web-based applications that provide pre-arranged transportation services for a certain fee (Land Transportation Franchising and Regulatory Board, 2015).

2.9.4.12 Malaysia

The nationwide transportation authority, SPAD, in Malaysia released the "Taxi Industry Transformation Programme", in which it authorized the TNCs such as Uber and Grab and initiated a reform in the taxi industry. There are 4 basic principles within the scope of this program:

- Being based on technology,
- Increasing the income and welfare of drivers,
- Increasing the quality of taxis and
- Rationalizing the taxi fares (Hassan, 2017).

2.9.4.13 Indonesia

The Ministry of Transport issued the Regulation 32/2016 for the TNCs in April 2016. Within the scope of this regulation, the TNCs shall either work with licensed transportation companies or establish a licensed one themselves. Drivers are obliged to either be employees of these companies or to be members of driver cooperatives (Susanty, 2017).

2.9.4.14 Japan

No new legal regulation has been made in Japan since the introduction the TNCs. Operators are expected to abide by all the rules applicable to taxis (Hanada, R., Urasaki, K., 2016).

2.9.4.15 South Korea

Uber and other mobile app-based companies are all banned in Seoul. The Seoul Metropolitan Administration has launched its own taxi application to be valid for the registered taxis (Strange, 2014).

2.9.4.16 Taiwan

Under Taiwanese law, taxi companies must be owned and operated within the country. Since the government has refused to make separate legislation for technology firms, Uber has had serious problems in Taiwan since it first started operations in 2013. Uber is registered as a knowledge management company in Taiwan but is recognized by the government as a transportation company, and therefore Uber ceased operations as of February 2017 (Mullen, Yang, 2017).

2.9.4.17 China

The Chinese government introduced a number of temporary practices for online ride-hailing businesses and services in July 2016. Later, the joint application of the Ministry of Transport and six other ministries was legalized and became effective as of

November 1, 2016 (Singh, 2017). The main elements of the regulation are as follows (Singh, 2017):

- Business certificates must be obtained from the district administration,
- Vehicles must have a capacity of less than 7 with a GPS,
- Vehicles must be commercially licensed,
- Drivers must have 3 years of experience with no violent criminal record,
- Drivers must have legal qualifications for taxi operation,
- An employment contract must be signed with the drivers, to specify issues such as working hours and service frequency,
- Wages must be determined according to the rules of the relevant state and must neither violate the conditions of fair competition, nor dominate the market by determining the wages below the costs,
- Necessary data related to services in China must be collection and stored,
- Penalty of between 10,000 and 30,000 RMB shall be payable in case of an operation without legal permission.

2.9.4.18 Vietnam

In April 2014, the government in Vietnam published a guideline, in which the TNCs are required to enter into contracts with law-abiding local transportation companies. The contracts defined the legal elements such as how to identify vehicles with official registrations and logos, and how to equip vehicles with tracking devices. The guideline, however, had some problems in practice and the government was expected to devise a new regulation (Nikkei, 2015).

2.9.4.19 India

In India, a new legal regulation was made on 15 December 2016 in relation to this area and a guide was issued to be put into practice in all states and cities across the country (Singh, 2017).

2.9.4.20 Germany

According to local laws, taxi drivers are required to have commercial licenses and comply with the pricing system, and there are no other legal regulations in relation to this matter (Davies, 2016).

2.9.4.21 Spain

The TNCs can only operate with licensed taxis and there are no other legal regulations on the subject matter (Che, 2015).

2.9.4.22 Denmark

In February 2017, Denmark adopted a new legal regulation including such obligations as mandatory use of a taximeter, video tracking, seat use detector for the activation of airbags (Henley, 2017).

The European Court of Justice made a decision binding on all member states of the European Union at the end of 2017. In the lawsuit filed by Elite Taxi, operating in Barcelona in 2014, the company claimed that Uber should be regarded as a transportation company and therefore, like other transportation companies in the country, it should obtain the necessary licenses and permits in accordance with the legal regulations. The EU's highest court, the European Court of Justice, has ruled on the case against Uber. The Luxembourg-based court ruled that Uber was a transportation company, indicating that "the service provided by Uber connecting individuals with non-professional drivers is covered by services in the field of transport. Member states can, therefore, regulate the conditions for providing that service" (the European Court of Justice, 2017).

2.9.4.23 Russia

The federal law in Russia is very permissive for taxis in that any person or company can easily operate a taxi. The TNCs, on the other hand, can only operate with licensed taxis and have tax sharing obligations with the transportation authority. In July 2016,

a value-added tax of 8% was introduced by the state to be valid as of 2017, for goods and services purchased from the internet as well as for the operations of Uber. International companies are not obliged to establish a legal entity in Russia and can pay their taxes through their partners in the country. Uber directed its Russian drivers to register as a legal entity and individual entrepreneur, and their tax liability was stated in their contracts with Uber N.V., namely Uber's Dutch company (Khrennikov, 2017).

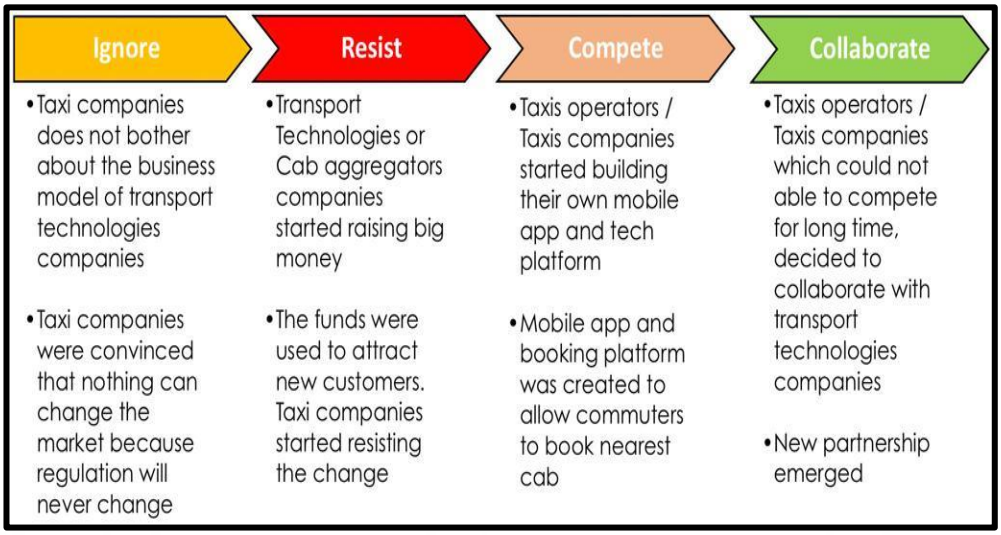
2.9.5 The TNCs and Traditional Taxis

The greatest impact of the TNCs appears to be on the traditional taxi market since they have caused a serious transformation and change in urban mobility. In China, for example, taxi plate values have declined by 60%, the number of drivers in the taxi driver pool by 18%, the number of new taxi drivers by 33%, and taxi revenues by 20-30% since 2014. The number of passengers using traditional taxis seems to have declined in recent years (Guoping, 2018). The number of trips by taxis are reported to have decreased by 65% in San Francisco between 2012 and 2014 (Canabutan, 2014), while taxi plate prices in New York were 1 million USD in 2013, but decreased by 25% in 2015 (Wallsten, 2015).

Similarly, license plate values in Hong Kong decreased by 1 million Hong Kong dollars, and in Toronto from CAD 90,000 to CAD 360,000. In Dubai, the number of regular taxis decreased by 15% after the introduction of Uber and Careem (Yıldızgöz, 2017).

In the mainstream taxi industry, a variety of responses have been given in various countries against the introduction of the TNCs. As shown in Table 2.17, such various responses can be grouped into four basic categories, namely, "Ignoring" the TNCs, "Resisting" them, showing a "Competitive Effort", or focusing on the "Development of Collaboration".

Table 2.17: Various Reactions of Traditional Taxis to the TNCs



Source: (Prepared for the purpose of this Thesis)

2.9.6 Ignoring Attitude Towards the TNCs

Today, taxi operators or taxi owners in many countries tend to ignore the TNCs, but rather focus on their traditional business. They think that the taxi industry is subject to serious regulations and that the governments will never allow any operations outside of this regulation, due to which, there are also countries or cities where the TNCs have not yet entered, but this is particularly true for small cities.

2.9.7 Resistance Against the TNCs

Taxi drivers or taxi operators react negatively to the introduction of the TNCs in many different ways. In some instances, it has been aimed to attract public and media attention by closing roads, stopping services, and holding demonstrations. Especially in a number of European cities, such examples have been encountered recently. Apart from the demonstrations, taxi representatives also started serious lobbying activities, increased their communication with the press, and started various legal procedures.

2.9.8 Competitiveness

Traditional taxi owners' competitive reaction against the TNCs is one of the most common situations experienced worldwide today. Many taxi associations or companies have already launched their own mobile applications and attempted to develop a variety of projects to increase their service quality. In a study by Jaspal Singh (2017), the author made mention of various applications in this area, some examples of which can be presented as follows: The taxi mobile application named 9211 in Mumbai- one of the largest cities of India-, Oride, which represents 90% of the taxis in Malaysia, and the Tokyo Taxi Association, TAKKUN's mobile application in Tokyo. In a similar manner, the Italian Taxi Drivers Association, URI has made the "It Taxi" application available in more than 30 cities in Italy in Italian, English and German. In Australia, the "IHail" application is available to include more than 50% of taxis (Singh, 2017).

Picture 2.15: Traditional Taxi Advertising vs Dynamic Pricing of the TNCs in Singapore

Source: Personal Photo Archive

2.9.9 Development of Collaboration

Under this approach, taxi owners, their companies, and their associations work in collaboration with the TNCs. Working in partnership with black cabs in London, "Hailo" stand out as a good example in this context. As another example, "e-Cab" has entered into partnerships with taxi operators in different countries. In Singapore, on the other hand, Premier Taxis Pte Ltd has started a partnership with "Grab". In this connection, 3,000 drivers working for Premier Taxis have been involved in the Grab system. Grab also partners with Trans-cab in Singapore (Singh, 2017). Moreover, the Public Transport Council (PTC) and the Land Transport Authority (LTA) freed the taxi operators in Singapore with respect to implementing dynamic and incremental pricing (Lim, 2017).

In Dubai, some traditional taxi operators have entered the market by developing their products in the Limousine (Luxury Taxi) segment, in addition to their usual taxi operations, following the inception of Uber and Careem, and cooperated with "Uber and Careem" in this segment (Yıldızgöz, 2017).

2.10 The Pandemic and Taxis

The coronavirus crisis, which has been impacting the whole world since 2020, has made urban transportation and passenger transportation services one of the important issues discussed by both decision makers and citizens. Along with the crisis, taxi supply decreased by 50-60% and the revenues of taxis decreased by 80-90% in many cities around the world. The number of trips dropped to 70-80% in Hong Kong, 50-70% in Australia and 80% in Norway. In like manner, in some other countries such as India, Philippines, Malaysia, Vietnam and Thailand, taxi services were also completely suspended during the quarantine period, ultimately resulting in no taxi rides (UITP Taxi Committee, 2020).

In Turkey, on the other hand, despite the lack of clear statistics published on the decrease in the number of passengers and income, odd-even license plate policy was applied for the taxis in İstanbul, Ankara and İzmir between 30 March – 5 May 2020 in conformity with the decision of the Ministry of Interior, thereby halving the taxi supply

(the Ministry of Interior, 2020). Bitaksi, the TNC serving in İstanbul and Ankara, declared that the demand in Bitaksi decreased by 87% compared to the pre-crisis period, in a statement made at the end of March 2020 (Salur, 2020).

The decrease in the number of trips and revenues was not the case only for the taxis, but also for the TNCs. The CEO of Uber, Dara Khosrowshahi, for instance, reported an 80% decline (Hawkins, 2020), and Ola likewise, which operates in many countries, especially in India, announced this rate as 95% (Browne, 2020).

In Singapore, however, with the decreased demand for taxis and the increased demand for delivery business, the Land Transport Authority, LTA, in Singapore allowed taxis to operate in the delivery business until September 2020 (Channel Asia, 2020). Similar practices started in various cities of Germany (DW, 2020) and in other cities like New York (Pereira, 2020).

As can be expected, the crisis had serious financial impacts on the taxi industry, as a consequence of declining number of taxi trips and levels of income. By announcing some subsidies for the sector during the crisis, some countries have tried to support the sector so that it could survive. Some taxi operators have filed for bankruptcy protection due to the effects of the crisis (NYPost, 2020).

Due to the declining demand and falling incomes, the TNCs tried to reduce their costs by laying off their employees. The rate of layoffs, as an example, reached 25% of the total number of employees when 3700 more employees were laid off in addition to the 3000 employees who were announced to be laid off at the first place by Uber. Upon the decision, Uber closed down its 40 offices around the world (Crum, 2020). Similarly, Ola dismissed 1400 employees, which accounted for 33% of the total number of its employees (Abrar, 2020).

In the city of Dubai, United Arab Emirates, however, it was aimed to provide a certain extent of convenience for the people suffering from economic difficulties by reducing the taxi fares by 30% during the pandemic-induced crisis (UITP Taxi Committee, 2020).

In many cities, taxis provided free service for health workers within the period of pandemic crisis. Such services were generally rendered with the joint initiative of the health and/or transportation authorities related to the taxi operators in most cities, while in some others, taxi companies offered such services without any financial

return. As reported by the Governorship of İstanbul in Turkey, BiTaksi & MasterCard Turkey allocated 12,500 free taxi services for healthcare workers. With this project, health workers working in 30 hospitals in İstanbul were able to get access to free transportation from home to work and from work to home via the BiTaksi application, on condition that they submitted an informative letter taken from their chief physician. In addition to this, İstanbul Chamber of Taxi Drivers and İstanbul Airport Taxi Cooperative announced that they had decided to transport health personnel in 50 public hospitals free of charge on May 1st, 2nd, and 3rd as well as during the pandemic, with 300 taxis and 50 taxis, respectively (Orkan, 2020).

CHAPTER III
METHODOLOGY AND RESULTS

3.1 Research Questions

The “Transportation Network Companies” are completely shaping the urban mobility, particularly the taxi industry all over the world. They are on almost everyone’s lips today and the topic of many academic and professional discussions.

The impact of the TNCs on sustainable urban mobility, their regulation, and their role in the future ecosystem of mobility are definitely critical topics. In addition, it is essential to evaluate the current situation of the traditional taxi industry, which is greatly challenged by the TNCs, and future perspectives towards it from several different angles, not only in terms of urban mobility but also of social and economic aspects in relation to the society.

Being the largest city in Turkey, İstanbul has also been facing challenges related its taxi industry especially since the introduction of the TNCs and changing passenger demands and expectations.

As can be predicted, these topics will remain as the core issue of debate in the future. This doctoral thesis will concentrate on different aspects of Taxi Transportation and Transportation Network Companies, and the following central research questions have been identified:

- How should cities regulate the TNCs and define relevant policies?
- What should the traditional taxi sector do for its future due to the disruption caused by the TNCs?
- How should İstanbul adapt its taxi sector into new market conditions?

3.1.1 How Should Cities Regulate the TNCs and Define Relevant Policies?

The introduction of the Transportation Network Companies created many legal challenges because of their different features of operating and business model. Policymakers and regulators are pressured to take an approach on that quickly.

Today different countries have taken different stances as policy and regulatory framework responses as regards the market entry of the TNCs, yet there is no common approach. This topic has also been discussed in some studies, but not addressed in details until now. Current studies are mostly in favour of solutions with respect to the market protection for current taxi operators or full liberalization of the market. Both approaches are missing the main purpose of public regulation. A regulation should be used as a tool for reaching public policy goals, and here the public policy should be the one that ensures sustainable urban mobility from economic, social, and environmental aspects.

Current studies seem to have failed to establish a link with their proposed regulatory approaches to the current market regime of the respective cities, which are unique and different in each case, nor do they provide detailed implementation measures and observation in terms of potential results. There is also no regulatory approach in current literature proposed to address the traffic congestion which might be caused by the TNCs in cities. This study will make concrete proposals on this as policymakers and regulators are pressured to take a clear approach. A set of recommendations addressing important areas of the TNC policy, and can help guide safe, efficient, and sustainable mobility will be developed as a regulatory framework for the TNCs in order to be able to ensure the efficient implementation of above-mentioned policies.

Below are the actions to be taken and methodologies to be used related how this research question will be analysed.

a) Survey for Transportation Authorities

- A set of parameters were developed covering economic, social, and environmental aspects of urban mobility to be able to present the impact of the TNCs on congestion, public transport, taxi, travel habits etc.,

- Definitions for that indicators were presented to be able to make correct comparisions and further analysis,
- Different cities with different sizes, geographical backrounds, different mix of mode shares were selected,
- Survey was administered to the urban transport authorities of those cities who can present the full overview,
- Data was collected from those cities based on their own research and studies (e.g. travel survey, urban mobility master plans, other studies),
- Collected data went for internal (compatibility with other data from the same city) and external (compatibility with data from other cities) checks and adjustments.
- Organizations and general policy messages were defined and elaborated.

b) In-Depth Interview with Key Executives of the Taxi Sector

- Different policy and regulatory model options were identified based on previous initiatives of cities and responses to surveys and considering the challenges identified in the previous section,
- In depth interviews were conducted with key taxi professionals to get their opinion about the different model options.

c) Focus Group Sessions

- Focus group sessions were organised to further discuss with the related experts,
- Regulatory challenges were discussed at the focus group meetings,
- Regulatory options were evaluated at focus group meetings.

d) Other Available Data and Research

- Previous data published already will be analysed and used for comparision with the findings of the survey,
- Previous research of other researhces will be also analysed as main source and to make consistency checks,

- Regulatory matrix based on literature review was developed to categorise the regulatory responses.

3.1.2 What Should Be Done by the Traditional Taxi Industry in the Aftermath of the TNC Disruption?

Undoubtedly, the most important impact of the disruption caused by the TNCs was felt on traditional taxi services. There are variety of responses already given by the traditional taxi industry to the TNC disruption in different countries. Responses can be basically categorized into 4: Taxi Companies who are "Ignoring" the TNC Disruption, "Resisting" to the disruption caused by the TNCs, developing "Competition" against and "Collaborate" with new actors. Current research recommendations for the traditional taxi sector are limited although the traditional taxi sector is the most impacted party by Transportation Network Companies. Limited current research mostly recommending the taxi sector that it should compete against the Transportation Network Companies but a concrete strategy for this competition is missing. Competition against Transportation Network Companies by the traditional taxi industry is not an easy task. Different options need to be evaluated and discussed in further studies. Also, the collaboration option as a strategy has not been suggested in any research. Transportation Network Companies today are reality and have many competitive advantages against the traditional taxi industry. Collaboration option needs to be researched as well in order to develop messages both to the traditional taxi sector and to the TNCs.

Below are the actions to be taken and methodologies to be used related how this research question will be analysed.

a) Survey for Transportation Authorities

- Further analysis of the results of the Survey for Transportation Authorities to develop strategic pathways for the taxi industry.

b) Survey/In depth interview with Key Executives of Taxi Sector

- Different strategic alternatives were discussed with senoir exectives of taxi operating companies.

c) Focus Group Sessions

- Focus group sessions were organised to further discuss with the related experts on scenario alternatives for the use of the taxi sector.

3.1.3 How Should İstanbul Adapt the Taxi Sector to the New Market Conditions?

The taxi, be it individual or shared, is an essential element of the multimodal urban transportation system. It is a kind of a chameleon mode taking different forms according to the environment and the context it operates. In İstanbul, taxis are important part of the urban mobility puzzle. In the growing city of İstanbul, taxis are utilized by many local and foreign residents as well as by tourists and visitors. The taxi system of İstanbul is facing challenges because of the decreasing passenger satisfaction and operational efficiency, increased accidents, as well as driver related problems. İstanbul has 17,395 taxis, a figure which has not changed since 1998. It is noticeable that the number of taxis per capita in İstanbul is much lower than other cities, that taxi fare affordability is less, and the taxi system in İstanbul faces operational challenges considering its efficiency especially in terms of utilization of taxi vehicles and vehicle-kilometres travelled. The entrance of ride-hailing apps – mainly UBER- after 2017 presented an alternative to passengers, so they started to voice up their concerns more about the current situation of taxis in İstanbul, a situation which also received higher attention from national media and politicians. This study is meant to provide a system analysis and structured assessment of the taxi system in İstanbul with the objective of identifying current situation as well as reviewing the literature and conducting stakeholder consultation, thereby culminating on developing a comprehensive strategy for taxi reform in İstanbul. Such a reform would be targeted to achieve customer satisfaction, increase operational efficiency, and to better integrate

taxis to public transportation for the sake of sustainable mobility goals leading eventually to customer happiness.

Below are the actions to be taken and methodologies to be used related how this research question will be analysed.

a) Further Analysis and Assessment of Transport Authorities Survey and Interview with Taxi Transport Executives

Current Situation Analysis in İstanbul

- Current situation in İstanbul will be defined and compared with different cities in the world regarding the current situation of taxi transportation and related trends.

User Surveys

- It will be a representative panel of randomly selected adults living in households in İstanbul.
- Questions will be about taxi travel habits and potential tendencies.

MaaS Readiness Assessment

- MaaS Readiness Assessment will be conducted for İstanbul.
- MaaS Readiness Assessment will have the objective to measure the readiness of İstanbul to implement the MaaS.

3.2 Current Situation Analysis of the Taxis in İstanbul

3.2.1 General Situation

The total number of taxis operating in İstanbul is 17,395, 744 of which are serving in towns (with C, M plates) (TUHİM, 2017). Of the 17,395 taxis, 17,000 are yellow cabs, 294 are turquoise, and 101 are luxury taxis, serving only from the airport (İBB, 2020).

Picture 3.1: İstanbul Taxi Tours

Source: İBB, 2020

The supply of taxi license plates in İstanbul was limited with the application of the restriction on taxi license plates in accordance with the law No. 10553 dated 1986, (Council of Ministers, 1986), and reached its current number with the last supply made in 1998. Since then, there has been no change in the number of taxis in İstanbul in the last 19 years. However, the population of İstanbul was 10,313,900 in 1998, whereas it has recently reached 15,462,452 with an increase of nearly 50% (TÜİK, 2020). Not only the population, but also the economic activity and the number of tourists have shown a great transformation in İstanbul in the last 20 years. Figure 3.1 presents the number of taxis that remained constant despite the population growth in İstanbul.

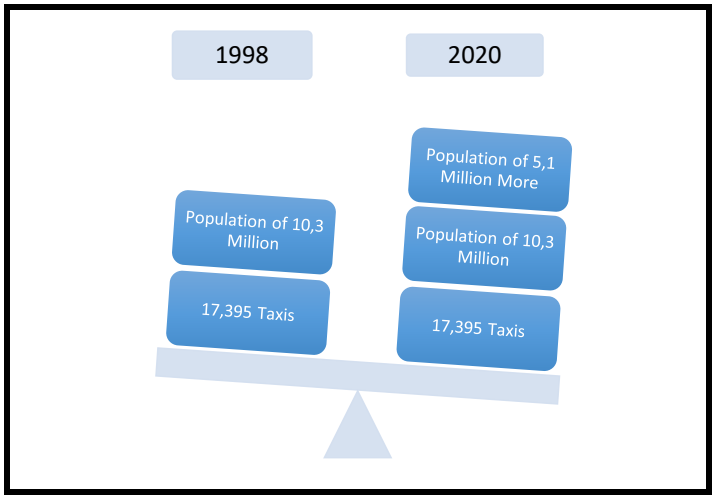


Figure 3.1: Constant Number of Taxis Despite the Population Growth

Source: İBB, 2020 & TÜİK, 2020

Obtaining and evaluating sufficient data for the taxis in İstanbul is a serious problem. There is, for example, no official data on the most basic information in this field, such as the number of daily trips per taxi on weekdays, the average number of passengers per trip, the daily total km of taxis, and the rates of taxis working in single/double shifts (TUHİM, 2017).

The population of İstanbul has increased rapidly since the last taxi supply and reached 15 million according to official sources. According to the current official figures, the number of people per taxi in İstanbul is 804. As can be seen in Figure 3.2, compared to that of in developed countries, this figure turns out high (UITP, 2015).

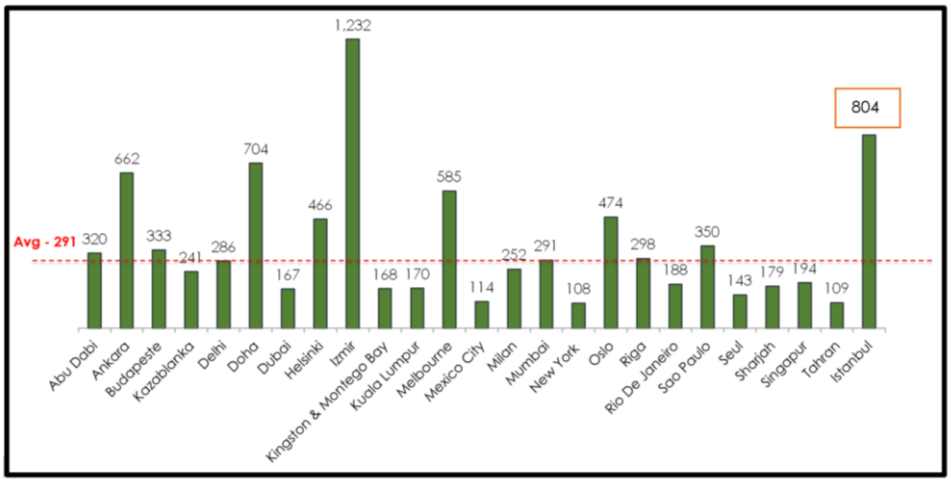


Figure 3.2: Number of Persons Per Taxi in Various Cities

Source: UITP, 2015

In order to explain such an uneven distribution in İstanbul, it is necessary to consider the decisions taken and the practices implemented in the past. Figure 3.3 shows a taxi thermal map prepared by İstanbul Metropolitan Municipality (İBB, 2020). This map shows the taxi operating areas and as expected, there is a density within the central business area.

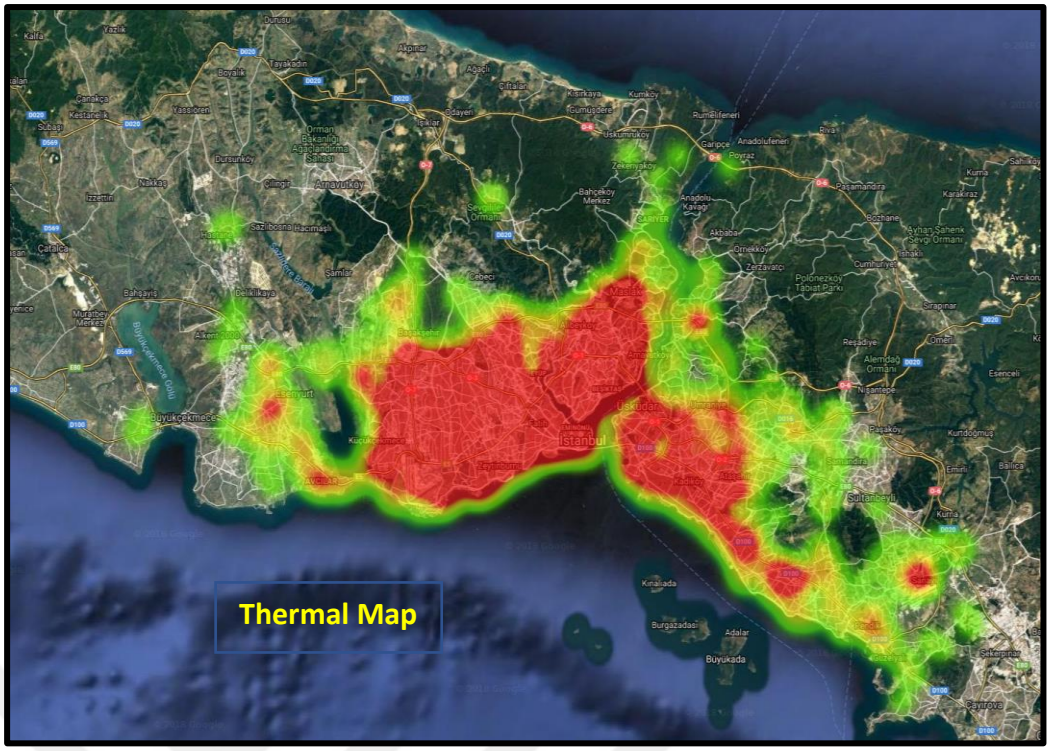


Figure 3.3: Taxi Operating Areas

Source: İBB, 2020

3.2.2 Legal and Organizational Structure

All necessary coordination for taxi transportation is carried out by İstanbul Metropolitan Municipality and taxi licenses contain the information regarding the license plate, the owner of the license, and the driver employed. The Directorate of Public Transportation Services performs this task under the organization of İstanbul Metropolitan Municipality.

The most important development in terms of legal structure in the taxi industry in İstanbul has been experienced since the Decision No 10553 of the Council of Ministers dated 1986. With this decision, all taxis serving as taxi operators until that date were officially registered. Some relevant articles of the same Cabinet Decision (Council of Ministers, 1986) can be presented as follows:

- "Article 2 - This Decision is implemented in the provinces where the decision about the license plate restriction policy has been taken by the provincial traffic commissions in accordance with the provisions of Article 12 of the Highway Traffic Law No. 2918".

- “Article 3- In order to have a commercial license plate issued, a driver shall declare that he has chosen to be a chauffeur in taxis, dolmushes, or minibuses as his profession, as a source of livelihood, that he has been performing it continuously, and that he has been a member of the relevant professional chamber, or the chamber of drivers, where there is no relevant professional chamber”; and in addition to the above-mentioned conditions, the condition of “making a living only out of this job” has been introduced in taxi license plate ownership, in the framework of restricting the number of taxi license plates.

Following that decision, some tenders were held in different years, and as a result of the one held in 1998, the number of taxis reached the current number. No supply has been made since that date. Notwithstanding the growing population, the increased mobility and the changing traffic dynamics of İstanbul, the lack of a resupply has led to increased income per taxi in the current situation, causing the taxi business to be regarded as an investment tool and various practices to emerge within this system. The developments regarding taxis have eventually made the taxi license plate prices to be considerably high.

Tax issue comes first among the various problems experienced as regards taxi operations. Since there is no invoicing system in taxis, a “small business taxation” procedure is applied, though such a tax amount is much less compared to the real income of taxis. Moreover, there is also the claim that the calibration settings of the taximeters used as a pricing system in taxis are often changed by the operators. Another problem is that although a person with a taxi plate is required to “make a living only out of this job”, this condition is not sought when the license plate ownership is transferred to another person through inheritance. In taxi operations, too many actors are involved between a license plate owner and a driver, although legally the license plate owner must also be the driver of the vehicle, leading to the revenue to be divided between 2-3 actors. For this reason, drivers enter a passenger competition in order to guarantee their own income, causing decreased quality of service. Figure 3.4 demonstrates the actors playing critical roles in the taxi transport industry.

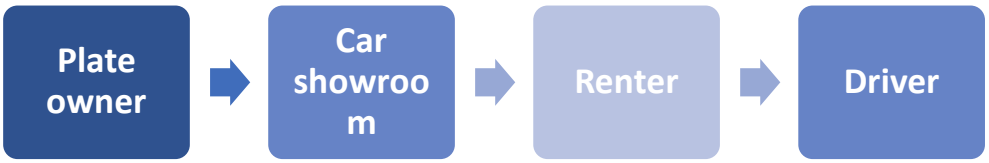


Figure 3.4: Taxi Industry Actors in İstanbul

Source: Prepared for the purpose of this Thesis

Since the number of taxis in the current situation cannot meet the demand, various forms have emerged; for example, so-called clone taxis are illegally taxiing, with a reprint of an actually existing taxi license plate. In the same way, illegal taxis operate as taxi drivers even though they do not have a commercial taxi license plate.

There is no periodic inspection for taxis. The Municipal Police performs an inspection within the framework of the Code of Misdemeanour, only upon notice.

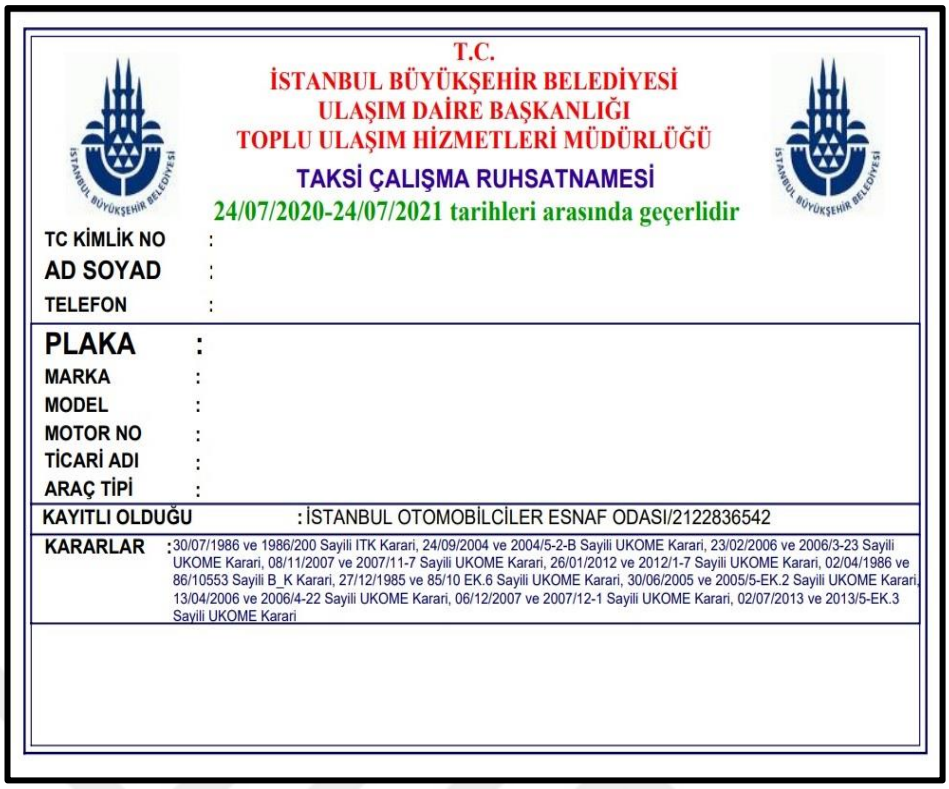
All taxis are directly related to the Public Transportation Services Department (TUHİM) of the İBB. The taxis are subject to the UKOME decisions in connection with their public service activities within the boundaries of the Metropolitan Municipality and are obliged to comply with the Commercial Taxi and Taxi Dolmush Directive prepared by UKOME. In the Commercial Taxi and Taxi Dolmush Directive (2009) created by UKOME, the duties of TUHİM regarding taxi operations are as follows:

- The Public Transportation Services Department is responsible for preparing the integration plan of public transportation vehicles in such a way as to determine the working principles of taxis and taxi dolmushes, and create, cancel, combine and change the taxi dolmush routes, designate or change the stops, increase and decrease the routes, in addition to making adjustments to be implemented, when necessary, within the boundaries of İstanbul province and within the framework of the Transportation Master Plan, and presents the plan to UKOME.
- The provisions of Law No. 5216 and 5362 are applied to determine taxi and taxi-dolmush fare tariffs.
- Since it is clearly stated in the clause that “It shall issue the Annual Operating Licenses of taxis and taxi-dolmushes”, the “Annual Operating Licenses”

mentioned in the said directive are issued by TUHİM in the name of license plate holders every year.

UKOME has the authority to set standards and make decisions on all technical issues (vehicle features, fare tariffs, environmental effects, service quality, etc.) related to the taxi operations. All decisions regarding taximeter pricing calculation and fare tariffs used in taxis are made by UKOME.

While issuing an Annual Operating License, it is expected that the license plate holders (the person who will receive the license) have driver competence and are affiliated with a professional chamber with respect to transportation. As shown in Figure 3.5, the Taxi Operating License represents the right to operate in the field of public transportation, includes necessary information related to the defined plate, such as the owner of the license plate and license, the driver or drivers employed by the license holder.



T.C.
İSTANBUL BÜYÜKŞEHİR BELEDİYESİ
ULAŞIM DAİRE BAŞKANLIĞI
TOPLU ULAŞIM HİZMETLERİ MÜDÜRLÜĞÜ

TAKSİ ÇALIŞMA RUHSATNAMESİ

24/07/2020-24/07/2021 tarihleri arasında geçerlidir

TC KİMLİK NO :
AD SOYAD :
TELEFON :

PLAKA :
MARKA :
MODEL :
MOTOR NO :
TİCARİ ADI :
ARAÇ TİPİ :

KAYITLI OLDUĞU : İSTANBUL OTOMOBİLCİLER ESNAF ODASI/2122836542

KARARLAR : 30/07/1986 ve 1986/200 Sayili ITK Karari, 24/09/2004 ve 2004/5-2-B Sayili UKOME Karari, 23/02/2006 ve 2006/3-23 Sayili UKOME Karari, 08/11/2007 ve 2007/11-7 Sayili UKOME Karari, 26/01/2012 ve 2012/1-7 Sayili UKOME Karari, 02/04/1986 ve 86/10553 Sayili B_K Karari, 27/12/1985 ve 85/10 EK.6 Sayili UKOME Karari, 30/06/2005 ve 2005/5-EK.2 Sayili UKOME Karari, 13/04/2006 ve 2006/4-22 Sayili UKOME Karari, 06/12/2007 ve 2007/12-1 Sayili UKOME Karari, 02/07/2013 ve 2013/5-EK.3 Sayili UKOME Karari

Figure 3.5: A Taxi Operating License

Source: Cırak, 2021

Taxi operators work in association with İstanbul Metropolitan Municipality in that the fare tariffs are determined by UKOME in accordance with the requirements of the Commercial Taxi and Taxi Dolmush Directive, and that the license plates and work licenses are issued by the İBB.

Taxi plates are under individual ownership, so no vehicles are owned by companies, or no contracts have been made with taxi license plate owners (as well as legal operators). Taxi license plate owners operate as taxi operators in conformity with their work licenses issued by TUHİM every year.

Picture 3.2: Taxis in İstanbul

Source: Cumhuriyet, 2016

3.2.3 Taxi License Limitation

With the taxi license "limitation" launched in İstanbul, it is aimed to:

- eliminate the needs for transportation,
- develop public transportation,
- prevent illegal taxi operations in transportation,
- protect the taxi drivers' rights.

However, it is not entirely possible to assert that the targets have been fully achieved.

30.01.1966, Milliyet, Sayfa 1

İstanbul'da plâka sayısı dondurulacak

Trafik Müdürlüğünün teklifi üzerine taksi ve minibüsler için tahdit kararı alındı

Picture 3.3: "The Number of License Plates to be frozen in İstanbul",

Source: Milliyet, 1966

The practice of limitation has inevitably led to certain interest groups to emerge. The major and strongest group that benefit from this practice are the taxi license plate holders. Increasing license plate values has not only made these license plate holders financially strong, but has also increased their pressure on decision-making mechanisms. The fact that a new taxi has not been offered in the last 23 years in response to the increasing demand is a proof of the extent of the pressure of interest groups on decision makers.

For the market to function effectively, price and quantity must be determined by supply and demand. Limiting the license plates caused an artificial restriction of the supply in the market, thereby increasing the prices. This practice requires owning one of the few license plates tendered by the state in order to operate a taxi, and those who want to earn money by operating a commercial taxi agree to pay higher prices for these license plates as they expect to make higher incomes. In other words, the major factor in agreeing to high plate values is the fact that potential demand increases with the growing population, while supply remains the same, strengthening the assumption that the number of people per taxi and income will proportionally rise.

The taxi license plate value, which was around 50-60 thousand Turkish Liras in the early 2000s, reached an average of 1.5 million Turkish Liras as of September 2017. The license plate values that have risen over the years have led to an increase in investments made in this area.

That the number of legal taxis is not enough to meet the demand, that the taxi license plates are seen as an investment tool, that the customer potential is constantly growing, and that people's expectation of profit has increased even more lead to the introduction of so-called "İstanbul Taxi Exchange", which is not legally regulated to issue licenses for plates or to do rental business. Various companies in this market carry out vehicle buying, selling and leasing processes. Plate shares are purchased and sold on this exchange market for those who cannot afford to invest in the whole plate due to the increasing plate prices. These plate shares are priced as full, half, quarter ("a wheel") or 6.5% ("stud") shares (Aydinonat, 2013).

As a result of such practices, a multi-layered structure has emerged between the taxi owner and the taxi driver. According to the Decree of the Council of Ministers, a license plate holder must also be the driver of the vehicle, and make his income only

in this way, which is, however, not the case in reality. Figure 3.6 presents the hierarchical structure in the rental system, which has become a trend in the market.

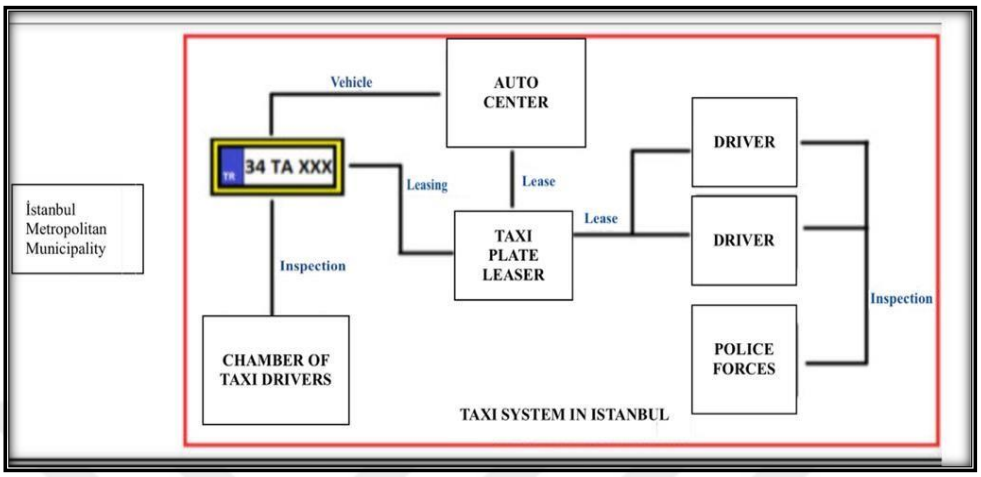


Figure 3.6: Hierarchical Structure in the Taxi Industry

Source: Prepared for the purpose of this Thesis

Considering the population of İstanbul, its demographic structure, mobility rate, and the number of taxis in the current situation, it is obvious that 17,395 vehicles cannot meet the demand in the field of taxi transportation. It is known that according to the current taxi demand, much more is needed than the official number of taxis.

Taking into consideration the current rate of meeting the taxi demand and the current number of taxis will definitely reveal the fact that there are many illegal taxis in the market. Taxis with duplicated license plates, or cloned taxis, and illegal taxis are both considered as illegal taxis. Cloned taxis are those that are produced by duplicating a taxi plate more than once, with or without the knowledge of the license plate holder, in order to carry passengers illegally. Illegal taxis, on the other hand, are taxis that also carry passengers illegally even though they do not have a commercial taxi plate.

The tax loss caused by illegal taxis, which is frequently discussed in the taxi industry, is also the case for legal taxis. Due to the absence of inspections in this regard and to the facts that taxi revenues are not documented and tax transactions are carried out through chambers, the available data regarding the tax declarations of taxi owners do not correspond with the reality.

In the hierarchical structure mentioned above, it is impossible that the annual income of a taxi will not to exceed the amounts determined as the income limit of the tradesmen. Taxi owners are subject to small business taxation by showing their income amounts less than the actual amount, with the idea that it cannot be proven otherwise. This situation inevitably leads to a high amount of tax losses.

Taxi license plates should be personalized. As is known, the procedures and principles of the license plate limitation were determined by the Decree of the Council of Ministers on the Procedures and Principles to be Followed in Issuing Commercial License Plates. Article 3 of the said decree aims to regulate to whom the owners of taxis, dolmushes, minibuses and public service vehicles can sell their plates. Taxi, dolmush and minibus owners can sell their license plates to people who have declared that they have chosen the profession of taxi driver as a source of livelihood and practice it continuously, and to those who are members of the relevant professional chamber, or the chamber of drivers, in places where there is no relevant professional chamber. As a result, taxi, dolmush and minibus license plates may only be sold to natural persons. Selling these plates to any company will be against the Decree of the Council of Ministers.

The Decree of the Council of Ministers on the Procedures and Principles to be Followed in Issuing Commercial License Plates states that the decision for a license plate limitation will be made by the Provincial Traffic Commissions. Article 9 of the Metropolitan Municipality Law No. 5216 (Metropolitan Municipality Law, 2004), states that the authorities of the provincial traffic commission will be exercised by the transportation coordination centre within the metropolitan boundaries. Article 4 of the Decree of the Council of Ministers further states that, “By taking into account the population growth and the transportation plan of the city, the need for public transportation of a province or a district shall be reported to the Ministry of Interior with a report to be prepared by the traffic commission. The authority to increase the number of commercial license plates declared for taxis, dolmushes, minibuses and public service vehicles in the provinces where license plate limitations are still applied, and to distribute all licenses, including those that have been returned and those that have not yet been allocated, by traffic commissions, shall be subject to the approval of the Minister of Interior”, in accordance to which, a new decision can be taken by the İBB UKOME regarding plate limitation. It is obligatory to submit the new decision

regarding this license plate limitation to the approval of the Minister of Interior. On the other hand, the procedures and principles of issuing commercial license plates are regulated as indicated in Article 5 of the said Decree and given as follows:

> *A commercial license plate is issued in accordance with the principles to be determined by the traffic commission, taking into account the following provisions with the closed bid:*
>
> *a. The number of commercial license plates to be distributed taking into account the needs of a province, the estimated price for 80% of the estimated value of the commercial license plate to be determined by the traffic commission in the free market, the form of application and its duration, the time of the tender and other issues shall be announced to the public by local means and/or at least two newspapers.*
>
> *b. Commercial license plates may be issued six times a year in two-month periods.*
>
> *c. Sealed bid envelopes shall be opened in the presence of traffic commissions and commercial license plates shall be given in the amount determined for that period, starting with those who have offered the highest price. The lot shall be drawn in the presence of the traffic commission among those who have offered equal prices.*
>
> *d. The bidders shall pay 1/5 of the estimated price to be determined by the traffic commission as collateral in advance. Unless the remaining part of the license plate price is paid, commercial license plates shall not be issued to those who are entitled to receive plates, and the collaterals of those who have not won the bid shall be returned.*

3.2.4 Fare Management

As for taxi fares in İstanbul, the tariffs prepared by the Union of Chambers of Tradesmen with the proposal of the relevant chamber of tradesmen are sent to TUHİM to be submitted to UKOME. TUHİM evaluates the offer and submits it to UKOME, whose decision is to be implemented. The currently used taxi fare tariff is given in Table 3.1.

Table 3.1: Taxi Tariffs in İstanbul

TARIFF	**(As of September 2017)**
Start Fare (TL)	4
Distance Tariff (TL/Km)	2.5
Time Schedule (TL/Hour)	23.10
Unit Distance Measurement Range (Meter)	100
Unit Distance Fee (TL)	0.250
Unit Time Measurement Interval (Minute)	1
Unit Time Fare (TL)	0.385
Conversion Rate Bid (Hours/Km)	9.24
Minimum Fare Per Trip (TL)	10

Source: UKOME, 2016

In the fare schedule, there is neither any difference according to the night/day nor other hours of the day, nor according to the airport or certain regions, baggage fees, etc. There is likewise no detailed procedure, pricing formula, nor any specified period to determine/change fares.

It can be considered that taxi fares in İstanbul are higher than those in many cities around the world. The level of taxi fares in İstanbul is almost the same as that in cities such as Singapore and Seoul, where the level of development is higher and personnel salaries and fuel expenses are not lower than they are in Turkey. Figure 3.7 presents a comparison of the taxi fare levels across different cities.

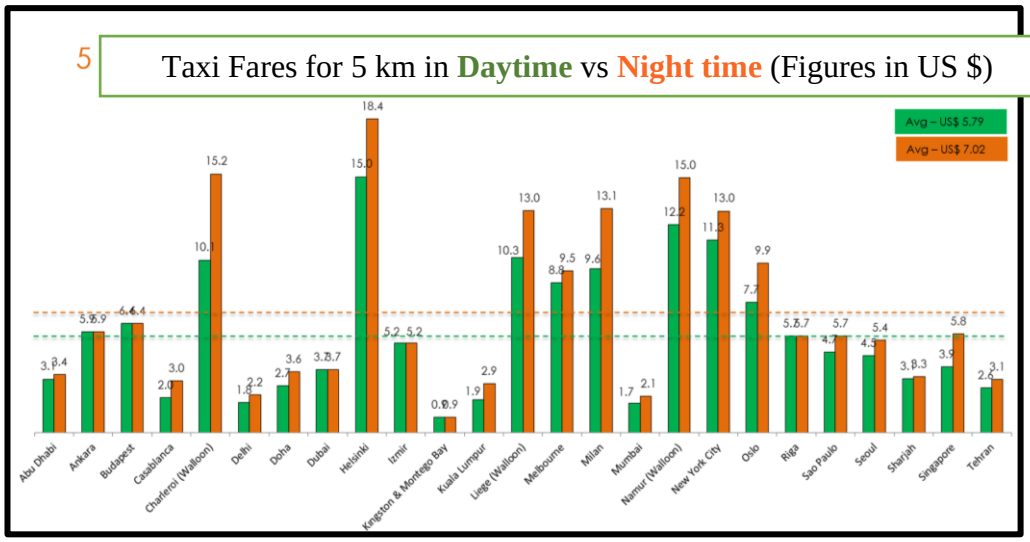


Figure 3.7: Taxi Fare Levels in Different Cities

Source: UITP, 2015

There are two main reasons for high taxi fares:

- The high amounts of daily turnover and taxi plate license costs that are paid to the license plate holder as rent
- Inefficient operation of taxis

According to an analysis made by the İstanbul Metropolitan Municipality in 2020, the distribution of income in a rental vehicle with two drivers is shown in the chart below. The most remarkable point here is that 32% of the total income goes to the license plate holder, which is mainly due to the high plate prices. Figure 3.8 shows the taxi revenue breakdown by different actors and cost elements.

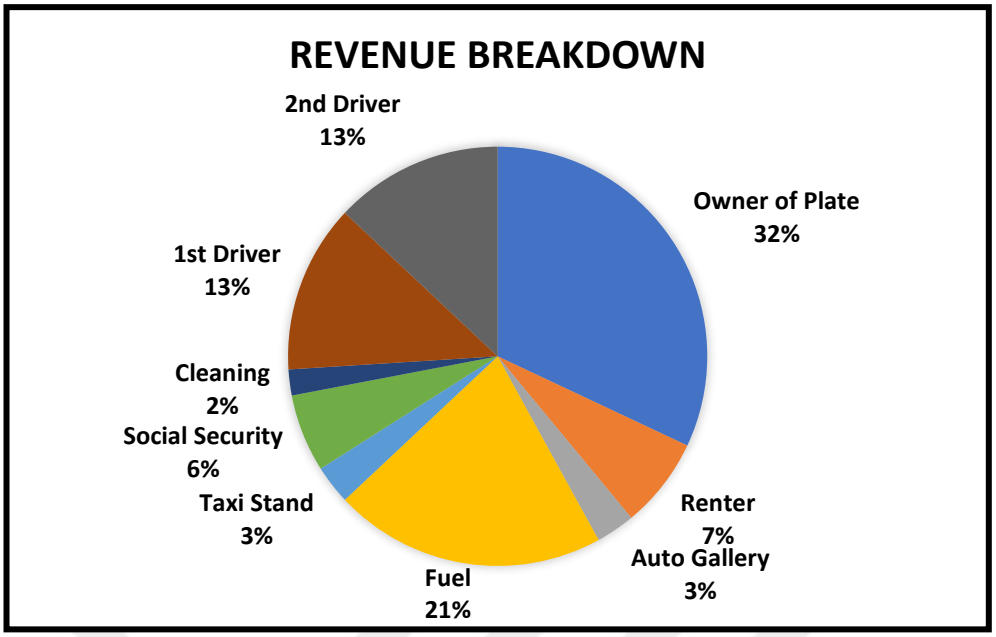
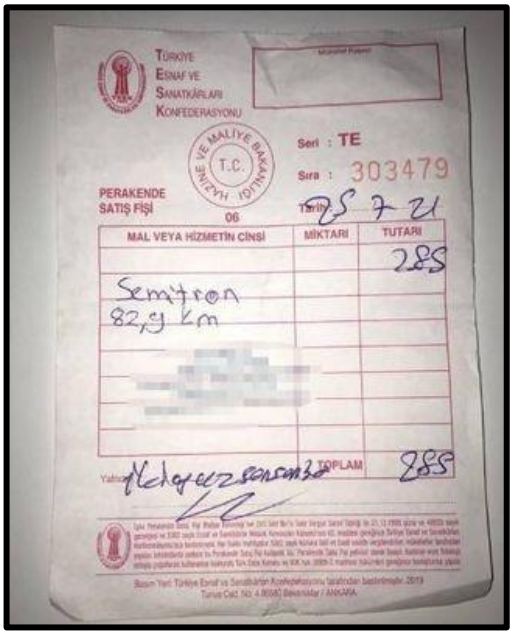


Figure 3.8: Taxi Revenue Breakdown by Different Actors and Cost Elements

Source: İBB, 2020

Payment of fares is made in cash and other payment instruments such as credit cards and İstanbulkart are not accepted in all taxis, causing both a serious increase in the informal economy and passenger dissatisfaction.



Picture 3.4: A Taxi Receipt

Source: Habertürk, 2021

Taxis do not automatically issue receipts after payment, nor there is a cash register integrated with the taximeter. The receipt is prepared manually by the driver upon the customer's request. In addition, many taxi users feel the need to ask the driver, "Do you have a receipt?" before they get into the taxi. Otherwise, after the trip, the driver may state that he does not have a receipt, or may not give a receipt, or sometimes try to get a receipt from another taxi driver, causing a waste of time.

No information is provided in the taxis to state the taxi fare tariff, creating insecurity especially for new users. Likewise, passengers do not know exactly how to pay the fee in matters such as bridge and tunnel crossing and highway use, as a result of which there may be arguments between passengers and drivers. This was especially true since after Eurasia Tunnel was opened since there was no integration between HGS/OGS systems and taximeters in situations such as bridge and tunnel crossing, or highway use.

3.2.5 Taxi Drivers

The total number of taxi drivers in İstanbul is known to be 43,174 (TUHİM, 2017). However, it can be suggested that there are more taxi drivers than this due to the lack of supervision in practice.

Taxi drivers and taxi vehicle owners are required to submit certain documents (TUHİM, 2017). According to the Commercial Taxi and Taxi Dolmush Directive (2009), the conditions to be sought in Taxi Drivers are as follows:

- Educational background
    - Current drivers: Primary school diploma (5 years),
    - Recent ones: Primary education diploma (8 years),
- Training Certificates to be provided for drivers with the coordination between the İBB, Chamber of Taxi Drivers and the Ministry of National Education
    - Emergency rescue and first aid training,
    - City information (historical, touristic, geographical, social and cultural),
    - Map and city plan reading training,
    - Behavioural knowledge and articulation training (R.G. Date: 14.09.2004 R.G. Number: 25583, in accordance with driver behaviour development training regulation),

    - Road and traffic information training,
    - Foreign language training (optional),
- Psychotechnical report to be obtained from centres authorized by the Provincial Health Directorate and a health report to be obtained every year in terms of infectious diseases and eye health (from doctors with the title of specialist) (2015/8-17),
- Criminal Background Check not exceeding 6 months as of the date of application and issued for official institutions (No. 5237),
- Not to have been convicted of any criminal offence mentioned in the articles "102", "103", "104", "105", "109", "179/3", "188", "190", "191", and "227" of the Turkish Penal Code and article "35" of the Law No. 5326 on Misdemeanours (2015/8-17),
- Social Security Institution document registered on the carrier, (2015/8-17),
- Public Transport Vehicle Driving Certificate,
- Copy of B/C/E class driver's license (2015/8-17),
- The original document of the Driver's License Cancellation Inquiry, which has not exceeded 2 months as of the application date (2015/8-17),
- Passport photograph taken within the last 6 (six) months as of the application date (for all drivers) (2015/8-17),
- A medical report showing negative drug test results taken from centres authorized by the Provincial Health Directorate (Not exceeding 1 (One) month as of the application date) (2014/8-3), (2015/8-17),

The adequacy of these standards for taxi drivers and how much they are applied is, however, a matter of debate. Likewise, it can be underlined as a separate deficiency that the details of these standards and especially the duration of the training conditions are yet to be specified.

In the Commercial Taxi and Taxi Dolmush Directive (2009), it is stated that clothing should be neat and well-groomed, though it lacks a clear definition, so how to follow it or the sanctions in case of non-compliance have not been specified. Moreover, the fact that the identity cards of the taxi drivers are not visible to the passengers in the vehicles is also regarded as a problem in all taxis in İstanbul.

Taxi driving is often seen as an easy job. Many people who move from Anatolia to İstanbul for the first time, who have problems finding a job and who do not know the city yet, think they can work as taxi drivers.

Working as a taxi driver as a side job is also quite common to make additional income only on certain days of the week. In addition, it is common for a relative to be a temporary unregistered taxi driver instead of the original taxi driver in cases of illness, emergency work, or holidays.

The social and personal rights of taxi drivers are another issue of importance. Unfortunately, there are still weaknesses in this regard since there are a considerable number of taxi drivers working without social security. In addition, there are also problems in arranging and keeping record of the working hours of taxi drivers, causing both a decline in service quality and an increase in the risk of accidents. There are taxi drivers who state that they work 24 hours a day (CNNTürk, 2021). Another important issue recently noted for taxi drivers is that they turn out to be addicted to drugs, a situation frequently coming on the agenda (Sputnik, 2021).

3.2.6 Taxi Vehicles

There are vehicle features contained in the Commercial Taxi and Taxi Dolmush Directive (2009) and specified by the Authority as mandatory to be implemented. In this context, the age limit for cars in the A, B or C segment is 5. Despite the lack of clear information on the number of alternative fuel taxi vehicles (Electric/LPG/Hybrid/CNG) in İstanbul, it is known that LPG use is very common in taxis.

Nevertheless, a number of projects exist to expand the use of electric taxis in İstanbul with the first applications in this area that have already been initiated.

Picture 3.5: A Fiat Albea, One of the Most Widely Used Taxi Cab Models in İstanbul

Source: Flickr, 2011

According to the Commercial Taxi and Taxi Dolmush Directive (2009), the conditions to be sought in taxis and dolmushes are as follows:

(1) Aftermarket accessories cannot be installed in taxis and taxi dolmushes, and no modifications may be made that block the vehicle's interior view from being seen or plate from being read.

(2) As stated in Article C of Table 1 of the Highway Traffic Law and Regulation No. 2918 (the equipment to be kept in taxis and taxi-dolmushes according to their characteristics), particular equipment that should be kept in taxis and taxi-dolmushes are as follows:

   a) Interior lamps: It will illuminate the interior of the taxi or dolmush, will not shine into the driver's eyes, and will have a white light.

   b) Taxi logos: As stated in the section for distinctive signs for taxi cars, the logo sides are 105 * 320 millimetres in size, 3 mm thick, light-transmitting, made of plexiglass in chrome yellow colour, and logos must be placed on both sides of the vehicle with a connecting foot made of steel or anodized aluminium with the word "Taxi" written on it. There will be no text other than the word "Taxi" on the roof sign lamp, which

will be turned on at night when the taxi is empty, and will be manufactured in such a way that it can be switched off from inside when a passenger is taken.

c) Fire Extinguisher: It shall be of the quantity and quality indicated in the regulation on the manufacture, modification and assembly of vehicles.

d) Spare supplies: A jack, a lug wrench, spare bulbs for each exterior light fixture, a pair of pliers, a screwdriver, a torch or a flashlight, a pair of skid chains for snowy and icy days, a tow rope, a blanket, an emergency hammer, a chock, a tool kit, a spare tire, an air pump, a lever and a first aid kit.

e) Reflector: There will be at least two reflectors suitable for the sample, reflecting or emitting red light that can be seen clearly from at least 150 meters under normal weather conditions.

f) Spare wheel: It shall always be in usable condition.

(3) It is forbidden to operate the vehicles that do not comply with the technical conditions in the traffic.

(4) It is obligatory to keep a city guide in taxis in order to easily find the address sought. It is provided free of charge by the İBB.

(5) The ceiling of taxis and taxi dolmushes, and the plates to be written on both front doors shall have the following features:

a) It shall be written in blue with Arial Black font.

b) The taxi plate shall be written on the vehicle roof, near the upper edge of the rear window in the area between the taxi lamp and the upper edge of the rear window.

c) For easier legibility, it would be more appropriate not to write the number (34) showing the provincial affiliation while the license plate is written on the ceiling of the taxi (TMN 18 – TK 2234).

d) In order to ensure easy legibility of the taxi plate, a gap of 5-6 cm shall be left between letter and number groups (TPR 56 – TS 198).

e) If the taxi license plate consists of 5 characters in total (i.e., TM 178 – TYF 79), each number and letter shall be 25 cm long, 17 cm wide, with a letter thickness of 6 cm, and the plate shall cover a total area of 17 x 5 + 6 = 91 cm long and 25 cm high.

f) If the taxi plate consists of 6 characters in total (i.e., TF 6325), each number and letter shall be 22 cm long, 14 cm wide, with a letter thickness of 5 cm, and the plate shall cover a total area of 14 x 6 + 5=90 cm long and 22 cm high.

g) Reflective sticker strips of 2 cm x 2 cm with the same colour (blue) as the letters and numbers shall be pasted diagonally at 1 cm intervals along the middle line of the letters and numbers. Thus, with the help of the projector in police helicopters, commercial license plates can be better selected in dark environments at night.

h) The plate and district names to be written on the doors of town taxis with C-M serial plates shall be white (RAL NO: 9010) and arial black font (2012/10-10).

i) The name of the districts where the plates have been tendered or allocated written under the license plate numbers on both front doors of the town taxis with C-M serial plate shall be 7 cm long, 5 cm wide, and 2 cm thick (2012/10-10).

(6) Technical conditions of taxi standards are as follows:

a) As of 01.01.2017, vehicles older than 5 years old in taxis and 8 years old in taxi dolmushes may not be operated *(2012/1-7), (2013/1-24), (2013/5-Appendix 4), (2014/4-14), (2015/4-25), (2015/8-19), (2016/1-7),*

b) Luggage space shall be a minimum of 250 litres,

c) At least 2 airbags,

d) Air conditioning,

e) Hydraulic wheel,

f) Minimum 1300 cc engine volume or Minimum 70 HP,

g) Taxis with plates in T-series will be yellow, and those in C and M-series will be claret red.

h) For visually impaired passengers, it is obligatory to have a license plate in the size of 12 x 6 cm prepared in the Braille alphabet, with ALO 153 inscribed on the inside of the right rear door of the vehicle (2014/8-3).

However, it seems that many of these conditions are never put in practice, nor is there a well-established follow-up system with respect to inspecting the implementation of the specified conditions, besides the lack of efficient sanctions to be imposed.

Another issue is that the maintenance of the taxis and the supply of spare parts are carried out like ordinary cars. When the taxi driver has a malfunction or maintenance need with the vehicle, he/she does this through the nearby auto repair shop, a situation that leads to an economy of scale, reduces maintenance costs, shortens the operating life of a taxi, decreases performance while increasing the probability of accidents.

3.2.7 Taxi Stands

Taxi stands have been used for many years in İstanbul, both as a place for taxi drivers to rest and park their vehicles when there are no passengers, and as a place for passengers to call a taxi from, get on a taxi, as well as being change points for taxi drivers. Rules for the determination, allocation and operation of taxi stand locations have been specified in the taxi directive.

Picture 3.6: A Taxi Stand Called Uydu in İstanbul
Source: Taxi Stands, 2018

However, today's technological developments and the change in consumer expectations have made taxi stands not as functional as in the past. Today, no such model exists in many countries of the world as the one applied in Turkey. The taxi calling function in the Taxi Stand model has been replaced by central call centres and mobile applications, through which higher efficiency can be achieved by making the

nearest taxi go to pick up passengers. In this connection, that taxi stands are places where passengers can take a taxi is now almost out of scope. Passengers, nowadays, take taxis either in front of their homes or from other central spots to start a journey such as public transport stations. Even so, the number of existing taxi stands located in these centres is not high though.

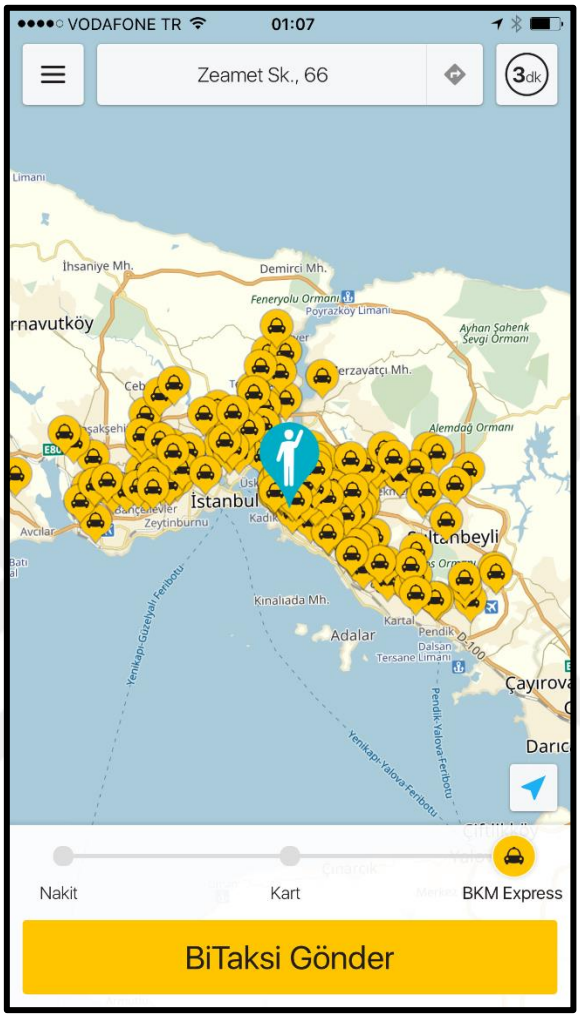
In İstanbul, İspark taxi stops have opened by İspark in recent years as passenger hop-on and hop-off locations, as well as short-term passenger waiting areas. An additional fee is charged for taxis entering these stops.

3.2.8 Call Centres and Mobile Applications

In İstanbul, there are currently neither central call centres nor taxi control and command centres, a situation that makes it difficult for passengers to call a taxi, dispatch and follow-up of the taxis, to the extent that it causes inefficiencies.

In recent years, mobile applications have been launched in İstanbul as well as in different cities around the world. The first of these, BiTaksi, which started in 2013, is the leading ride-hailing application in İstanbul today. BiTaksi is known to have served in İstanbul and Ankara for approximately 12 million trips from the day it was first established until 2017. This system, which includes 10 thousand active drivers, decreases the cash circulation in such as a way that the taxi operations can be recorded with the credit card payment option. In BiTaksi, 51 percent of whose users are women, while 49 percent are men, drivers travel an average of 6.2 km per trip. The application is controlled by a system where passengers and drivers are scored, and in particular, the average score of the drivers appears to be 4.81 out of 5. Having been downloaded as an application to mobile phones by 2.3 million people since the day it was put into service, BiTaksi has exceeded 75 million kilometres in total. In other words, BiTaksi drivers can be considered to have travelled around the world 1,875 times. The interest in BiTaksi, which provides service in the yellow taxi region in İstanbul and Ankara, is growing so much that there is no district where BiTaksi is not called from, with an average of 600 thousand trips per month made through the application. The busiest calls are reported to be made between 8 am and 9:30 am, and between 6 pm and 8:30 pm (T24, 2017). One of the most important features of BiTaksi is that it works with legally operating taxis. For this reason, it is favoured and used a lot by taxi drivers.

However, it should be noted that taxi stands tend to feel discontent about mobile applications such as BiTaksi.

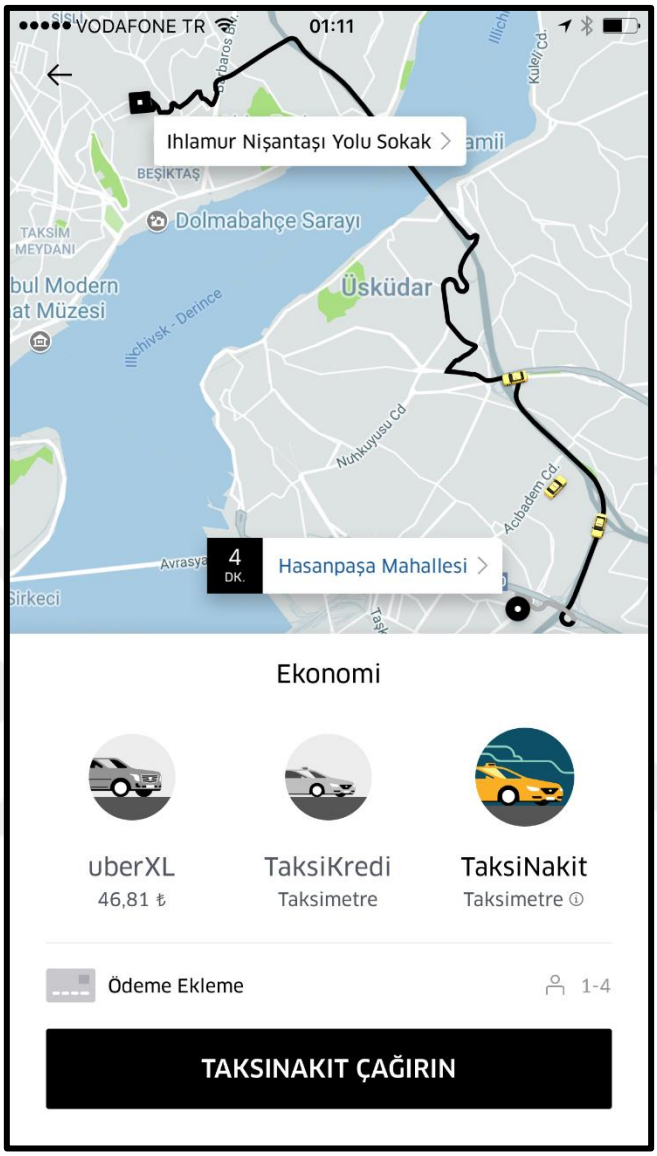


Picture 3.7: BiTaksi Application Interface

Source: BiTaksi, 2017

In 2017 two more major mobile applications serving worldwide were launched in Turkey apart from BiTaksi. The most talked-about and the most worldwide-known one is definitely Uber, which operated in İstanbul and some tourism destinations in Turkey. However, the service provided by Uber with Mercedes Vito vehicles drew serious reaction from the existing taxi drivers and was frequently brought to the agenda by the Chamber of Taxi Drivers. In this connection, Uber faced intense protests, as a result of which its services offered with Mercedes Vito vehicles were banned. Following the lawsuit filed by the İstanbul Chamber of Taxi Drivers to prevent access to Uber, which provides services over its Internet application, the İstanbul 10th

Commercial Court of First Instance ruled that Uber constituted unfair competition. The Court ruled to block access to Uber application and Uber.com (Sözcü, 2019).



Picture 3.8: UBER App Interface

Source: UBER, 2017

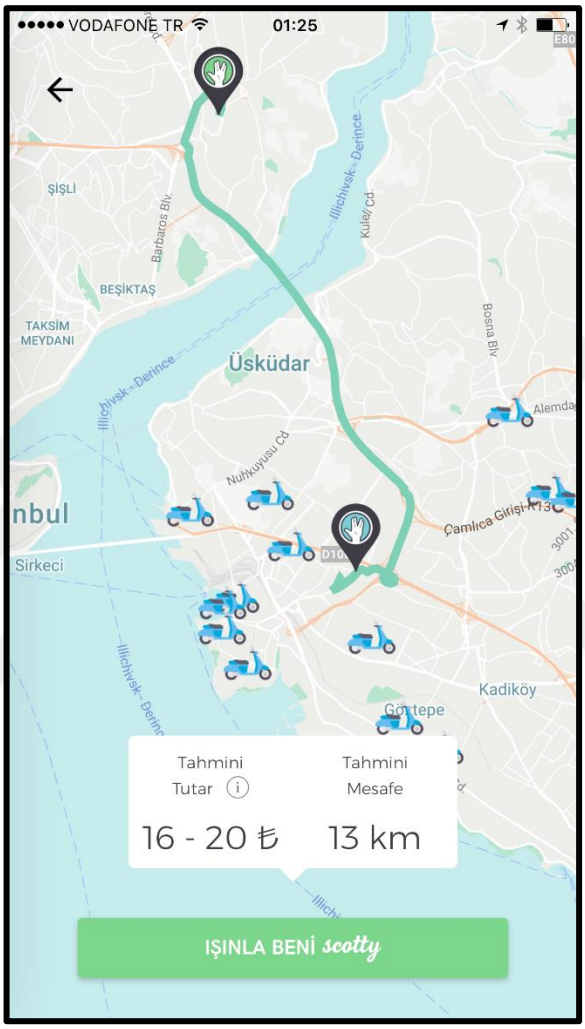
Another critical issue about Uber is that it started a ride sharing application, which is not yet legal in Turkey. Uber announced that through its mobile application, passengers could share the relevant journey with someone to reduce the cost. Uber currently maintains a limited operation in İstanbul, which is being carried out by legally operating yellow taxis. CAREEM, the largest TNC in the Middle Eastern countries, entered the İstanbul market in 2017; however, it later left the market.

Apart from BiTaksi, Uber and CAREEM, İstanbul Metropolitan Municipality also worked on commissioning its own mobile application and technology system, and its senior management introduced the iTaksi project in May 2017. The project was planned to be implemented in 4000 taxis at the first stage with the aim of meeting the taxi needs of the citizens more rapidly, ensuring the effective and efficient use of taxis, and raising the driver competency. İETT Hasanpaşa and İETT Topkapı Stations were chosen as the assembly areas, where assembly stations were established, and a total of 16 vehicles, 8 in each, can be assembled at the same time. The first 4000 taxis would be selected from those whose operating licenses had expired, and it was aimed to register 17,395 taxis to the system gradually in the later stages (İBB, 2017). The iTaksi project was planned to include such features as a ride-hailing mobile application, a taxi in-car camera recording, taxi tracking and command centre, vehicle tracking, driver scoring, payment with credit card and İstanbulkart, instant navigation, and a panic button. Today, however, it appears that the iTaksi application is not successful and no longer promoted as a ride-hailing system by the İBB.

Picture 3.9: İBB iTaksi Launching Ceremony
Source: İBB, 2017

Due to its targeting potential taxi customers, another mobile application worth mentioning here is Scotty, which started its activities in 2017, although it is outside of

the conventional taxi services. Scotty is a motorcycle calling application for a motorcycle travel, which is widely available in different countries around the world. Though not very common at present, it should be noted that the taxi industry will likely to react if it becomes widespread in a short time.



Picture 3.10: Scotty App Interface

Source: Scotty, 2017

Finally, it should also be remarked that no legal regulation or regulation article exists as regards such mobile applications in İstanbul.

3.2.9 System Safety and Security

Despite the lack of official data on the accidents involving taxis in İstanbul (TUHİM, 2017), it is understood from the press that these accidents are common in daily life, and unfortunately, passengers and drivers are injured and even killed in accidents involving taxis. Among the causes of accidents, driver errors or technical malfunctions of the vehicle cannot be underestimated. It can be argued that there are shortcomings with respect to drivers' training and behaviour, to the technical equipment of the vehicles and the use of technology, as well as to the procedures in practice for the purpose of preventing accidents and for system safety.

Picture 3.11: A Taxi Accident in İstanbul

Source: Hürriyet, 2016

Besides the necessity of system safety and accidents, security is also an indispensable element of taxi transportation. As is the case in many cities around the world, security problems are often encountered in İstanbul from time to time, especially targeting taxi drivers. The fact that taxi drivers work at night in different parts of the city, dealing with cash simply makes them a target. Today, taxi extortion has become one of the most common judicial cases in İstanbul. Elements such as vehicle tracking system, camera recording, security compartment, not working with cash, which will be

beneficial in preventing this, are not available in all taxis in İstanbul. In this connection, the safety of taxi drivers as much as passengers is a very important issue. The fact that female passengers do not feel particularly safe causes them not to take a taxi later in the day since there are many known cases of harassment and assault against passengers.

Picture 3.12: News About a Taxi Robbery in Beyoğlu

Source: İHA, 2016

3.2.10 Service Quality

Service Quality is one of the most important problems related to İstanbul taxis. In 2019, 103,669 complaints were received by the İBB White Desk regarding taxis (İBB, 2020). Figure 3.9 shows the types of complaints about taxis in İstanbul as of 2019.

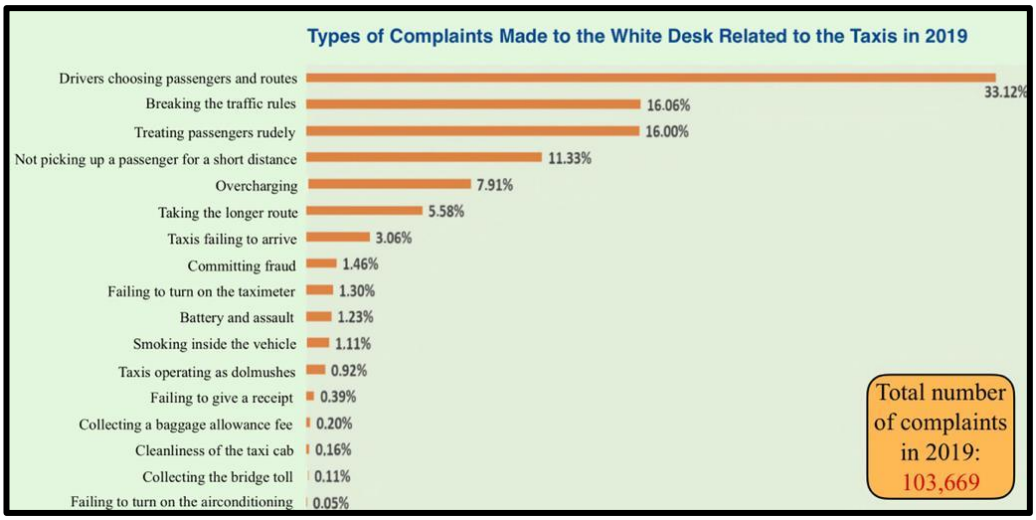


Figure 3.9: Types of Complaints About Taxis Received in 2019

Source: İBB, 2020

A general evaluation of the complaints indicates that the first 5 complaints, constituting 75% of them are related to drivers' attitudes and capabilities. In order to increase service quality, further studies that focus on how to select drivers as well as identifying prerequisites for becoming a taxi driver, conducting taxi driver trainings and sustaining taxi driver performance management will be of great importance.

3.2.11 MaaS Readiness Assessment

İstanbul is the largest city in Turkey, constituting the country's economic, cultural, and historical heart. With a population of more than 14 million, İstanbul forms one of the largest urban agglomerations in Europe and has a unique feature as the city spans two continents – Europe and Asia. With its ever-increasing population, İstanbul is facing urban transport challenges to meet the demand. Urban transportation is one of the current key problems of İstanbul and the challenge continues to grow with the rise of population and an increase in income levels, which is bringing a higher rate of private car ownership to the city.

İstanbul has one of the largest urban transport networks in the world. In recent years, it has experienced a rapid growth of car ownership; there are 3.5 million registered motorised vehicles in İstanbul. Every day, 400 new vehicles add to the city's traffic congestion. Like many metropolitan areas throughout the world, the city has been

working very hard to upgrade its transportation infrastructure and boost public transport services to meet the demand and reduce congestion and pollution (TUVIMER, 2018).

It is important to emphasize that citizens will not give up on their private automobiles as their preferred mode of transportation unless and until they are offered a service that provides the benefits of convenience, reliability, and low cost whilst weaving together mobility service operators into one seamless service. However, part of the challenge is that setting up such an innovative mobility-as-a-service means moving outside the exclusive control of traditional firm boundaries. In İstanbul, MaaS could offer an opportunity to give citizens the option to live and work in their city without having to own a car. It is, therefore, necessary to analyse carefully readiness of İstanbul to launch a MaaS platform. The current situation analysis of İstanbul according to MaaS Readiness Indicators of CIVITAS is presented below:

The CIVITAS ECCENTRIC project's partner cities have identified several critical elements that need to be considered before the environment is ready for launching the MaaS. These MaaS readiness level indicators highlight the different aspects of MaaS development that have so far been identified to display the local authorities' current situation for establishing the MaaS in their local context. There are 4 main and 2 sub-indicators for each of them identified by CIVITAS and these indicators are only showcasing the readiness level and giving some possible perspectives for the future development that can be adopted by local authorities. CIVITAS indicators are listed below and these can act as a checklist-that can be used by cities for MaaS development (CIVITAS, 2017). Figure 3.10 shows the CIVITAS MaaS Readiness Assessment Framework. In that assessment cities are ranked from 1 to 5, where 5 indicates highest level of readiness.

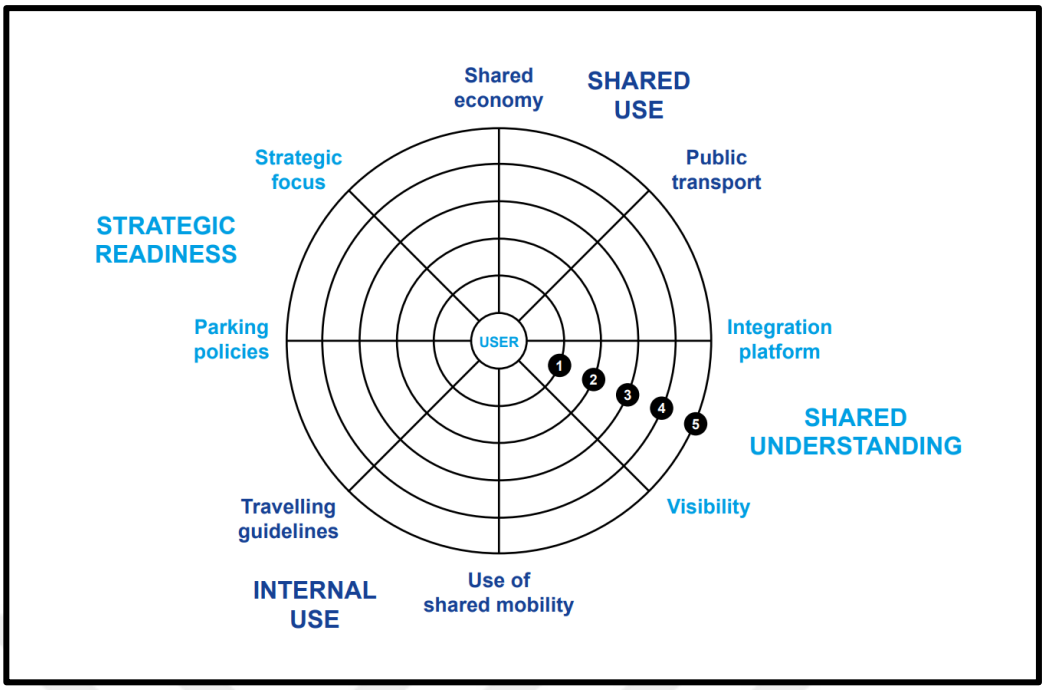


Figure 3.10: CIVITAS MaaS Readiness Assessment Framework

Source: CIVITAS, 2017

3.2.11.1 Strategic Readiness- to Promote, Support and Incentivise the MaaS

a) Strategic Focus

İstanbul Metropolitan Municipality (İBB) is currently working on the MaaS framework and organised a capacity building programme in summer 2017 so that officials could be trained about the MaaS concept, implementation steps, different business models, and a potential road map for İstanbul.

Until today, there has been no detailed statements related to the MaaS from official communication channels of the city but the CEO of Municipality-owned transport technology company – İSBAK - announced that transport department of the İBB and İSBAK had been working on a MaaS platform which would be launched soon. (Alyürük, 2018)

b) Parking Policy

The local authority has a parking policy, but it does not explicitly support the shared use of vehicles and/or transport on demand. The city authority declared as priority to offer new parking spaces across the city with the aim of offering a vehicle parking capacity of 120,000 by year 2023 (İspark, 2018).

3.2.11.2 Internal Use

a) Travelling Guidelines for the Staff and Politicians

İstanbul Metropolitan Municipality provides transportation opportunity for its employees with shared shuttle busses every working day from home-to-work and from work-to-home. However, there is no other policy to prioritize sustainable mobility and establish a monitoring and reporting system related to travel patterns of staff.

b) Use of Shared Mobility Within the Local Administration

The local authority is not using shared mobility services itself. There is a vehicle fleet of the İBB, but full of normal use cars with no scheme for the use of car-sharing or car-pooling for operations of the İBB.

3.2.11.3 Shared Use

a) Shared Economy- Availability and Market Penetration of Shared and Combined Travel Options

There are pilots/campaigns/incentives taking place in İstanbul regarding shared mobility options. In the area of carsharing services, ZIPCAR is the most common option together with other alternatives of Atlagit, Mobicar, Mobilizm, and YOYO (WRI, 2015). In the area of carpooling, VOLT was once the pioneer, but changed its concept and focus area from general carpooling to provision of services to citizens looking for carpooling for trips mainly from/to work. Biservis is a new company,

which also provides on-demand shuttle sharing especially for trips between home and work. The municipality-owned parking operator İSPARK also provides bike-sharing service, but mainly on sea side areas and used by citizens not for daily trips, but for recreational purposes etc. (Yıldızgöz, 2018).

b) Public Transport

Customers can buy local public transport tickets via public transport service providers' own channels and via third parties, which have an agency contract with İstanbulkart to make uploads into smartcards. There is no other channel to purchase public transport tickets listed at communication channels of İstanbulkart (İstanbulkart, 2019).

3.2.11.4 Shared Understanding

a) Integration Platform

The local authority in İstanbul has not allowed access to data gathered from public transportation operations in order to prevent third parties from using it to create new apps and services. Public transport data is often gathered by scraping data from the public transport operators' computer server or from gathering publicly displayed information on websites and piecing it together. From this perspective, urban transport authority in İstanbul, which is İstanbul Metropolitan Municipality, cannot even access data from public transport operators freely and it must be bought from them.

b) Visibility

Customers have different channels from which they can find multimodal traveller information. Yet, this is limited and information found at these sources are subject to verify. Due to the reasons explained in the previous section related to open data policy of İstanbul, the data has to be purchased by mobile developers to access public transport information for developing applications that would enrich and offer better transportation and coordination. This offers only a small piece of the entire picture of İstanbul's complex public transport system and its open data dilemma. Since the public transport service providers of İstanbul do not provide open data, possible developers

are unable to access important information such as real-time bus data, but must manage with the schedule data, which is accessible from official channels, but might be unreliable due to traffic congestion. In addition, pulling data from websites of public transport operators may result in more complications as these sources do not provide complete and accurate data in standard format.

3.2.11.5 MaaS Readiness of İstanbul

Assessment of İstanbul's readiness to MaaS according to CIVITAS ECCENTRIC MaaS readiness level indicators can be summarised in Table 3.2 provided below.

Table 3.2: Ranking of İstanbul According to Different MaaS Readiness Indicators

No	MaaS Readiness Indicators		Ranking of İstanbul
1	Strategic readiness	Strategic Focus	3
		Parking Policy	2
2	Internal Use	Travelling guidelines	2
		Use of shared mobility	1
3	Shared Use	Shared economy	3
		Public Transport	2
4	Shared Understanding	Integration Platform	1
		Visibility	2

Source: Prepared for the purpose of this Thesis

Figure 3.11 shows a radar diagram for ranking of İstanbul according to different MaaS readiness indicators.

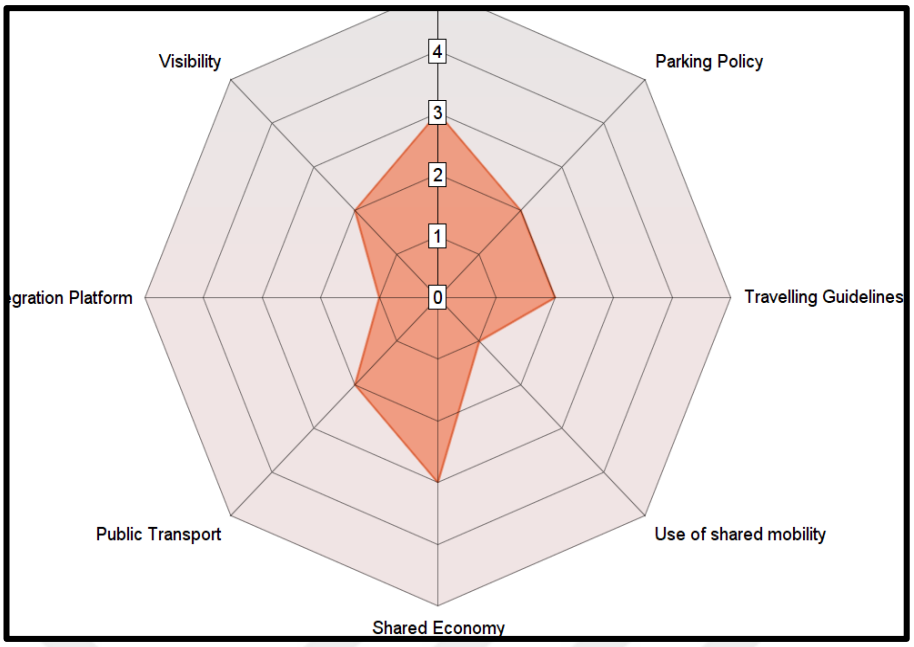


Figure 3.11: Ranking of İstanbul by Different MaaS Readiness Indicators

Source: Prepared for the purpose of this Thesis

İstanbul owns only 3 of the said 8 indicators and has reached the rank of 3 only in 2 areas including strategic focus and shared economy. As can be seen from the above radar chart presented in Figure 3.11, İstanbul has steps to take in all areas in order to be able to be ready for launching the MaaS Platform especially regarding the Use of Shared Mobility and Integration Platform, for which İstanbul ranked as 1, which is the lowest.

3.2.11.6 Further Analysis of İstanbul's Readiness to the MaaS

MaaS Readiness Indicators of CIVITAS ECCENTRIC does not include integration requirements needed for MaaS platforms. There are 3 main levels of integration required for sufficient MaaS platforms (Arby, 2017):

- Ticketing & Payment Integration: When one smart card or ticket can be used to access all the modes taking part in the service and one account is charged for the use of those services,
- ICT Integration: When there is a single application or online interface that can be used to access information about the modes,

- Mobility Package Integration: When customers can pre-pay for a specific amount (in time or distance) of a combination of mobility services.

MaaS offers services in different forms, and the three different stages of integration given above have been identified, ranging from the most basic stage where operators provide discounts for other operators' services, all the way to fully integrated MaaS providers with tailored mobility packages on offer. In İstanbul, there are different service providers especially in traditional public transport modes. The main operator of bus transport is municipally-owned IETT, and there are individually owned bus operators such as ÖHO, minibuses and Otobüs AŞ as an umbrella organisation of municipality for some of the individually owned busses. Regarding urban rail systems of İstanbul, Metro İstanbul and Turkish State Railways (TCDD) are the main players. The biggest car park operator of the city is the municipally-owned İSPARK, and there are other private car park operators in the city. In addition, there are limited car sharing or carpooling offers in İstanbul. Regarding Ticketing and Payment integration, only existing option is the İstanbulkart system as integrated ticketing and payment which integrates the İETT, ÖHO, Otobüs AŞ, TCDD, Metro İstanbul, and İSPARK, but other forms of transport options are not included into the system as of now. There is an ICT integration between İETT, ÖHO and Otobüs AŞ and integrated information is offered via MOBIETT mobile application. There is limited mobility package integration with monthly subscription option of İstanbulkart, which includes İETT, ÖHO, Otobüs AŞ, TCDD, Metro İstanbul. Integration levels of different mobility operators/modes are shown in Table 3.3 below.

Table 3.3: Integration Assessment of Different Operators/Modes in İstanbul

Integration Level	YES	PARTLY	NO
Ticketing & Payment Integration	İETT, ÖHO, Otobüs AŞ, TCDD, Metro İstanbul, İSPARK	-	Minibus, Taxi, Car Sharing, İsbike, non-İSPARK Car Parks
ICT Integration	-	İETT, ÖHO, Otobüs AŞ	TCDD, Metro İstanbul, İSPARK, Minibus, Taxi, Car Sharing, İsbike, non-İSPARK Car Parks, Car Pooling
Mobility Package Integration	-	İETT, ÖHO, Otobüs AŞ, TCDD, Metro İstanbul	Minibus, Taxi, Car Sharing, İsbike, non-İSPARK Car Parks, Car Pooling

Source: Prepared for the purpose of this Thesis

3.3 Taxi Users Survey in İstanbul

Within the scope of this doctoral thesis studies, İstanbul Metropolitan Municipality was contacted to offer them a study as regards taxi users. The İBB accepted the proposal, and agreed that questions about taxi transportation should be involved within the scope of the Public Transportation User Research they had been planning to conduct, that the thesis student's suggestions should be taken into consideration while determining these questions, and that the research results should be shared with the thesis student.

3.3.1 Research Method

A questionnaire was developed to include questions suitable for each mode designed for the research, and is presented in Annex-1. A total of 5,207 users were interviewed. The surveys were completed between 25.10.2017 and 27.11.2017 with the face-to-face survey method.

The completion of the questionnaires was followed by the reporting phase in which reporting, frequency analysis and correlation techniques were used, in addition to pie charts and various histograms. Figure 3.12 illustrates the steps of the research method employed in this study.

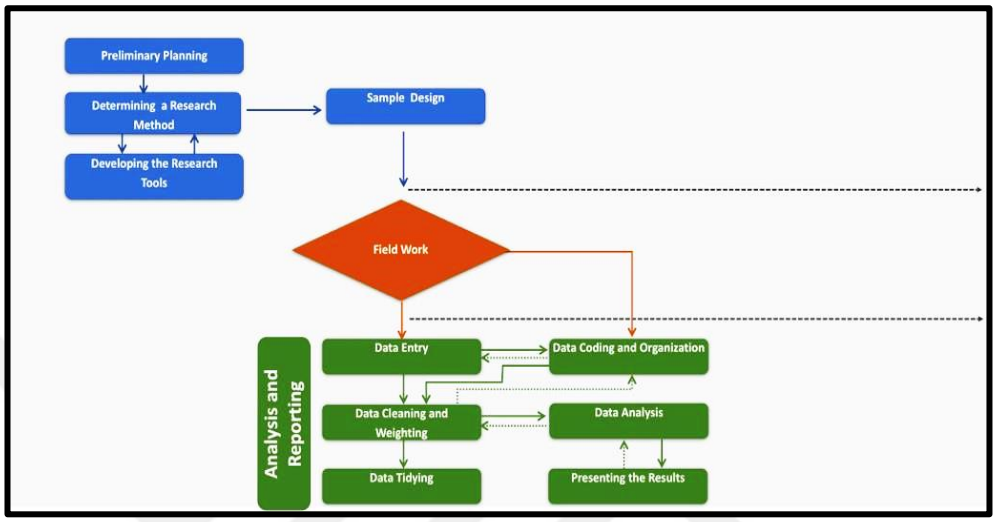


Figure 3.12: Research Method

Source: Prepared for the purpose of this Thesis

As can be seen in Figure 3.13 below, this study was carried out in 7 different transportation modes operating in rail, rubber tire and waterborne systems within the borders of İstanbul. The studies were carried out at the points where the relevant mode was used intensively.

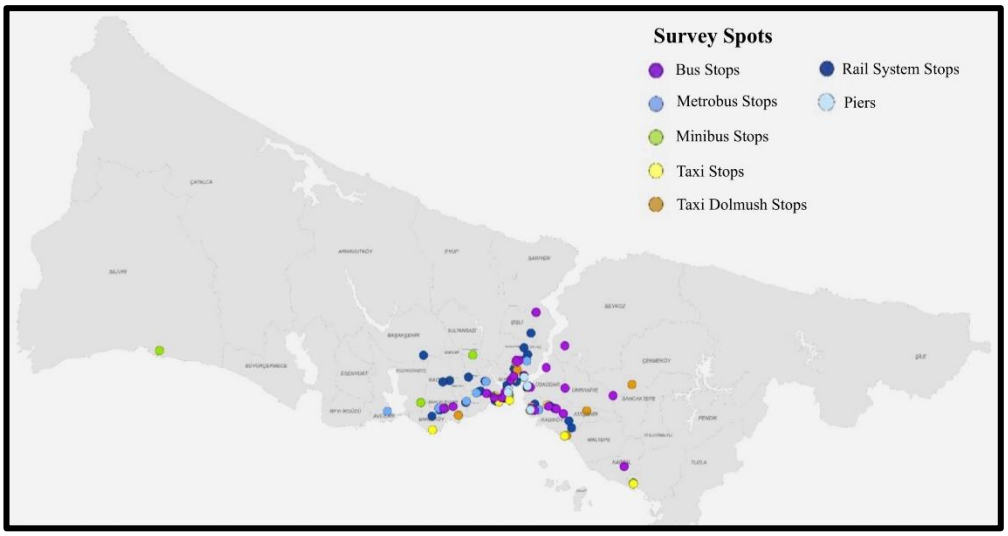


Figure 3.13: Survey Spots

Source: Prepared for the purpose of this Thesis

3.3.2 Frequency of Taxi Usage

As shown in Figure 3.14, only 2.5% of public transportation users stated that they take a taxi ride every day. The rate of those who use a taxi a few days a week is 17.3%, whereas 80.2% of the users stated that they use a taxi once a month or less. Finally, 24.6% of taxi users stated that they use a taxi a few days a week.

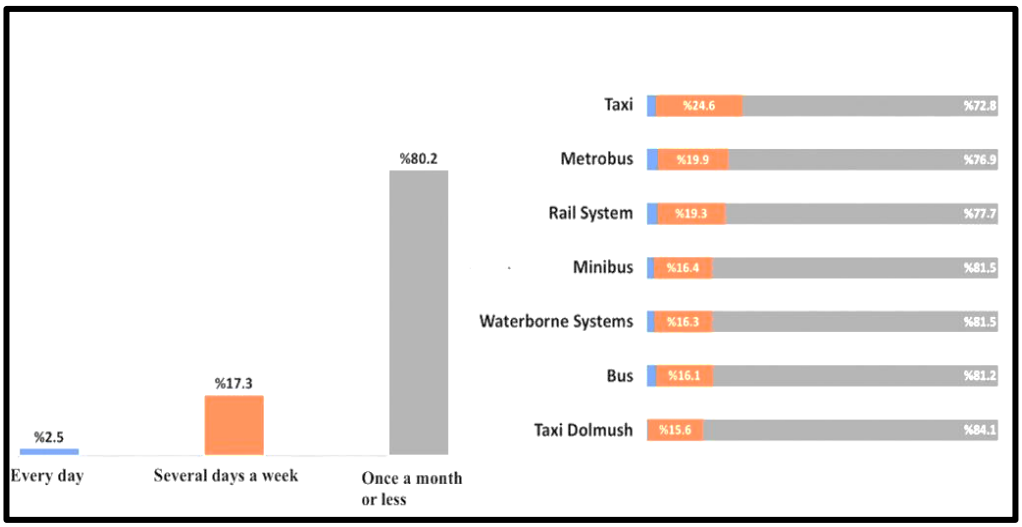


Figure 3.14: Frequency of Taxi Usage

Source: Prepared for the purpose of this Thesis

3.3.3 Issues Where Taxi Services Remain Insufficient

As presented in Figure 3.15, the share of drivers in the inadequacy of taxi services is 34%, followed by security with 13.6%, and cleanliness with 12.8%.

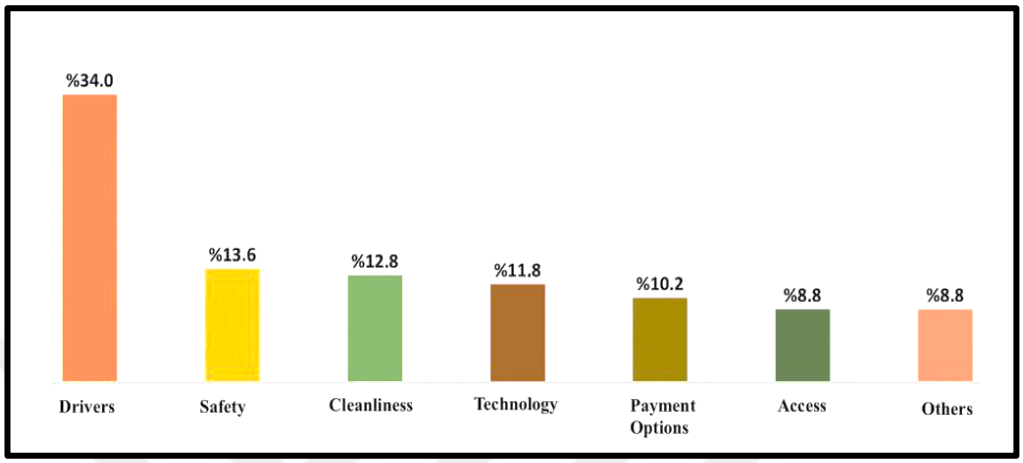


Figure 3.15: Issues Where Taxi Services Remain Insufficient

Source: Prepared for the purpose of this Thesis

3.3.4 The Need to Use a Taxi

Figure 3.16 presents below the main reasons for taking a taxi. In this framework, 67.4% of the users have stated that they take a taxi when there is an emergency, which constitutes the major reason, while the second reason with a ratio of close to 10% is that they take a taxi when they are to travel as a group of people. This indicates that taxi transportation has not yet become a routine means of transportation in İstanbul.

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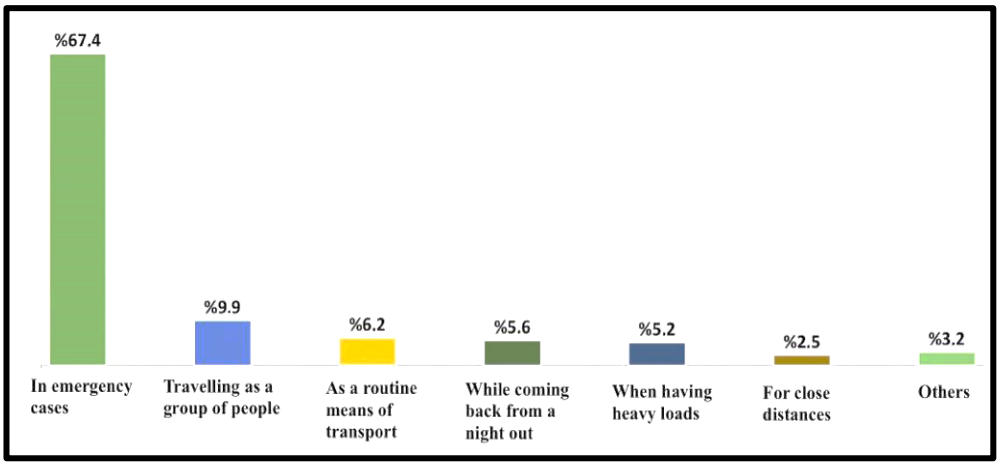


Figure 3.16: Main Reasons for Taking a Taxi

Source: Prepared for the purpose of this Thesis

3.3.5 Taxi Access Channels

Regarding the taxi access channels, 64.7% of the respondents have stated that they just "take a passing-by taxi", while the rate of those who book a taxi through mobile applications is around 10%. Figure 3.17 shows the commonly indicated taxi access channels.

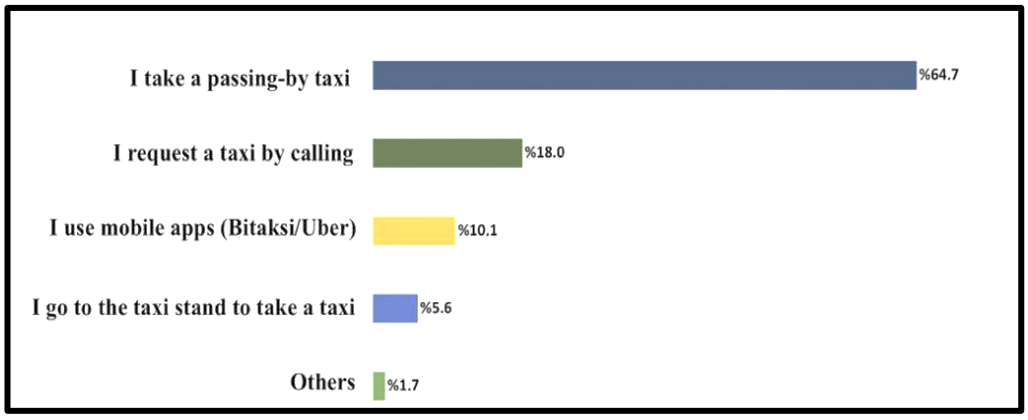


Figure 3.17: Taxi Access Channels

Source: Prepared for the purpose of this Thesis

3.3.6 Safety and Comfort in Taxis

When asked, 41.3% of public transportation users stated that they would feel safer and more comfortable during the journey in the presence of a camera in the vehicle and 24.6% said they would feel so in cases when drivers obey the traffic rules. Figure 3.18 below presents the passengers' general criteria regarding safety and comfort in taxis.

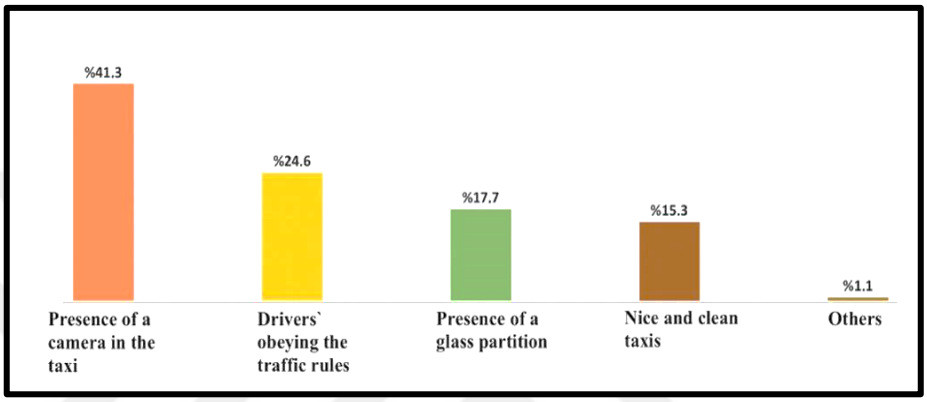


Figure 3.18: Criteria of Safety and Comfort in Taxis

Source: Prepared for the purpose of this Thesis

3.3.7 Comparison of Taxi Fares in İstanbul with Similar Cities

As illustrated in Figure 3.19, 20.2% of public transportation users stated that taxi fares in İstanbul are more affordable than they are in similar cities, while the rate of those who say that it is more expensive is 44.3%. On the other hand, 53.9% of taxi users stated that taxi fares are more expensive in İstanbul, while 24.4% of taxi dolmush users find it more economical.

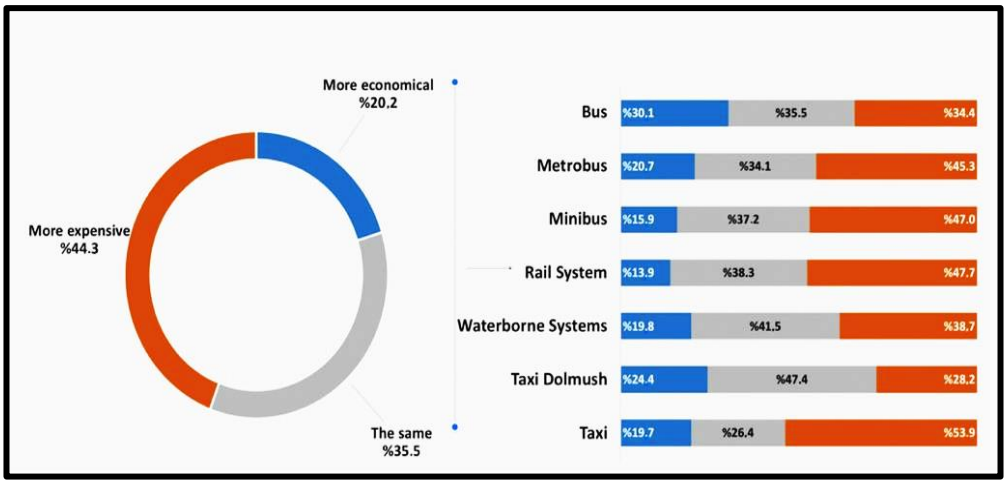


Figure 3.19: Taxi Fare Comparisons

Source: Prepared for the purpose of this Thesis

3.3.8 Shared Taxi Services

As can be seen in Figure 3.20, 59.0% of the respondents stated that they might prefer the shared taxi system from their neighbourhoods; however, 65.9% of taxi dolmush users stated that they might prefer the shared taxi system from their neighbourhoods.

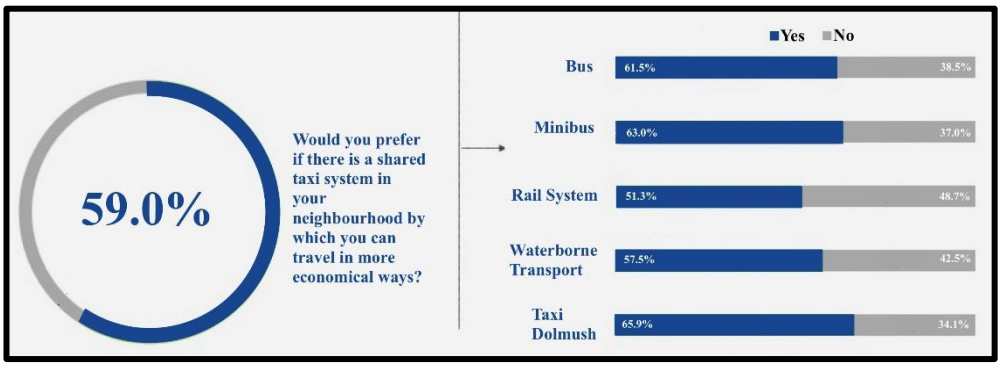


Figure 3.20: Use of Shared Taxis

Source: Prepared for the purpose of this Thesis

3.4 Survey on the Regulation of Transportation Network Companies Administered to Transportation Authorities

A set of questions were developed in relation to regulation and impact of transport network companies on urban transport and the survey was conducted to different cities with different size, geographical background, different mix of mode share. Survey was conducted via e-mail for the urban transport authorities of those cities which can present the full overview. Data was collected from those cities based on their own research and studies (e.g., travel survey, urban mobility master plans, other studies). Collected data underwent internal (compatibility with other data from the same city) and external (compatibility with data from other cities) checks and adjustments.

This can provide common grounds for meaningful comparisons, positioning of cities and establish typologies to support comparisons and policy transfer. This can be used further by cities to develop their policy positions and design regulatory framework. From this perspective, a survey for transport authorities were planned at initial time plan of the Thesis Proposal. Below actions were taken under this study:

- A set of parameters were developed covering economic, social and environmental aspects of urban mobility to be able to present the impact of TNCs on congestion, public transport, taxi, and travel habits etc.,
- Definitions for the indicators were defined to be able to make correct comparisons and further analysis,
- Different cities with different sizes, geographical backgrounds, different mix of mode share were selected,
- Survey was sent to the urban transport authorities of the cities who can present the full overview,
- Data collection started from the cities based on their own research and studies (e.g., travel survey, urban mobility master plans, other studies).

Regarding this survey a partnership with Taxi Platform of UITP - International Association of Public Transport was established and the UITP agreed to share the results with Kaan Yıldızgöz, the thesis student, to use them within the scope of PhD.

studies. Below are the questions included into the UITP Taxi Benchmarking Study within this scope. The questions presented in Annex-2 were discussed with the Thesis Advisor, Prof. Dr. Murat Çelik, and also Statistics Manager of the UITP - International Association of Public Transport, Mr Mircea Stireau, before they were sent to different authorities. The survey was conducted with 20 different transport authorities all around the world in January 2018, and was filled by organisations whose names are provided in Annex-3. The aim was to collect the data from transport authorities, or in the absence of any transport authority, or in the event of a connection problem, data was collected from other reliable sources.

As can be seen in Table 3.4 below, the survey included 20 cities from different regions of the world (Europe, Asia, North America and Middle East), including Abu Dhabi, Ankara, Brussels, Budapest, Dubai, Dublin, Frankfurt, Helsinki, Hong Kong, Kuala Lumpur, Lagos, Lisbon, Milan, Montreal, Moscow, Oslo, Phoenix, Prague, Singapore, and Tehran.

Table 3.4: List of Cities Included in the Survey for Urban Transport Authorities

Abu Dhabi	Lagos
Ankara	Lisbon
Brussels	Milan
Budapest	Montreal
Dubai	Moscow
Dublin	Oslo
Frankfurt	Phoenix
Helsinki	Prague
Hong Kong	Singapore
Kuala Lumpur	Tehran

Source: Prepared for the purpose of this Thesis

Among the authorities of the cities that responded to the survey, Abu Dhabi, Ankara, Lagos and Budapest indicated there were no Transportation Network Companies operating in their city at the time of the survey. Although, 3 of 20 cities indicated there were Transportation Network Companies, they did not provide their names. From among the cities that responded, Uber was found to be operating with the largest prevalence in 10 of 20 cities surveyed. During the survey and interaction with the participating authorities in the selected cities, it was understood that there is no single

description for and understanding of a Transportation Network Company. Table 3.5 presents the cities where the TNCs are actively carrying out their operations.

Table 3.5: TNCs Operating in the Cities Selected

	City	Actively Operating Transportation Network Company
1	Abu Dhabi	-
2	Ankara	-
3	Brussels	eCab, Taxi.eu, Splyt, Taxibleus, Taxi2share, Collecto
4	Budapest	-
5	Dubai	Uber and Careem
6	Dublin	Uber (as licensed despatch operator)
7	Frankfurt	Taxi-App, Taxi Deutschland, eG
8	Helsinki	Uber
9	Hong Kong	There are TNCs but names not provided
10	Kuala Lumpur	Uber, Grab, Zepp On, Quulo, M.U.L.A., Riding Pink, L.O.R.D, JomTumpang, EzCab, 2Go App, PickNgo, Eevom
11	Lagos	-
12	Lisbon	Uber, Cabify, Taxify, Mytaxi, Chofer, 99taxis, Taxi Digital, MEO Taxi
13	Milan	Uber Black, MyTaxi
14	Montreal	There are TNCs but names not provided
15	Moscow	Yandex, Uber, Gett
16	Oslo	There are TNCs, but names not provided
17	Phoenix	Uber, Lyft, Azida, Cabmea App, Fountain Hills, Kiwi, Raiser, Veya, Wingz, Total Ride, Total Transit, Lusso, Buckeye
18	Prague	Uber, Taxify
19	Singapore	Uber, Grab
20	Tehran	Snap, Tap30 and Carpino

Source: Prepared for the purpose of this Thesis

Also, all of the cities responded to the survey expressed that they had no mode share of Transportation Network Companies operating in their city. Only Milan indicated that the fleet size of MyTaxi was about 500 vehicles.

Launching specific regulations for Transportation Network Companies or modifying the existing regulation is a topic of important debate today for transport regulators. Only 25% of the cities were found to have launched specific regulations or modified the existing regulations after the introduction of Transportation Network Companies. These cities include Dubai, Kuala Lumpur, Montreal, Phoenix, and Singapore. Yet,

75% of the cities seem to continue with an existing regulation and expect Transportation Network Companies to operate with the earlier defined set of rules or not to enter their market at all. Figure 3.21 illustrates the situation about the presence of a specific regulation for the TNCs.

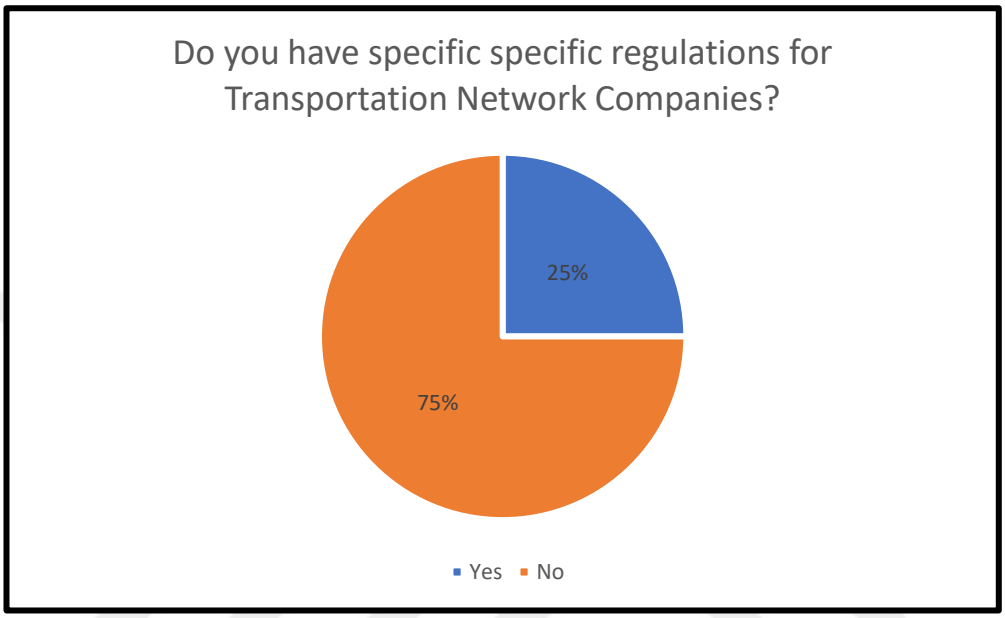


Figure 3.21: Presence Status of a Specific Regulation for the TNCs

Source: Prepared for the purpose of this Thesis

Only in Montreal is there a specific regulatory approach regarding the fare-levels of the TNCs. In other cities, however, they either do not regulate the fare levels of ride-hailing services or the TNCs are subject to the same regulatory approach as traditional taxis.

Kuala Lumpur and Montreal are the only cities which were found to measure the impact of ride-hailing services on their traditional taxi market. Authorities in other cities, which represent 90% of the cities selected, expressed that they never measure the impact of Transportation Network Companies on traditional taxi market. It is also noticed that both in Kuala Lumpur and Montreal, traditional taxis were operated by individual license owners. Another important question directed to participating cities is related to the impact of the TNCs on public transport, but none of the cities that joined the survey expressed that they are measuring the impact of ride-hailing services

on public transportation. Figure 3.22 illustrates the situation regarding whether the TNCs' impact on traditional taxis is measured or not.

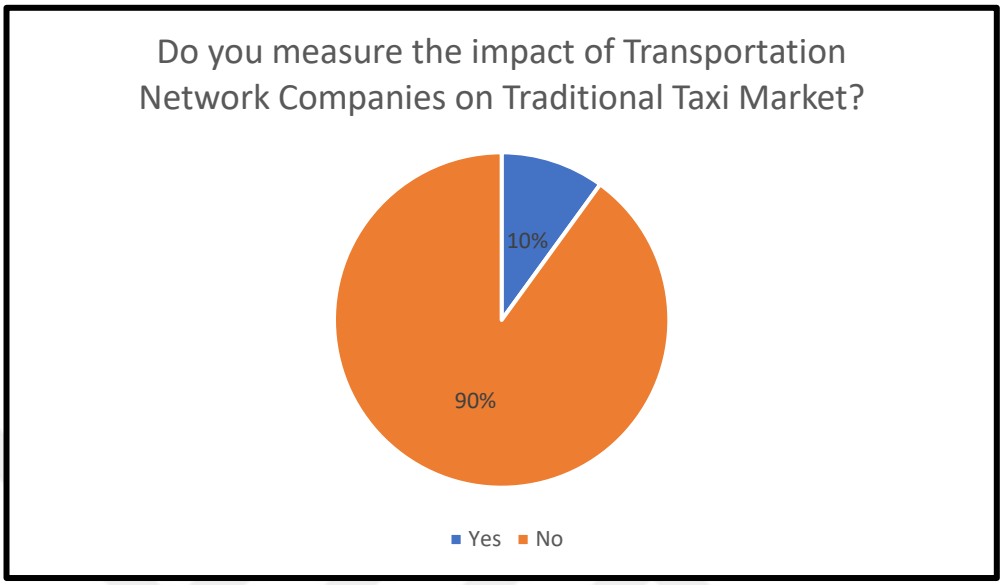


Figure 3.22: Measuring the Impact of Transportation Network Companies on Traditional Taxis

Source: Prepared for the purpose of this Thesis

The authorities in Oslo and Milan expressed that they noticed the increased traffic congestion because of the introduction of ride-hailing services in their cities, while those in other cities made no mention of measuring any change. Figure 3.23 presents the situation about the impact of the TNCs on traffic congestion.

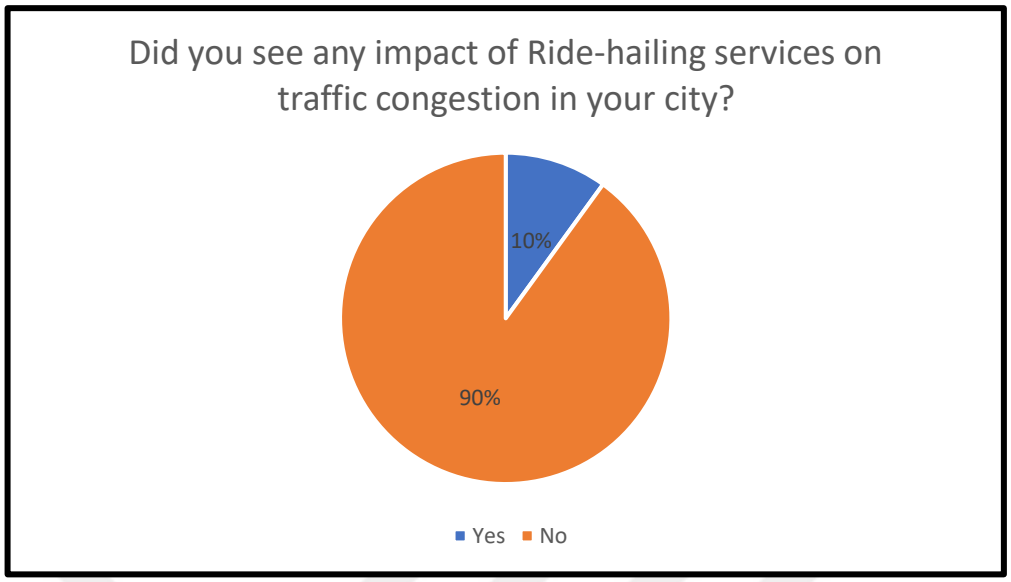


Figure 3.23: Impact of Transportation Network Companies on Traffic Congestion

Source: Prepared for the purpose of this Thesis

Different cities appeared to have noticed considerable changes in the traditional taxi industry after the introduction of TNCs. In Kuala Lumpur, for example, the emergence of the TNCs has resulted in a decreased demand for taxis both due to the poor quality of vehicles and also poor service. This leads to the adoption of technology among taxi drivers for them to remain relevant. This also causes taxi companies to slowly improve their offering to taxi drivers such as by reducing vehicle rental, offering training etc. In Lisbon, apps allowing users to request a traditional taxi service were made available (e.g., MyTaxi). There are frequent price promotions if the user requests the taxi service through these apps.

3.5 Interviews with Senior Executives of Taxi Operating Companies

In addition to collection of data from different sources and survey administered to urban transportation authorities, Table 3.6 presents the senior executives of taxi operating companies interviewed within the scope of this thesis. The list of executives was selected to represent different type of corporate structures, geographic balances, and their availability.

Table 3.6: List of Senior Executives Interviewed

	Abdulla Sultan Al Sabbagh	**Tony Heng**	**Siti Faradillah**	**Alpay Kılıckaya**	**Dr. Yousif Al Ali**	**Joe Ma**
Position	CEO	General Manager	General Manager	Manager	CEO	Deputy General Manager
Company	CARS	SMRT	Destination	Izmir Taxi	Dubai Taxi Corporation	Shenzhen Electric Taxi
Area	UAE, Qatar, Kuwait, Bahrain, Malaysia, India	Singapore	Kuala Lumpur	Izmir	Dubai	Shenzhen, China

Source: Prepared for the purpose of this Thesis

During the interviews, the respondents were asked about the taxi market and regulations in their city, the impact of the TNCs, their strategy before and after the TNC disruption in their respective city with providing different examples. Table 3.7 presents the questions asked during the interviews:

Table 3.7: Questions Asked to Senior Executives

No	DataPoint	Unit
1	What is the type of your organisation and ownership?	Multiple Choice from Private, Government owned, Association/Chamber
2	What are the regulatory elements of taxi transport in your city?	Multiple Choice from Quantity, Price and Quality Regulation
3	Are there any TNCs operating in your city?	Yes/No
4	Did your regulator change regulatory framework after introduction of the TNCS?	Yes/No
5	What are the impacts of the TNCs on your operation?	Open Ended
6	How was your approach to the TNCs at early stages of their introduction?	Multiple Choice from Ignore, Resist, Compete and Collaborate
7	How is your current approach against the TNCs?	Multiple Choice from Ignore, Resist, Compete and Collaborate
8	How will be your approach against the TNCs 5 years later?	Multiple Choice from Ignore, Resist, Compete and Collaborate

Source: Prepared for the purpose of this Thesis

Answers given to the questions during the interviews were summarized in Table 3.8 below. There was a mixed type of companies but the majority of them were in the status of a privately owned company, but others were affiliated to chamber of taxi owners and public owned operating companies. In most cities, except for Singapore, the main focus of taxi regulation was expressed as having strong dimensions in quantity, price and quality. Except for İzmir, there was a TNC operating in all cities.

Table 3.8: Responses of Senior Executives at the Interviews

	Abdulla Sultan Al Sabbagh	**Tony Heng**	**Siti Faradillah**	**Alpay Kılıckaya**	**Dr. Yousif Al Ali**	**Joe Ma**
Position	CEO	General manager	General manager	Manager	CEO	Deputy general manager
Company	CARS	SMRT	Destination	İzmir Taxi	Dubai Taxi Corporation	Shenzhen Electric Taxi
Area	UAE, Qatar, Kuwait, Bahrain, Malaysia India	Singapore	Kuala Lumpur	İzmir	Dubai	Shenzhen, China
Organization Type	Private company	Private Company	Private Company	Chamber of Individual Taxis	Government Owned Company	Private Company
Regulation of Taxis	Quantity, Price and Quality	Quality	Quantity, Price and Quality	Quantity, Price and Quality	Quantity, Price and Quality	Quantity, Price and Quality
TNCs operating in your City?	Yes	Yes	Yes	No	Yes	Yes
What are the impacts of TNCs on your operation?	Decrease of Demand, Decrease of Revenue, Lack of Drivers	Decrease of Demand, Decrease of Revenue, Lack of Drivers	Decrease of Demand, Decrease of Revenue, Lack of Drivers	Public Pressure over Taxis	Lack of Drivers	Decrease of Demand, Decrease of Revenue,
Approach towards TNCs at the beginning	Ignore	Resist	Ignore/Resist	Ignore	-	Resist
Current Approach Towards TNCs	Compete	Compete/ Collaborate	Resist/ Compete	Resist	Compete/ Collaborate	Compete/ Collaborate
Estimated approach in 5 years	Compete/ Collaborate	Collaborate	Compete/ Collaborate	Collaborate	Collaborate	Collaborate

Source: Prepared for the purpose of this Thesis

Main impact of the TNCs on the traditional taxi operators were seen as the decreased demand and decrease revenue accordingly; however, challenges of finding taxi drivers and increased public pressure was also indicated.

Most of the key executives expressed they had an approach of ignorance/resistance to market entrance of the TNCs in the past; later this has changed in

competitive/collaborative aspects, but in the future, they think collaboration will be seen more.

3.6 Focus Group Meetings

Two focus group meetings were organised in Dubai, UAE, in March 2018 and in Brussels, Belgium in September 2018, to discuss further on 2 main issues:

- Regulation of Transportation Network Companies
- Actions of Traditional Taxi Sector after the TNC Disruption?

There were 20 participants from different countries and from different type of organizations including transport authorities, taxi operators, ride-hailing companies and international associations for each focus group meeting. There were participants from Cars Taxi Group, Ajman Transport Authority, Mwasalat, Transport General Authority, Taxi Deutschland AG, Taxi Verts, Universitat Politecnica de Catalunya, STIB and Beijing Public Transport. Participants were given a set of questions related to Transportation Network Companies and taxis. They were provided with a time to discuss among each other and make proper research. Groups presented the outcome of their discussions related to the questions as a result of which their findings were used as one of inputs to the assessment done in this research.

<u>GROUP 1: Regulation of Transport Network Companies (TNCs)</u>

Focus Group working on Regulation of Transport Network Companies were provided with below questions:

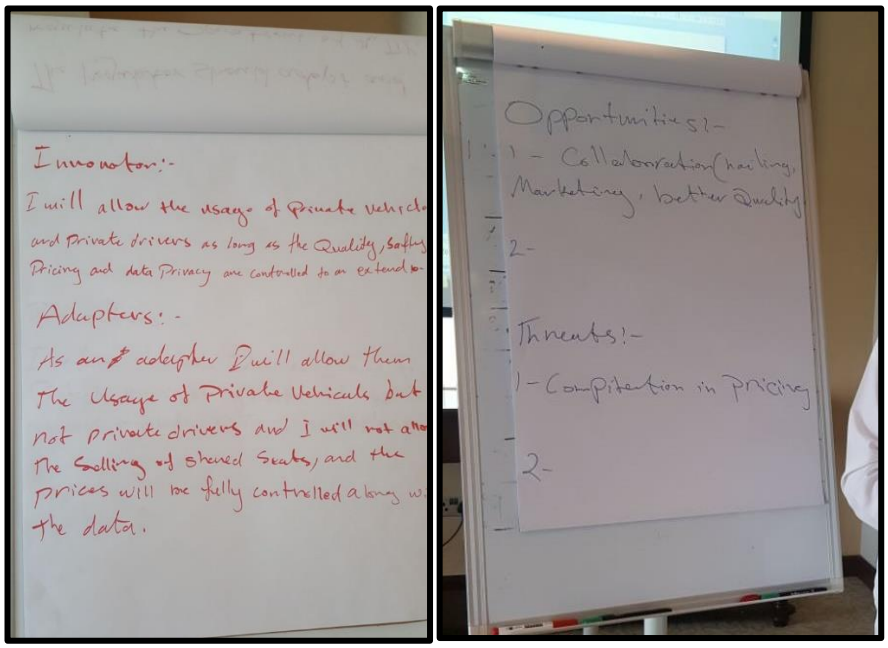
- How urban transport authorities should define their policies related to Transportation Network Companies?
- Please evaluate and discuss 4 categories (Innovators/adapters/protectors/regulators) given above and discuss their pros/cons.
- Please define the regulatory contradictions faced since the introduction of the Transportation Network Companies.

- Case Study of İstanbul: With considering data file related to taxi transportation in İstanbul, please propose improvement areas in terms of legal and institutional framework, supply/demand model, pricing and fare management of taxi transportation.

<u>GROUP 2: Critical Moment for Taxi Sector: Traditional Taxi Sector after the TNC Disruption?</u>

Below are the questions raised during the Focus Group Meetings:

- Could you evaluate categories of Ignore/Resist/Compete/Collaborate and define best approach for Traditional Taxi Sector?
- Could you prepare a road map and a set of actions for traditional taxi sector and defined approach in question 1?
- Could you identify a taxi value chain with strong points of traditional taxis and the TNCs?
- Case Study of İstanbul: With considering data file related taxi transport of İstanbul, could you please propose improvement areas in terms of drivers, vehicles, technology and the TNCs, Integration and service quality.



Picture 3.13: Reflection of Focus Group Discussions on Flipcharts
Source: Prepared for the purpose of this Thesis

Main outcomes of the discussions of groups were provided below in summary:

3.6.1 Regulation of Transport Network Companies (TNCs)

- How should urban transport authorises define their policies related to the Transportation Network Companies?
  - Regulatory Framework should not have the aim of protecting any certain group, but should be designed as a tool to implement public policies,
  - Regulatory Framework for Taxis and TNCs should be developed together to ensure fair conditions,
  - Advanced technology can be used to develop advanced regulatory and enforcement schemes,
  - Cities can use technology revolution and the TNCs for better implementation of demand management practices with tools like UBER POOL or OLA SHARE,
  - Regulatory Framework should less concentrate on Price and Quantity Regulation, but more on Quality Regulation in terms of road usage, environmental issues, safety and availability,
  - Regulatory Scheme based on Road Charging should be considered to avoid extra vehicle miles and congestion of the TNCs like the model in Brazil. Road Charging could be applied as an incentive, for instance, there could be different pricing in terms of passenger occupancy in the TNC cars. Incentivized pricing could be applied to promote shared vehicles, and if rides are shared, no pricing implemented,
  - Regulation should not only concentrate competition between the TNCs and Taxis/Public Transport, but also potential competition may take place soon in the future between the TNCs.
- The four categories of innovators/adapters/protectors/regulators, with respect to their advantages and disadvantages were evaluated from the below-mentioned main perspectives:
  - Sustainable urban mobility and traffic congestion: Approaches indicating innovators' letting transportation network companies have their number of vehicles and vehicle kms increased, so that they can attract passengers from public transport modes, needs to be considered carefully.

- Customer satisfaction: There is a strong expectation from customers in terms of not limiting the operation of transportation network companies in cities.
- Impact on traditional taxis: The increased presence of transportation network companies has until now had impact to reduce the number of passengers and amount of revenues of traditional taxis in many cities.

- Regulatory contradictions faced after introduction of the TNCs:
  - Using private vehicles for taxi operation,
  - Using unprofessional drivers,
  - Surge pricing,
  - Sharing the taxis with others,
  - Taxation,
  - Contractual relations with drivers,
  - Data privacy.
- Areas to be Improved in İstanbul:
  - Legal and Institutional Framework:
    - Need for clear and sound regulatory framework on taxis,
    - TNC Regulation is needed based on advice developed in earlier discussion at focus group meetings,
    - Changing the regulatory focus from quantity and price to quality,
    - Integrated authority with qualified staff and institutional capacity is the key.
  - Supply/Demand Model:
    - It is not acceptable and explainable to have same number of taxis in a city over more than 20 years
    - Urgent need for establishing a taxi demand and supply model,
    - Urgent need to develop technological capacity to be able to monitor operations and collect operational level statistics to help to define a taxi supply/demand,
  - Pricing and Fare Management:
    - Transparent fare setting mechanism and affordable fares are the key,
    - Technology should be used for fare collection like credit card payment etc.

3.6.2 Traditional Taxi Sector after the TNC Disruption

- The categories of Ignore/Resistance/Competitiveness/Collaboration should be evaluated to define best approach for the traditional taxi sector.
  - The approach of ignorance or resistance is certainly not recommended.
  - It is recommended to develop competitive advantage and develop service quality level and increase efficiency of operations.
  - It is also recommended that traditional taxis should look for ways of collaboration with the TNCs and be open for it.
- Please identify taxi value chain with strong points of traditional taxis and the TNCs.
  - Main Elements of taxi value chain has been identified as:
- Vehicle ownership
- Driver management
- Pre/post taxi booking services
- Management and disposal of taxi vehicles
  - Traditional taxi operators have strengths in terms of the current taxi vehicle fleet they have all around the world and existing drivers operating these vehicles,
  - Transport network companies have developed good technology base especially in terms of pre/post taxi booking services and management of operations, services and vehicles
  - Areas of Improvement in İstanbul
    - Drivers
      - Need for new and strong criteria for ability to be taxi drivers in city,
      - Develop extensive training and certification course,
      - Develop taxi drivers' performance management system.
    - Vehicles
      - Need for minimum service quality requirements for vehicles,
      - Environmental concerns should also be addressed.
    - Technology
      - İstanbul taxis are far beyond technology developments,

- Need for launch of operation dispatch centre and call centre integrated with vehicles,
- Taxis have to be equipped with latest technology equipment like meters, cameras, sensors, AI etc.
- EN 13816 can be considered for service quality management.

CHAPTER IV

RECOMMENDATIONS

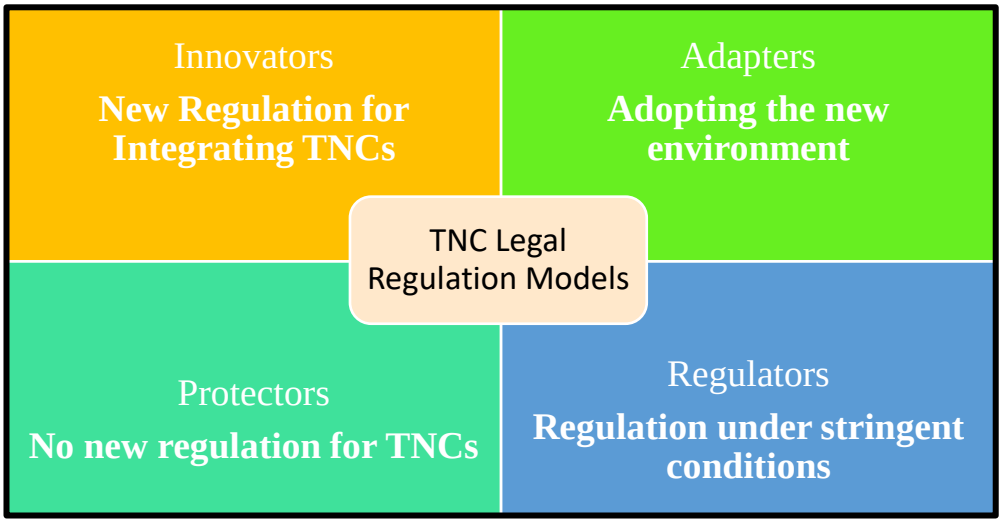
4.1 Recommendations for Regulatory Approach on Transport Network Companies

4.1.1 Regulatory Model and Principles

When the different legal and policy responses of transport authorities after introduction of the Transportation Network Companies are analyzed, it seems that they can be categorized into four: “Innovators”, who create new regulations to integrate the TNCs into urban mobility offer, “Adapters”, who mainly follow other countries and adapt themselves to new environment, “Protectors”, who protect the existing legal approach, and “Regulators”, who allow the TNCs to work, but under very stringent conditions.

At the occasion of focus group meetings, participants indicated the future regulatory model adapted by cities should be in favour of innovation. This means cities should revise their current legal framework to integrate the TNCs into urban mobility offers. The categories of the regulatory matrix are presented in Table 4.1.

Table 4.1: Regulatory Matrix for Transportation Network Companies



Source: (Prepared for the purpose of this Thesis)

This has been verified in focus group meetings by participants as a suggested way for regulators for the future. Also, when we look for the model that is implemented in cities like Singapore and Dubai, where taxi transport is one of most successful in terms of different efficiency measures, it is clear that these cities are also implementing such an approach. Such a model can be applied in conformity with below principles:

- As a general principle, a Regulatory Framework should not have the aim of protecting any certain groups, but should be designed as a tool to implement public policies. It is seen in practice that most of the policies implemented to protect current actors were not successful, but the sustainable approach can be achieved when the regulators prioritise implementation of public policy goals.
- A Regulatory Framework for Taxis and the TNCs should be developed together to ensure fair conditions for both parties as both have similar interests and purposes.
- Advanced technology provided by the TNCs can be used to develop advanced regulatory and enforcement schemes.
- Cities can use technology revolution and the TNCs for better implementation of demand management practices with tools like UBER POOL or OLA SHARE. This is important from the perspective of reducing traffic congestion and unnecessary trips occupying streets.
- A Regulatory Framework based on road charging should be considered to avoid extra vehicle miles and congestion of the TNCs like the model in Brazil. Road charging could be applied as an incentive; for instance, there could be different pricing in terms of passenger occupancy in the TNC cars. Incentivized pricing could be applied to promote shared vehicles, if rides are shared with no pricing implemented.
- The regulation should not only concentrate on competition between the TNCs and Taxis/Public Transort but also potential competition may take place soon in the future between TNCs.
- A Regulatory Framework should less concentrate on price and quantity regulation, but more on quality regulation in terms of road usage, environmental issues, safety and availability.

Figure 4.1 below illustrates an ideal approach for a taxi regulation.

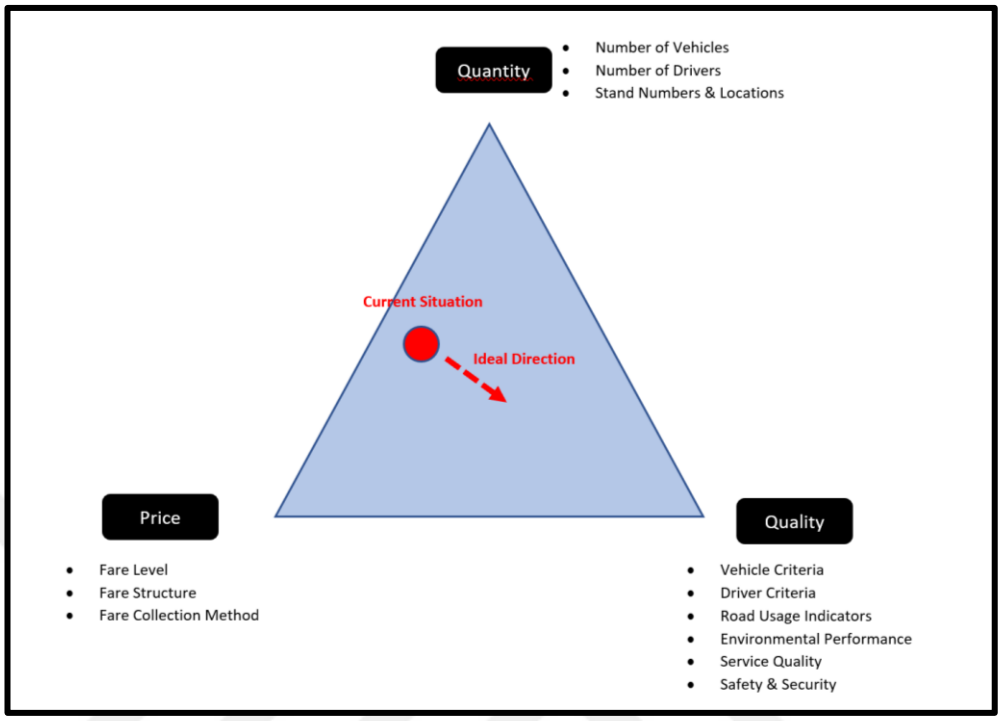


Figure 4.1: An Ideal Approach for a Taxi Regulation

Source: Prepared for the purpose of this Thesis

4.1.2 Key Elements of the TNC Regulation

Most controversial issues faced in cities since the introduction of TNCs have been identified within the scope of this thesis. These controversial issues are related to the facts that the TNCs use private vehicles for taxi operation and unprofessional drivers, surge pricing, share the taxis with others, as well as other issues related to taxation, contractual relations with drivers, and data privacy. Figure 4.2 presents the key elements of the TNC regulation.

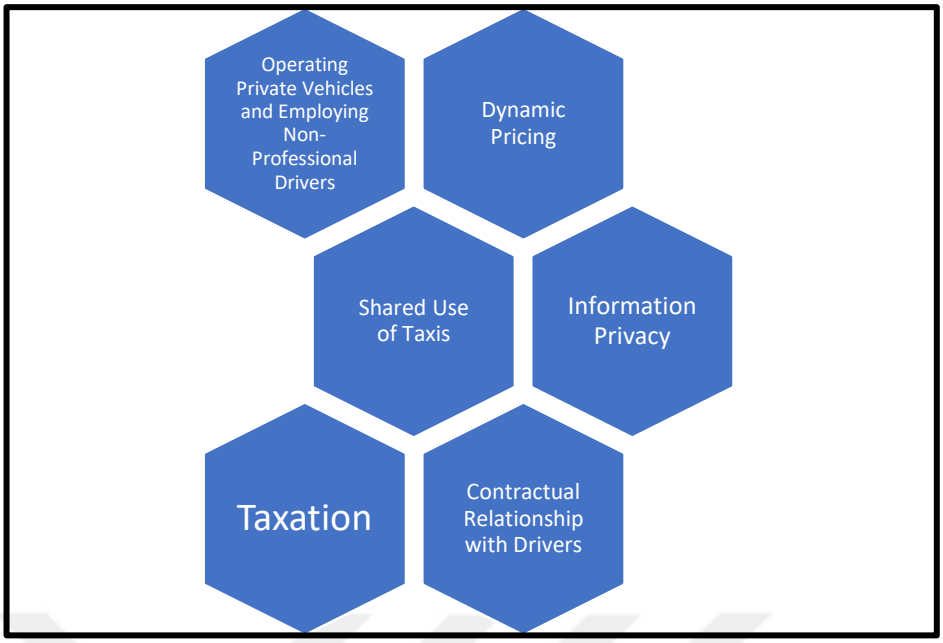


Figure 4.2: Key Elements of the TNC Regulation

Source: Prepared for the purpose of this Thesis

New regulatory framework for the TNCs in cities should address these elements. There should be a clear approach for all to allow the integration of the TNCs in urban transport and at the same time, to reach public policy goals.

The TNCs are using private vehicles and unprofessional drivers for the operation for most of their service types. UberPoP is the most well-known in this area, but this is also the case for many other TNCs as well. Without doubt, using unprofessional drivers and regular private vehicles for such services is likely to decrease the cost of services and lead to planning efficiency, but there are also concerns from many aspects of safety, security, and quality. In addition, the impact of such services from the perspective of fair playing ground, considering the heavily regulated other traditional taxi operators, is also a crucial point to consider. It is suggested that the TNCs should be allowed to operate only with licensed taxi vehicles and drivers in cities by creating a new legal approach.

Sharing the taxi trips with others passengers are not legal in many countries. There are different reasons behind the decisions taken by authorities for that position, but today with applications like UberPool or Olashare, this has become commonly practiced in various cities. However, many cities can use such a technology revolution and the TNCs for better implementation of demand management practices with tools like

UBER POOL or OLA SHARE. This is important from the perspective of reducing traffic congestion and unnecessary trips occupying streets.

Surge pricing, however, was on everyone's lips when it was first introduced by the TNCs. Surge pricing is a tool to match demand and supply for taxi rides when there is high demand. Surge pricing could be used with the objective of better management for taxis rather than an extra revenue generation tool.

Tracking the users after the end of the journey by the TNCs is also an important discussion mainly from the privacy perspective. Data privacy should be addressed within the framework of general data protection laws. Also, data ownership needs to be clarified in the way to promote open and data-sharing principles.

4.2 Recommendations for Taxi Operators

Limited research analysed during the literature review of this thesis was mostly advising to the taxi sector to compete against the TNCs. At the stage of research during that thesis, however, the strategy recommended to the taxi sector was about changing in the past and expected to change more. Table 4.2 below shows the results of the interviews conducted with senior executives of taxi companies. At the beginning of the TNC disruption, taxi companies mostly had a tendency of Ignoring or Resisting against the TNCs. Today most commonly exercised strategy has turned out to be a competition. Table 4.2 demonstrates the change of strategy within the taxi sector.

Table 4.2: Change of Strategy within the Taxi Sector

	Ignore	Resist	Compete	Cooperate
Past				
Today				
Future				

Source: Prepared for the purpose of this Thesis

The competition against the TNCs by the traditional taxi industry is not an easy task as the TNCs has a strong competitive advantage in terms of technology, economy of scale, modern management, and marketing techniques. It is also important to notice that the traditional taxi sector continued their operation in many countries for several years with heavy regulations in terms of market entry and protection, which limited their innovation capability and produced poor services together with less ability to response market changes.

Still, senior executives of the taxi sector are expecting and suggesting an increased collaboration between the TNCs and the traditional taxi sector in the future. That is also seen in different examples in various cities around the world today, and especially in cities like Singapore and Dubai, which can be defined as one of the most successful taxi operating cities. From that perspective, it is recommended that traditional taxi operators should look for ways of cooperation with the TNCs in the future.

There are many advantages of traditional taxi services against the TNCs such as having well-trained drivers (in comparison to unprofessional TNC drivers), existing vehicle fleet, city knowledge, etc. From this standpoint, the traditional taxi sector should consider more about collaboration options with the TNCs, which are today a reality and have many competitive advantages against the traditional taxi industry. This option could bring benefit to both parties and they can act complementarily rather than competing each other and losing sources for this competition for the mid-term. Examples from Singapore or Dubai where traditional taxi sector was very strong can be taken as a case study on this and could be studied by other cities to design a further strategy.

It is also important to suggest a model for the cooperation between the TNCs and traditional taxi operators. For that reason, a Taxi Value Chain was identified during Focus Group Meetings which mainly consists of vehicle ownership and drivers as strong points of traditional taxi operators, pre/post booking services and vehicle management and disposal as strengths of the TNCs. Figure 4.3 illustrates the taxi value chain with strong elements of traditional taxis and the TNCs.

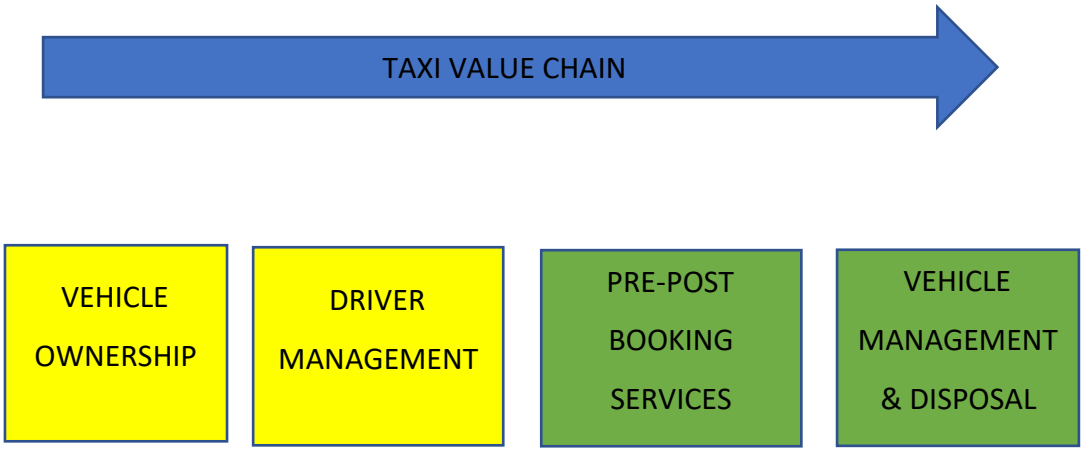


Figure 4.3: Taxi Value Chain with Strong Elements of Traditional Taxis and the TNCs

Source: Prepared for the purpose of this Thesis

It is highly recommended that the role sharing between the TNCs and Traditional Taxi Operators could be based on their strengths in a taxi value chain. It is also important for the traditional taxi sector to keep in mind the fact that the introduction of the autonomous vehicles will be a game changer on this partnership since it will eliminate drivers, an aspect which is an important strength that traditional taxis can bring on the table of partnership with the TNCs. Figure 4.4 presents the taxi value chain after the introduction of autonomous vehicles with strong elements of traditional taxis and the TNCs.

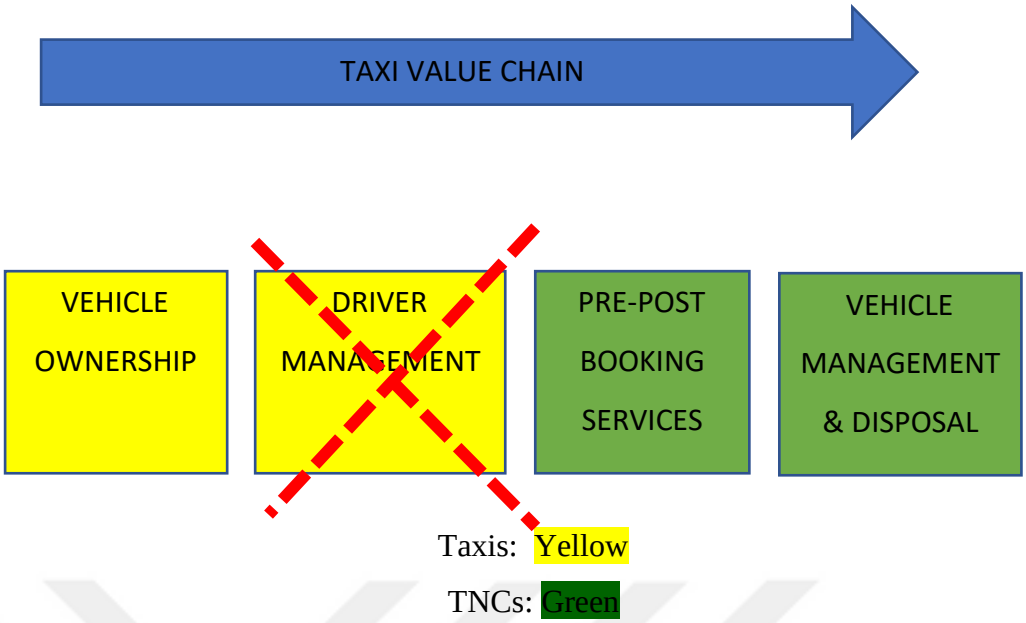


Figure 4.4: Taxi Value Chain After the Introduction of Autonomous Vehicles with Strong Elements of Traditional Taxis and TNCs

Source: Prepared for the purpose of this Thesis

In addition to partnering with the TNCs, Traditional Taxi Industry should also look for different ways to improve customer satisfaction and efficiency. This can be achieved through, corporatisation of individually owned taxi operators and by increasing the service quality and focusing more on product differentiation, market segmentation, and better integration with other modes of public passenger transportation, which can all be summarized as follows:

- Individually owned taxi operators need to be corporatized quickly and this needs to happen very quickly.
- Taxi sector should increase their service quality to be able to stay attractive.
- Taxi sector should launch Taxi Apps but they also need to establish alliances.
- Taxi sector should go under MaaS Platforms.
- Taxi operators should look for ways of cooperation with Transportation Network Companies.
- Taxi operators need to focus more on product differentiation and market segmentation.

- Transportation Network Companies cannot continue offering such discounted prices to clients, and the taxi sector should be ready for this moment of change in the TNC pricing strategies.

4.3 Taxi Reform in İstanbul

Within the scope of the thesis, a taxi reform proposal has been developed for İstanbul in such a way as to cover all elements. This reform proposal has been created to determine the basic policies and strategies for the development of taxi services in İstanbul. The Taxi Reform proposal covers the necessary work to regulate existing taxi services and to provide prominent practices and trends around the world. The reform proposal has been prepared by considering the world examples examined in the literature review, the results of the current situation analysis in İstanbul, the results of the taxi user research conducted within the scope of the current situation analysis, and the MaaS readiness analysis results, the recommendations for the TNC regulation developed for the thesis and the recommendations developed for traditional taxi companies.

4.3.1 The Future Role of Taxis in Urban Transportation in İstanbul

The part that taxis can and should play in İstanbul's urban transportation is of great importance. Taxis can provide service in hours or service areas where major public transportation services such as buses and rail systems are not available. It should be a great necessity to consider taxi transportation as a complementary mode of transportation, not as a rival mode of transportation to public transportation. Within the scope of the proposed Taxi Reform, the integration of taxis with public transportation is to be considered as one of the main objectives for the establishment of a sustainable urban transportation system in İstanbul.

Currently, there is a lack of a clear role definition for taxi transport in İstanbul. With the increasing investments in public transportation in İstanbul, the role of taxi transportation should be redefined and transformed. Also, metro lines have been built in the main transportation corridors in the city, and the İstanbul Metrobus system has brought a serious difference to the transportation of the city compared to 10 years ago.

Since İstanbul is a notable tourism destination, the correct design and operation of taxi transportation, both in terms of planning and product, is of critical importance for domestic and foreign tourists visiting the city. Besides its being an important tourism destination, the fact that the world's largest airport has been built in İstanbul at a location farther outside the city compared to the previous airport, reveals the necessity of taxi transportation to be ready for this change.

The main objectives of taxi transportation in İstanbul can be suggested as follows:

- Operating in such a way as to feed the main public transportation lines,
- Offering transportation opportunities in suburban areas where public transportation services are not sufficient,
- Providing transportation opportunity during the hours (i.e., night) when public transportation services are not available or the frequency of the trips is very low,
- Creating transportation opportunities for citizens who do not own any private vehicles and for whom public transportation cannot fully meet the needs (for example, disabled citizens as a movement restriction, those who need to carry large suitcases/packages),
- Building an alternative transportation system for tourists visiting the city

All the actions proposed under the taxi reform will be directed towards the achievement of these strategic goals.

4.3.2 Analysis of Expectations in Terms of Stakeholders

Being among the users of the taxi system, the society, the taxi industry providing taxi services and the İBB, which is also responsible for the organization and regulation of taxi transportation, have different expectations and targets for the future of this system. They may overlap in some aspects and contradict each other in others. All projects to be proposed within the scope of the proposed reform program should be determined by considering the expectations and roles of these three stakeholders.

4.3.2.1 Desirable Conditions as Viewed by the Society

In order to create a real alternative and satisfaction for users, it is absolutely necessary to increase the quality, create price efficiency, and establish trust in taxi transportation. The basic service quality components desired by the users can be listed as follows:

- Safety and system security
- Reliability
- Customer services
- Fare levels
- Integration
- Comfort

4.3.2.2 Desirable Conditions as Viewed by the Taxi Industry

The taxi industry offers a service that is of great importance for urban transportation in İstanbul. The quality of other transportation alternatives is, however, increasing, and the scope of service is expanding day by day. The taxi industry also needs to improve its service quality in order to assume its role well in the urban transportation system and to take an active part in this field in the future. Still, the main challenge for the taxi industry is to manage costs for the industry while increasing quality. This will only be possible if the current actors get a fair return after the changes under this program. It is also of great importance that the sector has access to sufficient capacity to provide the services targeted within the scope of this reform program. This situation is closely related to both organizational capacity and individual capacity. In this connection, the taxi industry should:

- Create the opportunity to provide fair returns for the sector without causing a disadvantage to the passengers by ensuring the balance of supply and demand,
- Build an organizational capacity,
- Employ trained and qualified drivers,
- Operate safe and comfortable vehicles

4.3.2.3 Things to be Done by İstanbul Metropolitan Municipality

The expectations of the society and the needs of the taxi industry should form the basis of the legal framework and business standards to be implemented by the İBB. In addition, compliance with the transportation policies implemented by the İBB and the support of these policies by the taxi industry are also critical factors in achieving the goals. In order to achieve these three objectives, it is important that the following elements are provided by the İBB:

- Increasing service quality and community trust through reviewing the legal
- structure, better enforcement, and sharing changes with the community,
- Maintaining the taxi supply and product range in accordance with the requirements,
- Setting up a fare management and review mechanism,
- Ensuring the safety and security of passengers and drivers
- Adopting transparent and accountable processes

4.3.3. Strategic Goals

Considering the current situation analysis conducted in relation to the Taxi Reform, the examination of world examples and the results of other research for the purpose of shaping the methodology, the strategic targets of the taxi transportation in İstanbul for the future have been determined. Utmost attention is to be paid in order to achieve these strategic goals through various projects to be envisaged within the scope of Taxi Reform. The goals can be listed as follows:

- Ensuring the integration of taxi transportation with public transportation,
- Regarding taxi transportation as an important component of the urban transportation spectrum and positioning it as an actor in the provision of last kilometre services,
- Providing access to taxi transportation for different segments of society,
- Establishing the correct, clear and easily applicable legal framework for taxi transportation,
- Improving taxi vehicle standards and increasing fleet quality,
- Improving driving comfort and customer services,

- Improving the quality of drivers and their professional conditions,
- Creating cost advantages by increasing the efficiency of taxi transportation,
- Establishing partnerships among industry stakeholders in order to achieve the targets,
- Assessing, auditing, and ensuring the continuous improvement of individual and sector performance.

4.4 Main Actions of the Taxi Reform

Within the scope of the thesis, a Taxi Reform has been prepared to form a basis for the development of taxi services in İstanbul and its main elements specified. This proposition has been determined by considering international best practice examples, current conditions, citizen expectations, discussions in focus group studies, global trends, and transportation policies.

The aim of the proposed Taxi Reform is to identify the processes that need to be addressed in the taxi system in a way that will ensure integration with public transportation in all areas and increase the quality of services at every step. The Taxi Reform has been discussed in a way that prioritizes the role of taxi services, the areas of responsibility and expectations of system stakeholders, and the strategic targets created in urban transportation. Figure 4.5 presents a model for the İstanbul Taxi Reform.

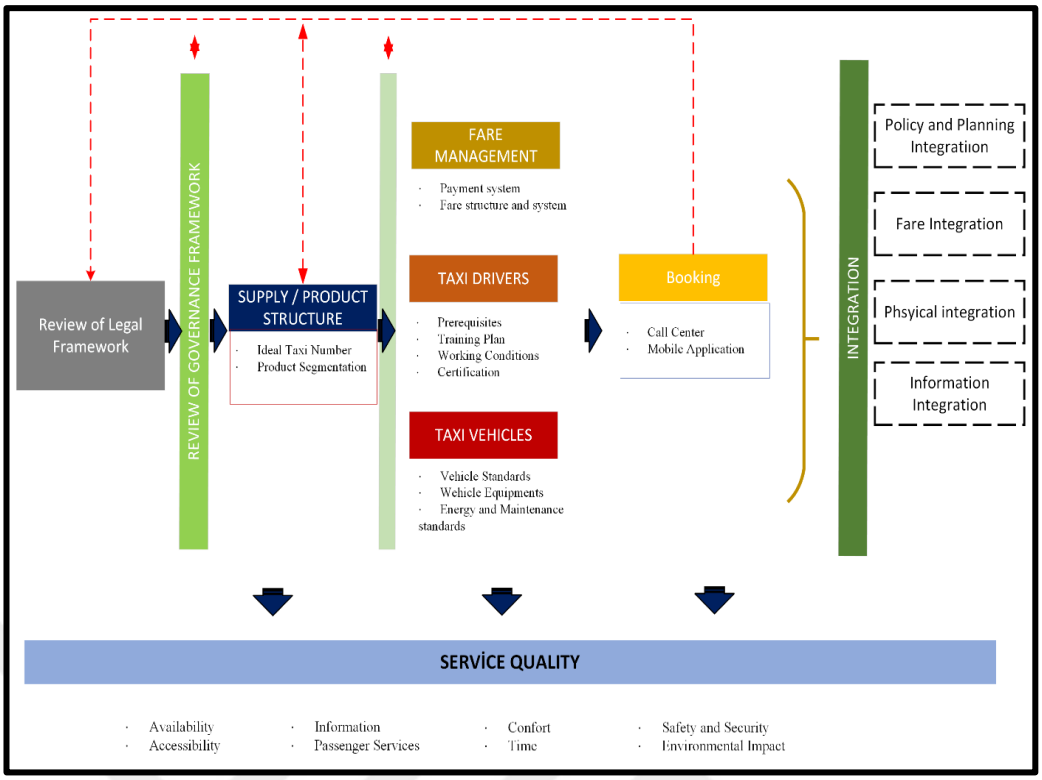


Figure 4.5: İstanbul Taxi Reform

Source: Prepared for the purpose of this Thesis

In order to achieve the desired developments and changes in taxi services, necessary arrangements must be made in the legal framework to support these changes and developments. With the removal of obstacles through legal regulations, the management structure, relations between actors, duties, and responsibilities for the taxi industry should be clearly defined and documented officially. Upon determining the management structure, the ideal number of taxis in the sector should be estimated, and segmentation should be made in the taxi services in line with the needs and expectations of the citizens. After the supply of adequate and qualified taxis to the system, fare management, vehicle and driver standards should be provided in all taxis, and a transition to the application of digitalization should be ensured.

Each of the aforementioned steps are likely to directly affect the service quality. With the use of digitalization in all taxis, it is expected that a suitable environment will be created to ensure regulations in all areas of integration.

4.4.1 Legal and Organizational Structure

4.4.1.1 Legal Structure

The legal structure for taxi transportation should be built in such a way that will ensure that the supply and demand balance is established in taxi services, and that mobility and economic growth are not hindered, and that there is not much competition in the market.

Currently, the legal regulation in İstanbul is mostly in the form of strict control of the number (quantity) of taxis in operation and taxi fares. However, the rules determined by laws and regulations in the field of quality are either very few or the existing ones are not implemented enough. As can be seen from the examples around the world, the legal framework in the field of quality has been tightened in many cities, and the regulation of quantity and fares has been relatively lightened. This approach should be taken as a basis for İstanbul as well.

It is essential that the current Taxi Directive be revised in such a way as to allow for the actions proposed in this report to be executed. Likewise, the current directive covers both taxi and taxi dolmushes at the same time.

Taxis and taxi dolmushes working with taximeters offer two very different transportation services as operating regimes, and the contents of the directive differ from each other at some points. For this reason, it is useful to prepare separate guidelines for two different types of transportation. Figure 4.6 shows the taxi regulation triangle and the ideal approach for İstanbul.

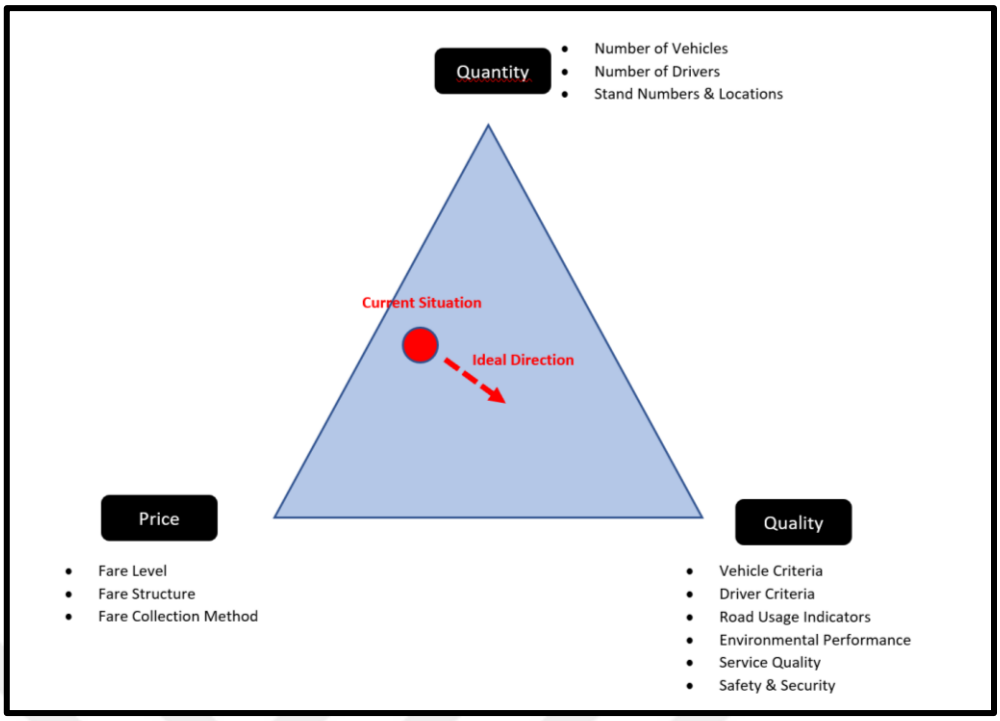


Figure 4.6: Taxi Regulation Triangle and the Ideal Approach for İstanbul

Source: Prepared for the purpose of this Thesis

The legal framework should be designed in a way that will pave the way for taxis to evolve from individual ownership to corporatization in the medium and long term.

That the list of license plate holders and taxi drivers should be open to the public and be obtained transparently in İstanbul, as in many other cities around the world, will both facilitate the auditing of the taxi market and facilitate disclosing those who drive a profit by manipulating the license plate "stock market". In this context, it should be made possible to access the lists with the names and license numbers of all license plate holders and drivers over the internet.

Formulating regulations regarding the purchases and sales in the brokerage and second-hand license plate market is also important for the transparency and financial sustainability of the taxi business. Preventing unregistered activities in the second-hand license plate market is necessary both to protect the public interest and to prevent illegal taxi transportation. It should be ensured that the activities of companies dealing with license plate buying-selling and leasing, especially by providing intermediary services, are transparent and traceable.

By the same token, it is also important to increase tax audits in the legal taxi market in parallel with the above-mentioned issues. In particular, it is necessary to make arrangements to prevent tax loss in taxi plate purchases and sales, and to prevent low prices in plate purchases and sales in order to do this. For this, more controls can be added as an initial measure. In case of insufficient controls, more radical measures can be considered. If, for example, the public retains the right to purchase taxi plates at any time at their selling value on paper, they can largely ensure that sales are made at real prices.

4.4.1.2 Organizational Structure

Currently, the İBB Public Transportation Services Department is responsible for the implementation of the Taxi Directive, as well as taxi transportation and other decisions taken. Apart from taxis, the relevant department is also responsible for other modes of transportation such as minibuses, company and school service vehicles, waterborne transport vehicles, and heavy vehicles.

Considering the cities with successful taxi operations and urban transportation systems in the world, it is recommended to establish an Urban Transportation Authority for İstanbul. The establishment of a special department focused on taxi transportation together with the İstanbul Urban Transportation Authority will play an important role in fulfilling the authority functions for this mode of transport.

It is, likewise, necessary to build institutional capacity within this department. With the Taxi Transformation Program, important and strong project actions have been proposed, however, there should be sufficient human resources in sufficient numbers and competence so that such projects can be put into action. Table 4.3 presents the governance levels and role-sharing for taxis in İstanbul.

Table 4.3: Governance Levels and Role-Sharing for Taxis in İstanbul

LEVEL	INSTITUTION	ROLE
STRATEGICAL LEVEL Long-term	Central Government/ Ministry of Transportation	•Legal structure •National Transportation Policy •Financial Support of Local Government
	İBB Mayor/City Council	•General Urban Transport Policy •Budget •Pricing Policy
TACTICAL LEVEL Medium-term	Urban Transportation Authority	•Planning, Coordination, Supervision •Number of Vehicles •Vehicle and Driver Criteria •Setting the Service Standards •Licensing and Certification •Registering •Determination of Call Centre and Mobile Application Rules
OPERATIONAL Short-term	Taxi Operators (Chambers, Drivers)	•Performing the operations •Maintenance •Quality Service Delivery •Implementing a Training Plan •Compliance with Labour Standards

Source: Prepared for the purpose of this Thesis

Below listed main actions are recommended in terms of legal and organizational structure of taxis in İstanbul:

- Taxi Regulation should focus on quality rather than quantity and price.
- Instructions for taxis and taxi dolmushes operating with a taximeter should be separated from each other.
- The legal framework should be designed in such a way that will pave the way for taxis to evolve from individual ownership to corporatization in the medium and long term.
- The lists with the names and license numbers of all license plate holders and drivers should be available to access over the Internet.

- Regulations should be made in conformity with the transparency and financial sustainability of the taxi business for purchases and sales in the intermediary and second-hand license plate market.
- With the increase of tax audits in the taxi market, the tax loss especially during the purchase and sale of license plates should be prevented.
- The existing taxi directive should be updated in a way that will enable the projects and activities proposed in this report to be put into practice.
- A special department focusing on taxi transportation should be established together with the newly proposed İstanbul Urban Transportation Authority.
- Contracts should be prepared between the drivers and the license plate holders in order to specify the commercial rules among themselves, but in a way that the other elements are determined by the Authority.

4.4.2 Fare Management

4.4.2.1 Fare Level Specification and Pricing Changing Mechanism

Taxi fares in İstanbul are high when compared to those in other countries. One of the main reasons for this is the high taxi license plate fees and operational inefficiency. Provided that the taxi license plate values are prevented from being so high, it will be possible to reduce the fare level by 40%.

Additionally, the increase in efficiency together with the projects proposed to be implemented within the scope of the Taxi Reform will also allow to reduce taxi operating costs. Reducing the fare levels will result in more interest in taxi transportation, increasing the total net profit even if the total turnover per trip decreases.

The pricing change mechanism, on the other hand, is of great importance. In this regard, it would be the most logical step to develop a transparent procedure and proceed to a pricing formulation. The following basic elements can be found in the pricing change formula:

- Maintenance (spare parts, service, insurance, maintenance)
- Financing (vehicle reimbursement and/or rental cost)

- Fuel costs (over average km)
- Average income change (a proportional increase in salary for drivers compared to other sectors)

The weights of these different elements in the pricing change formula can be determined according to the real business values. In this formula, the source of each value should be identified clearly and together with the information when it will be disclosed. Annually, the fees can be updated according to the change in the formula at the end of the spring or the beginning of the summer. The pricing formula must also be shared with the society, and the society must clearly know the reasons for the change in the taxi fare levels, and the process must operate in a transparent manner.

4.4.2.2 Fare Structure

The current fee structure is simply based on a certain minimum price and then an increase as to km/time. This structure can be sustained; however, there is still a need for a more detailed analysis of the levels of the components of this structure. If drivers are reluctant to accept short-haul trips, a minimum fare review can be increased.

There is already serious confusion in the current fare structure for bridge, highway and tunnel crossings. In the collection of bridge and highway fees, taximeters and the HGS/OGS system should be integrated and automatically reflected in the price. In addition, many taxi drivers are known to state that they will have to use bridges, highways and tunnels on their return, and demand the relevant fee from the passengers. A passenger should only be responsible for the fare for his/her itinerary. Possible bridge, highway and tunnel fees on the way back should not be collected from a passenger.

Along with the new taxi supply, changes in the fare structure will also be required for different products. For airport taxis, for example, there will be a need for a different application in terms of the starting fare. For taxis in the luxury segment, the fare level should be determined according to the extent of difference of the service, service production costs, and the purchasing power of the market.

In many cities around the world, additional fees are charged for taxi reservations made via the call centre. However, with the spread of mobile applications in the recent period, such an additional fee has not been charged by mobile applications.

It should also be ensured that the taxi fare and structure are clearly announced in the taxi vehicles in a way that passengers can easily see.

4.4.2.3 Payment Receipt

Currently, taxi receipts in İstanbul are only issued upon request and are prepared manually by the drivers. The use of cash registers integrated with taximeters should be introduced as soon as possible with the availability to issue receipts after all trips.

4.4.2.4 Payment Method

Taxis in İstanbul still operate by cash payment although the role of cash shopping in daily life is gradually decreasing and other payment methods have started to be used more frequently. In this sense, the possibility of payment by credit card should be made available. In the case of an additional transaction fee is charged by the banks during payments by credit card, it may be considered to add this additional transaction fee to the taxi fare. However, in many cities around the world, there is no cost difference for the passengers when they pay the taxi fares either by credit card or cash.

In addition to credit cards, the immediate use of the İstanbulkart system in taxis will both offer an additional payment opportunity to passengers and facilitate the integration of taxis with other types of public transportation. In this respect, a similar contractual relationship can be established between Belbim and taxi drivers, just as a contractual relationship between banks and taxi drivers can be established for credit cards.

In the names of its future vision, the İBB has also been planning to establish an integrated transportation platform, namely the MaaS system. One of the biggest challenges in the successful establishment of the MaaS system in İstanbul is the difficulty of integrating taxis into this system. However, the integration of taxis into

the system can be achieved through mobile applications. For this purpose, the following steps should be followed:

- The taxi fare levels should be lowered by taking certain actions such as reducing plate prices and the number of intermediaries, and increasing efficiency.
- A pricing change mechanism should be established on the basis of a transparent formula.
- The taximeters and the HGS/OGS system should be integrated and automatically included in the price.
- A new taxi supply and the fare level/structure appropriate for different segments should be specified.
- It should be ensured that the fare level and structure in taxis are clearly announced in the taxi vehicles in a way that passengers can easily see.
- Cash register application integrated with taximeters should be introduced.
- It should be made available to pay with credit cards and İstanbul Card.
- MaaS integration efforts should start very soon.

4.4.2.5 Supply/Product Structure

As noted previously, there is a very strict regulation on the number of taxis in İstanbul. The lack of sufficient data infrastructure regarding the current taxi transportation prevents us from making a clear analysis regarding the number of taxis needed in İstanbul, as well as about the areas of need for taxis and the type of taxi products.

A general estimation on the average number of taxis per capita worldwide indicates that İstanbul needs 51,546 taxis in total to catch up with the world average. However, the number of taxis per capita is not the only indicator for demand and such a figure may be too high. In this connection, a taxi demand model should be devised by taking into account the use of private vehicles, fuel prices, parking facilities, public transportation alternatives, number of illegal taxis, population density, number of tourists, and income levels, etc. At this point, a Taxi Supply Model analysis should be done and the number of taxis needed theoretically should be determined clearly. Besides the factors influencing the demand in İstanbul, the results of the existing taxi industry should be examined in detail. Until now, the circumstances of the existing

taxi industry have only been mentioned in the *Analysis of the Taxi Industry in İstanbul*, a report prepared by Prof. Dr. Murat Çelik (Çelik, 2020).

The results of the report should be analyzed in two main elements for İstanbul. The first should be considered as the rate of kilometres with passengers in the total daily taxi kilometres, whereas the second should be considered from the perspective of taxi availability.

The need for a new taxi supply is inevitably obvious, provided that the amount is determined clearly. At this point, how this supply will be provided should be determined by a reliable and separate study.

New taxis should not be supplied on a lifetime basis, nor with a personal licensing model. The new taxi supply must be made with a timed contract and a competitive tender. It should be planned to make the supply of new taxis in bulk, that is, it is necessary to switch to a professional taxi operating business. Still, in such a case, since there will be a conflict with Article 3 of the Decree of the Council of Ministers on the Procedures and Principles to be Followed in Issuing Commercial Plates, necessary arrangements must be made in advance to prevent the confrontation.

In this framework, it is of great importance to create a separate taxi service product with the new taxi supply. Currently, there is a single type of taxi service in İstanbul. However, taxi services appear to be remarkably diverse in different cities around the world. Positioning the new taxi supply as taxis that will serve in the higher segment can be considered as the first choice. In addition, airport taxis can be positioned as a separate taxi service group, thereby constituting three different types of taxi service range, which are presented as follows:

- Normal Taxis: These are the taxis that serve for normal intra-city trips. The system is based on the lowest fare level, and the vehicle, driver and service quality standards are to be determined accordingly.
- Luxury Taxis: Both the vehicle model and the level of service should be higher than how they are in normal taxis. Inability to take them on the road can be considered as a criterion, according to which, this taxi group either goes to pick up the customer on call or from predetermined taxi demand hotspots such as locations such as hotels, large business centres etc. The availability of the WIFI

in all of these vehicles, wide knee and ceiling distance, and trunk space should be considered to include as attractive services.

- Airport Taxis: These are the taxis that are only in charge of picking up passengers from the airport. They should have ample luggage space. Drivers must go through special training, and especially English language knowledge should be a requirement. The starting fare is different, but the mileage change price should be the same as normal taxis. Only these taxis should serve for the journeys departing from the airport.

Apart from the taxi types given above, segmentation can be performed in other different areas according to the results of the data collection and analysis work to be done. These alternatives are listed below:

- Taxis Operating via a Call Centre/Mobile Application: This type of segmentation can be performed especially after the first call centre/mobile application trial. These taxis do not pick up customers on the road and only go to pick up their customers after the call centre/mobile application reservations. After the first results of the iTAKSİ application are analyzed, it will be better understood whether such an application is necessary.
- Taxis Special to Certain Regions: In certain areas where taxis do not serve in İstanbul, and in the cases of a reluctance of taxi drivers to go to/pick up passengers in those regions, a specific group of taxis could be dedicated to serve in such regions. These taxis can be differentiated from others by a different colour (whole vehicle or specific area). They can only take passengers from the defined region, but not from other regions.
- Taxis for the Disabled: These taxi vehicles are suitable for disabled passengers. They work with advance reservation. Government subsidies can be provided to the operators of these taxis.

Making clear and correct decisions on all these issues will only be possible with the provision of a regular and high-quality data infrastructure. It is therefore necessary to set up a regular data collection infrastructure for the purpose of determining future policies and establishing the supply/demand balance. At this point, the provision of technological equipment for taxis is the main concern. A well-structured infrastructure should include the following aspects:

- The number of taxis in İstanbul and their efficiency should be increased.
- A Taxi Supply Model analysis should be done and the number of taxis needed theoretically should be determined clearly.
- The Business Model for a Taxi Supply should also be created by considering factors such as different scenario analyses and legal regulations.
- The supply of new taxis should not be carried out on a lifetime and personal licensing model. The new taxi supply should be made with a timed contract and competitive tender.
- It necessary to create a separate taxi product with the new taxi supply.
- The new taxi product segments can be classified as Normal Taxis, Luxury Taxis and Airport Taxis. In addition to these, Taxis Operating via a Call Centre/Mobile Application, Taxis Special to Certain Regions and Taxis for the Disabled can be introduced for better services.
- In order to be able to make clear and correct decisions on all these issues, a regular data collection infrastructure and technological equipment should be established.
- After the decision on the new taxi supply taken at UKOME, it should be submitted to the Ministry of Interior for approval.

4.4.3 Taxi Drivers

Drivers are key actors in the transformation of taxi services in İstanbul. Despite the presence of certain pre-criteria and training requirements in the taxi directive regarding drivers, it should be pointed out that they are not fully implemented, that there are problems in follow-up and inspection, and that these pre-criteria and training standards are insufficient. A taxi driver licensing system should be developed and implemented, just like taxi license plates. The following elements should be determined by the licensing system:

4.4.3.1 Preconditions for Becoming a Taxi Driver

Preconditions for becoming a taxi driver should be reviewed and made compatible with international examples in the following aspects:

- Basic education level

- Age
- Driver experience
- Health situation
- Criminal record check

Appropriate conditions for all these elements should be determined in detail in a clear manner.

4.4.3.2 Training for Taxi Drivers

In order to improve quality and establish system safety, a comprehensive and compulsory training program and post-training testing should be introduced for taxi drivers. The training program specified in the current taxi directive remained only at the level of topics, the content and duration of these topics were not specifically mentioned. The training program of taxi drivers can be arranged according to a curriculum, including the following topics:

- Information on work zones
- Basic passenger collection areas
- Customer service
- Occupational health and safety, HR Assistance
- Vehicle knowledge and using vehicle equipment
- Basic rules and regulations

This training program can be conducted by the Transportation Academy, which is planned to be established by the İBB. However, in the long term, this process can be carried out by independent training centres that will be accredited and supervised by this academy. After the training, all driver candidates must be tested. The relevant test should be divided into two parts, both a theoretical and a practical test. Candidates who pass the test should be awarded a driver's license which must be valid for a certain period of time and be renewed after a certain period. The relevant training program and its details should be developed by the İBB and a certain period of time should be allowed for all drivers to comply with the relevant criteria. It is necessary that this

period is not changed later. As a consequence, a database for existing drivers can also be created.

4.4.3.3 Taxi Drivers' License Renewal

Taxi Drivers should not have the right to use a taxi for life after completing the training and passing the tests. A certain period of time must be defined for these licenses, and at the end of the term, refresher trainings and certain health tests must be demanded as a requirement, otherwise, the taxi driver license should not be valid.
The driver performance should be regularly monitored in the period before reaching the pre-determined period, and it is of great importance in terms of service quality and system safety that the drivers who show poor performance are retrained or their license is revoked. A Taxi Driver Performance Tracking System is also recommended in the Taxi Reform proposed in this thesis.

4.4.3.4 Working Conditions for Taxi Drivers

In current practices, there is no regulation regarding the working hours of taxi drivers with no follow-up of this regulation. Working hours for taxi drivers should be clarified. While determining the working hours, continuous driving time, maximum daily driving time, daily rest times, and weekly rest periods should be clearly ascertained. To this end, the following actions need to be taken:

- Taxi Driver Licensing System should be developed and put into practice just like taxi license plates.
- The Taxi Driver Licensing System should include Taxi Driver Preconditions, Training Program, License Renewal and Driver Performance Tracking.
- The training program, which is the basic component of the Taxi Driver Licensing system, should be prepared together with the İBB Transportation Academy and capacity be created within the Academy.
- Working hours for taxi drivers should be clearly determined. While determining the working hours, continuous driving time, maximum daily driving time, daily rest times and weekly rest periods should be clarified separately.

4.4.3 Taxi Vehicles

There are serious complaints and dissatisfaction from the passengers regarding the vehicles used in the current taxi transportation operations. Despite the investment made in taxi plate value, the cheapest vehicle models are generally preferred in the market. The problem in vehicle models not only poses passenger dissatisfaction, but also operational inefficiency, safety and security problems.

It is of great importance to specify the quality and service standards for vehicles in more detail and to implement the standards properly. Setting the criteria of annual inspection of vehicles will also be a notable element, especially in terms of vehicle safety.

It has also been observed that the overhead taxi signs of some vehicles do not work, resulting in confusion among passengers as to whether the taxis are empty or full. In order to prevent this, it is important that the sign is transferred to the written method as well as the illuminated version.

Vehicle interior features should be specified in terms of following elements:

- Enough room for knees and head for passengers in the vehicle,
- Sufficient luggage space,
- Airbags and other accident prevention elements,
- Taxi interior and exterior direction/information signs,
- A black box and technological equipment,
- An environmentally friendly engine choice
- Accessibility criteria for a certain number of vehicles
- Ergonomic and long-term driving design on the driver's side

The vehicle age limit specified in the current taxi directive may be maintained; however, in case of a temporary licensing in the new taxi supply, this license period and the taxi vehicle age should be compatible with each other. It is of great importance to seek annual detailed inspection conditions for taxi vehicles.

For the maintenance and spare parts needs of taxi vehicles, service centres should be built by the İBB affiliates or through accredited institutions. Considering that

individual ownership continues, such an exercise will provide an opportunity to reduce the costs of taxi drivers and extend the life of vehicles. In this sense, the following actions can be taken:

- Vehicle standards should be identified for taxis as to different segments,
- These standards should establish the basic elements of sufficient knee/headroom, comfort, luggage space, technological equipment, interior and exterior orientation, accident prevention, accessibility, environmentally friendly engine, and driver ergonomics,
- An annual inspection should be required from taxis,
- A detailed feasibility study should be conducted for the use of electric taxis and an incentive mechanism should be established.
- For taxi maintenance and spare parts needs, service centres should be established by the İBB's affiliates or through accredited institutions.

4.4.5 Transportation Network Companies

The lack of a ride-hailing and booking system in İstanbul has been felt very intensely for years. The iTAKSİ application initiated by the İBB was believed to close the gap at this point, yet this project failed while this thesis study was continuing. The regulatory structure for the TNCs should be clearly identified by the İBB. The recommended regulatory structure is not to ban mobile applications, but to integrate them with the existing taxi system.

It should also be noted that iTAKSİ was not positioned to replace or compete with other applications, as had been done by the İBB before. Nevertheless, competition in this field should be accepted as a factor that will increase service quality and efficiency.

However, the increasing number of mobile applications and the diversity of business models of such applications reveal the need for detailed regulation in this area as well. In this respect, the operational principles and procedures of mobile applications in İstanbul should be determined by the İBB. While determining these procedures and principles, it should be mandatory for all mobile applications to work with licensed taxis and drivers, otherwise there should be criminal sanctions. Moreover, the compliance of relevant mobile applications with tax and company laws in Turkey is a

necessity that should also be taken into account. Relevant mobile applications must be legally made obliged to collect and share data. In this connection, the current taxi directive should be revised to include these issues.

It would be a mistake to think that only mobile applications in the field of ride-hailing and booking will meet this need adequately. Considering that the majority of the population still does not use smart phones, and taxis are important especially for customers over a certain age, the necessity of establishing a taxi call centre arises. In the light of such elements, the following considerations should be taken into account:

- The TNCs should not be banned since competition in this field should be regarded as a factor that will increase service quality and efficiency.
- Operational principles and procedures of mobile applications should be ascertained. In this process, it should be mandatory for all mobile applications to work with licensed taxis and drivers, otherwise there should be criminal sanctions.
- Compliance of mobile applications with tax and company laws in Turkey should be observed.
- Collecting and sharing data for related mobile applications should be made mandatory.
- In addition to mobile applications, a taxi call centre should be planned and established in a way to serve over the phone.

4.4.6 Integration

The integration of taxi transportation with other transportation modes is essential for the success of sustainable transportation policies in İstanbul. At this point, integration can be evaluated in 4 basic aspects:

4.4.6.1 Policy and Planning Integration

While implementing policies for urban transportation, the role of taxi transportation in the implementation of such policies should definitely be considered and taxi transportation should become a component of the relevant urban policies. Likewise,

the transportation master plan or other public transportation plans should be prepared by adopting taxi transportation as part of the whole.

4.4.6.2 Physical Integration

The physical integration of taxi transportation, especially with other transportation modes, is of great importance. In the design of the metro lines that have been going on in İstanbul recently, taxi pockets and passenger drop-off points should be ascertained during the design phase, especially in the station areas. Likewise, the integration of taxi transportation with bus stops and sea transportation piers is of great importance. In case of physical integration in this way, it will be possible for passengers to transfer more easily. In order to avoid long waiting times in these areas, maximum waiting times should be determined for different stops. These times can be determined according to the passenger arrival frequency at the stops and the average passenger waiting time.

The integration of taxis with pedestrian transportation is also a very important element. For taxis, passenger pick-up/drop off points, stop/start areas should be clearly defined and monitored.

4.4.6.3 Fare Integration

The fare integration of taxis with public transport can be achieved through two components:

- Payment Method Integration: Providing the opportunity to pay with İstanbulkart in taxis will be likely to increase the rate of passengers using taxis as a part of their journey after/before public transportation.
- Integration of Fare Policies: Public transportation charges should also be taken into account when determining taxi fares. Setting completely different fares will further separate the users of the two modes of transport from each other. Furthermore, a feasibility study can be carried out with respect to including taxis in the transfer system so that the application rules can be determined in addition to exploring the cases in which this will be possible.

4.4.6.4 Information Integration

No current information resources exist as regards taxi transportation and other forms of public transportation. An integrated website and trip planner would fill a huge gap in this area in order to enable passengers to plan their journeys by considering all modes of transportation. At present, the integration of taxis with other public transportation mobile applications such as İETT's mobile application can be achieved through systems such as iTAKSİ and BiTAKSİ.

Integration should be ensured not only in digital dynamic platforms but also in terms of static information. Reciprocal guidance signs for taxi waiting areas/stops should be placed at rail system and central bus transfer spots. With the purpose of achieving the integration, the following aspects should be considered:

- Taxi transportation should be integrated with other modes of transportation and become part of the urban transportation spectrum.
- While making transportation policies and urban transportation plans, the role of taxis should not be underestimated and should be evaluated together with other transportation modes.
- Taxis should be physically integrated with other public transportation lines. Especially in the newly planned metro, bus transfer and sea transportation pier areas, taxi disembarkation/unloading zones should be very well planned.
- For the integration of taxis with pedestrian transportation, passenger pick-up/drop off points and stop/start areas should be clearly defined and monitored.
- With the valid use of İstanbulkart in taxis, integration with public transportation should be ensured in terms of payment method.
- While determining the taxi fares, the integration of the fare policy should be ensured by taking the public transportation fees into consideration.
- A feasibility study should be conducted to ensure that taxis are involved in the transfer system and also in the future MaaS system.
- A website and mobile application should be developed, which will include taxi transportation and which covers information and travel planning for all other passenger transportation modes.

- A static information system for taxi transportation should be developed and implemented especially at transfer points.

4.4.7 Service Quality

4.4.7.1 Establishing a Service Quality Management System

It is necessary to establish a Service Quality Management System for taxi transportation with reference to the European Union Standard - EN 13816- namely, Quality of Service in Public Passenger Transport.

Within the scope of this management system, the customer activity circle should be analyzed in detail, considering different customer groups in taxi transportation, and likewise, it is necessary to define the service quality in all transportation activities, identify the current status of service quality for these quality components, set the targets and the measurement systems.

The Service Quality for taxi transportation should be analyzed in four dimensions given as follows:

- Desired (expected) service quality
- Targeted service quality
- Realized service quality
- Perceived service quality

The service quality of taxi transport can be divided into 8 basic categories:

- Availability: The service provided in terms of geography, time, frequency and mode of transportation,
- Accessibility: Access to the taxi system, including transfer by other modes of transport,
- Information: Systematic information to help plan and make trips,
- Time: The time involved in planning and making trips,

- Customer services: Service elements that ensure the proximity between customer requirements and standard service,
- Comfort: Service items that make travels comfortable and peaceful
- Safety and security: Features that keep customers protected
- Environmental impact: Effects of taxi transport on the environment

Within the scope of the Taxi Transportation Service Quality Management System, service quality should be measured according to three basic measurement systems:

- Mystery Shopper Survey
- Passenger Satisfaction Survey
- Direct Performance Measurement
    - Software-based direct performance measurement
    - Direct audits

4.4.7.2 Driver Performance Tracking and Control System

One of the most crucial components of the Taxi Transport Service Quality Management System is to establish a Driver Performance Tracking and Inspection System. It is necessary to implement the rules that have been determined to apply penalty points within the system so as to ensure that the taxi drivers are supervised and motivated to show maximum effort to comply with the rules. The penalty point system should identify all unacceptable actions and establish sanctions as a consequence of such actions. These sanctions may be directed against the taxi driver, as well as against the taxi license holder or could be in the form of joint sanctions. Table 4.4 presents a proposal for unacceptable situations and penalty points or amount of fine to be paid.

Table 4.4: A Proposal for Unacceptable Situations and Penalty Points/Fine

Unacceptable acts	**Penalty**
Refusing a Passenger	6 Penalty Points & 2000 Turkish Liras
Mistreatment of a Passenger	12 Penalty Points & 3000 Turkish Liras
Overcharging a Passenger	12 Penalty Points & 3000 Turkish Liras

Source: Prepared for the purpose of this Thesis

Other unacceptable situations and their corresponding penalty points and fines should be determined by the relevant authority. According to the system, if a driver is given 6-20 penalty points within a 24-month period, it may be recommended to suspend the driver's license, and to cancel it in the case of exceeding 20. Table 4.5 may serve as an example for the relationship between penalty points and the duration of suspension.

Table 4.5: A Proposal for Taxi Driver Penalty Scores and License Suspension Period

Penalty points	**Duration of suspension**
6 – 10	2 weeks
11 – 15	4 weeks
16 – 20	8 weeks
21 or more	License cancellation

Source: Prepared for the purpose of this Thesis

4.4.7.3 Passenger Services Centre

A Passenger Services Centre can be established for the reception, collection, evaluation and analysis of passenger complaints regarding taxi transportation. This centre will also act as a bridge between taxi drivers and passengers in the field of taxi

transportation. It may also be responsible for the lost property management process for taxis and track the possible passenger lost property.

In summary, the following actions should be taken in terms of service quality management:

- A Service Quality Management System should be established with reference to the EN 13816 European Union, Quality of Service in Public Passenger Transport.
- Passenger Satisfaction Survey, Mystery Shopper Survey and Direct Performance Measurement systems should be established and implemented in relation to taxi transportation.
- Driver Performance Monitoring and Control System should be established.
- Taxi Passenger Services Centre should be established.

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ANNEX

ANNEX-1 Public Transportation System User Survey

Date:____/____/_____	Time: ___:_____	Survey No: _____	Name of the Surveyor: _____

TRAVEL HABITS AND PREFERENCES

Q1. How often do you use public transportation?

Every day	1		1- 2 days a month
3-5 days a week	2		Once a month or less
1-2 days a week	3		Once a year or less

Q2. What other means could you have taken on this journey, other than public transportation?

I cannot go by any other vehicle. Public transport is my only option.
By taxi
On foot
By car
By bike
Other (……)

Q3. For what purpose do you usually use public transportation?

Work (Commuting)	1
School (Commuting)	2
Work follow-up (Banks, Bills, etc.)	3
Social, Entertainment, Hospitality	4
For Travel-Touristic Purposes	5
Health	6
Other (……)	7

Q4. When you have the chance to choose different types of public transport on the same route, which one would you prefer?

Rail system	1
Metrobuses	2
Minibus/Dolmush	3
Taxi	4
Sea transport	5

Q5. Could you compare each pair of criteria in the table below according to which you make your preference the most?

	Very important	**Important**	**A little important**	**Equally important**	**A little important**	**Important**	**Very important**	
Economical								Speed
Economical								Comfort
Economical								Density
Speed								Comfort
Speed								Density
Comfort								Density

APPRECIATION / SATISFACTION

Q6. If you consider all the stages of the service you receive as a whole, how satisfied are you with the bus services?
(***Please inquire about the cause of inconvenience for dissatisfactions***)

			Q7. Could you list the three things that bother you the most about public transportation?	
Completely dissatisfied	1	→	The total trip takes too long.	
Dissatisfied	2	→	The physical conditions of the vehicles are poor.	
Tolerable	3		The choice of stops is not suitable.	
Satisfied	4		There is no suitable route.	
Completely satisfied	5		Information is insufficient.	
			The fee is too high.	
			Other (please indicate)	

ACCESS CHANNELS

Q8. Do the existing bus routes meet your needs? Yes 1 | No 2

Q9. On average, how long does it take to reach the bus stop you use for your most frequent route? _____min.

Q10. What do you think about this access time? Very good 1 | Good 2 | Not bad 3 | Bad 4 | Very bad 5

Q11. Can you easily transfer to other types of public transportation on your trips? Yes 1 | No 2 →

Q12. Can you list the three things that bother you the most in the transfers?

WAYS OF GETTING INFORMATION

Q13. Which of the information channels do you use the most?

Guidance signboards	1		Line Route Information Outside the Vehicle	4		Other Mobile Apps	7
Maps	2		Line Route Information Inside the Vehicle	5			8
Bus Stop Display Boards	3		MobİETT/HowdoIgo App	6		Other (……)	

Q14. What types of information do you need most during your public transportation trips?	Line/route information	1
	Stops	2
	Time of journey	3
	Vehicle timetables	4
	Please specify other	5

Q15. From among the following mobile apps,	**Which ones do you know?**	**Which ones have you used?**	**Why did you prefer?**	
MobİETT	1	1 ▸		
		When I am going somewhere for the first time.		1
HowdoIgo	2	2 ▸		
		When I am looking for an alternative on the route		2
Metro İstanbul	3	3 ▸		
		When the traffic is heavy		3
City Lines	4	4 ▸		
		When there is an accident		4
Trafi	5	5 ▸		
		When there is a delayed vehicle		5
Moovit	6	6 ▸		
		Please specify other _____		6

Q16. When do you need information about public transportation the most?

Q17. Can you easily differentiate the line/route types (By colour, coding, vehicle type, etc.) in the public transportation you use?	Yes	1	If no, what do you suggest doing?
	No	2	

PRICING/PAYMENT METHODS					
Q18. Are you satisfied with the public transportation fee system applied throughout İstanbul?	Yes	1	If not, why?		
	No	2			
Q19. What type of pricing should there be in public transportation vehicles?	Uniform Pricing				1
	Line Based Pricing				2
	Distance Based Pricing				3
Q20. Should different fares be applied during peak hours when public transportation is heavy and comfort is low?	Yes	1	Why?		
	No	2			
Q21. If the transfers become free, would you prefer to travel with transfers on shorter lines?	Yes				1
	No				2
Q22. Do current İstanbulkart products meet your needs?	Yes	1	If not, why?		
	No	2			
Q23. Would you like to use İstanbulkart in different areas other than transportation?	Yes	1	If yes, where?	Toll Road Passes	1
				Shopping	2
				Cultural events	3
	No	2		Museums	4
Q24. Should İstanbulkart be integrated with different technologies such as credit card-bank card-mobile phone?	Yes	1	Why?		
	No	2			
Q25. What kind of products would you like to be developed about İstanbulkart?	Only metrobus cards				1
	Passenger passes for peak hours				2
	Weekly subscription cards				
	Other_____ ___				4
Q26. Would you mind if your personal travel data obtained from İstanbulkart was used to improve the system?	Yes	1	If yes, why?		
	No	2			
				Yes, I would	1

Q27. Would you agree that İstanbulkart provide you with personalized offers and promotions?	No, I would not	2
Q28. Would you support package program applications (with a single card and fixed fee) in public transportation? For example, monthly 100 km taxi ride, 100 metro and bus rides, 30 sea routes, 150 km taxi and 100 metrobus rides.	Yes, I would	1
	No, I would not	2

CUSTOMER RELATIONS				
Q29. From among the communication channels that you will read for your suggestions, complaints and requests,		**Which ones have you used in the last one year?**	**Was it effective in the solution?**	
			Yes	No
Social Media	Facebook	1 ▸	1	2
	Twitter	2 ▸	1	2
Web site		3 ▸	1	2
İBB White Desk (Alo 153)		4 ▸	1	2
E-mail		5 ▸	1	2
İETT Help Desk (Live Support)		6 ▸	1	2
Writing a Petition (to İETT General Directorate)		7 ▸	1	2
SMS 1530		8 ▸	1	2
Other ……				

Q30. How would you evaluate the public transport personnel (drivers, supervisors, security staff etc.) in general?		Yes	No
	Sympathetic/Friendly	1	2
	Knowledgeable / Competent	1	2
	Responsible	1	2
	Solution oriented	1	2
		Yes	1

Q31. Should practices such as female passengers being dropped off outside the stops at late hours and free travel for passengers over 65 continue?	No	2

INTEGRATED SERVICES			
Q32. Do the existing equipment at stops, stations and piers meet your needs for a comfortable travel?	Yes	1	If no, what would you like to be done?
	No	2	

Q33. What do you pay attention to when transferring?	Hop-on Hop-off Distance	1
	Lack of density	2
	Time of journey	3
	Closed area	4
	Free/Discounted Transfer	5
	Taxi Access	6
	Other_____	7
Q34. What should be in the transfer centres where many transportation lines and vehicles intersect? What are your expectations?	Closed area	1
	Waiting area	2
	ATMs	3
	Card Sales / Filling Counters	4
	WC	5
	Mosque	6
	Social area (cafés, restaurant, etc.)	7
	Other …….	

Q35. Would you rather travel comfortably in two different modes that will go faster and are physically better connected, instead of using a single line that will take longer?	Yes	1
	No	2

TAXIS and PRIVATE VEHICLES

Q36. How often do you take a taxi?

Every day	1		1 or 2 days a month
3-5 days a week	2		Once a week or less
1-2 days a week	3		Once a year or less

Q37. What do you think taxi services are most inadequate about?

Cleaning	
Modernity	
Drivers	
Access	
Safety	
Other (……)	

Q38. On what occasions do you take a taxi?

Emergency cases	1
Travelling as a group of people	2
Routinely when going everywhere	3
After the evening entertainment	4
At close distances	5
When I have a heavy load	6
Other (……)	7

Q39. When you need a taxi, on which channel do you access the taxi?

I often take the taxi passing by	1
I use mobile apps (Bitaxi/ Uber/ BlaBlaCar)	2
I call from the taxi stand	3
I go to the taxi stand to get on	4
Other ……..	5

Q40. What kind of facilities in taxis make you feel safer and more comfortable during your journey?

A camera in the vehicle	
A glass partition between the driver and the passenger	
Driver's obeying the traffic rules	
Well-maintained and clean cars	
Other ……..	

Q41. What would you prefer as a payment method in taxis?

Cash	
İstanbulkart	
Credit card	
Taxi Cards with special promotions	
Other ……..	

Q42. When you think of similar cities, how would you evaluate the taxi fares in Istanbul?

Cheaper	
The same	
More expensive	

Q43. Should taxis be classified according to different vehicle standards and price scales by the service area?

Yes, why?	1
No, why?	2

Q44. Would you prefer if there is a shared taxi system in your neighbourhood where you can travel in more economical ways?

Yes, why?	1
No, why?	2

Q45. Do you use ride-hailing mobile applications?

I have never heard about them. Do not know.	1
I have heard about them, but never used them.	2
I have heard about them and am using them.	3

Q46. In which situations would you share your private vehicle?

For a fee.	1

	In exchange for favourable promotions.	2
	I can share it for free.	3
	In no way do I share my vehicle.	

DEMOGRAPHIC INFORMATION

Q47. Please indicate the gender of the respondent.

Female	1	Male	2

Q48. Do you mind telling me your age? _____

Q49. What is your educational background? (Please indicate the last school you graduated from)

Dropout in primary school / No education	1
Primary school graduate	2
Middle School Graduate	3
High school graduate (Normal)	4
High school graduate (Vocational high school)	5
2-year associate degree graduate	6
Open university graduate	7
University (normal)	8
Master's degree	9

Q50. Which of the following ranges does your household's monthly total net income fall into?

-500 TL	1
500 TL - 750 TL	2
750 TL - 1000 TL	3
1000 TL -1500 TL	4
1500 TL - 2000 TL	5
2000 TL - 3000 TL	6
3000 TL - 4000 TL	7
4000 TL - 5000 TL	8
5000 TL + over	9

RESPONDENT'S						
NAME						
SURNAME						
TELEPHONE						
CITY / DISTRICT						
(To be filled by the Survey office)	**A**	**B**	**C1**	**C2**	**D**	**E**

Q51. May I learn how many people live in your household, including you? _____

Q52. May I learn about your employment status?

Retired	
Retired, but still working.	(Previous job:)
Retired, and not working.	(Previous job:)
Non-worker	
Unemployed / No additional income	3
Unemployed / With additional income	4
Housewife / No additional income	5
Housewife / With additional income	6
Student (No income generating job)	7
Paid/Salary employee	
Worker / Servant (irregular, occasional employee)	8
Worker / Servant (with a regular job)	9
Foreman / Journeyman (self-employed)	10
Non-Administrative Officer / Technical Staff / Specialist etc.	11
Manager (with 1 to 5 employees)	12
Manager (with 6 to 10 employees)	13
Manager (with 11-20 employees)	14
Manager (with more than 20 employees)	15
Military staff (specialist private, non-commissioned officer, officer)	16
Paid senior qualified specialist (lawyer, doctor, architect, engineer, academician, etc.)	17
Self Employed	
Farmer (self-employed / working with family)	18
Peddler	19
Self-employed / shop owner / tradesman (including taxi drivers)	20
Business Owner (1-5 employees in the fields of trade, agriculture, manufacturing, or service)	21
Business Owner (6-10 employees in the fields of trade, agriculture, manufacturing, or service)	22

	Business Owner (11-20 employees in the fields of trade, agriculture, manufacturing, or service)	23
	Business Owner (more than 20 employees in the fields of trade, agriculture, manufacturing, or service))	24
	Freelance Specialist (lawyer, engineer, financial advisor, doctor, pharmacist, etc.)	25

Thank you for your time.

ANNEX-2: Questions as Part of Survey for Transport Authorities

	DataPoint	Unit	31 December 2016
1	Transportation Network Companies / E-hailing / Ride-hailing / App-based Ride-sharing companies operating in your city.	Text	
1a	Mode share, fleet size etc of Transport Network Companies / E-hailing / Ride-hailing / App-based Ride- sharing companies operating in your city	Text	
1b	Do you have specific regulations for Transportation Network Companies?	Yes / No	
1c	Do you regulate the fare of Transport Network Companies?	Yes / No	
1d	Do you have quality parameters to measure performance of Transportation Network Companies?	Yes / No	
1e	Do you measure the impact of Transport Network Companies on Conventional taxi market?	Yes / No	
1f	Do you measure the impact of Transport Network Companies on Public Transport (Metro, buses etc)?	Yes / No	

ANNEX- 2 Continued

	DataPoint	Unit	31 December 2016
1g	Did you see any impact of Transport Network Companies on traffic congestion in your city?	Yes / No	
1h	Is there any change you noticed with Traditional Taxi Industry after introduction of TNCs? (Increase of Service Quality, new features, change in business model etc.)	Text	

Source: Prepared for the purpose of this Thesis

ANNEX-3: List of Organizations Included into the Survey

	City	Organisation
1	Abu Dhabi	Department of Municipal Affairs and Transport Integrated Transport Centre
2	Ankara	General Directorate of EGO
3	Budapest	BKK Centre for Budapest Transport
4	Brussels	Ministere de la Region de Bruxelles-Capitale
5	Dubai	Road Transport Authority (RTA)
6	Dublin	National Transport Authority (NTA) + Irish Department of Transport
7	Frankfurt	Deutscher Taxi und Mietwagenverwand
8	Helsinki	Center for Economic Development Transport and the Environment / Aalto University
9	Hong Kong	Transport Department Hong Kong
10	Kuala Lumpur	Land Public Transport Comission Malaysia (SPAD)
11	Lagos	Lagos Metropolitan Area Transport Authority
12	Lisbon	Autoridade da Mobilidade e dos Transportes – Portugal

ANNEX-3 Continued

	City	Organisation
13	Milan	TAM Tassisti Artigiani Milanesi
14	Montreal	Bureau Taxi Montreal
15	Moscow	Moscow Department of Transport
16	Oslo	Institute of Transport Economics
17	Phoenix	Arizona Department of Transportation, State of Arizona, USA
18	Prague	Ministry of Transport, Czech Republic
19	Singapore	Land Transport Authority, Singapore
20	Tehran	Tehran Taxi Organization

Source: Prepared for the purpose of this Thesis

CV

KAAN YILDIZGÖZ

EDUCATION

2015-	PhD., Urbanism and Urban Transformation Zaim University, Istanbul, Turkey
2007	Infrastructure in a Market Economy: Public-Private Partnerships, Executive Education Programme Kennedy School of Government, Harvard University, Boston, USA
2004-2007	MBA., International Business Administration Marmara University, Istanbul, Turkey
2000- 2004	B.Sc., Management Engineering* Istanbul Technical University, Istanbul, Turkey

**Kaan Yıldızgöz is the first student of Istanbul Technical University who graduated in 2.5 years from 4 years long Management Engineering Programme.*

PROFESSIONAL EXPERIENCE

October 2018 –	Member of Management Board & Senior Director of Membership, Marketing and Services, International Association of Public Transport (UITP), Brussels, Belgium

- Global responsibility of UITP membership administration and development, events, exhibitions, marketing, UITP Academy and other business services.
- Supervise the growth of the membership base, the organisation and promotion of events, exhibitions and trainings as well as marketing and all commercial operation of the Association.
- Acting as voice of the customer within Association, to improve the services to the sector.
- Managing departments of Membership Administration & Development, Exhibitions, Events, Marketing and UITP Academy.
- Management of team of 30 international staff based in Brussels and various offices of UITP worldwide.

August 2014 – October 2018 Director of Training Academy, International Association of Public Transport (UITP), Brussels, Belgium

- Responsibility of all UITP capacity building activities in different countries.
- Organization of training & capacity building programmes in 57 different countries with participants from more than 90 countries.
- Development of UITP Training Portfolio with more than 70 different training programmes.
- Supervision of full-time staff in Brussels, part time staff in 15 country offices (Moscow, Astana, New Delhi, Melbourne, Singapore, Hong Kong, Shenzhen Sao Paulo, New York, Johannesburg, Abidjan, Casablanca, Dubai, Tehran and Istanbul) and part-time lecturers.
- Full Responsibility of the training strategy, business plan for existing and new training activities of UITP.

Training needs analysis, development of training of products, promotion, logistical organization, delivery of training.

- Partnerships with different local and international organizations. Joint programmes with World Bank, UNDP, UNEP, Oxford University, Ecole Polytechnique Fédérale de Lausanne etc.
- Lectured personally in different training programmes in more than 40 different countries as lead lecturer.

September 2014 – December 2014 Guest Lecturer, Ecole Polytechnique Fédérale de Lausanne, Switzerland

- Lecturer of "Integrated Policies for Sustainable Urban Mobility" and "Funding & Financing of Public Transport" courses in the IGLUS Masters Programme.

August 2012 – August 2014 Senior Manager of Middle East & North Africa Centre Transport Excellence, International Association of Public Transport (UITP), Dubai, UAE

- 3 responsibilities were taken at the same time. %70 of working time spent for the position of Senior Manager of UITP MENA (Middle East and North Africa) Center for Transport Excellence based in Dubai, %15 of working time spent for the position of Head of UITP Turkey Office based in Istanbul and %15 of working time spent as Head of UITP Taxi Platform based in Dubai.
- Leading role was taken during establishment phase of UITP MENA Center for Transport Excellence which has been launched by UITP and RTA Dubai Road and Transport Authority.
- Development and Management of multiple Center for Transport Excellence projects for public transport

sector in MENA (Middle East and North Africa) including:

  - Urban Mobility Benchmarking Project in MENA with the participation of different MENA Cities.
  - Preparation of MENA Transport Atlas
  - MENA Bus Market Study,
  - MENA Taxi Transportation Study.

- Design and develop training and development programs based on needs of public transport sector and launch of Educational Services Portfolio.
- Launch of UITP Taxi Platform. Organization of Taxi Platform Meetings coordination of research projects (e.g., Taxi Fares, Taxi Vehicle Specifications, Taxi Statistics) of Platform, Organization of Workshops, Int'l taxi Conferences and Showcases.
- Management of UITP Turkey Office Activities, UITP Membership Development Activities in Turkey, Organization of events in Turkey, coordination of national working groups, lobbying activities.
- Attending international events in different countries and presenting papers.

January 2011-January 2013 Partner, Urbanfra Engineering and Consulting, Istanbul, Turkey

- %50 owner and managing partner of Urbanfra Urban Infrastructure and System Solutions Engineering and Consulting Company based in Istanbul, Turkey with the purpose of providing engineering and consulting services to clients mainly in transport sector and other infrastructure sectors.
- Projects with Direct Involvement:

- Consultancy Contract with Metro Istanbul: Advisory role is taken in the areas of; pricing and fare collection system design, expansion planning and financing of public transport operation and investments (especially development of business model for public private partnerships), strategic planning, benchmarking, corporate restructuring & development.
- Consultancy contract with IETT (Bus Operator of Istanbul): Advisory role is taken in the areas of pricing and fare collection system design, generation of secondary income resources such as advertisement areas in buses and stations.
- Consultancy Contract with Turkish Ministry of Health Department of Public Private Partnerships (PPP): There Consultancy assignments about 1) Assessment of the Importance of PPP model in Healthcare Infrastructure Provision in Turkey 2) Benchmarking analyses of different PPP Models used in world in Healthcare Infrastructure Provision 3) Assessment of current PPP model used in Turkey and development of suggestions to improve the current model.
- Consultancy Contract with Ministry of Transport of Iraq: Role taken for preparation of Iraq Transportation Strategy. Worked together with HE Transport Minister Hadi Al-Amiri.

October 2010 – August 2012 Regional Projects Manager & Turkey Manager, International Association of Public Transport (UITP), Istanbul, Turkey.

- Management of UITP activities in Turkey.
- Project Management for UITP Urban Mobility Benchmarking Project & UITP Taxi Working Group.
- Organization of international conferences and showcases.
- Lecturer in international training programmes in various topics of public transportation.
- Organization of training programmes and conferences for the sector, marketing and membership development activities in Turkey.
- Attending conferences and presenting papers, preparation of research reports about public transport sector and market researches.
- Management of Turkish Bus Working Group and Turkish Light Rail Working Group.
- Supporting UITP MENA Division and Dubai Center for Transport Excellence.

September 2010 - August 2012 Part-time Teaching Staff, Istanbul University, Istanbul, Turkey

- Lecturer of "Public Transport Management" and "Customer Relationships Management in Passenger Transportation" courses in the faculty of Transportation and Logistics.

September 2010 – August 2012 Part-time Teaching Staff, Bahcesehir University, Istanbul, Turkey

- Lecturer of "Public Transport Management" and "Customer Relationships Management in Passenger

Transportation" courses in Urban Transportation Management Masters Programme.

February 2010 – August 2012 Consultant, Turkish Airlines, Istanbul, Turkey

- Temporary assignment in B&H (Bosnia & Herzogovinia) Airlines as advisor to CEO for restructuring of the company during and after the acquisition by Turkish Airlines.
- Organizational Restructuring and Country Aviation Capacity Building reports were prepared.
- Conducting a feasibility study for establishing a new daughter company in the area of airline training. For this purpose, market research, product design, competitor analyses were done and business plan were prepared.
- Lecturing courses of Contract Management, Contract Negotiations, Service Quality, Sales&Marketing and Finance.
- Representing Turkish Airlines in Star Alliance Training Advisory Board meetings.
- Corporate development projects were coordinated in training department.

July 2008 – February 2010 Director of CRM & Customer Loyalty, Turkish Airlines, Istanbul, Turkey

- Management of Miles&Smiles Loyalty Frequent Flyer Programme.
- Management of Co-Branded Credit Card Shop&Miles in cooperation with Garanti Bank.
- Supervision of 27 staff working for the teams of Programme Management, Airline Partnerships, Non-

Air Partnerships, Miles&Smiles Membership Services, Advertising & Communication, Analysis and Database Management.

- Development and Management of various projects in the area of CRM, Customer Loyalty, Partnership Marketing, B2B Sales, Database Marketing, Product & Brand Management, Contract Management, Communication & Advertisement.
- Development of partnership marketing programs with leading multinational and Turkish companies including Garanti Bank, Turkcell, Avea, Fiat, Alfa Romeo, Lancia, Opet, Hilton, Swiss Hotels and Star Alliance member airlines.
- Intensive cooperation with Marketing and Sales, Revenue Management, Accounting and Finance, Law, IT, Corporate Communications Departments of Turkish Airlines, besides Miles&Smiles Programme Partner Airlines and other 46 partner companies out of Turkish Airlines.
- Supervision and control of outsourced services (production of cards, airport services, postal services, call center)
- Partnership Agreements with all Miles&Smiles Programme Partners and companies, the management of administrative, communication and financial processes relevant to partnerships.
- Preparation of all Miles&Smiles related advertising and communication materials with Advertising Agency.
- Carrying out membership services, responding to customer complaints, evaluation of Service Quality.
- Shop&Miles Credit Cards were relaunched in 2009 and card revenue was increased.

- Number of Miles&Smiles award tickets increased % 50 from 2008 to 2009.
- Increasing the number of Miles&Smiles passengers from 1.2 million to 1.9 million within a year.
- Increasing the amount of Co-Branded Credit Card Shop&Miles New Term agreement to 250 million USD from 63million USD of previous period, within 3 years.
- Planning and application of structural change of Miles&Smiles Frequent Flyer Programme.
- Management of the CRM software selection process.

December 2005 – July 2008 Quality & Corporate Development Director, Metro Istanbul, Istanbul, Turkey

- Responsible for marketing, quality, training, public relations, IT, statistics, environment and foreign relations units of Metro Istanbul.
- Responsible for the fare collection system and fare management.
- Established Quality & Corporate Development Department, and employed nearly 20 staff
- Management of the Istanbul Card system (fare collection system) development and supplier selection process.
- ISO 9001:2000, ISO 14001:2004 and OHSAS 18001:1999 quality certificates were gained.
- Corporate Strategic Plan was prepared. According to strategic plan KPI's are defined and Performance Management System was established.
- Corporate Suggestion System was established.
- EN 13816 EU standard for public transport service quality was implemented, and many projects were developed in terms of increasing service quality. Complaints Management System, Mystery Shopping

Survey and measurement of Customer Satisfaction System was established.

- Service Quality Trainings were given to the frontline staff.
- Passenger Services Center of Metro Istanbul was launched.
- Career Management System was established. New training programmes were designed to train the staff based on the positions.
- Transition to ERP (Enterprise Resource Planning) software process was managed.
- Corporate Sustainable Development policy and plan were prepared and various projects were developed accordingly. Corporate Sustainable Development report has been prepared, and therefore, Metro Istanbul has become the first public corporation to present such report in Turkey.
- Corporate Health Risk Management System was established and implemented.
- Safety Risk Analysis Conducted and Safety Management System Established
- Preparation studies were managed for establishing corporate asset management system according to PAS 55 Asset Management Standard.
- Consulting services were provided to other public transport operators in Turkey.
- Participation as manager and/or team member in several national and international projects (Some of them are financed by EU Programmes).

June 2007 – July 2008 Turkey Office Manager, International Association of Public Transport (UITP) Istanbul, Turkey

- Training programmes and conferences for the sector were organized in different countries.
- Marketing and membership development activities in Turkey and Central Asian countries were managed. Membership in Turkey was increased more than 2fold.
- Attended conferences and gave papers.
- Preparation of research reports about public transport sector and market research.
- Support was given to the members of UITP.

August 2004 – December 2005 Advisor to General Manager, Metro Istanbul, Istanbul, Turkey

- Advising and consultancy was provided to the General Manager, and several reports were prepared in many areas.
- Activities in the areas of foreign relations, quality, R & D were managed.

PUBLISHED BOOKS AND BOOK CHAPTERS

- Yıldızgöz, K. (2018) Taxis in the Era of Digitalisation, Marmara Union of Municipalities, ISSBN ISBN-10: 6056807169, İstanbul, Turkey.
- Yıldızgöz, K. (2020) Taxis in the Era of Coronavirus, Marmara Union of Municipalities, ISBN: 978-605-80307-3-2, İstanbul, Turkey.
- Yıldızgöz K., Çelik H.M. (2019) Critical Moment for Taxi Sector: What Should Be Done by Traditional Taxi Sector After the TNC Disruption? In: Nathanail E., Karakikes I. (eds) Data Analytics: Paving the Way to Sustainable Urban Mobility. CSUM 2018. Advances in Intelligent Systems and Computing, vol 879. Springer, Cham. https://doi.org/10.1007/978-3-030-02305-8_55.
- Yıldızgöz K., Çelik H.M. (2020) How to Level the Playing Field for Ride-Hailing and Taxis. In: Sierpiński G. (eds) Smart and Green Solutions for Transport Systems. TSTP 2019. Advances in Intelligent Systems and

Computing, vol 1091. Springer, Cham. https://doi.org/10.1007/978-3-030-35543-2_4.

PRESENTATIONS AT INTERNATIONAL CONFERENCES

- K. Yildizgoz, On the road to sustained and full recovery: post-Covid-19 initiative for inland transport, United Nations Economic Commission for Europe, Geneva, Switzerland (2, 22).
- K.Yildizgoz, MaaS and Post Pandemic Era, MENA Transport Congress and Exhibition, Dubai, UAE (2, 22).
- K.Yildizgoz, Reforming Taxi Sector of Turkey, 6th Urban Research Congress, Ankara, Turkey (12, 21).
- K.Yildizgoz, Importance of Rail Sector for Sustainable Mobility, Eurasia Rail Expo Congress, Istanbul, Turkey (11, 21).
- K. Yildizgoz, Tourism and Sustainable Mobility, TURSAB Turkey Tourism Congress, Antalya, Turkey, (11, 21).
- K.Yildizgoz, Post Pandemic Priorities for Urban Mobility, SmartCity Expo Congress, Barcelona, Spain (11, 21).
- K. Yildizgoz, Is your City ready for MaaS?, 18th IRF World Meeting and Exhibition, Dubai, UAE (11, 21).
- K. Yildizgoz, Mobility in the Future and Mobility Management, 6th Kayseri Transport Summit, Kayseri, Turkey (9, 21).
- K. Yildizgoz, Challlenges of Urban Mobility in Turkey, WorldBank SUMP Workshop, Ankara, Turkey (9, 21).
- K.Yildizgoz, Urban Mobility in Post Pandemic Era, UITP Turkey Conference, Istanbul, Turkey (5, 21).
- K.Yildizgoz, Global Emergence of New Mobility , SmartCity Expo Congress, Barcelona, Spain (11, 19).
- K.Yildizgoz, H.M. Celik, Regulation of Transport Network Companies: New Dilemma for Transport Authorities, 4th UITP International Taxi Seminar, London, UK (2, 17).

- K.Yildizgoz, H.M. Celik, Regulation of Transport Network Companies: New Dilemma for Transport Authorities, Transist 2017, Istanbul, Turkey (11, 17).
- K. Yildizgoz, *Funding and Financing of Urban Rail Projects*, 1st International Railways Conference, Lagos, Nigeria (2016, 11).
- K. Yildizgoz, *Regional Transport and contribution to Sustainable Development,* AER Assembly Meeting, Izmir, Turkey (2016, 11).
- K. Yildizgoz, *Digitalization in Public Transport*, Turkish Smart Municipalities Summit, Istanbul, Turkey (2016, 11).
- K. Yildizgoz & J. Singh, *Mobility Challenges in Rapidly Developing Cities,* SITCE Singapore International Transport Congress and Exhibition, Singapore (2016,10).
- K. Yildizgoz, *Regulation of Transport Network Companies,* UITP Taxi Platform Workshop, Singapore, (2016,10)
- K. Yildizgoz, *Panorama of Taxi Transport Worldwide,* IATR Annual Congress, San Francisco, USA (2016, 9).
- K. Yildizgoz, *Worldwide Trends in Taxi Transport*, European Taxi & Mobility Conference, Brussels, Belgium, (2016, 6).
- K. Yildizgoz, Better Taxi Operations with Technology, KOTI & UITP Joint Seminar, Seoul, Korea (2016, 5).
- K. Yildizgoz, *Panorama of Taxi Transport Worldwide,* MENA Transport Congress & Exhibition, Dubai, UAE (2016, 4).
- K. Yildizgoz, *Regulation of Taxi Transport,* UITP Taxi Seminar, Mumbai, India (2015, 11).
- K. Yildizgoz, *Trolleybus Systems: Efficient solution for Sustainable Mobility,* UITP Trolleybus Workshop, Malatya, Turkey (2015, 10).
- K. Yildizgoz, *Contracting and Tendering of Public Transport,* UNDP & UITP Conference on Regulation and Governance of Public Transport, Almaty, Kazakhstan (2015, 4).
- K. Yildizgoz, *Planning, Design and Construction of Mass Transit*, 6th UITP National Public Transport Conference, Istanbul, Turkey (2015, 3).
- K. Yildizgoz, *Taxi Transport as Key Part of Urban Mobility Puzzle,* UITP MENA Seminar and Assembly, Casablanca, Morocco (2015, 2).

- K. Yildizgoz, *Worldwide Trends in Taxi Transportation, 2nd* UITP International Taxi Conference, Doha, Qatar (2014, 11).
- K. Yildizgoz, *Urban Transport Benchmarking: Better Performance Measurement,* UITP Workshop, Ankara, Turkey (2014, 11).
- K. Yildizgoz, *Integration of Taxi Transport with Public Transportation,* IRU Taxi Forum, Cologne, Germany (2014, 11).
- K. Yildizgoz, *The challenges of the increasing urban mobility demand in a fast growing economy and satisfying speedy demand,* 60th UITP World Congress and Exhibition, Geneva, Switzerland (2013, 5).
- K. Yildizgoz, *How Public Transport Authorities can generate extra revenue from Smart Card Systems?,* National Public Transport Conference, Izmir, Turkey (2013, 2).
- K. Yildizgoz, *European Bus System of Future,* Fertransport Conference, Rio de Janerio, Brasil (2012, 10).
- K. Yildizgoz, *Innovative Financing of Public Transport,* Eastern Europe Urban Transport Regional Conference, Skopje, Macedonia (2012, 9).
- K. Yildizgoz, *Global Trends in Taxi Transportation,* UITP International Taxi Conference, Abu Dhabi, UAE (2012, 3).
- K. Yildizgoz, *Good Fences Make Good Neighborhoods: Better Contracting in Public Transport,* UITP Seminar, Kuwait (2011, 11).
- K. Yildizgoz, *Better Financing of Public Transport for Doubling the Market Share of Public Transport,* National Public Transport Conference, Kayseri, Turkey (2011, 10).
- K. Yildizgoz, *Role of Busses for Doubling the Market Share of Public Transport,* Regional Public Transport Seminar, Skopje, Macedonia (2011, 10).
- K. Yildizgoz, *Setting up a Transport Organizing Authority,* Sumpa-MED Workshop, Amman, Jordan (2011, 5).
- K. Yildizgoz, *Challenges of Urban Mobility in Turkey,* 59th UITP World Congeress and Exhibition, Dubai, UAE (2011, 4).
- K. Yıldızgöz, *Loyalty Effects of Partnership Marketing Programmes : Examples from Turkish Airlines*, Airline Loyalty Conference, Antalya, Turkey (2009, 10).

- K. Yıldızgöz, *Increasing Airline Revenues with Loyalty Programmes,* Star Alliance Loyalty Workshop, Bangkok, Thailand (2009, 3).
- K. Yıldızgöz, B Onat, U Sahin & P Karim *PM10 and PM2.5 Personal Exposure Levels in the Istanbul Underground Transport System,* The Importance of Indoor Air Conference & Exhibition, London, (2007, 10).
- K. Yıldızgöz, *Sustainable Urban Transportation: Challenges in Fast Growing Cities,* World Car Free Conference, Istanbul, Turkey (2007, 8).
- K. Yıldızgöz, *Rail Systems of Istanbul: As a key for sustainability*, Regional Conference on Sustainable Transport Policies in South Eastern Europe, Budapest, Hungary (2007, 6).
- K. Yıldızgöz, *Implementation of European Service Quality Standard in Istanbul Metro*, Empowering Transport Research with The Special Focus on the New EU States and The Candidate Countries, International Workshop, Istanbul, Turkey (2007, 5).
- K. Yıldızgöz, *Strategic Management in Public Companies*, Workshop on Strategic Management in Public Sector, Ankara, Turkey (2007, 4).
- K. Yıldızgöz, *Contribution of Public Transportation to the Sustainable Development*, BusinessWeek Turkish Edition (2007, 1).
- K. Yıldızgöz & S Açıkbaş, *Sustainable Development Commitment of Istanbul Ulaşım: First Achievements, the Case of Energy Efficiency*, 1st Sustainable Development Conference in Public Transportation, Bilbao, Spain (2006, 10).
- K. Yıldızgöz, *Achieving High Performance Tram Operation in Downtown Istanbul*, 3rd Marketing Conference in Public Transportation, Vienna, Austria (2005, 10).

LECTURING EXPERIENCE AT SHORT COURSES

- K.Yildizgoz, Strategies for Managing Taxis Beyond COVID-19, UITP Training Programe, Dubai, UAE (6, 21).
- K. Yildizgoz, *Bus Network Design and Route Structuring*, UITP Training Programme, Dubai, UAE (2016, 12).
- K. Yildizgoz, *Planning, Design and Construction of BRT and Urban Rail Systems,* UITP Training Programme, Lagos, Nigeria (2016, 11).

- K. Yildizgoz, *Bus Operations Planning and Execution*, UITP Training Programme, Riyadh, KSA (2016, 11).
- K. Yildizgoz, *Leaders in Urban Transport Planning*, World Bank Capacity Building Programme, Johannesburg, South Africa (2016, 10).
- K. Yildizgoz, *Service Quality Management in Public Transport*, UITP Training Programme, Rosario, Argentina (2016, 9).
- K. Yildizgoz, *Bus Operations Planning and Execution*, UITP Training Programme, Johannesburg, South Africa (2016, 7).
- K. Yildizgoz, *Sustainable Mobility for a Better Life*, CIVITAS Summer Course, Malaga, Spain (2016, 6)
- K. Yildizgoz, *Formalization of Informal Transport*, UNEP & UITP Capacity Building Programme, Nairobi, Kenya (2016, 6).
- K. Yildizgoz, *Electric Busses*, ZeEUS Training Programme, Warsaw, Poland (2016, 4).
- K. Yildizgoz, *Public Transport Fundamentals*, LTA-UITP Training Progamme, Singapore (2016, 3).
- K. Yildizgoz, *Public Transport Fundamentals*, UITP ANZ Training Programme, Brisbane, Australia (2016, 3).
- K. Yildizgoz, *Leaders in Urban Transport Planning*, World Bank Capacity Building Programme, Dubai, UAE (2016, 3).
- K. Yildizgoz, *Marketing and Communications in Public Transport*, UITP Training Programme, Brussels, Belgium (2016, 2).
- K. Yildizgoz, *Innovation in Taxi Transport and Mobile Apps,* UITP Training Programme, Dubai, UAE (2016, 2).
- K. Yildizgoz, *Combined Mobility,* UITP Training Programme, Mexico City, Mexico (2016, 1).
- K. Yildizgoz, *Regulation and Contracting of Public Transport Services*, UITP Training Programme, Madina, KSA (2015, 12).
- K. Yildizgoz, *Safety Management*, UITP Training Programme, Istanbul, Turkey (2015, 11).
- K. Yildizgoz, *Pricing in Urban Mobility,* UNDP Training Programme, Kaliningrad, Russia (2015, 10).

- K. Yildizgoz, *Bus Operations Planning and Execution,* UITP Training Programme, Doha, Qatar (2015, 10).
- K. Yildizgoz, *ICT and Smart Mobility,* UITP Training Programme, Dubai, UAE (2015, 10).
- K. Yildizgoz, *Marketing and Communications*, UITP Training Programme, Dubai, UAE (2015, 10).
- K. Yildizgoz, *Service Quality Management in Public Transport,* UNDP Training Programme, Kazan, Russia, (2015, 9).
- K. Yildizgoz, *Public Transport Maintenance and Asset Management,* UITP Training Programme, Istanbul, Turkey (2015, 9).
- K. Yildizgoz, *Fundamentals of Taxi Transport*, UITP Training Programme, İzmir, Turkey (2015, 9).
- K. Yildizgoz, *Public Transport Operations Planning and Execution*, UITP Training Programme, Istanbul, Turkey (2015, 4).
- K. Yildizgoz, *Leaders in Urban Transport Planning*, World Bank Capacity Building Programme, Dubai, UAE (2015, 4).
- K. Yildizgoz, *Bus Transport Planning and Operations*, UITP Training Programme, Hong Kong (2015, 4).
- K. Yildizgoz, *Fare Management in Public Transport*, UNDP Training Programme, Almaty, Kazakhstan (2015, 4).
- K. Yildizgoz, *Taxi Transport Fundamentals*, UITP Training Programme, Abu Dhabi, UAE, (2015, 3).
- K. Yildizgoz, *Public Transport Fundamentals*, UITP Training Programme, Ulaanbaatar, Mongolia (2015, 3).
- K. Yildizgoz, *Planning, Design and Construction of Urban Rail Systems*, UITP Training Programme, Dubai, UAE (2015, 2).
- K. Yildizgoz, *Public Transport Fundamentals*, UITP Training Programme, Tehran, Iran (2015, 1).
- K. Yildizgoz, *Fare System Management in Developing Countries,* World Bank Training Programme, Istanbul, Turkey (2014, 12).
- K. Yildizgoz, *Leadership Programme: Global Challenges in Transport, Health, Well-Being and Urban Mobility*, Oxford University, Oxford, UK (2014, 12).

- K. Yildizgoz, *Pricing, Ticketing and Fare Management,* UITP Training Programme, Jeddah, KSA (2014, 10).
- K. Yildizgoz, *Bus Transport Fundamentals,* UITP Training Programme, Johannesburg, South Africa (2014, 10).
- K. Yildizgoz, *Integrated Policies for Achieving Sustainable Urban Mobility,* IGLUS Masters Programme, Istanbul, Turkey (2014, 9).
- K. Yildizgoz, *Leaders in Urban Transport Planning,* World Bank Capacity Building Programme, Dubai, UAE (2014, 6).
- K. Yildizgoz, *Public Transport Fundamentals,* UITP Training Programme, Istanbul, Turkey (2014, 5).
- K. Yildizgoz, *Ticketing and Fare Management,* UITP Training Programme, Brussels, Belgium (2014, 5).
- K. Yildizgoz, *Financing and Funding of Public Transport,* UITP Training Programme, Abu Dhabi, UAE (2014, 5).
- K. Yildizgoz, *Service Quality Management, UNDP* Training Programme, Almaty, Kazakhstan (2014, 3).
- K. Yildizgoz, *Regulation of Public Transport,* UITP Training Programme, Kuwait (2014, 3).
- K. Yildizgoz, *Bus Transport Fundamentals,* UITP Training Programme, Abu Dhabi, UAE (2013, 11).
- K. Yildizgoz, *Taxi Transport Fundamentals,* UITP Training Programme, Doha, Qatar (2013, 11).
- K. Yildizgoz, *Financing and Funding of Public Transport,* UITP Training Programme, Brussels, Belgium (2013, 11).
- K. Yildizgoz, *Funding and Financing of Public Transport,* UITP Training Programme, Brussels, Belgium (2013, 11).
- K. Yildizgoz, *Bus Transport Fundamentals,* UITP Training Programme, Abu Dhabi, UAE (2013, 9).
- K. Yildizgoz, *Public Transport Organizing Authorities,* UITP Training Programme, Dubai, UAE (2013, 3).
- K. Yildizgoz, Public Transport Fundamentals, UITP Training Programme, Doha, Qatar (2012, 10).

- K. Yildizgoz, *Service Quality Management,* UITP Training Programme, Sao Paulo, Brazil (2012, 10)

OTHER ACTIVITIES

- 2019- 2020 Member, Advisory Board, GEO-TWIN, Paris, France.
- 2017- 2021 Member, Advisory Board, IATR International Association of Transport Regulators, New York, USA.
- 2014- Member, Training Advisory Board, IRU International Road Union, Geneva, Switzerland.
- 2011-2013 Member, Board, Turkey Strategic Planning Association, Istanbul, Turkey.
- 2009-2012 Member, Inspection Board, Eurasian and East Mediterranean Transport Research and Training Association, Istanbul, Turkey.
- 2008-2010 Member, Loyalty Advisory Group, Star Alliance GmbH, Frankfurt, Germany.
- 2005 – 2006 Member, Preparation Committee, 9th Development Plan (2007-2013) of Turkey Prime Ministry State Planning Organization, Ankara, Turkey.