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**AVRUPA BİRLİĞİ İKTİSADI ANABİLİM DALI**

# ON THE PATH TOWARDS EUROPEAN UNION'S SUSTAINABLE URBAN MOBILITY PLANS: SOLVING TURKEY'S URBAN MOBILITY PROBLEMS

**DOKTORA TEZİ**

**Bilgesu Güneş YERLİ**

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**Danışman: Doç. Dr. İmre Sabahat ERSOY**

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## ONAY SAYFASI

Enstitümüz AB İktisadı Anabilim Dalı Türkçe / İngilizce Doktora Programı öğrencisi Bilgesu Güneş Yerli'nin, **On The Path Towards European Union's Sustainable Urban Mobility Plans: Solving Turkey's Urban Mobility Problems** konulu tez çalışması 30/11/2017 tarihinde yapılan tez savunma sınavında aşağıda isimleri yazılı jüri üyeleri tarafından **OYBİRLİĞİ / ~~OYÇOKLUĞU~~** ile BAŞARILI bulunmuştur.

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## ÖZET

## AVRUPA BİRLİĞİ'NİN SÜRDÜRÜLEBİLİR KENT İÇİ HAREKETLİLİK PLANLARI'NA DOĞRU: TÜRKİYE'NİN KENT İÇİ HAREKETLİLİK PROBLEMLERİNİ ÇÖZMEK


*2000lerden itibaren kentleşmenin etkisiyle dünyadaki büyük şehirlerde, vatandaşların hayat kalitesi giderek azalmaktadır. Kentleşmenin getirdiği artan ulaşım ihtiyacı, kısa mesafeli yaya ulaşımının yerini motorlu ulaşıma bırakmıştır ancak kentleşme ve altyapı yatırımları motorlu ulaşımın negatif etkileriyle başa çıkamamış ve hatta uygun altyapı sağlayarak artışını desteklemiştir. Sonuç olarak da insanlar için değil, araçlar için tasarlanmış, kent içi hareketlilik problemleriyle vatandaşlarının hayat kalitesini düşüren, kirli, sürdürülemez şehirler ortaya çıkmıştır.*

*Son zamanlarda kent içi hareketlilik problemlerini sürdürülebilir çözümlerle ortadan kaldırmanın önemi daha da açık hale gelmiştir. 2016'da Türkiye dünyanın trafiği en yoğun 10'uncu ülkesi seçildi. Bu sebeple, Türk şehirlerindeki kent içi hareketlilik problemlerine, sürdürülebilir hareketlilik çözümleriyle çare bulunması bu tezin amacını oluşturmaktadır.*

*Bu tezle, Türk şehirlerinde son zamanlarda yaşanan kent içi hareketlilik problemlerinin çözümü araştırıldı. Bu bağlamda: 1. Bölümde tezin ana sorunu, soruları, hipotezleri ve içeriği tanımlandı. 2. Bölümde literatür incelemesi yapıldı. 3. Bölümde sürdürülebilir kent içi hareketlilik konsepti ve sürdürülebilir kent içi hareketliliğin Avrupa Birliği ve Türkiyedeki durumuna bakıldı. 4. Bölümde Türkiye'deki sürdürülebilir kent içi hareketliliğin mevcut durumu soru kağıdı vasıtasıyla derinlemesine analiz edildi. 5. Bölümde ise bisikletli ulaşım, Türk şehirleri için sürdürülebilir kent içi hareketlilik çözümü olarak önerildi. Ve bisikletli ulaşımı teşvik etmek için, Türk şehirleri için bisiklet yolu projelerinin ön değerlendirmesini yapabilen bisikletli ulaşım göstergeleri hazırlandı ve örnek çalışma olarak Eskişehir bu göstergelerle değerlendirildi. Bölüm 6 ise tezin sonucunu hipotezler ışığında değerlendirerek, gelecekteki araştırmalar için öneriler sundu.*

# GENERAL KNOWLEDGE


Name and Surname : Bilgesu Güneş Yerli

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# ABSTRACT

## ON THE PATH TOWARDS EUROPEAN UNION'S SUSTAINABLE URBAN MOBILITY PLANS: SOLVING TURKEY'S URBAN MOBILITY PROBLEMS


*The life quality of citizens is diminishing with the urbanisation since 2000s in all major cities around the world. The increasing need for travel with urbanisation shifted from short distance and pedestrian mobility travel to motorized transport as city and infrastructure development could either not cope with the negative impacts of motorisation or even supported its rising by providing suitable transport infrastructure. The results are polluted and unsustainable cities just designed for cars not for people which causes urban mobility problems that decreased the citizen's quality of life.*

*The importance to overcome urban mobility problems with sustainable solutions is hence very evident in our times. Turkey is selected as the 10th congested country in the world in 2016. From this point of view, trying to solve Turkish cities' urban mobility problems by sustainable mobility solutions is the aim of this thesis.*

*With this thesis, solutions to recent urban mobility problems in Turkish cities are examined. In this structure: Chapter 1, Introduction identifies the main problem, questions, hypotheses and scope. Chapter 2 focuses the literature of the thesis. Chapter 3 focuses the sustainable urban mobility concept and examines sustainable urban mobility in the EU and the Turkey. Chapter 4 focuses deeply to Turkey's current situation on sustainable urban mobility via questionnaire. Chapter 5 concentrates on cycling as a sustainable urban mobility solution for Turkish cities. To motivate cycling, cycling indicators are developed for Turkish cities to pre-evaluate bike lane projects and a case study evaluation for the city of Eskişehir is calculated using these indicators. Finally, Chapter 6 provides the conclusions of the thesis by evaluating hypotheses and recommendations for future research.*

# *ACKNOWLEDGEMENTS*

*Urban mobility problems are the most problematic issue in cities that citizens suffer from. To solve these problems, Sustainable Urban Mobility Plans as a best practice from the EU and their adaptation to Turkish cities are examined in this thesis. To complete this thesis, I would like to thank first of all my Supervisor Assoc. Dr. İmre Saadet Ersoy and my Thesis Monitoring Committee Members Asst. Prof. Yasemin Özerkek and Asst. Prof. Mustafa Sinan Yardım for their remarkable contributions and then to my lovely family, friends and colleagues for their support. No need to express that all the mistakes and opinions in this study thereof are mine.*

İstanbul, 2017 Bilgesu Güneş Yerli

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# ABBREVIATIONS

| | |
|---|---|
| **BRT** | Bus Rapid Transit |
| **ERDF** | European Regional Development Fund |
| **EC** | European Commission |
| **EU** | European Union |
| **GHG** | Greenhouse Gas |
| **HEAT** | Health Economic Assessment Tool |
| **HUL** | Historic Urban Landscape |
| **IPA** | Instrument for Pre-accession Assistance |
| **İTÜ** | İstanbul Technical University |
| **KPI** | Key Performance Indicator |
| **LTP** | Local Transport Plans |
| **M** | Million |
| **METU** | Middle East Technical University |
| **ITS** | Intelligent Transport Systems |
| **PDU** | Plans de Deplacements Urbains |
| **PMT** | The name adopted for SUMP in Portugal |

| | |
|---|---|
| **PMUS** | Planes de Movilidad Urbana Sostenible |
| **PT** | Public Transport |
| **PUT** | Piano Urbano del Traffico |
| **PUM** | Piano Urbano della Mobilita |
| **RPMP** | Riga and Pieriga Mobility Plan |
| **SUM** | Sustainable Urban Mobility |
| **SUMP** | Sustainable Urban Mobility Plan |
| **SUTP** | Sustainable Urban Transport Plan |
| **SWOT** | Strengths Weaknesses Opportunities Threats |
| **TÜİK** | Turkish Statistical Institute |
| **TRAST** | Transport for an Attractive City |
| **TRY** | Turkish Lira |
| **UK** | United Kingdom |
| **WHO** | World Health Organization |

# 1. INTRODUCTION

In recent years, most cities in the world are facing increasingly urban mobility problems which causes a poor life quality for citizens. “Travel is increasing in virtually all regions of the world, usually at or faster than the rate of economic growth, and generally faster in the long run than the rate of reduction of energy and pollution intensity.”[1] Today 9 out of 10 European Union (EU) citizens believe that the urban mobility problems in their cities need to be improved.[2] Due to the fast technological progress in the last decades, particularly private car transport changed the urban life, as city and infrastructure development could either not cope with the negative impacts of motorisation or even supported its rising by providing suitable infrastructure. The results are city structures designed for a fast and efficient car transit, a machine-based, unsustainable, polluting and socially unequal planning system.

Human behaviour shifted from a short distance and pedestrian mobility idea to common use of cars and with that the distance between living areas and jobs, retails, leisure services expanded. The consequence is an increase of the urban traffic and its economic, social and environmental effects.

In economic terms, our society suffers from travel time losses due to congestion causing a noticeable reduction of productivity. This diminishes public welfare significantly. Another crucial point is the bad accessibility for people with restricted mobility (e.g. missing car ownership or physical constraints). This large and growing group is kept out of many daily services and thus they are unable to participate in daily life.

Besides its economic disadvantage, it is also an important problem regarding social justice and inclusion. In car dependent cities, personal vehicles play the most

---

[1] Todd Goldman and Roger Gorham, “Sustainable urban transport: Four innovative directions”, **Technology in Society**, Vol.28, (2006), p.262.

[2] EC, **Action Plan on Urban Mobility**, Brussels, 2009.

important role for individual mobility and flexibility in accessibility.[3] In other words, the group of car owners can access urban activities easily, whereas non-car owners depend on public transport (PT) or non-motorised transport (walking and cycling). As these modes received less attention in urban planning for many years, a social gap opened. Traffic fatalities and local air and noise pollution, that are more likely to occur with more cars on the streets, underline the mobility triggered inequality, as non-car owners are the ones who need to deal with the dangers produced by cars. From a social point of view, a car dependent mobility pattern hence seems very disparate and undesirable.

In environmental terms, the consumption and the depletion of oil is the leading problem. According to 2014 statistics, transport consumes 64.5% of worldwide oil.[4] In large part, automobiles are the consumers. Oil is a finite resource and its peak, the point with the highest per year depletion, is estimated in newest research to appear between 2020 and 2030.[5] We are forced by nature, by the end of oil, to come up with solutions for a new mobility. However, this should not be the main environmental driver, but only the last exit from the unsustainable transport system. "Transport accounts for 26% of global $CO_2$ emissions and is one of the few industrial sectors where emissions are still growing."[6] The consequences of global warming are certainly a problem to tackle and in which transport has to play a key role. However, also on a local scale environmental problems caused by emissions harm massively the well-being of citizens. These include tail-pipe emissions from road transport like nitrogen oxide, hydrocarbons, ozone, benzene, lead and particular matter which are proven to increase mortality and a range of respiratory

[3] Md Aftabuzzaman and Ehsan Mazloumi, "Achieving sustainable urban transport mobility in post peak oil era", **Transport Policy,** Vol.18, (2011), p.698.

[4] International Energy Agency, **Key World Energy Statistics**, Paris, 2016, p.33.

[5] Aftabuzzaman and Mazlouni, p.697.

[6] Lee Chapman, "Transport and climate change: a review", **Journal of Transport Geography**, Vol.15, (2007), p.355.

and other diseases.[7] The source for noise pollution, in addition, is mainly caused by urban road traffic.

Additionally, transport is not a closed system; it is among the most important public urban schemes that ensure and shape the human way of life in our cities today and tightly intertwined with other systems.[8] It interferes directly with all human activity such as land-use, water supply, food supply, economic success, resource usage, cultural urban life and education. It is the backbone of our cities.

The importance to overcome urban mobility problems with sustainable solutions is hence very evident in our times. Turkey is selected as the 10$^{th}$ congested country in the world in 2016.[9] From this point of view, trying to solve Turkish cities' urban mobility problems by sustainable mobility solutions is the reason of this thesis. From the Literature Analysis; PT and non-motorised transport (walking and cycling) are found the main modes of sustainable mobility but findings from the Sustainable Urban Mobility Questionnaire for Turkish metropolitan municipalities showed that non-motorised transport (walking and cycling) are the missing modes when preparing Transport Master Plans for Turkish cities. With the new regulation and incentives for cycling in recent years, Turkish government started to support cycling. That points the sustainable mobility solution target for Turkish cities specially to cycling. This thesis is trying to prove that cycling should be added to Turkish cities' Transport Master Plans as a sustainable mobility solution to solve urban mobility problems.

The main aim of this thesis is to solve urban mobility problems by sustainable mobility solutions and taking cycling as the main sustainable mobility solution for

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[7] James Woodcock, David Banister, Phil Edwards, Andrew M Prentice and Ian Roberts, "Energy and Transport", **The Lancet**, Vol.370, (2007), p.1078.

[8] Goldman and Gorham, p.264.

[9] Turkey is among 10 at the world in congestion, 2017, http://www.ntv.com.tr/galeri/dunya/turkiye-trafik-sikisikliginda-dunyada-ilk-10da,T8OK5mSTakeUazME2L6HUQ/QLGXDeG8fUm91tDbNslpAw (17 March 2017).

Turkish cities to be supported. Proposals of this study to increase cycling as a sustainable mobility solution for Turkish cities and developed cycling indicators to show positive monetised health effects of bike lane projects will be expected to motivate decision makers. According to the previous observations and the Literature Review, main questions of the thesis are:

- Did Sustainable Urban Mobility Plans (SUMPs) really solve urban mobility problems in the EU?
- How is Turkey's situation legally on sustainable mobility?
- How is Turkish cities current situation on sustainable mobility?
- Will SUMPs really solve urban mobility problems in Turkish cities?
- What should be done for Turkish decision makers to motivate them on planning and implementing bike lane projects on behalf of SUMP adaptation?
- How bike lane projects can be ex-ante evaluated to show their benefits to motivate decision makers?

To answer these main questions, hypotheses of the thesis are:

- Turkish cities have deficiencies on planning and implementing bike lane projects.
- Bike lane projects implementation on behalf of SUMP adaptation to Turkish cities will solve urban mobility problems in Turkish cities.

This thesis is assumed to contribute to the literature with SUMP Ranking for Turkish cities by evaluating Turkish metropolitan municipalities' current situation on sustainable urban mobility and justification of the bike lane projects implementation on behalf of SUMP adaptation to solve Turkish cities ongoing urban mobility problems. Within the context of this thesis, to motivate decision makers in the Turkish cities for bike lane projects, indicators are developed from the quality of life perspective for ex-ante evaluation of bike lane projects. Indicators are calculated for the city of Eskişehir's future bike lane project to find number of bike commuters, number of bike commuters fatalities prevented and its economic value at the end of the project. Eskişehir case is an important example for other Turkish cities.

With the detailed explanation of SUMP approach, SUMP Ranking and indicators for cycling; this thesis is new in the Turkish literature and is assumed to increase bike lane projects in Turkish cities to solve urban mobility problems.

With this thesis, solutions to recent urban mobility problems in Turkish cities is examined. The thesis unfolds as follows: In Chapter 1, Introduction identifies the main problem, questions, hypotheses and scope of the thesis. Chapter 2 focuses on the Literature Review of the thesis. Chapter 3 focuses on sustainable urban mobility concept and examines sustainable urban mobility in the EU and the Turkey. Chapter 4 focuses deeply to Turkey's current situation on sustainable urban mobility via questionnaire. Chapter 5 concentrates on cycling as a sustainable urban mobility solution for Turkish cities. To motivate cycling, cycling indicators are developed for Turkish cities to pre-evaluate bike lane projects and a case study evaluation for the city of Eskişehir is calculated using these indicators. Finally, Chapter 6 provides the conclusions of the thesis by evaluating hypotheses and recommendations for future research.

# 2. LITERATURE REVIEW

Theses and articles in the literature about sustainable transport and mobility since 2000 are examined and the ones about cycling and evaluation of sustainable transport/mobility are summarized as below:

Eryiğit propounded the effects of social dimension of sustainable transport on bicycle use and evaluated bicycle use with this social dimension and principles and accordingly made suggestions on increase of urban life quality and on equal, safe transport facilities in cities.[10]

Nal brought together two important fields of research in the planning literature: Sustainable transport and city-regions. Three aspects were identified as 'threats' for the attainment of sustainable transport and land-use development in city-regions: 1. Increase in need to travel and car dependency due to increase in interactions and longer distances in city-regions, 2. Economic objectives for city-regions conflicting with objectives of sustainable transport, and 3. Difficulty in ensuring policy coordination for an integrated approach to sustainability due to fragmentation of governments. Two most effective ways of achieving sustainable transport, land-use planning policies and policies for improving PT and non-motorised transport (walking and cycling), were chosen as the main policy approaches to be analyzed. Through the analysis of planning experience in a selected case study area, the Izmir City Region, the study intended to find out whether these issues are real threats for attaining sustainable transport in city regions and whether they could be overcome.[11]

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[10] Sedef Eryiğit, "The Role of Bicycle Use In Sustainable Transportation's Social Dimension", (**Unpublished Ph.D Thesis**, Selçuk University Institute of Science, 2012), p.4.

[11] Seda Nal, "Sustainable Transport in City-Regions: The Case of Izmir City Region", (**Unpublished Master Thesis**, METU The Graduate School of Natural and Applied Sciences, 2008), pp.4-5.

Güngör examined the relationship between transport and city under sustainability, liveability, healthy city, mixed city, city quality, equality, accessibility topics. Then the sustainable, human-oriented and integrated transport systems were evaluated with best practices from Europe and compared with the City of Sakarya and requirements were listed to achieve human-oriented and entegrated transport system.[12]

Altıntaşı quantified the current levels of mobility and vehicle emissions within the METU campus to develop sustainable campus transport policies. Based on the base case mobility and emission values, more sustainable campus transport policies were simulated in PTV VISUM software, and assessed in terms of carbon emission impacts. Discouraging of private car usage by students seemed the first and simplest action.[13]

Öztürk analyzed traffic demand management as one of the most important elements of sustainable transport plans to reduce congestion, improve road safety, reduce environmental pollution, reduce energy consumption and save money. Multiple strategies determined for the management of traffic demand are; reducing the traffic during rush hour, maintaining traffic flow, reducing the private vehicles usage, increasing the PT usage. Traffic demand management was held for Gürsu district of the city of Bursa for a sustainable transport plan and implementation suggestions were submitted for pedestrian walkways, traffic reduction and improving PT. [14]

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[12] Bekir Güngör, "Sustainable Transport Policies within the Scope of the Human-Oriented Integrated Transport Method: The City of Sakarya Example", (**Unpublished Master Thesis**, Mimar Sinan Fine Arts University Institue of Science and Technology, 2012), pp.3-4.

[13] Oruç Altıntaşı, "Assessment of Scenarios for Sustainable Transportation at METU Campus", (**Unpublished Master Thesis**, METU The Graduate School of Natural and Applied Sciences, 2013), p.4.

[14] Hatice Öztürk, "Traffic Demand Management and Sustainable Transport Planning in Gürsu District", (**Unpublished Master Thesis**, Bahçeşehir University Institute of Science, 2012), p.v.

Eriçok obtained driving cycle diagrams of İstanbul Bus Rapid Transit (BRT) on Zincirlikuyu-Söğütlüçeşme route and private car on the paralel road of this route by GPS measurements of velocities with ExpertGPS software. According to diagrams BRT is found suitable for sustainability.[15]

Şimşek determined the Park&Drive user profile in Turkey, identified the behavior patterns of the target audience, showed the feasibility and benefits of Park& Drive system in İstanbul to reduce car flow and relieve the traffic.[16]

Yıldıztekin analyzed examples from Commuter Train Systems as an important sustainable transport for their high capacity and low costs and developed a model to increase the effectiveness and capacity of Commuter Train System of Ankara.[17]

Erçetin analyzed planning and operating approaches of bike-sharing implementations. The worldwide experiences in this new approach were reviewed and best practices from world were studied with a view to reveal some criteria for the successful planning and operating of these systems in Turkey. The first three bike-sharing systems, those in Konya, Kayseri and İstanbul were assessed to provide a better understanding of the current experience in bike-sharing systems in Turkey to reveal the

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[15] Serdar Doğuş Eriçok, "Analyzing Private Car and Bus Rapid Transit's Driving Cycles within The Sustainable Transport Goal of Istanbul", (**Unpublished Master Thesis**, Bahçeşehir University Institute of Science, 2012), p.iv.

[16] Anıl Venüs Şimşek, "Park&Drive Systems to Direct Private Car Owners to Public Transportation in the Frame of Sustainable Transport Policy: İstanbul Case", (**Unpublished Master Thesis**, İstanbul Technical University (İTÜ) Institute of Science, 2014), pp.xxiii-xxv.

[17] Halil Yıldıztekin, "Rail Systems in Sustainable Urban Mobility Models and Ankara Commuter Train Sample", (**Unpublished Master Thesis**, Gazi University Graduate School of Natural and Applied Sciences, 2016), p.v.

strengths and weaknesses of the systems implemented so far, and to provide recommendations for the planning, implementation and operation of the future systems.[18]

Uluç assessed mobility systems, existing projects and implemented cases as well as international charters and manuals within the urban mobility and the urban conservation. Complementing these assessments with the assessment of the observations drawn from the case of Antalya Kaleiçi, a framework for SUM in HULs (Historic Urban Landscapes), including the process, principles and tools, were proposed. A checklist for SUM systems in HULs were also provided. The historical development, the conservation and planning studies, the cultural properties, the users, the functions, the public realms and the urban mobility system existing today in Antalya Kaleiçi were surveyed and assessed. Based on these assessments, and adhering to the provided framework and checklist, a SUM proposal was developed for Antalya Kaleiçi.[19]

Krynauw and Cameron observed the linkage between performance measurement and decision making. By looking at some international ideas about sustainable development and its measurement within the transport sector, KPI's were measured in Johannesburg. Analysis and recommendations were done on the relevance of these measures to cities in South Africa.[20]

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[18] Cihan Erçetin, "Planning and Operating of Bike Sharing Systems for Sustainable Urban Transport: Konya, Kayseri and İstanbul", (**Unpublished Master Thesis**, METU Graduate School of Social Sciences, 2014).

[19] Aynur Uluç, "A Framework for Sustainable Urban Mobility (SUM) in Historic Urban Landscape (HUL): A Proposal for Antalya Kaleiçi", (**Unpublished Master Thesis**, METU Graduate School of Natural and Applied Sciences, 2014), pp.v-vi.

[20] M. N. Krynauw and J.W.M. Cameron, "Incorporating Sustainability into Transportation Planning and Decision Making: Definitions, Performance Measures, and Evaluation", **22nd Annual Southern African Transport Conference**, Pretoria South Africa, 14- 16 July 2003.

Jeon prepared a framework for incorporating sustainability in transport planning and decision making. Atlanta Metropolitan Region's transport and land use plans were evaluated as a case study by using sustainability parameters.[21]

Fillis analyzed the current situation in San Luis Potosi, Mexico that was experiencing rapid urbanisation, congestion, air quality problems, and increasing incidents of fatal accidents involving cyclists and motorists and developed feasible policy prescriptions to mitigate the multi-faceted problems for San Luis Potosi.[22]

Yoram, Sigal and Shalom suggested and used a scenario approach for the future development of the Tel-Aviv Metropolitan Area. An expected scenario and a desired scenario were developed to analyze the feasibility of the desired scenario and assessed the likelihood of the implementation.[23]

Algers, Eliasson and Mattsson discussed future travel demand models under urban analysis.[24]

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[21] Mihyeon Christy Jeon, "Incorporating Sustainability into Transportation Planning and Decision Making: Definitions, Performance Measures, and Evaluation", (**Unpublished Ph.D Thesis**, Georgia Institute of Technology, 2007).

[22] Danielle Marie Fillis, " Barriers to Bicycle Infrastructure: Why Do Some Communities Put the Brakes on Sustainable Transport?", (**Unpublished Master Thesis**, Tufts University Urban and Environmental Policy and Planning, 2007), p.ii.

[23] Yoram Shiftan, Sigal Kaplan and Shalom Hakkert, "Scenario Building as a Tool for Planning a Sustainable Transportation System", **Transportation Research Part D: Transport And Environment**, Vol.8, Nu.5, September 2003, pp.323-342.

[24] Staffan Algers, Jonas Eliasson and Lars-Göran Mattsson, "Is it time to use activity-based urban transport models? A discussion of planning needs and modelling possibilities", **The Annuals of Regional Science**, Vol.39, Nu.4, December 2005, pp. 767-789.

Sastre, Sastre, Gamo and Gaztelu looked at the Valdemoro case to evaluate the economic impact of the pedestrianisation which was planned under Sustainable Mobility Plan. [25]

Magdalena discussed the state of Bucharest's PT system to make it more sustainable according to European regulations.[26]

Nocera and Cavallaro presented a two-step method (balance and valuation) for considering $CO_2$ within mobility plans because saving $CO_2$ emissions were one of the most delicate challenges of transport engineering and according to the EU and national directives, urban mobility and traffic plans should consider $CO_2$ savings as one of the goals to be reached.[27]

Diez, Gonzalo, Velasco and López-Lambas developed a formula to measure the effectiveness of the SUMP activities in the city of Burgos. [28]

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[25] Julián Sastre and Others, "Economic impact of pedestrianisation in historic urban centre, the Valdemoro case study (Spain)", **Procedia - Social and Behavioral Sciences**, Vol.104, 2013, pp. 737-745.

[26] Baidan Ana Magdalena, "A brief analysis of the sustainable mobility approach in Bucharest", **Procedia Environmental Sciences**, Vol.32, 2016, pp. 168-176.

[27] Silvio Nocera and Federico Cavallaro, "The Ancillary Role of CO2 Reduction in Urban Transport Plans", **Transportation Research Procedia**, Vol.3, 2014, pp. 760-769.

[28] José María Diez and Others, "A CO2-saving-based methodology to measure the impact of the SUMP in European Cities: Application to the city of Burgos", **Procedia - Social and Behavioral Sciences**, Vol.162, 2014, pp. 70-79.

Romero and López developed Methodological Guide and Computer Tool to assess SUMP proposals.[29]

Zavaglia underlined that in the last decade, a big European effort has been made in terms of research, strategies and initiatives to boost new forms of sustainable urban mobility to replace individual transport. Among the other instruments identified to achieve this goal the European Commisson (EC) emphasised integrated planning at all mobility levels by both PUMs (Piano Urbano della Mobilita) and Intelligent Transport Systems (ITS). Under these two conditions, car sharing was expected to become an efficient sustainable transport service as an alternative to PT for decreasing private car usage.[30]

Luciana mentioned that most priorities identified under sustainable urban development in Romania between the years 2007-2013 were not achieved because of the economic crisis and the lack of regional development projects. [31]

Bos and Temme described a case study in Breda, Netherlands to become a completely carbon-neutral city by the year 2044. By using traffic models and discussing the results in workshops with a diversity of municipal departments, a quantitative insight was gained in assessing the potential for realizing the goal of a carbon neutral mobility system by the year 2044. The results led to the preparation of a SUMP including new

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[29] Patricia Rey Romero and María Carpio López, "ieCOtrans: Smart Mobility for economic, energy and environmental assessment of measures and policies applied to the transport sector", **Procedia - Social and Behavioral Sciences**, Vol.162, 2014, pp. 506-515.

[30] Claudio Zavaglia, "European Union instruments and strategies for sustainable urban mobility: Exploiting PUMs and ITS to develop an efficient car sharing proposal", **Procedia - Social and Behavioral Sciences**, Vol. 223, 2016, pp. 542-548.

[31] Paul Luciana, "Some Considerations on the Sustainable Urban Development in Romania", **Procedia Economics and Finance**, Vol.27, 2015, pp. 574-578.

bicycle and PT action plans. This plan was incorporated in the new spatial development plan Breda 2030. Next to this, climate action plans were set up between the municipality and private stakeholders.[32]

Kocak, Adell, Ljungberg, Ljungberg, Sessa, Giuffrè and Pietro discussed the pros and cons of the Poly-SUMP approach applied to the cities of polycentric regions, as opposed to the conventional methods used to elaborate SUMPs at the level of individual cities. Polycentric regions, their features and how they could be detected by means of indicators of regional structure and mobility patterns, and why polycentric regions would be increasingly relevant to the future of mobility planning in the EU landscape were analysed.[33]

Lindenau and Böhler-Baedeker searched participation in sustainable urban mobility planning by evaluating citizen and stakeholder engagement practices in European cities.[34]

Minh analyzed two new "car-free city" and "city of short walks" planning concepts in Hanoi under mobility and logistics.[35]

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[32] Ron Bos and Rob Temme, "A roadmap towards sustainable mobility in Breda", **Transportation Research Procedia**, Vol.4, 2014, pp. 103-115.

[33] Nazan Kocak and Others, "Planning sustainable mobility in polycentric regions: testing a participatory approach in six regions of Europe", **Transportation Research Procedia**, Vol.4, 2014, pp. 327-346.

[34] Miriam Lindenau and Susanne Böhler-Baedeker, "Citizen and stakeholder involvement: a precondition for sustainable urban mobility", **Transportation Research Procedia**, Vol.4, 2014, pp. 347-360.

[35] Nguyen Quang Minh, "Application of "Car-Free City" and "City of Short Walks" to Living Quarters in Hanoi Towards Sustainable Mobility and Logistics", **Procedia Engineering**, Vol: 142, 2016, pp. 284-291.

Makarova, Pashkevich, Shubenkova and Mukhametdinov considered the ways to increase the urban transport system's sustainability and measures to promote non-motorised transport (walking and cycling) and the safety of the PT.[36]

Keseru, Bulckaen, Macharis and Kruijf assessed sustainability of the projects through multi-criteria analysis and stakeholder preferences through multi-actor multi-criteria analysis under three pillars: economy, environment, society.[37]

Papaioannou, Politis and Nikolaidou mentioned from the ENDURANCE project which promotes SUMP concept by creating national city networks. Greek cities are evaluated as an example but lack of staff, experience, culture, funding and policy about sustainable mobility are determined as the main problems towards SUMPs.[38]

Gebhardt, Krajzewicz, Oostendorp, Goletz, Greger, Klötzke, Wagner and Heinrichs assumed that public, private and non-motorised transport (walking and cycling) combination can achieve sustainable cities by showing the results of the German Aerospace Center's Urban Mobility Project.[39]

Sdoukopoulos, Kose, Gal-Tzur, Mezghani, Boile, Sheety and Mitropoulos presented PT, transport infrastructure, city logistics and integrated planning/SUMPs as

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[36] Irina Makarova and Others, "Ways to Increase Population Mobility through the Transitionto Sustainable Transport", **Procedia Engineering**, Vol: 187, 2017, pp. 756-762.

[37] Imre Keseru and Others, "Sustainable consensus? The NISTO evaluation framework to appraise sustainability and stakeholder preferences for mobility projects", **Transportation Research Procedia**, Vol: 14, 2016, pp. 906-915.

[38] Panos Papaioannou, Ioannis Politis and Anastasia Nikolaidou, "Steps towards sustaining a SUMP Network in Greece", **Transportation Research Procedia,** Vol: 14, 2016, pp. 906- 915.

[39] Laura Gebhardt and Others, "Intermodal urban mobility: users, uses, and use cases", **Transportation Research Procedia**, Vol: 14, 2016, pp. 1183-1192.

urban mobility solutions developed by SOLUTIONS Project, and assessed these solutions' transferability to the Mediterranean Partner Countries.[40]

Glotz-Richter presented municipality's policies and activities to increase car sharing under SUMP in the city of Bremen.[41]

Schippl, Gudmundsson, Sørensen, Anderton, Brand, Leiren and Reichenbach discussed a roadmap to reach the urban transport goals in the White Paper.[42]

Homrighausen and Tan compared the cases of Groningen, the Netherlands and Phoenix, AZ, US to find key conditions allowing innovations for sustainable mobility. Through a historiography of key moments within these processes, interviews with key experts and a qualitative data analysis of policy documents; the authors identify the key conditions as i) appropriate governance and ii) presence of complementary institutions. Additionally, the presence of coalitions (bottom-up initiatives, local activist or lobby groups) contributes a surprisingly crucial and tangible role in the shift towards sustainable mobility.[43]

Foltýnová and Jordová analyzed the contribution of CIVITAS Initiative for improvement of policy documents at the city level by using CIVITAS documents and data from semi-structured interviews with 25 cities. Index of Policy Environment are

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[40] Eleftherios Sdoukopoulos and Others, "Assessment of urban mobility needs, gaps and priorities in Mediterranean partner countries", **Transportation Research Procedia**, Vol: 14, 2016, pp. 1211-1220.

[41] Michael Glotz-Richter, "Reclaim street space! – exploit the European potential of car sharing", **Transportation Research Procedia**, Vol: 14, 2016, pp. 1296-1304.

[42] Jens Schippl and Others, "Different pathways for achieving cleaner urban areas: a roadmap towards the white paper goal for urban transport", **Transportation Research Procedia**, Vol: 14, 2016, pp. 2604-2613.

[43] J. R. Homrighausen and W.G.Z. Tan, "Institutional Innovations For Sustainable Mobility: Comparing Groningen (NL) and Phoenix (US)", **Transportation Research Procedia**, Vol: 19, 2016, pp. 151-163.

developed to describe the cities and to verify whether the composition and quality of strategies and policy documents as well as the ways of communication with key stakeholders' influence implementation and impacts of different sustainable transport measures. Findings of the paper indicate that policy environment influences the implementation process of sustainable mobility measures though the effect is not fatal and usually does not prevent the measure implementation.[44]

Decker, Hećimović and Wolek explained that SUMPs are the EU's top agenda for solving urban transport problems and guidance to develop and implement SUMPs are required. Gdynia from Poland and Koprivnica from Croatia were selected and mentioned as best SUMP practices.[45]

According to the literature examined about sustainable transport and sustainable mobility, the main starting point of these theses and articles is to solve urban transport and mobility problems in cities. But the main differences of this thesis from the literature are that: SUMPs in the EU suggested as a solution to solve urban mobility problems in Turkey; Sustainable Urban Mobility Questionnaire is conducted to Turkish metropolitan municipalities to evaluate their current situation on sustainable urban mobility; SUMP Ranking is prepared for Turkish cities according to findings from the questionnaire; to support SUMPs in Turkey, cycling is recommended as a starting point and cycling indicators are developed for Turkish cities by using city's current data to pre-evaluate bike lane projects.

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[44] Hana Bruhová Foltýnová and Radomíra Jordová, "The Contribution of Different Policy Elements to Sustainable Urban Mobility", **Transportation Research Procedia**, Vol: 4, 2014, pp. 312-326.

[45] Bernd Decker, Helena Hećimović and Marcin Wołek, "Sustainable Urban Mobility Planning in Central Eastern Europe: case examples from Poland and Crotia", **Procedia - Social and Behavioral Sciences**, Vol: 48, 2012, pp. 2748-2757.

# 3. SUSTAINABLE URBAN MOBILITY

Sustainable development concept first introduced in 1987 at the Report of the World Commission on Environment and Development: Our Common Future which is also known as Brundtland Report: "Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."[46] To solve urban mobility problems, sustainable transport concept stems from the Brundtland Report "satisfying current transport and mobility needs without compromising the ability of future generations to meet these needs".[47] Sustainable transport is the expression of sustainable development in the transport sector. (Sustainable mobility is a synonym used by the EC)[48]

Sustainable urban mobility solutions cannot be described as a general idea adaptable on every city in the world with the necessary budget and expertise. It is a complex system composed of many different factors and layers with large regional differences depending on the topography, political situation, technical progress and citizens' behaviours.

Chapman claims that policies to change travel behaviour are important than technological solutions in the short run because technological solutions (e.g. large infrastructure constructions or projects to improve fuel efficiency) do not tackle the urban mobility problems in the first stage and need to be seen critical, by applying the theory of induced travel.[49] This concept indicates and explains the effects of redesigned transport

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[46] Bruntland Commission, **Report of the World Commission on Environment and Development**, Oslo, 1987.

[47] William R. Black, "Sustainable Transportation: A U.S. Perspective", **Journal of Transport Geography**, Vol. 4, 1996, pp.151-159.

[48] OECD, OECD Proceedings Towards Sustainable Transportation, **The Vancouver Conference**, Vancouver British Columbia, 24-27 March 1996, p.11.

[49] Chapman, p.354.

infrastructure with the conclusions that traffic participants choose their mode by reviewing the provided infrastructure. For example, many cases of widened highways show the same level of congestion recurring way earlier than expected, because the new capacity fosters private car use.[50]

Thus, it can be followed that traffic is not an ascertainable figure that should be planned for, but one that is caused by technology, infrastructure and urban structure given to the citizens. Banister calls this a new mobility paradigm, in which travel is not anymore a derived demand, but an activity people do for their own sake.[51] The traditional approach of traffic engineering, aiming to provide the necessary traffic capacity gets inverted with these new ideas of planning. It can be stated that changes in the transport system lead changes in human behaviour. This opens doors to sustainability. Means of transport considered as sustainable are principally PT, non-motorised transport (walking and cycling).

In order to increase the modal share of PT, its accessibility needs to be provided for everyone including the ones with restricted mobility. The right choice between PT and their respective implementation is very important, but only pays off if it possesses a well-designed intermodal integration. This should be done spatially by proximity to interchange stations, safe and comfortable station design as well as by fare integration, real time on board information and a corporate and attractive branding. In well designed cases, PT ensures that all individuals enjoy the accessibility to meet the minimum basic needs.[52]

Non-motorised transport (walking and cycling) as zero carbon and environmental friendly solutions need more attention in the sustainable urban mobility

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[50] Goldman and Gorham, p.265.

[51] David Banister, "The sustainable mobility paradigm", **Transport Policy**, Vol.15, Nu.2, (March 2008), p.73.

[52] Aftabuzzaman and Mazlouni, p.700.

planning scheme to overcome the urban mobility problems. Implementation strategies are comparatively easy in a technical manner. Public support and political will is crucial though. Pedestrianisation zones in inner city areas, a safe and dense bike network, integration with the PT networks, bike parking facilities, bike-sharing options and bike spaces on buses and urban trains are the principal innovations. This means, non-motorised transport (walking and cycling) are the key to provide a good level of urban accessibility, applying the strength of being very flexible on a local scale and needing no further support such as parking lots.

Though, measures to foster PT and non-motorised transport (walking and cycling) alone do not suffice to increase their modal share to a desirable extent. Additionally, car usage needs to be made unattractive on the one hand, but even more unnecessary on the other hand. Policies should lead people to the decision to leave their cars at home or even sell them, because sustainable mobility solutions became more appealing in financial and convenient ways. Sustainable mobility solutions also comprise reduction of inner city parking spaces, congestion charging, environmental zones and housing projects missing parking spaces but including bike storages. Events like car-free days help to foster an understanding among the population that mobility without cars is possible and enjoyable.

The relationship between society and the transport system is the ambitious target to be met. To reach this, the political and societal challenges continue being more important than technical issues. Furthermore, this process is not a one to be finished and achieved at one point. Sustainable mobility is a pathway policy, not a vision with an endpoint.[53] However, in many cases transport decisions are taken under larger policy goals like economic growth, job creation, land-use, socio-economic and geographic wealth transfers instead of following a pathway towards a sustainable mobility behaviour

[53] Goldman and Gorham, p.261.

in the cities."[54] SUMPs are made to address exactly this misunderstanding that caused the fragmentation of our cities and allowed the current unsustainable mobility pattern to be prevented. However United Kingdom (UK) and France had their own comprehensive SUMPs, Local Transport Plans (LTP) for UK and Plans de Deplacements Urbains (PDU) for France, other countries in the EU didn't have their own plans to solve their urban mobility problems before SUMPs.

SUMPs are strategic plans developed to satisfy the mobility needs of people in cities for a better life quality and build on existing plans by taking consideration integration, participation and evaluation processes. Differences of SUMPs from existing transport plans are shown at Table 1.

[54] Goldman and Gorham, p.262.

**Table 1**

**Traditional Transport Plans versus SUMPs**

| **Traditional Transport Plans** | **SUMPs** |
|---|---|
| Focus on traffic | Focus on people |
| Primary objectives: Traffic flow capacity and speed | Primary objectives: Accessibility and quality of life as well as sustainability, economic viability, social equity, health and environmental quality |
| Modal-focused | Balanced development of all relevant transport modes and shift towards cleaner and more sustainable transport modes |
| Infrastructure focus | Integrated set of actions to achieve cost-effective solutions |
| Sectorial planning document | Sectorial planning document that is consistent and complementary to related policy areas (such as land-use and spatial planning; social services; health; enforcement and policing; etc.) |
| Short and medium term delivery plan | Short and medium term delivery plan embedded in a long term vision and strategy |
| Related to an administrative area | Related to a functioning area based on travel to work patterns |
| Domain of traffic engineers | Interdisciplinary planning teams |
| Planning by experts | Planning with the involvement of stakeholders using a transparent and participatory approach |
| Limited impact assessment | Regular monitoring and evaluation of impacts to inform a structured learning and improvement process |

**Source:** Rupprecht Consult, Guidelines Developing and Implementing a SUMP, 2014, p.7.

As a summary of Table 1, SUMPs aim is to ensure all people's accessibility, safety, security, health in cities and enhance the attractiveness and quality of cities for the people and the economy. According to the Table 1 SUMPs contributions are: Improving quality of life; Saving costs, creating economic benefits; Contributing to better health and environment; Making mobility seamless and improving access; Making more effective use of limited resources; Winning public support; Preparing better plans; Fullfilling legal

obligations effectively; Using synergies, increasing relevance; Moving towards a new mobility culture.[55]

### 3.1 SUSTAINABLE URBAN MOBILITY IN THE EU

EC's interest on sustainable urban mobility begun in 2000s with the increasing demand for urban mobility in the EU cities which are home to 70% of the EU population and 85% of the EU GDP.[56] Increasing demand for urban mobility has also caused congestion, air and noise pollution and high levels of $CO_2$ emissions. For the better quality of life in the EU cities, the need for more sustainable and integrated urban mobility planning has been widely recognised.

Sustainable Urban Transport Plans (SUTPs) arise as a new planning concept in 2006 in the Thematic Strategy on the Urban Environment: "The Commission strongly recommends local authorities to develop and implement SUTPs."[57] SUTPs are different from Transport Master Plans and their aim is to create more sustainable urban transport system. In the 2007 Green Paper, SUTPs are also used as: "The Thematic Strategy on the Urban Environment identified a number of environmental problems which could be improved by the development and implementation of SUTPs. In its Strategy, the EC committed itself to prepare guidance on how to prepare such SUTPs."[58]

Since transport is used for carrying people from one place to another and mobility is used for the movement of people, SUTPs are changed to SUMPs at Action Plan on Urban Mobility in 2009: "In the short term, following up the Thematic Strategy

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[55] Rupprecht Consult, **Guidelines Developing and Implementing a SUMP**, 2014, p.11-12.

[56] EC, Action Plan on Urban Mobility, p.2.

[57] EC, **Thematic Strategy on the Urban Environment**, Brussels, 2006, Clause 5.2.

[58] EC, **Green Paper: Towards a new culture for urban mobility**, Brussels, 2007, p.15.

on the Urban Environment, the Commission will support local authorities in developing SUMPs."[59]

SUMPs were most detailedly mentioned at the 2013 Urban Mobility Package's central element Communication "Together towards competitive and resource efficient urban mobility": "The Commission has actively promoted the concept of sustainable urban mobility planning for several years. With Commission support, Guidelines for the development and implementation of SUMPs were developed."[60] With the Urban Mobility Package, EC supports sharing best practices, fostering cooperation and providing financial support.

Urban Mobility Package was also completed by an Annex A titled Concept for SUMPs to the Communication, Together towards competitive and resource-efficient urban mobility: "This document sets out a concept for the development of SUMPs".[61] It describes the main features for SUMPs:

1. Goals and objectives

   SUMPs goal is to improve the accessibility and to provide the sustainable mobility in the urban area.

2. Long-term vision and a clear implementation plan

   SUMPs present a long-term vision for the future development of urban transport and mobility systems.

[59] EC, Action Plan on Urban Mobility, Action 1, p.5.

[60] EC, **Together towards competitive and resource-efficient urban mobility**, Brussels, 2013, Clause 3, p.3.

[61] EC, **Annex A Concept for SUMPs, Together towards competitive and resource-efficient urban mobility**, Brussels, 2013, p.2.

3. Performance assessment

SUMPs assess the current and future performance of the urban transport and mobility systems.

4. Integrated transport

SUMPs encourage a shift towards more sustainable transport modes under these elements:

(a) PT**:** SUMPs should imrove quality, security, accessibility and integration of PT services.

(b) Non-motorised transport (walking and cycling): SUMPs should provide attractive, safety and security urban areas for non-motorised transport (walking and cycling).

(c) Inter-modality: SUMPs should integrate different modes for a seamless, multi-modal mobility and transport.

(d) Urban road safety: SUMPs should improve road safety in urban areas.

(e) Road transport (flowing and stationary): SUMPs should address moving and stationary traffic by optimising the use of existing road infrastructure, providing a road space to other transport modes.

(f) Urban logistics: SUMPs should improve the efficiency of urban logistics, including urban freight delivery while reducing emissions of greenhouse gas (GHG), pollutants and noise.

(g) Mobility management: SUMPs should move towards more sustainable mobility while engaging people, businesses and all relevant actors in the city.

(h) ITS: SUMPs should include ITS for strategy formulation, policy implementation and monitoring for all transport modes and mobility services, both for passengers and freight.

5. Horizontal and vertical integration

   SUMPs follow an integrated approach with co-operation, co-ordination and consultation.

6. Participatory approach

   SUMPs follow a transparent and participatory approach.

7. Monitoring, review and reporting
   Planning and implementation of SUMPs should be monitored closely.

8. Quality assurance
   SUMPs' concept should be in compliance with the actions of the EU on SUMPs.

With the above regulations, EC requested the establishment of SUMPs as a comprehensive planning tool for cities to solve urban mobility problems and satisfy the needs of people in the EU cities for a better life quality. SUMPs were not declared mandatory in the EU, EC just put incentive measures like financing to disseminate SUMPs. Despite the diversity of planning cultures inside and outside the EU, there are common SUMP characteristics to overcome urban mobility problems. SUMPs encourage a shift towards sustainable transport modes like PT and non-motorised transport (walking and cycling), ensure transport system accessibility for all, improve safety and security, reduce air and noise pollution, improve cost-efficiency of transport, enhance better urban environment.

In 17 December 2013 in conjuction with the Urban Mobility Package, "Guidelines Developing and Implementing a SUMP" was released for urban transport and mobility practitioners, local authorities and other stakeholders involved to the SUMP process. The aim of the guideline is to motivate SUMPs in the EU by providing guidance, making awareness raising workshops and trainings.

EC is working closely with the EU cities to ensure SUMPs are well-adapted and disseminated. In 2014 EC set up a European Platform for SUMPs to support development

and implementation of SUMPs by Mobility Plans Portal, to provide knowledge sharing and networking in between representatives from on-going SUMPs by the Co-ordinating Group, to promote concept of SUMPs by Annual Conferences. EC also supports local partnerships on sustainable mobility by CIVITAS 2020 program and provides financial support via funds like European Structural and Investment Funds, Horizon 2020, Connecting Europe Facility.

### 3.1.1 SUMP Planning Cycle

Since developing and implementing SUMP is a complex and challenging process, “Guidelines Developing and Implementing a SUMP” offers a planning cycle on how to apply the SUMP concept.

Figure 1 shows the SUMP planning cycle. Appendix 1 includes detailed description of 4 phases, 11 main steps and 32 activities of the planning cycle.

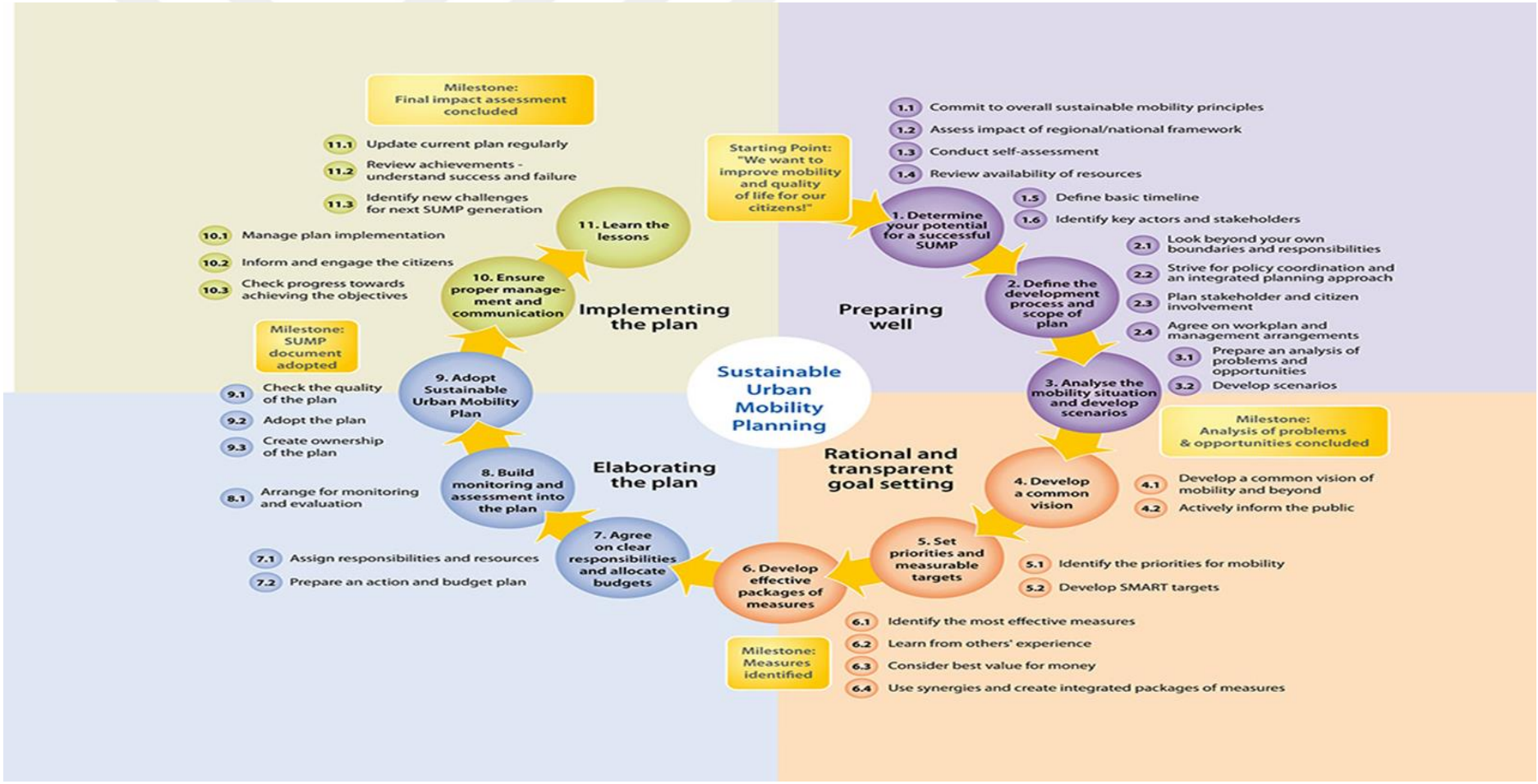


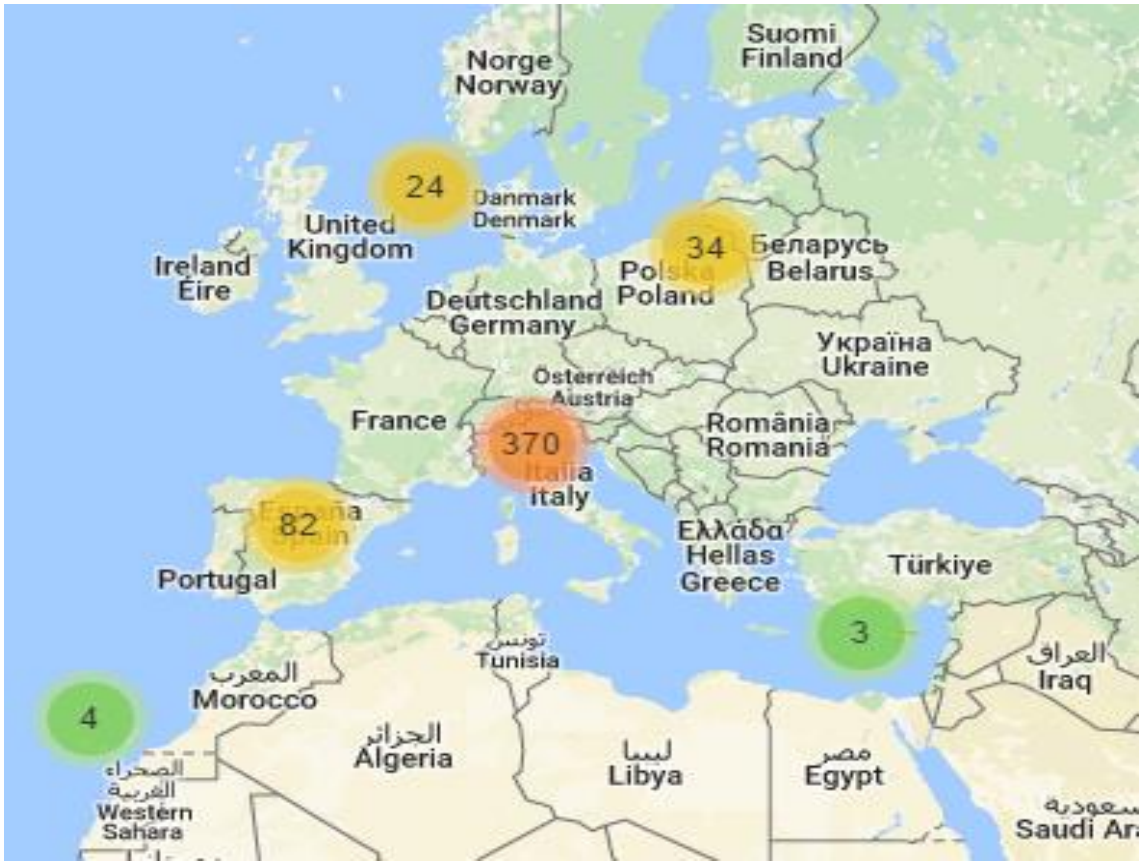

**Figure 1:** SUMP Planning Cycle

**Source:** Rupprecht Consult, Guidelines Developing and Implementing a SUMP, 2014, p.15.

### 3.1.2 SUMP Practices in the EU

There are 517 EU cities that implemented SUMP. Figure 2 shows the number and location of SUMPs. Appendix 2 gives all the names of the EU cities shown at Figure 2.

**Figure 2:** SUMP Map




**Source:** Eltis, City database, http://www.eltis.org/mobility-plans/city-database (02.03.2017).

### 3.1.3 SUMP Legislation in the EU

Even SUMPs were not declared mandatory by EC, huge number of SUMP practices implemented in the EU cities. SUMP legislation in the EU countries in which SUMP practices were implemented in, are analysed below.

In Austria, it is not compulsory for Austrian cities to have SUMPs. Austria gives consultation and financial support for the implementation of urban mobility plans. Austria's National Guidance on Transport Planning focuses on SUMP elements. Some cities in Austria have transport plans which include some SUMP elements, other cities that listed at Appendix 2 have SUMPs.[62]

In Belgium, municipalities are responsible from urban mobility plans development in the regions and provide a SUMP related guidance. In Flanders Region, mobility plans focusing sustainable mobility are obliged. In Capital Region, priority is to combat congestion by reducing motorised traffic by 20% until 2018. According to this target each municipality construct their own mobility plan. In Walloon Region, SUMPs are promoted, developed and financed for many cities.[63]

In Bulgaria, SUMP is a new concept. Development of SUMPs are municipality's responsibility but it is not obliged.[64]

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[62] *Austria*, 2016, http://www.eltis.org/mobility-plans/member-state/austria (4 March 2017).

[63] *Belgium*, 2017,http://www.eltis.org/mobility-plans/member-state/belgium (4 March 2017).

[64] *Bulgaria*, 2016,http://www.eltis.org/mobility-plans/member-state/bulgaria (4 March 2017).

In Croatia, even SUMPs are not defined by law, SUMPs are politically supported but public participation and technical capacity for SUMP implementation are inadequate.[65]

In Czech Republic, even there is no national legislation on SUMPs, the Ministry of Transport is promoting sustainable transport planning and a new transport policy including SUMPs.[66]

In Denmark, even there is a strong focus on traffic, environment and citizen involvement in the urban planning processes, SUMPs are new. "Currently, the two predominant trends in Denmark are 'liveable cities' and 'energy efficiency' and these trends are supported by a growing concern and actions to prevent the negative effects of climate change, resulting in a growing focus on mobility management and SUMPs."[67]

In Estonia, there is no law for urban mobility development, just have law for urban development. "National Government's workplan includes support for sustainable urban mobility planning, Ministry of Interior is working on a national planning document for a non-binding guidance on mobility planning, The Ministry of Economy Affairs and Communications is working on pedestrian and cycling planning guidance." [68] Estonian SUMP network has been set up and funding for SUMPs is available.

In Finland, there are no legal obligations for local authorities to implement SUMPs. The Finnish counterparts of SUMPs at regional level are Transport System

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[65] *Croatia*, 2016,http://www.eltis.org/mobility-plans/member-state/croatia (4 March 2017).

[66] Czech Republic, 2016, http://www.eltis.org/mobility-plans/member-state/czech-republic (4 March 2017).

[67] Denmark, 2015, http://www.eltis.org/mobility-plans/member-state/denmark (4 March 2017).

[68] Estonia, 2016, http://www.eltis.org/mobility-plans/member-state/estonia (4 March 2017).

Plans. Transport System Plans are not statutory but they cover many elements of SUMPs. Mobility plans for employers and schools also have the same targets like SUMPs at a small scale.[69]

In France, PDUs considered as French kind of SUMPs, were developed since 1996. They are compulsory in urban areas of over 100.000 population. With PDUs, car-use in urban areas has decreased, PT and the development of active modes have increased.[70]

In Germany, even urban transport plans are not legally binding, they are common in most German cities since 1960. Elements of SUMPs are increasingly included to urban transport plans.[71]

In Greece, mobility planning is primarily the responsibility of municipal authorities. In 2015, the Ministry of Environment, Energy and Climate Change released a White Paper as part of a call for SUMP funding which acts as a guidance including best practices of SUMPs.[72]

In Hungary, urban mobility planning based on traditional plans which define the future of mobility for 10-20 years. These are infrastructure-based plans. Even there were no governmental initiative for SUMPs and National Transport Strategy did not mention SUMPs in 2014; SUMP became a precondition for cities to access Cohesion Funds in 2015. SUMP preparation became eligible for European Regional Development Fund

[69] Finland, 2015, http://www.eltis.org/mobility-plans/member-state/finland (4 March 2017).

[70] France, 2016, http://www.eltis.org/mobility-plans/member-state/france (4 March 2017).

[71] Germany, 2016, http://www.eltis.org/mobility-plans/member-state/germany (4 March 2017).

[72] Greece, 2016, http://www.eltis.org/mobility-plans/member-state/greece (4 March 2017).

(ERDF) for urban development of each major city. First national guidance on SUMPs was published in 2015.[73]

In Ireland, urban mobility plans are the responsibility of the local authority and they are not mandatory. They are created by each local authority every 6 years. Although SUMP concept is not yet very popular in Ireland, many of the plans contain SUMP elements. Since Ireland has dispersed population, congestion problems which necessitate SUMPs are not evident in many places. Cork city recently identified SUMP as its 2015-2021 strategic aim.[74]

In Italy urban mobility planning is based on two main plans: PUTs (Piano Urbano del Traffico) and PUMs. PUTs were introduced as Urban Traffic Plans in 1986 and mandatory since 1992 for municipalities over 30.000 population to manage traffic circulation for 2 years. PUMs were introduced as Urban Mobility Plans in 2000 to manage mobility in urban areas for 10 years. They are not mandatory, they are identified as fundamental prerequisite for all municipalities with population over 100.000 in order to receive national funds. PUMs are consistent with SUMPs. Italian cities are recently beginning to adopt PUMs beside PUTs. An observatory about SUMPs was launched in 2016.[75]

"In Latvia, the Riga and Pieriga Mobility Plan (RPMP) was approved by Ministry of Transport in December 2010 to create an overall framework in which all

[73] Hungary, 2016, http://www.eltis.org/mobility-plans/member-state/hungary (4 March 2017).

[74] Ireland, 2016, http://www.eltis.org/mobility-plans/member-state/ireland (4 March 2017).

[75] Italy, 2016, http://www.eltis.org/mobility-plans/member-state/italy (4 March 2017).

existing and new plans for the construction and improvement of the traffic and transport system were evaluated and prioritised."[76]

In Lithuania, Ministry of Transport and Communications adopted the Guidelines on the Preparation of SUMPs in 2015 and Lithuanian cities started implementing SUMPs. Municipalities with more than 25.000 population are recommended to prepare SUMPs. SUMP development are based around current city planning processes and master plan. There have been funds to encourage SUMP implementation.[77]

In Malta, there is no official SUMP and also no guidelines on urban mobility planning.[78]

In Netherlands, Current urban traffic and transport plans largely correspond to the SUMPs.[79]

In Poland, government started supporting cities to solve urban mobility problems caused by motorisation and the bad quality of PT since 1990s. "In National Transport Policy for 2006-2025, sustainable urban transport policies were given and more than 100 cities were obliged to prepare Plans of Sustainable Public Transport until March 2014."[80] In the National Urban Policy in October 2015, sustainable urban mobility is listed as one of the 10 main areas.

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[76] Latvia, 2015, http://www.eltis.org/mobility-plans/member-state/latvia (4 March 2017).

[77] Lithuania, 2016, http://www.eltis.org/mobility-plans/member-state/lithuania (4 March 2017).

[78] Malta, 2015, http://www.eltis.org/mobility-plans/member-state/malta (4 March 2017).

[79] Netherlands, 2016, http://www.eltis.org/mobility-plans/member-state/netherlands (4 March 2017).

[80] Poland, 2016, http://www.eltis.org/mobility-plans/member-state/poland (4 March 2017).

In Portugal, there is no formal legal obligation for SUMPs. In 2012 National Directives were proposed to prepare PMT (the name adopted for SUMP) mandatorily for municipalities over 50.000 population. PMT process was then stopped due the economic crises.[81]

In Romania, the law in 2001 provided the definition of SUMP. Urban Mobility Plans are mandatory for Romanian cities and towns and also precondition for taking the Regional Operational Programme funds. "2.3 billion Euros are allocated for SUMPs in the 2014-2020 period."[82]

In Slovakia, Urban Master Plans that address transport are obligatory for municipalities with more than 2.000 population but Transport Master Plan are not obligatory. It is recommended for municipalities to revise their Urban Master Plans or Transport Master Plans in every 5 years but municipalities can make revisions according to their budgets. "In recent years, municipalities are willing to develop SUMPs as they are a precondition to receive the EU funds and in 2015 Ministry of Transport prepared SUMP Guidelines."[83]

In Slovenia, there is no legal obligation for local authorities to implement SUMPs. The Ministry of Infrastructure is responsible from urban transport and started to support SUMPs by first developing a national platform including national guidelines for SUMPs and trainings, then by funding the development of SUMPs. With these actions

[81] Portugal, 2015, http://www.eltis.org/mobility-plans/member-state/portugal (4 March 2017).

[82] Romania, 2016, http://www.eltis.org/mobility-plans/member-state/romania (4 March 2017).

[83] Slovakia, 2016, http://www.eltis.org/mobility-plans/member-state/slovakia (4 March 2017).

SUMPs become regular plans for Slovenian cities and all municipalities with big and mid-size urban centers will develop SUMPs by summer 2017. [84]

In Spain, preparation and implementation of SUMPs with its Spanish name Planes de Movilidad Urbana Sostenible (PMUS) are municipalities responsibility but they are not mandatory except for Cataluna. "In 2011 the national government passed a law linking the national funding for PT to the implementation of SUMPs for cities more than 100.000 population." [85] This encouraged municipalities adopting SUMPs because all former subsidies were stopped due to economic crisis.

In Sweden, it is not a legislative requirement to have transport strategy in Swedish cities. SUMPs are strategies mentioned under Transport for an Attractive City (TRAST) handbook. TRAST handbook supports local authorities on developing sustainable transport strategies that can be thought as SUMPs. Now there is an increasing willingness and interest to develop sustainable transport strategies.[86]

### 3.2 SUSTAINABLE URBAN MOBILITY IN TURKEY

Turkish cities and their transport systems are subject to a substantial change since 2010s with growing population that is concentrated mostly in cities. According to Turkey's 2016 Census by Turkish Statistical Institute (TÜİK), Turkey's population is 79.8 million, 92% of the population is living in urban areas, 8% living in rural areas.[87]

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[84] Slovenia, 2016, http://www.eltis.org/mobility-plans/member-state/slovenia (4 March 2017).

[85] Spain, 2015, http://www.eltis.org/mobility-plans/member-state/spain (4 March 2017).

[86] Sweden, 2016, http://www.eltis.org/mobility-plans/member-state/sweden (4 March 2017).

[87] How much of the Turkish population live at cities?, 2017, http://www.trthaber.com/haber/turkiye/turkiye-nufusunun-ne-kadari-sehirlerde-yasiyor-297718.html (7 March 2017).

With the increasing expansion of cities as well as the economic development, need to travel and also travel distances are increasing which PT couldn't answer. This increases private car ownership which reveals urban mobility problems in Turkish cities. According to the INRIX Software Company, in 2016 Turkey is selected as the 10th congested country in the world with approximately 34 hours congestion annually and İstanbul is selected as the 15th congested city in the world with approximately 59 hours congestion annually, drivers in İstanbul pass 25% of their driving time in rush hour congestion and 20% of their driving time in daily congestion.[88]

In Turkey, municipalities are responsible from transport planning in municipality boundaries. According to the Regulation on Increasing Energy Efficieny in Transport in 2008 district municipalities and metropolitan municipalities with more than 100.000 population should prepare Transport Master Plans for 15 years period and update them in every 5 years.[89] With the law 6360 in 2012: Metropolitan municipalities and district municipalities' borders are extended to territorial borders.[90] So Transport Master Plans' responsibility area were extended and the plans which were created before the law no. 6360 should be revised in between 1-2 years or rebuilt in 2-3 years or kept until targetted year.[91]

To sum up the above Regulations, municipalities with population more than 100.000 must prepare Transport Master Plans for 15 years for their territorial region and should revise them in every 5 years.

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[88] Turkey is among 10 at the world in congestion.

[89] Ministry of Transport Maritime Affairs and Communication, Regulation on Increasing Energy Efficieny in Transport Clause 10, 2008, http://www.resmigazete.gov.tr/eskiler/2008/06/20080609-3.htm (18 January 2016).

[90] The law no. 6360 Clause 6, 2012, http://www.resmigazete.gov.tr/eskiler/2012/12/20121206-1.htm (16 January 2016).

[91] Union of Turkish Municipalities, **Transport Planning Studies and Transport Master Plan Development Guideline,** Ankara, 2014, p.14.

In Turkey Transport Master Plans are prepared to solve urban mobility problems by first focusing on PT, then transport infrastructure. But focusing on transport infrastructure rather than non-motorised transport (walking and cycling) couldn't solve urban mobility problems in Turkish cities. On the contrary, it increased private car usage and PT so the traffic in cities.

Since previous Transport Master Plans couldn't solve urban mobility problems in cities, these plans should be revised by including sustainable urban mobility solutions especially non-motorised transport (walking and cycling). Although objectives and political support for sustainability started to exist in recent years, knowledge and technical possibilities for the preparation of sustainable urban mobility projects are still limited in Turkey. Few cities have compiled Transport Master Plans which include certain elements of SUMP approach like inter-modality, urban road safety and non-motorised transport (walking and cycling).

In Turkey there is no national guidance or legislation on SUMPs yet. Since Turkey is an EU candidate country so funding for developing SUMPs will be available for Turkish metropolitan municipalities under EU Instrument for Pre-accession Assistance (IPA) 2 funds.[92] In the following years, metropolitan municipalities are willing to develop SUMPs as they are a precondition to receive funds from the EU.

[92] Turkey The Sustainable Cities Project Executive Summary, 2014, http://www.ilbank.gov.tr/Surdurulebilir_Sehirler_projesi%20-%201/index.php?lang=en&pg=1 (16 January 2016).

# 4. SUSTAINABLE URBAN MOBILITY QUESTIONNAIRE

This thesis depends on the literature analysis on sustainable transport and mobility in the EU and Turkey. To solve current urban mobility problems by adapting SUMPs to Turkey, at first current legislation on sustainable urban mobility in the EU and Turkey is examined in the previous chapter. Then to analyse deeply, current situation on sustainable urban mobility of Turkey is examined by a questionnaire to all Metropolitan Municipalities' Urban Transport Departments in this chapter. Metropolitan municipalities are selected to be examined because as mentioned in the previous chapter that Turkish metropolitan municipalities will be funded by EC in near future for SUMP planning and implementation. SUMP Ranking is also prepared according to the questionnaire to compare the Turkish cities.

## 4.1 DATA AND METHODOLOGY

In this chapter to investigate the Turkish cities current situation on sustainable urban mobility, a qualitative model is developed for evaluating the current Transport Master Plans' relationship with SUMPs. Our theoretical findings are mirrored with an empirical study of 26 Turkish metropolitan municipalities over 30 metropolitan municipalities in Turkey. Empirical study consists of a research on current information of Transport Master Plans using a questionnaire with the participation of urban transport experts.

Considering the above mentioned current urban mobility problems in Turkish cities, the search for sustainable urban mobility solutions in current Transport Master Plans or tendency to SUMPs are examined to deal with urban mobility problems. Since there is no national guidance or legislation on SUMPs yet in Turkey, current Transport Master Plans' relationship with SUMPs is evaluated via questionnaire as a qualitative model. Questionnaire analysis aims to better understand the current sustainable urban mobility situation in Turkey and therefore the drivers for sustainable urban mobility

solutions for experts from Urban Transport Departments, decison makers and citizens can use to shape the future of sustainable urban mobility.

This questionnaire was carried out in March-April 2016 for experts from all Turkish Metropolitan Municipalities Urban Transport Departments to estimate the current state of Transport Master Plans towards a possible implementation of SUMPs.

This questionnaire is new and first in literature as an ex-ante evaluator and there is no similar work in the literature for Turkish cities. As a similar study, an online self assessment tool for local authorities has been developed by Rupprecht Consult named SUMP Self-Assessment Tool and was launched in 19-20 November 2015.[93] But SUMP Self-Assessment Tool is an ex-post assessment tool for evaluating the compliance of a SUMP with EC's SUMP concept and Guidelines after finalising the local authority's SUMP process. SUMP Self-Assessment Tool consists of 100 yes-no questions according to the SUMP Planning Cycle steps. Each question represents one point and maximum score that a city can get is 100 points which indicates the Excellent SUMP.

In this Sustainable Urban Mobility Questionnaire, questions were prepared dedicatedly according to the thesis needs. Expert contacts from Turkish Metropolitan Municipalities Urban Transport Departments were gathered via phone calls to the metropolitan municipalities. At first questions were placed to Survey Monkey and then e-mailed to all metropolitan municipalities related experts in order them to fill in. The completion of the questionnaire was checked one by one via phone calls to experts and missing questions were asked as a phone interview.

The questionnaire consists of 15 questions in 4 different parts which is given at Appendix 3. The first part gathers general basic information on the current Transport Master Plans in terms of duration and timeframe. In the second part human and financial

[93] SUMP Self-Assessment Tool, 2016, http://www.eltis.org/resources/tools/sump-self-assessment-tool (9 March 2017).

resources are investigated to complete the organisational component. The third part asks more directly for the actual inclusion of SUMP elements in Transport Master Plans. The current and potential commitment of all possible stakeholders to SUMPs is determined in this part. The questionnaire closes with a fourth part, Strengths Weaknesses Opportunities Threats (SWOT) Analysis, which respondent metropolitan municipalities are asked to classify given factors into the strengths, weaknesses, opportunities and threats. The answers of the questionnaire are also given at Appendix 4. To take a full picture to the answers of the questionnaire, SUMP Ranking is prepared for the attendee metropolitan municipalities. From this questionnaire, the aim is to gain an overview and a better understanding of current planning habits of Turkish metropolitan municipalities. Possessing this information will facilitate consultations of how SUMP elements can be beneficially and efficiently integrated to the current Transport Master Plans.

Experts from 26 out of 30 Turkish metropolitan municipalities answered the questionnaire.* The participation rate is 87%. Only 4 metropolitan municipalities: Adana, Aydın, Kahranmanmaraş and Mardin did not answer the questions.

* Gaziantep Metropolitan Municipality, Kocaeli Metropolitan Municipality, Konya Metropolitan Municipality, Ordu Metropolitan Municipality, Erzurum Metropolitan Municipality, Diyarbakır Metropolitan Municipality, Manisa Metropolitan Municipality, Samsun Metropolitan Municipality, Van Metropolitan Municipality, Eskişehir Metropolitan Municipality, Mersin Metropolitan Municipality, Tekirdağ Metropolitan Municipality, Kayseri Metropolitan Municipality, İstanbul Metropolitan Municipality, Bursa Metropolitan Municipality, Malatya Metropolitan Municipality, Antalya Metropolitan Municipality, Trabzon Metropolitan Municipality, Muğla Metropolitan Municipality, İzmir Metropolitan Municipality, Balıkesir Metropolitan Municipality, Sakarya Metropolitan Municipality, Hatay Metropolitan Municipality, Ankara Metropolitan Municipality, Şanlıurfa Metropolitan Municipality, Denizli Metropolitan Municipality.

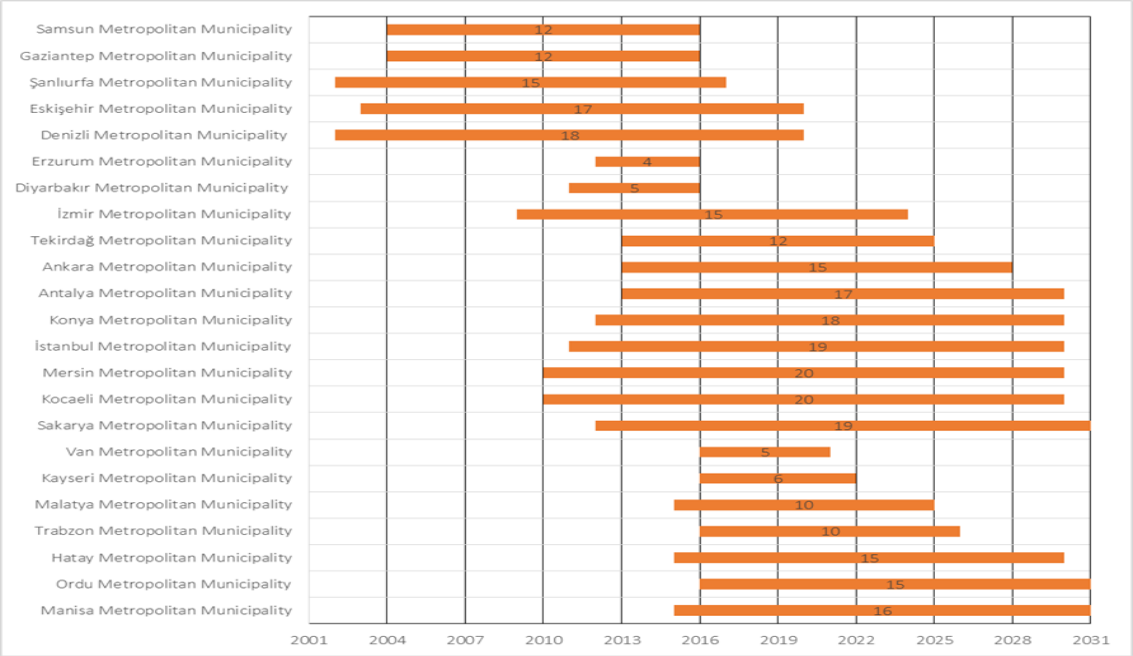
## 4.2 RESULTS AND DISCUSSIONS

### 4.2.1 Findings of Part 1: Current State

To determine the current planning status, the most important information is the time-wise planning. 23 metropolitan municipalities, Manisa, Ordu, Hatay, Trabzon, Malatya, Kayseri, Van, Sakarya, Kocaeli, Mersin, İstanbul, Konya, Antalya, Ankara, Tekirdağ, İzmir, Diyarbakır, Erzurum, Denizli, Eskişehir, Şanlıurfa, Gaziantep, Samsun excluding Bursa, Muğla, Balıkesir, answered the first and second questions asking relatively the beginning and expiration years of their current Transport Master Plans. The participation rate of 23 metropolitan municipalities from 26 attendee metropolitan municipalities is 88%. Table 2 is prepared according to the answers of these two questions and orange bars in Table 2 show the beginning and expiration years.

**Table 2**

**Current Transport Master Plans Durations**




**Source:** Author's calculations

The answers can be categorised in three different groups according to the current Transport Master Plans beginning years.

First group contains five metropolitan municipalities (Samsun, Gaziantep, Şanlıurfa, Eskişehir and Denizli) that are working with pretty aged Transport Master Plans which were prepared between 2002 and 2004.

The second group contains eleven metropolitan municipalities (Sakarya, Kocaeli, Mersin, İstanbul, Konya, Antalya, Ankara, Tekirdağ, İzmir, Diyarbakır and Erzurum) with their Transport Master Plans prepared in the period between 2009 and 2013. Among them are the three most crowded cities in 2016 respectively, İstanbul, Ankara and İzmir.[94]

The third group contains seven metropolitan municipalities that have elaborated new Transport Master Plans within two years. This group is built by the metropolitan municipalities of Van, Kayseri, Malatya, Trabzon, Hatay, Ordu and Manisa.

When evaluating the answers of the first two questions, it can be said that the Transport Master Plans in the first group includes less SUMP elements than the second and the third group considering that first group contains the oldest Transport Master Plans and sustainable mobility concept is very new in Turkey. Third group consists of the most SUMP elements considering Transport Master Plans were prepared within two years. Included SUMP elements in current Transport Master Plans are detailedly asked in Part 3 Question 8.

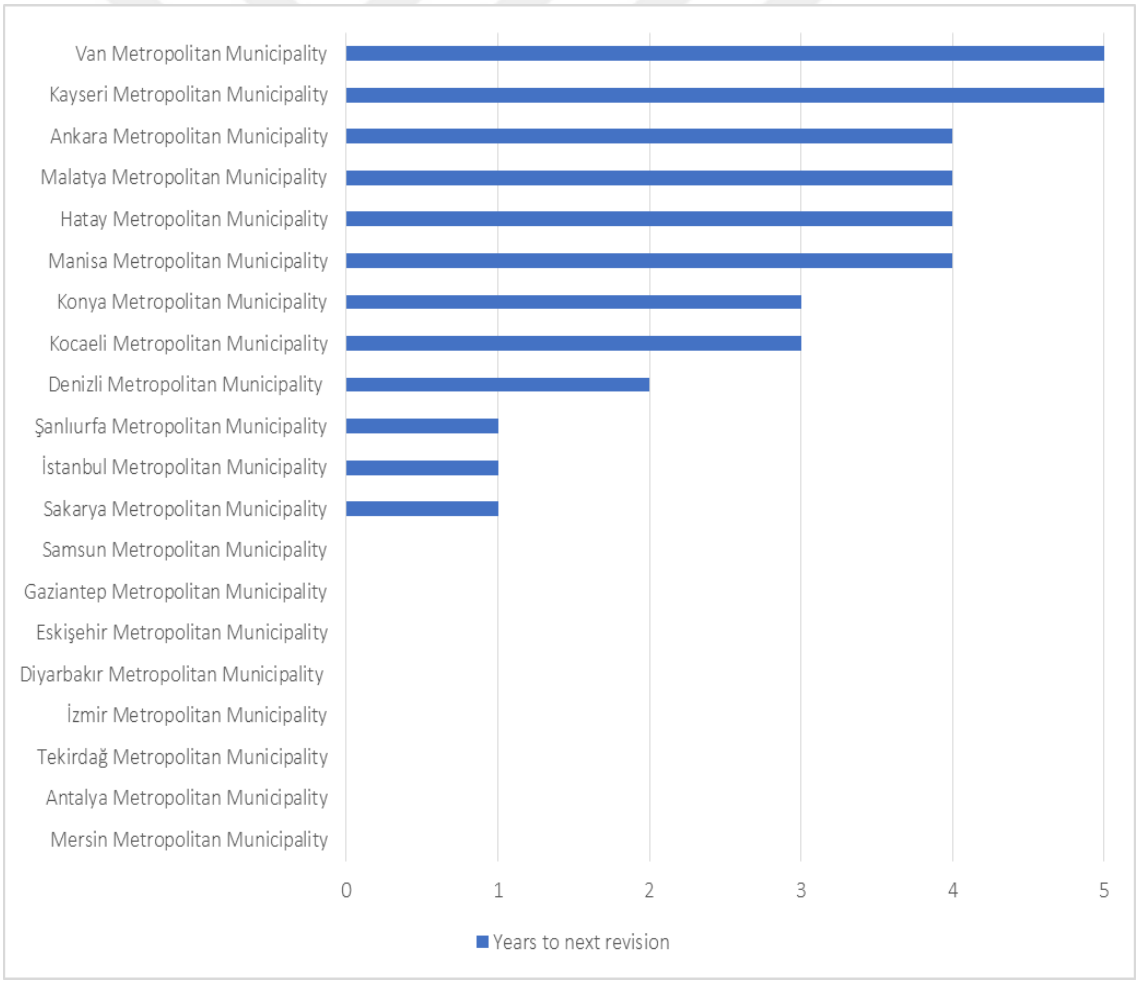
According to the beginning and expiration years of Transport Master Plans, durations of the current Transport Master Plans are calculated. The numbers written on orange bars in Table 2 states the durations of Transport Master Plans. As shown in Table 2, durations differ between 10 and 20 years in Samsun, Gaziantep, Şanlıurfa, Eskişehir,

[94] Turkey's most crowded cities, 2016, http://nufus.mobi/turkiyenin-en-kalabalik-illeri (7 March 2017).

Denizli, İzmir, Tekirdağ, Ankara, Antalya, Konya, İstanbul, Mersin, Kocaeli, Sakarya, Malatya, Trabzon, Hatay, Ordu, Manisa, even some exceptions with way shorter duration is occurred for Erzurum, Diyarbakır, Van and Kayseri. The questionnaire shows that only Şanlıurfa, Ankara, Hatay and Ordu are in line with Transport Master Plan duration of 15 years according to the Regulation on Increasing Energy Efficieny in Transport (2008) which is mentioned before.

**Table 3**

**Years to Current Transport Master Plans Next Revision**



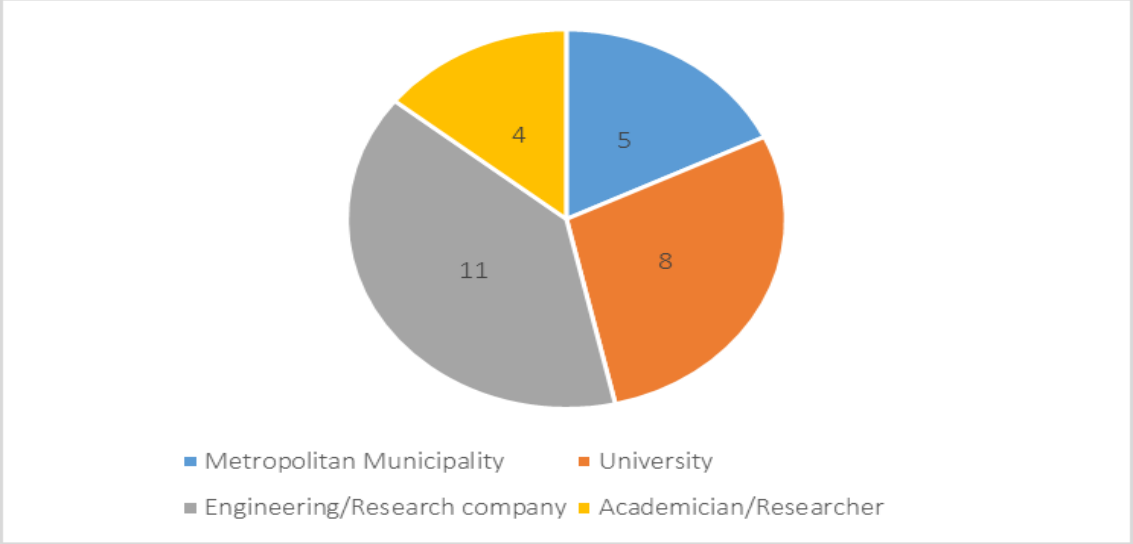

**Source:** Author's calculations

Question 3 asks the next revision year of the metropolitan municipalities current Transport Master Plans. 20 metropolitan municipalities, Manisa, Hatay, Malatya, Kayseri, Van, Sakarya, Kocaeli, Mersin, İstanbul, Konya, Antalya, Ankara, Tekirdağ, İzmir, Diyarbakır, Denizli, Eskişehir, Şanlıurfa, Gaziantep, Samsun excluding Bursa, Muğla, Balıkesir, Ordu, Trabzon, Erzurum, responded the question. The participation rate of 20 metropolitan municipalities from 26 attendee metropolitan municipalities is 77%. According to the answers, years to the next revision date are calculated and Table 3 shows the remaining years from 2016 to the next revision date. Apart from the preparation of entire new Transport Master Plans, Regulation on Increasing Energy Efficieny in Transport (2008) requires revisions of the existing Transport Master Plans in every five years. As shown from Table 3, 12 metropolitan municipalities will have a revision within two years, 2016-2018 (Mersin, Antalya, Tekirdağ, İzmir, Diyarbakır, Eskişehir, Gaziantep, Samsun, Sakarya, İstanbul, Şanlıurfa, Denizli), the other 8 in the time frame between 2019 and 2021 (Kocaeli, Konya, Manisa, Hatay, Malatya, Ankara, Kayseri, Van).

When considering the SUMP planning period of 1-3 years, 12 metropolitan municipalities which will revise their Transport Master Plans in two years, won't have time to convert their plans to SUMPs but they can include some SUMP elements into their Transport Master Plans. The metropolitan municipalities with later revisions have time to convert their plans to SUMPs.

**Table 4**

**Responsible Entities for the Transport Master Plan Preparation**




**Source:** Author's calculations

Besides the time-wise planning of the current Transport Master Plans, Question 4, multiple selection question, aims to find out the responsible entity/entities for the Transport Master Plan preparation. 20 metropolitan municipalities, Gaziantep, Kocaeli, Konya, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, Kayseri, İstanbul, Malatya, Antalya, İzmir, Sakarya, Hatay, Ankara, Şanlıurfa, Denizli excluding Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir responded the question. The participation rate of 20 metropolitan municipalities from 26 attendee metropolitan municipalities is 77%.

The results in Table 4 shows a very heterogenous picture. Most Transport Master Plans were prepared by Engineering/Research companies or Universities. While in Gaziantep, Konya, Diyarbakır, Manisa, Samsun, Mersin, Tekirdağ, Transport Master Plans were prepared by just outsourcing from Engineering/Research companies; in Van, Eskişehir, Denizli Transport Master Plans were prepared by just Universities; in Malatya and Sakarya by both Engineering/Research companies and Universities.

In Kocaeli and Şanlıurfa Transport Master Plans were prepared by both Engineering/Research companies and Academician/Researcher, in Hatay by both University and Academician/Researcher.

Just 3 metropolitan municipalities, Kayseri, İstanbul, Antalya prepared their Transport Master Plans on their own. In İzmir Transport Master Plan was prepared by metropolitan municipality together with the university and academician/researcher. In Ankara, Transport Master Plan was prepared by metropolitan municipality and the university.

7 metropolitan municipalities (Kocaeli, Malatya, İzmir, Sakarya, Hatay, Ankara, Şanlıurfa) preferred a joint venture of two or even three institutions for the preparation of Transport Master Plans in order to gather more expertise.

Among the 5 metropolitan municipalities who involved the Transport Master Plan preparation, the most crowded 3 Turkish cities (İstanbul, Ankara, İzmir) are found. It is noticeable that only large metropolitan municipalities are working at their Transport Master Plans' preparation. The assumption that smaller sized cities do not possess the necessary resources, both financially and technically in order to involve in the Transport Master Plan preparation processes. Resources will also be further monitored in the Part 2 Questions 5, 6, 7.

### 4.2.2 Findings of Part 2: Human and Financial Resources

In Part 2, 3 questions about the conditions of Turkish metropolitan municipalities in terms of budget, workforce and expertise have been raised. More precisely, the financial resources, the number of workers and their qualifications on SUMP processes of each metropolitan municipality are assessed.

19 metropolitan municipalities, Gaziantep, Kocaeli, Konya, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, Kayseri, İstanbul, Malatya, Antalya, İzmir, Sakarya, Hatay, Şanlıurfa, Denizli excluding Ordu, Erzurum, Bursa, Trabzon, Muğla,

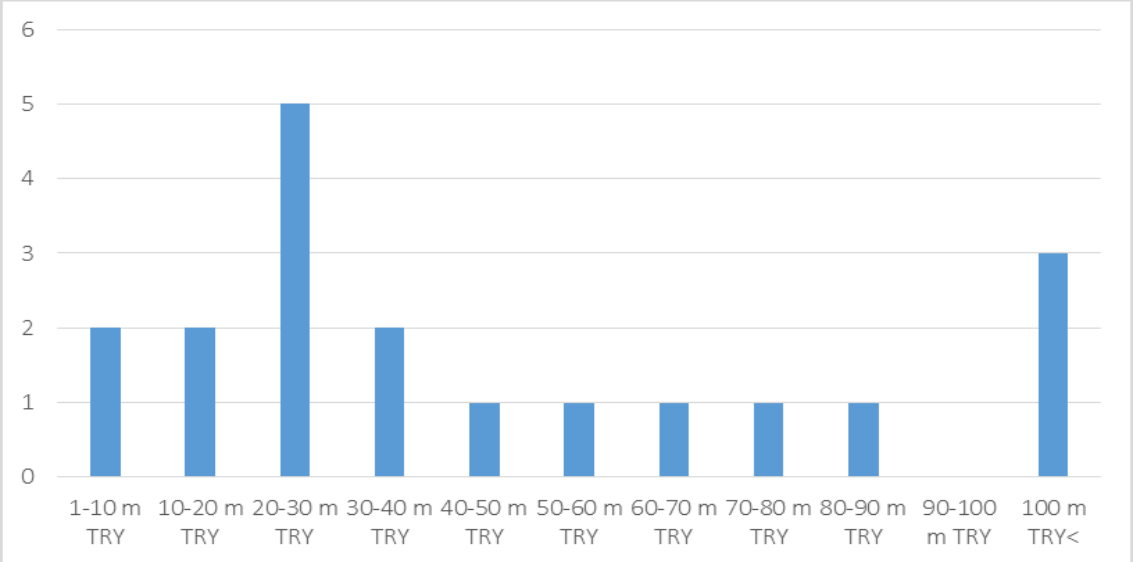
Balıkesir, Ankara responded Questions 5,6 and 7. The participation rate of 19 metropolitan municipalities from 26 attendee metropolitan municipalities is 73%.

#### 4.2.2.1 Financial Situation

Annual budgets of Metropolitan Municipalities' Urban Transport Departments are asked in Question 5.

**Table 5**

**Urban Transport Departments Annual Budgets**



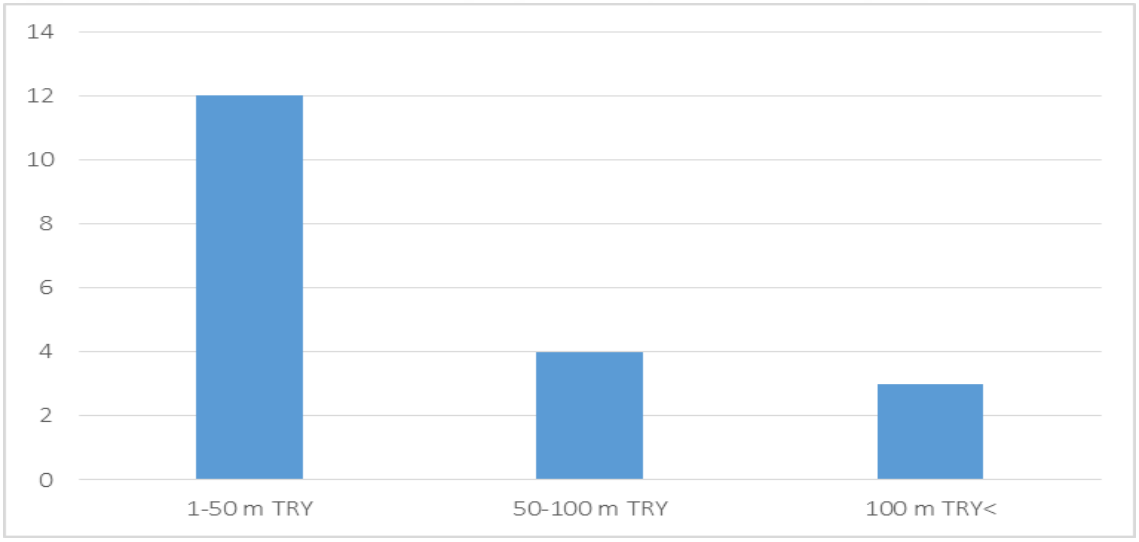

**Source:** Author's calculations

19 answers of the metropolitan municipalities are given at Table 5. Diyarbakır and Samsun are selected 1-10 million (m) Turkish Lira (TRY), Sakarya and Antalya are selected 10-20 m TRY, Gaziantep, Konya, Manisa, Tekirdağ, Malatya are selected 20-30 m TRY, Van and İstanbul are selected 30-40 m TRY, Denizli is selected 40-50 m TRY,

Hatay is selected 50-60 m TRY, Şanlıurfa is selected 60-70 m TRY, Eskişehir is selected 70-80 m TRY, Kayseri is selected 80-90 m TRY, none of the metropolitan municipalities is selected 90-100 m TRY and lastly Kocaeli, Mersin, İzmir are selected more than 100 m TRY.

**Table 6**

**Urban Transport Departments Annual Budgets in 3 Categories**




**Source:** Author's calculations

The answers can be categorised in three different groups to analyse easily in Table 6. First group is 1-50 m TRY, second group is 50-100 m TRY, third group is more than 100 m TRY. 12 out of 19 metropolitan municipalities, more than half of the metropolitan municipalities are in group 1, possess low budgets for their urban transport departments, less than 50 m TRY per year (Gaziantep, Konya, Diyarbakır, Manisa, Samsun, Van, Tekirdağ, İstanbul, Malatya, Antalya, Sakarya, Denizli). Eskişehir, Kayseri, Hatay, Şanlıurfa are in group 2, possessing a budget between 50-100 m TRY.

Kocaeli, Mersin, İzmir, are in group 3, have the highest budgets for their urban transport departments, more than 100 m TRY.

Budgets of the urban transport departments are not compatible to the population of the cities. Considering the Turkey's most crowded cities in 2016, İstanbul is the most crowded city but in group one, have a small budget. Second crowded city Ankara and fourth crowded city Bursa didn't answer this question. As a third crowded city, İzmir is in group 3, has the highest budget. Kocaeli and Mersin are the 10th and 11th crowded cities but have the highest budgets.[95] Converting Transport Master Plans to SUMPs is not directly a financial issue but considering it is a new process and planning from the beginning with all related stakeholders, including new SUMP elements to Transport Master Plans, taking capacity building trainings and technical support from outside, SUMP will be costy at the beginning even SUMP will reimburse these costs economically, environmentally and socially in the near future. So, the metropolitan municipalities that have higher budgets, ones in group 3, can be said that more advantageous when converting Transport Master Plans to SUMPs.

#### 4.2.2.2 Workforce and Qualification

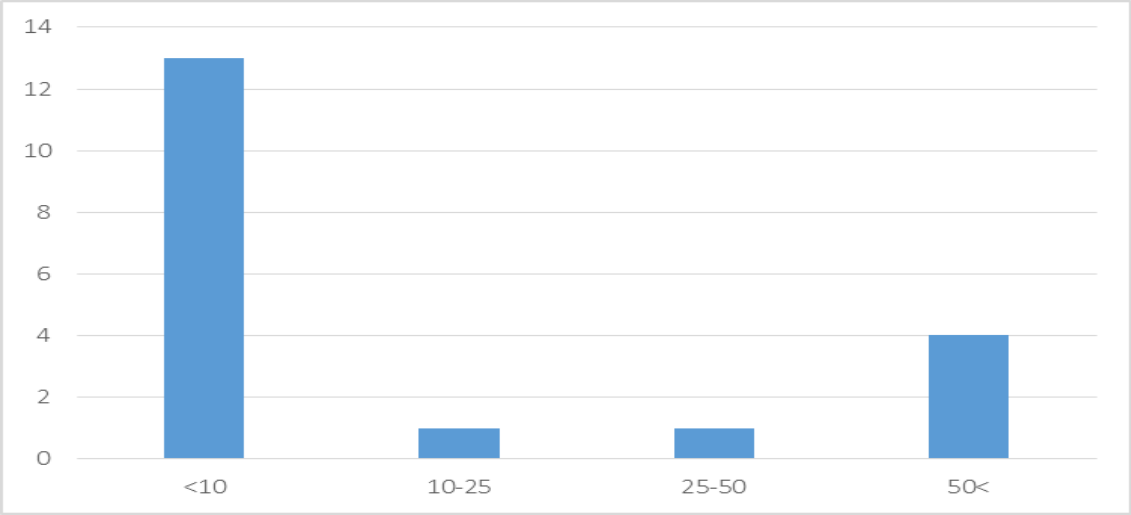
Current workforce in Urban Transport Departments and qualified workforce for SUMPs are asked in Question 6 and 7. As shown in Table 7, 13 metropolitan municipalities, Gaziantep, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Tekirdağ, Kayseri, İstanbul, Malatya, Antalya, Sakarya, Hatay, out of 19 metropolitan municipalities (68%) have less than 10 workers employed in Urban Transport Departments, including some major cities as İstanbul, Antalya. Ankara, as the capital, could not even answer this question. Şanlıurfa has 10-25, İzmir has 25-50 workers. Only

[95] Turkey's most crowded cities.

4 metropolitan municipalities, Kocaeli, Konya, Mersin, Denizli replied to have more than 50 workers in their Urban Transport Departments, an amount necessary to prepare Transport Master Plans with SUMP elements. Lack of workforce in Urban Transport Departments to prepare Transport Master Plans is in accordance with the answers to Question 4 asking the responsible entity to prepare Transport Master Plans. Since there is not enough workforce inside the metropolitan municipality, outsourcing for Transport Master Plans preparation is now significant. The size of the city and the number of workers are expected to be more or less proportional but the result showed that many small sized cities have more human resource than the biggest cities, respectively İstanbul, Ankara, İzmir.

**Table 7**

**Workforce in Urban Transport Departments**



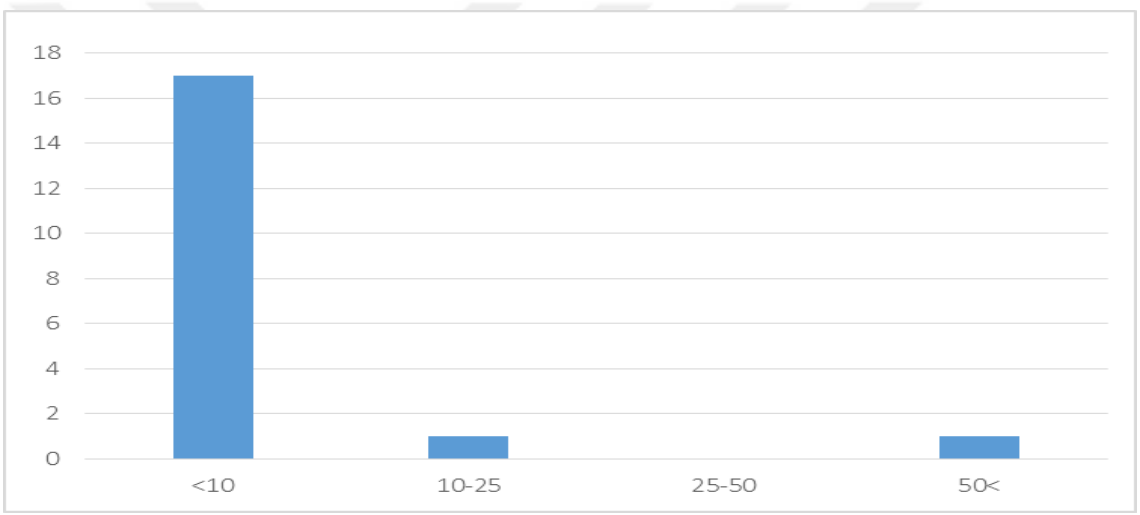

**Source:** Author's calculations

When it comes to the workers qualifications in terms of SUMP elements Table 8 shows 17 metropolitan municipalities out of 19 (89%), Gaziantep, Kocaeli, Konya, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, Kayseri, İstanbul,

Malatya, İzmir, Sakarya, Hatay, Şanlıurfa have less than 10 qualified workers. Antalya possesses 10-25, Denizli possesses more than 50 qualified workers meeting those requirements. Most of the cities were answered to have very few or no workers with knowledge on that topic so training and consultancies to increase this ratio seem to be urgently needed.

**Table 8**

**Qualified Workforce for SUMPs**




**Source:** Author's calculations

### 4.2.3 Findings of Part 3: Situation of SUMPs in Current Transport Master Plans

In Part 3, 4 questions (Questions 8, 9, 10 and 11) are asked to analyse the inclusion of SUMP related elements, plans and stakeholders into current Transport Master Plans and also stakeholders' interest to SUMPs.

19 metropolitan municipalities, Gaziantep, Kocaeli, Konya, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, Kayseri, İstanbul, Malatya, Antalya, İzmir,

Sakarya, Hatay, Şanlıurfa, Denizli excluding Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir, Ankara responded Questions 8 and 9. The participation rate of these 2 questions, 19 metropolitan municipalities from 26 attendee metropolitan municipalities is 73%.

#### 4.2.3.1 SUMP Elements

In Question 8, to gain an overview of the content of current Transport Master Plans, the metropolitan municipalities are asked about the involvement of 8 SUMP Elements: "PT, Non-motorised transport (walking and cycling), Inter-modality, Urban road safety, Road transport (flowing and stationary), Urban logistics, Mobility Management and ITS."[96] 7 qualitative categories 'currently not included', 'not included but planned for the next master plan', 'not included but partially implemented', 'not included but fully implemented and in usage', 'included but not yet implemented', 'included and partially implemented' and 'included, fully implemented and in usage' are introduced to understand the involvement. 152 qualitative results are get from this question and given at Appendix 4. To avoid from writing all these results narratively, results are converted to quantitative. It helps to analyse and compare these wide-ranging qualitative results easily. Numbers are assigned for each qualitative category from lowest value 1 to highest value 7 as is seen at Rate row in Table 9. 1 is for 'currently not included', 2 is for 'not included but planned for the next master plan', 3 is for 'not included but partially implemented', 4 is for 'not included but fully implemented and in usage', 5 is for 'included but not yet implemented', 6 is for 'included and partially implemented' and is 7 for 'included, fully implemented and in usage'. 1 refers to the negative, undesired situation, 7 refers to the positive, desired situation at SUMP planning.

[96] Rupprecht Consult, p.9.

## Table 9

### Involvement of SUMP Elements in Current Transport Master Plans

| SUMP Elements | currently not included (1) | not included but planned for the next master plan (2) | not included but partially implemented (3) | not included but fully implemented and in usage (4) | included but not yet implemented (5) | included and partially implemented (6) | included, fully implemented and in usage (7) | Rating Average | Most Responded Answer | Most Responded Answer (%) | Total Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | |
| Non-motorised transport (walking and cycling) | 5 | 1 | 8 | 0 | 0 | 4 | 1 | 3,26 | not included but partially implemented (3) | 42% | 19 |
| Public transport (PT) | 0 | 1 | 5 | 0 | 0 | 12 | 1 | 5,05 | included and partially implemented (6) | 63% | 19 |
| Inter-modality | 1 | 0 | 7 | 1 | 0 | 8 | 2 | 4,63 | included and partially implemented (6) | 42% | 19 |
| Urban logistics | 5 | 1 | 9 | 0 | 0 | 4 | 0 | 3,05 | not included but partially implemented (3) | 47% | 19 |
| Road transport (flowing and stationary) | 0 | 2 | 7 | 0 | 0 | 8 | 2 | 4,58 | included and partially implemented (6) | 42% | 19 |
| Urban road safety | 5 | 2 | 5 | 0 | 0 | 7 | 0 | 3,47 | included and partially implemented (6) | 37% | 19 |
| Mobility management | 0 | 2 | 8 | 0 | 1 | 6 | 2 | 4,37 | not included but partially implemented (3) | 42% | 19 |
| Intelligent transport systems (ITS) | 1 | 1 | 7 | 0 | 1 | 8 | 1 | 4,42 | included and partially implemented (6) | 42% | 19 |

**Source:** Author's calculations

In Table 9, Rating Average was calculated by first multiplying the Rates with the metropolitan municipalities' answers for each SUMP element, then by dividing to Total Response. Thus, the computed quantitative averages give a national overview about which SUMP elements are receiving what attention in Turkish Transport Master Plans. According to the Rating Averages in Table 9, SUMP Elements are listed from highest rating average to lowest in Table 10.

**Table 10**

**SUMP Elements from Highest Rating Average to Lowest**

| SUMP Elements | Rating Average |
|---|---|
| PT | **5,05** |
| Inter-modality | **4,63** |
| Road transport (flowing and stationary) | **4,58** |
| Intelligent transport systems (ITS) | **4,42** |
| Mobility management | **4,37** |
| Urban road safety | **3,47** |
| Non-motorised transport (walking and cycling) | **3,26** |
| Urban logistics | **3,05** |

**Source:** Author's calculations

Pleasing answer is that PT and Inter-modality are the leading SUMP elements according to the Table 10 because PT is one of the main sustainable transport modes beside non-motorised transport (walking and cycling). Urban logistics and Non-motorised transport (walking and cycling) are the least rated SUMP elements according to the Table 10. It seems to be crucial to support the least rated elements especially non-motorised transport (walking and cycling) for more sustainable urban mobility.

When we ignore Rates in Table 9 and just take Most Responded Answers and then take its percentage by dividing the number of Most Responded Answers to Total Responses, the results are given in the following order:

- 8 metropolitan municipalities from 19 (42%) responded Non-motorised transport (walking and cycling) and Mobility management are not included to the master plans but partially implemented.

- 12 metropolitan municipalities from 19 (63%) responded PT is included to the master plans and partially implemented.

- 8 metropolitan municipalities from 19 (42%) responded Inter-modality, Road transport (flowing and stationary) and ITS are included to the master plans and partially implemented.

- 9 metropolitan municipalities from 19 (47%), responded Urban logistics are not included to the master plans but partially implemented.

- 7 metropolitan municipalities from 19 (37%), responded Urban road safety is included to the master plans and partially implemented.

In Most Responded Answer column in Table 9, all SUMP elements are partially implemented even some of them are not in current Transport Master Plans. These results show that SUMP elements' importance and necessity are already recognised and SUMP elements are started to be partially implemented by most of the metropolitan municipalities so these metropolitan municipalities' transition to SUMPs from their current Transport Master Plans will be easier.

#### 4.2.3.2 SUMP Related Plans

In Question 9, to understand the comprisal of SUMP related plans in current Transport Master Plans, particularly consideration of out region Transport Plans and local Land-use Plans are asked to metropolitan municipalities.

The results of this question in Table 11 showed an advanced picture. Only 3 metropolitan municipalities out of 19 metropolitan municipalities (16%) did not include such plans to their current Transport Master Plans. While Samsun, Antalya and Sakarya didn't include local Land-use Plans; Samsun, Tekirdağ and Sakarya didn't include out region Transport Plans.

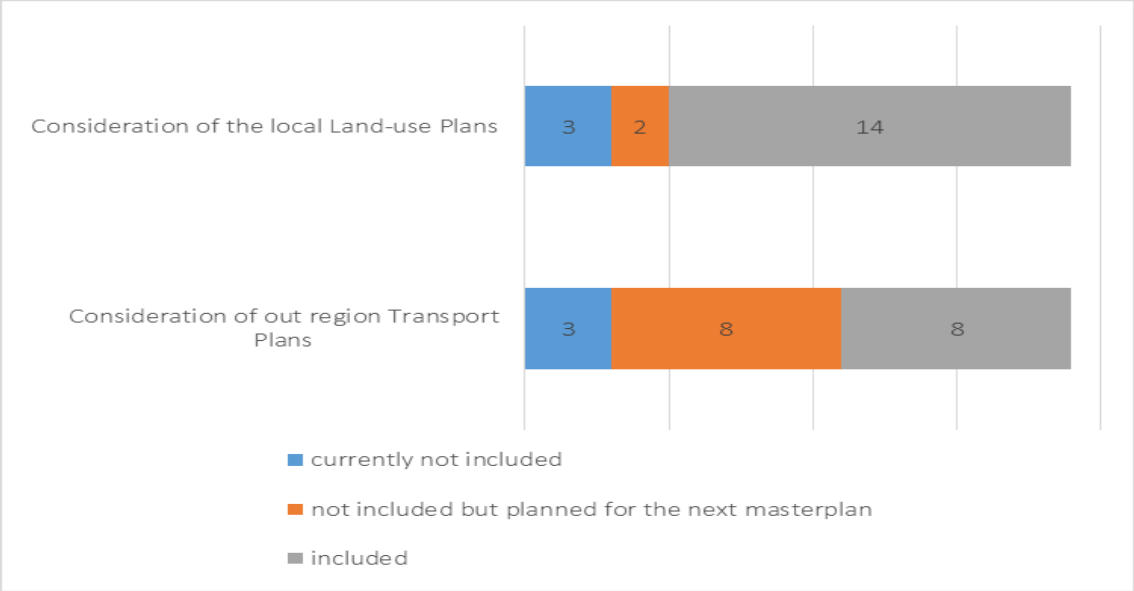
2 out of 19 metropolitan municipalities (11%): İstanbul and Denizli did not include local Land-use Plans to their current Transport Master Plans but will include them for the next Transport Master Plans. 8 out of 19 metropolitan municipalities (42%): Diyarbakır, Manisa, Van, Eskişehir, İstanbul, Antalya, Denizli did not include out region Transport Plans to their current Transport Master Plans but will include them for the next Transport Master Plans.

The broad majority of metropolitan municipalities, 14 out of 19 (74%): Gaziantep, Kocaeli, Konya, Diyarbakır, Manisa, Van, Eskişehir, Mersin, Tekirdağ, Kayseri, Malatya, İzmir, Hatay, Şanlıurfa have already included local Land-use Plans to their current Transport Master Plans. Nearly half of the metropolitan municipalities, 8 out of 19 (42%): Kocaeli, Konya, Mersin, Kayseri, Malatya, İzmir, Hatay, Şanlıurfa have already included out region Transport Plans to their current Transport Master Plans.

According to the Table 11, 16 out of 19 metropolitan municipalities (84%) included or will include both local Land-use Plans and out region Transport Plans to their Transport Master Plans. These results show that importance of SUMP related plans inside Transport Master Plans are already recognised by most of the metropolitan municipalities so that the transition to SUMPs from current Transport Master Plans with these metropolitan municipalities will be easier.

**Table 11**

**Consideration of SUMP Related Plans**




**Source:** Author's calculations

#### 4.2.3.3 Stakeholder Analysis

Stakeholder Analysis provides valuable information about the way metropolitan municipalities are carrying out their planning ideas and which authorities are influential for the plans.

In Question 10, to gain an overview of the stakeholder involvement, the metropolitan municipalities are asked about the existence and importance of 34 stakeholders that gathered from Stakeholder List in Guidelines Developing and Implementing a SUMP: Other local authorities; Neighbouring cities; Metropolitan municipality related transport authorities (IETT, EGO,.....); Private transport authorities (Minibus cooperatives, taxi,…..); Ministry of Transport, Maritime Affairs and Communications; Ministry of Environment and Urbanisation; Provincial Directorate of Health; Provincial Directorate of Security; EU authorities/funds; Development agencies; Transport consultants; Car sharing companies; Bicycle rental operators; Business

associations; Municipality associations; Major employers; Small businesses; Utility services (energy, water, ……); NGOs; Motorist associations; Media; Forums; Cycling groups; Walking groups; PT user groups; Citizens; Tourists; Disabled people; Landowners; Parents/children; Elderly people; Research institutions; Universities; Training institutions.[97] 4 qualitative categories 'inexistent', 'existent, but not an active role', 'existent, playing a minor role' and 'existent, playing an important role' are introduced to understand the existence and importance.

15 metropolitan municipalities, Gaziantep, Kocaeli, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, İstanbul, Malatya, İzmir, Sakarya, Şanlıurfa, Denizli excluding Konya, Ordu, Erzurum, Kayseri, Bursa, Antalya, Trabzon, Muğla, Balıkesir, Hatay, Ankara responded Question 10. The participation rate of Question 10, 15 metropolitan municipalities from 26 attendee municipalities is 58%.

510 qualitative results are taken from this question and given at Appendix 4. To avoid from writing all these results narratively, results are converted to quantitative figures. It helps to analyse and compare these wide-ranging qualitative results easily. Numbers are assigned for each qualitative category from the lowest value 1 to the highest value 4 as is seen at Table 12 at Rank line. 1 is for 'inexistent', 2 is for 'existent, but not an active role', 3 is for 'existent, playing a minor role', 4 is for 'existent, playing an important role'. 1 refers to the negative, undesired situation, 4 refers to the positive, desired situation at SUMP planning.

[97] Rupprecht Consult, p.29.

## Table 12

## Involvement of Stakeholders in Current Transport Master Plan

| Stakeholders | inexistent (1) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) | Rating Average | Most Responded Answer | Most Responded Answer (%) | Total Response |
|---|---|---|---|---|---|---|---|---|
| Rate | 1 | 2 | 3 | 4 | | | | |
| Other local authorities | 3 | 6 | 3 | 3 | 2,40 | existent, but not an active role (2) | 40% | 15 |
| Neighbouring cities | 7 | 5 | 2 | 1 | 1,80 | inexistent (1) | 47% | 15 |
| Metropolitan municipality related transport authorities (IETT, EGO,....) | 1 | 5 | 3 | 6 | 2,93 | existent, playing an important role (4) | 40% | 15 |
| Private transport authorities (Minibus cooperatives, taxi,....) | 2 | 3 | 2 | 8 | 3,07 | existent, playing an important role (4) | 53% | 15 |
| Ministry of Transport, Maritime Affairs and Communications | 4 | 6 | 2 | 3 | 2,27 | existent, but not an active role (2) | 40% | 15 |
| Ministry of Environment and Urbanisation | 5 | 7 | 3 | 0 | 1,87 | existent, but not an active role (2) | 47% | 15 |
| Provincial Directorate of Health | 6 | 7 | 2 | 0 | 1,73 | existent, but not an active role (2) | 47% | 15 |
| Provincial Directorate of Security | 3 | 4 | 6 | 2 | 2,47 | existent, playing a minor role (3) | 40% | 15 |
| EU authorities/funds | 4 | 8 | 1 | 2 | 2,07 | existent, but not an active role (2) | 53% | 15 |
| Development agencies | 5 | 6 | 2 | 2 | 2,07 | existent, but not an active role (2) | 40% | 15 |
| Transport consultants | 5 | 2 | 0 | 8 | 2,73 | existent, playing an important role (4) | 53% | 15 |
| Car sharing companies | 10 | 4 | 1 | 0 | 1,40 | inexistent (1) | 67% | 15 |
| Bicycle rental operators | 7 | 7 | 1 | 0 | 1,60 | inexistent (1)<br>existent, but not an active role (2) | 47% | 15 |
| Business associations | 6 | 4 | 5 | 0 | 1,93 | inexistent (1) | 40% | 15 |
| Municipality associations | 4 | 2 | 6 | 3 | 2,53 | existent, playing a minor role (3) | 40% | 15 |
| Major employers | 6 | 6 | 3 | 0 | 1,80 | inexistent (1)<br>existent, but not an active role (2) | 40% | 15 |
| Small businesses | 6 | 7 | 1 | 1 | 1,80 | existent, but not an active role (2) | 47% | 15 |
| Utility services (energy, water, .....) | 4 | 7 | 2 | 2 | 2,13 | existent, but not an active role (2) | 47% | 15 |
| NGOs | 2 | 5 | 4 | 4 | 2,67 | existent, but not an active role (2) | 33% | 15 |
| Motorist associations | 2 | 4 | 5 | 4 | 2,73 | existent, playing a minor role (3) | 33% | 15 |
| Media | 5 | 2 | 4 | 4 | 2,47 | inexistent (1) | 33% | 15 |
| Forums | 5 | 5 | 5 | 0 | 2,00 | inexistent (1)<br>existent, but not an active role (2)<br>existent, playing a minor role (3) | 33% | 15 |
| Cycling groups | 3 | 6 | 4 | 2 | 2,33 | existent, but not an active role (2) | 40% | 15 |
| Walking groups | 4 | 7 | 2 | 2 | 2,13 | existent, but not an active role (2) | 47% | 15 |
| Public transport user groups | 2 | 7 | 2 | 4 | 2,53 | existent, but not an active role (2) | 47% | 15 |
| Citizens | 2 | 2 | 4 | 7 | 3,07 | existent, playing an important role (4) | 47% | 15 |
| Tourists | 4 | 7 | 3 | 1 | 2,07 | existent, but not an active role (2) | 47% | 15 |
| Disabled people | 2 | 5 | 2 | 6 | 2,80 | existent, playing an important role (4) | 40% | 15 |
| Landowners | 8 | 6 | 1 | 0 | 1,53 | inexistent (1) | 53% | 15 |
| Parents/children | 3 | 2 | 3 | 7 | 2,93 | existent, playing an important role (4) | 47% | 15 |
| Elderly people | 2 | 2 | 4 | 7 | 3,07 | existent, playing an important role (4) | 47% | 15 |
| Research institutions | 3 | 4 | 4 | 4 | 2,60 | existent, but not an active role (2)<br>existent, playing a minor role (3)<br>existent, playing an important role (4) | 27% | 15 |
| Universities | 1 | 3 | 6 | 5 | 3,00 | existent, playing a minor role (3) | 40% | 15 |
| Training institutions | 3 | 4 | 4 | 4 | 2,60 | existent, but not an active role (2)<br>existent, playing a minor role (3)<br>existent, playing an important role (4) | 27% | 15 |

**Source:** Author's calculations

In Table 12, Rating Average was calculated by first multiplying the Rates with the metropolitan municipalities' answers for each stakeholder, then by dividing to Total Response. Thus, the computed quantitative Rating Averages give a national overview about the existence and importance of stakeholders in current Transport Master Plans.

According to the Rating Averages in Table 13, Stakeholders are listed from highest rating average to lowest in Table 13.

**Table 13**

**Stakeholder Involvement from Highest Rating Average to Lowest**

| Stakeholders | Rating Average |
|---|---|
| Private transport authorities (Minibus cooperatives, taxi,.....) | 3,07 |
| Citizens | 3,07 |
| Elderly people | 3,07 |
| Universities | 3,00 |
| Metropolitan municipality related transport authorities (IETT, EGO,.....) | 2,93 |
| Parents/children | 2,93 |
| Disabled people | 2,80 |
| Transport consultants | 2,73 |
| Motorist associations | 2,73 |
| NGOs | 2,67 |
| Research institutions | 2,60 |
| Training institutions | 2,60 |
| Municipality associations | 2,53 |
| Public transport user groups | 2,53 |
| Provincial Directorate of Security | 2,47 |
| Media | 2,47 |
| Other local authorities | 2,40 |
| Cycling groups | 2,33 |
| Ministry of Transport, Maritime Affairs and Communications | 2,27 |
| Utility services (energy, water, .....) | 2,13 |
| Walking groups | 2,13 |
| EU authorities/funds | 2,07 |
| Development agencies | 2,07 |
| Tourists | 2,07 |
| Forums | 2,00 |
| Business associations | 1,93 |
| Ministry of Environment and Urbanisation | 1,87 |
| Neighbouring cities | 1,80 |
| Major employers | 1,80 |
| Small businesses | 1,80 |
| Provincial Directorate of Health | 1,73 |
| Bicycle rental operators | 1,60 |
| Landowners | 1,53 |
| Car sharing companies | 1,40 |

**Source:** Author's calculations

In Table 13, Private transport authorities, Citizens, Elderly people, Universities, Metropolitan municipality related transport authorities, Parents/children and Disabled people are the leading stakeholders. Private transport authorities are found as the most important stakeholder in current Transport Master Plans and their existence and importance at the current Transport Master Plans proved the ongoing urban mobility problems. It should be at the last places because SUMPs offer sustainable transport modes like PT, non-motorised transport (walking and cycling) to solve the problems. The universities are also among the leading stakeholders because lack of qualified workforce in metropolitan municipalities, Transport Master Plans are prepared by universities as shown at Table 4. Groups from society such as citizens, elderly people, parents/children and disabled people are also among the most important stakeholders. This shows that people are already taken as a partner when planning current Transport Master Plans. Since SUMPs are people focused plans, these results show that when converting current Transport Master Plans to SUMPs, people focused stakeholders' participation is ready.[98]

Bicycle rental operators, Landowners and Car sharing companies are the least rated stakeholders according to the Table 13. Since these categories are comparatively new in Turkey and not mostly focused in Transport Master Plans, these results are not surprising. It seems to be crucial to involve those stakeholders to future Master Plans for a better SUMP development.

Most Responded Answers and its percentages according to Table 12 are detailedly listed in Appendix 5. When we ignore Rates and just take account the Most Responded Answers in Table 12 as a cross check, Table 14 is prepared.

[98] Rupprecht Consult, p.7.

## Table 14

## Stakeholder Involvement according to Most Responded Answers

| inexistent (1) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) |
|---|---|---|---|
| Neighbouring cities | Other local authorities | Provincial Directorate of Security | Metropolitan municipality related transport authorities (IETT, EGO,.....) |
| Car sharing companies | Ministry of Transport, Maritime Affairs and Communications | Municipality associations | Private transport authorities (Minibus cooperatives, taxi,.....) |
| Business associations | Ministry of Environment and Urbanisation | Motorist associations | Transport consultants |
| Media | Provincial Directorate of Health | Universities | Citizens |
| Landowners | EU authorities/funds | | Disabled people |
| | Development agencies | | Parents/children |
| | Small businesses | | Elderly people |
| | Utility services (energy, water, .....) | | |
| | NGOs | | |
| | Cycling groups | | |
| | Walking groups | | |
| | Public transport user groups | | |
| | Tourists | | |
| Bicycle rental operators | | | |
| Major employers | | | |
| Forums | | | |
| | Research institutions | | |
| | Training institutions | | |

**Source:** Author's calculations

According to Table 14:

- Neighboring cities, Car sharing companies, Business associations, Media, Landowners are inexistent on the current Transport Master Plans.

- Other local authorities, Ministry of Transport, Maritime Affairs and Communications, Ministry of Environment and Urbanisation, Provincial Directorate of Health, EU authorities/funds, Development agencies, Small businesses, Utility services, NGOs, Cycling groups, Walking groups, PT user groups, Tourists are existent but not an active role on the current Transport Master Plans.

- Provincial Directorate of Security, Municipality associations, Motorist associations, Universities are existent, playing a minor role on the current Transport Master Plans.

- Metropolitan municipality related transport authorities, Private transport authorities, Transport consultants, Citizens, Disabled people, Parents/children, Elderly people are existent, playing an important role on the current Transport Master Plans.

- Bicycle rental operators and Major employers have 2 Most Responded Answers: Inexistent on the current Transport Master Plans and existent but not an active role on the current Transport Master Plans.

- Forums have 3 Most Responded Answers: Inexistent on the current Transport Master Plans, existent but not an active role on the current Transport Master Plans, existent, playing a minor role on the current Transport Master Plans

- Research institutions and Training institutions have 2 Most Responded Answers: Existent, playing a minor role on the current Transport Master Plans and existent, playing an important role on the current Transport Master Plans.

Findings from Table 14 are also similar with Table 13. It is necessary to involve inexistent stakeholders to Transport Master Plans and increase the roles of existent stakeholders for a better SUMP development. Bicyle rental operators' inexistency in some cities or existency but least involvement is the most important problem to be solved because SUMPs main dependency is sustainable transport modes like PT and non-motorised transport (walking and cycling). So, Bicycle rental operators' existency and full involvement to the Transport Master Plans should be provided. PT's existency and full involvement is seen from Table 14 because Metropolitan municipality related transport authorities, Private transport authorities and Transport consultants are PT related organisations in Turkey.

Analogue to Question 10, same 34 stakeholders' interest to SUMP implementation are asked in Question 11. 4 qualitative categories 'negative', 'neutral', 'positive' and 'actively supportive' are introduced to understand the interest.

14 metropolitan municipalities, Kocaeli, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, İstanbul, Malatya, İzmir, Sakarya, Şanlıurfa, Denizli excluding Gaziantep, Konya, Ordu, Erzurum, Kayseri, Bursa, Antalya, Trabzon, Muğla, Balıkesir, Hatay, Ankara responded Question 11. The participation rate of Question 11, 14 metropolitan municipalities from 26 attendee metropolitan municipalities, is 54%.

476 qualitative results are taken from this question and given at Appendix 4. To avoid from writing all these results narratively, results are converted to quantitative figures. It helps to analyse and compare these wide-ranging qualitative results easily. Numbers are assigned for each qualitative category from the lowest value 1 to the highest value 4 as is seen at Rate row in Table 15. 1 is for 'negative', 2 is for 'neutral', 3 is for 'positive', 4 is for 'actively supportive'. 1 refers to the negative, undesired situation, 4 refers to the positive, desired situation at SUMP planning.

# Table 15

## Stakeholder Interest to SUMP Implementation

| Answer Options | negative (1) | neutral (2) | positive (3) | actively supportive (4) | Rating Average | Most Responded Answer | Most Responded Answer (%) | Total Response |
|---|---|---|---|---|---|---|---|---|
| Rate | 1 | 2 | 3 | 4 | | | | |
| Other local authorities | 1 | 3 | 4 | 6 | 3,07 | actively supportive (4) | 43% | 14 |
| Neighbouring cities | 0 | 3 | 9 | 2 | 2,93 | positive (3) | 64% | 14 |
| Metropolitan municipality related transport authorities (IETT, EGO,.....) | 1 | 2 | 2 | 9 | 3,36 | actively supportive (4) | 64% | 14 |
| Private transport authorities (Minibus cooperatives, taxi,.....) | 4 | 2 | 3 | 5 | 2,64 | actively supportive (4) | 36% | 14 |
| Ministry of Transport, Maritime Affairs and Communications | 0 | 5 | 4 | 5 | 3,00 | neutral (2)<br>actively supportive (4) | 36% | 14 |
| Ministry of Environment and Urbanisation | 1 | 5 | 4 | 4 | 2,79 | neutral (2) | 36% | 14 |
| Provincial Directorate of Health | 0 | 5 | 6 | 3 | 2,86 | positive (3) | 43% | 14 |
| Provincial Directorate of Security | 0 | 3 | 5 | 6 | 3,21 | actively supportive (4) | 43% | 14 |
| EU authorities/funds | 0 | 2 | 4 | 8 | 3,43 | actively supportive (4) | 57% | 14 |
| Development agencies | 0 | 2 | 4 | 8 | 3,43 | actively supportive (4) | 57% | 14 |
| Transport consultants | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Car sharing companies | 1 | 3 | 6 | 4 | 2,93 | positive (3) | 43% | 14 |
| Bicycle rental operators | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Business associations | 0 | 4 | 6 | 4 | 3,00 | positive (3) | 43% | 14 |
| Municipality associations | 0 | 2 | 3 | 9 | 3,50 | actively supportive (4) | 64% | 14 |
| Major employers | 0 | 5 | 7 | 2 | 2,79 | positive (3) | 50% | 14 |
| Small businesses | 1 | 5 | 5 | 3 | 2,71 | neutral (2)<br>positive (3) | 36% | 14 |
| Utility services (energy, water, .....) | 0 | 5 | 7 | 2 | 2,79 | positive (3) | 50% | 14 |
| NGOs | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Motorist associations | 4 | 3 | 3 | 4 | 2,50 | negative (1)<br>actively supportive (4) | 29% | 14 |
| Media | 0 | 4 | 6 | 4 | 3,00 | positive (3) | 43% | 14 |
| Forums | 0 | 4 | 6 | 4 | 3,00 | positive (3) | 43% | 14 |
| Cycling groups | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Walking groups | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Public transport user groups | 0 | 2 | 7 | 5 | 3,21 | positive (3) | 50% | 14 |
| Citizens | 0 | 2 | 4 | 8 | 3,43 | actively supportive (4) | 57% | 14 |
| Tourists | 0 | 4 | 5 | 5 | 3,07 | positive (3)<br>actively supportive (4) | 36% | 14 |
| Disabled people | 0 | 2 | 4 | 8 | 3,43 | actively supportive (4) | 57% | 14 |
| Landowners | 1 | 6 | 4 | 3 | 2,64 | neutral (2) | 43% | 14 |
| Parents/children | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Elderly people | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |
| Research institutions | 0 | 4 | 4 | 6 | 3,14 | actively supportive (4) | 43% | 14 |
| Universities | 0 | 2 | 5 | 7 | 3,36 | actively supportive (4) | 50% | 14 |
| Training institutions | 0 | 2 | 6 | 6 | 3,29 | positive (3)<br>actively supportive (4) | 43% | 14 |

**Source:** Author's calculations

In Table 15, Rating Average was calculated by first multiplying the Rates with the metropolitan municipalities' answers for each stakeholder, then by dividing to Total Response. Thus, the computed quantitative averages give a national overview about the stakeholders' interest for future SUMP implementations.

According to the Rating Averages in Table 15, Stakeholders are listed from highest rating average to lowest in Table 16.

**Table 16**

**Stakeholder Interest from Highest Rating Average to Lowest**

| Stakeholders | Rating Average |
|---|---|
| Municipality Associations | 3.50 |
| Disabled people | 3.43 |
| Citizens | 3.43 |
| Development agencies | 3.43 |
| EU authorities/funds | 3.43 |
| Universities | 3.36 |
| Metropol municipality related transport authorities (IETT, EGO,.....) | 3.36 |
| Traning Institutions | 3.29 |
| Elderly people | 3.29 |
| Parents/children | 3.29 |
| Walking groups | 3.29 |
| Cycling groups | 3.29 |
| NGOs | 3.29 |
| Bicycle rental operators | 3.29 |
| Transport consultants | 3.29 |
| Public Transport user groups | 3.21 |
| Provincial Directorate of Security | 3.21 |
| Research institutions | 3.14 |
| Tourists | 3.07 |
| Other local authorities | 3.07 |
| Forums | 3.00 |
| Media | 3.00 |
| Business associations | 3.00 |
| Ministry of Transport, Maritime Affairs and Communications | 3.00 |
| Car sharing companies | 2.93 |
| Neighbouring cities | 2.93 |
| Provincial Directorate of Health | 2.86 |
| Utility services (energy, water, .....) | 2.79 |
| Major employers | 2.79 |
| Ministry of Environment and Urbanisation | 2.79 |
| Small businesses | 2.71 |
| Landowners | 2.64 |
| Private transport authorities (Minibus cooperatives, taxi,.....) | 2.64 |
| Motorist associations | 2.50 |

**Source:** Author's calculations

In Table 16, Municipality associations, Disabled people, Citizens, Development agencies, EU authorities/funds, Universities and Metropolitan municipality related transport authorities are the leading Stakeholders. Municipality associations' interest to SUMP implementation is also a very encouraging picture for Turkey because municipality associations' support will transfer the idea and best cases of SUMPs to other municipalities and this will help metropolitan municipalities to convert their Transport Master Plans to SUMPs. Disabled people, Citizens, Universities and Metropolitan municipality related transport authorities are interested to SUMP implementation because as is seen from Table 13 they are also among the most important stakeholders in current Transport Master Plans and their interest to SUMP implementation shows that they are close to the SUMP idea and will help metropolitan municipalities on the way towards SUMPs. Expectedly, Development agencies and EU authorities are also among the most rated stakeholders on SUMP implementation because SUMP is an EU concept and Development Agencies in Turkey were established to develop the regions of Turkey on the Turkey's pre-accession period to the EU.

Motorist associations, Private transport authorities and Landowners are the least rated stakeholders according to the Table 16. This view is expectedly normal because they have interests in maintaining the current car-oriented planning approach since they benefit or believe to benefit from it. Improvement could be achieved by trainings and workshops in order to teach elements and clear up benefits and chances of SUMPs to negatively positioned stakeholders and gain higher degree of acceptance overall.

Most Responded Answers and its percentages according to Table 15 are detailedly listed in Appendix 6. When we ignore Rates and just take account the Most Responded Answers in Table 15 as a cross check, Table 17 is prepared.

## Table 17

## Stakeholder Interest according to Most Responded Answers

| negative (1) | neutral (2) | positive (3) | actively supportive (4) |
|---|---|---|---|
| | Ministry of Environment and Urbanisation | Neighbouring cities | Other local authorities |
| | Landowners | Provincial Directorate of Health | Metropolitan municipality related transport authorities (IETT, EGO,.....) |
| | | Car sharing companies | Private transport authorities (Minibus cooperatives, taxi,.....) |
| | | Business associations | Provincial Directorate of Security |
| | | Major employers | EU authorities/funds |
| | | Utility services (energy, water, .....) | Development agencies |
| | | Media | Municipality associations |
| | | Forums | Citizens |
| | | Public transport user groups | Disabled people |
| | Ministry of Transport, Maritime Affairs and Communications | | Research institutions |
| | Small businesses | | Universities |
| | | Transport consultants | |
| | | Bicycle rental operators | |
| | | NGOs | |
| | | Cycling groups | |
| | | Walking groups | |
| | | Tourists | |
| | | Parents/children | |
| | | Elderly people | |
| | | Training institutions | |
| Motorist associations | | | Motorist associations |

**Source:** Author's calculations

According to Table 17:

- Ministry of Environment and Urbanisation and Landowners are neutral to SUMP implementation.
- Neighbouring cities, Provincial Directorate of Health, Car sharing companies, Business associations, Major employers, Utility services, Media, Forums, PT user groups are positive to SUMP implementation.
- Other local authorities, Metropolitan municipality related transport authorities, Private transport authorities, Provincial Directorate of Security, EU authorities/funds, Development agencies, Municipality associations, Citizens, Disabled people, Research institutions, Universities are actively supportive to SUMP implementation.
- Ministry of Transport, Maritime Affairs and Communications, Small businesses have 2 Most Responded Answers: Neutral and positive to SUMP implementation.
- Transport consultants, Bicycle rental operators, NGOs, Cycling groups, Walking groups, Tourists, Parents/children, Elderly people, Training institutions have 2 Most Responded Answers: Positive and actively supportive to SUMP implementation.
- Motorist associations have 2 Most Responded Answers: Negative and actively supportive to SUMP implementation.

Findings from Table 17, are also similar with Table 16 excluding Private transport authorities and Motorist associations. Private transport authorities are inside the least rated stakeholders according to Table 16 but most of the metropolitan municipalities

responded Private transport authorities are actively supportive to SUMP implementation. Motorist associations are also inside the least rated stakeholders according to Table 16 but half of the metropolitan municipalities responded Motorist associations are actively supportive to SUMP implementation. These two are surprising and pleasing results because by taking private transport authorities and motorist associations' support for SUMPs, it is easier to leave the car-oriented planning approach in Turkey.

Since Ministry of Environment and Urbanisation are responsible from non-motorised transport (walking and cycling) strategy and Ministry of Transport, Maritime Affairs and Communications are responsible from motorised transport strategy, their neutral sight to SUMP implementation should be immediately changed in order to develop SUMPs. Capacity building trainings about SUMPs including the concept, elements, best practices, benefits should be given to the technical experts and decision makers in these Ministries in order them to put SUMPs on Turkey's transport agenda.

### 4.2.4 Findings of Part 4: Swot Analysis

In Part 4 with the SWOT analysis, questions (Questions 12, 13, 14 and 15) are asked to identify Strengths, Weaknesses, Opportunities and Threats to develop a successful SUMP. As is seen from Table 18, 10 answer options to SWOT Analysis questions are submitted to metropolitan municipalities to select. These questions respectively are: Content of current Transport Master Plan, Content of current Logistic Master Plan, Data availability/Unavailability, Expertise availability/Unavailability, Financial resources, Urban pattern/Infrastructure, Political will and vision, Citizens support, Stakeholder support and Innovative potential.

13 metropolitan municipalities, Kocaeli, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, İstanbul, Malatya, İzmir, Sakarya, Şanlıurfa excluding Gaziantep, Konya, Ordu, Erzurum, Kayseri, Bursa, Antalya, Trabzon, Muğla, Balıkesir, Hatay, Ankara and Denizli, responded Questions 12, 13, 14 and 15. The participation rate of these 4 questions, 13 metropolitan municipalities from 26 attendee metropolitan

municipalities is 50%. The participation rate of this section was the lowest of the entire survey.

Given answers by metropolitan municipalities to Questions 12, 13, 14 and 15 under SWOT Analysis are shown at Table 18.

## Table 18

## Answers to SWOT Analysis

| Question 12: Strenghts | | | |
|---|---|---|---|
| **Answer Options** | **Number of Answers** | **Answered Municipalities** | **% of Answers** |
| Content of current Transport Master Plan | 6 | Kocaeli, Eskişehir, Mersin, İstanbul, Malatya, Sakarya | 46% |
| Content of current Logistic Master Plan | | | |
| Data availability/Unavailability | | | |
| Expertise availability/Unavailability | | | |
| Financial resources | | | |
| Urban pattern/Infrastructure | 1 | Şanlıurfa | 8% |
| Political will and vision | 2 | Diyarbakır, İzmir | 15% |
| Citizens support | | | |
| Stakeholder support | 2 | Manisa, Samsun | 15% |
| Innovative potential | 2 | Van, Tekirdağ | 15% |
| **Response Count** | **13** | | **100%** |
| **Question 13: Weaknesses** | | | |
| **Answer Options** | **Number of Answers** | **Answered Municipalities** | **% of Answers** |
| Content of current Transport Master Plan | 1 | Manisa | 8% |
| Content of current Logistic Master Plan | | | |
| Data availability/Unavailability | | | |
| Expertise availability/Unavailability | 1 | İzmir | 8% |
| Financial resources | 4 | Diyarbakır, Samsun, Van, Malatya | 31% |
| Urban pattern/Infrastructure | 2 | Mersin, Tekirdağ | 15% |
| Political will and vision | 2 | Kocaeli, Sakarya | 15% |
| Citizens support | | | |
| Stakeholder support | | | |
| Innovative potential | 3 | Eskişehir, İstanbul, Şanlıurfa | 23% |
| **Response Count** | **13** | | **100%** |
| **Question 14: Opportunities** | | | |
| **Answer Options** | **Number of Answers** | **Answered Municipalities** | **% of Answers** |
| Content of current Transport Master Plan | 3 | Kocaeli, İstanbul, İzmir | 23% |
| Content of current Logistic Master Plan | | | |
| Data availability/Unavailability | 1 | Şanlıurfa | 8% |
| Expertise availability/Unavailability | 1 | Samsun | 8% |
| Financial resources | | | |
| Urban pattern/Infrastructure | 1 | Van | 8% |
| Political will and vision | 4 | Diyarbakır, Manisa, Eskişehir, Tekirdağ | 31% |
| Citizens support | 2 | Mersin, Sakarya | 15% |
| Stakeholder support | | | |
| Innovative potential | 1 | Malatya | 8% |
| **Response Count** | **13** | | **100%** |
| **Question 15: Threats** | | | |
| **Answer Options** | **Number of Answers** | **Answered Municipalities** | **% of Answers** |
| Content of current Transport Master Plan | | | |
| Content of current Logistic Master Plan | | | |
| Data availability/Unavailability | 1 | Tekirdağ | 8% |
| Expertise availability/Unavailability | 1 | Eskişehir | 8% |
| Financial resources | 6 | Samsun, Van, Mersin, İstanbul, Sakarya, Şanlıurfa | 46% |
| Urban pattern/Infrastructure | 4 | Kocaeli, Diyarbakır, Malatya, İzmir | 31% |
| Political will and vision | | | |
| Citizens support | | | |
| Stakeholder support | | | |
| Innovative potential | 1 | Manisa | 8% |
| **Response Count** | **13** | | **100%** |

**Source:** Author's calculations

According to the Table 18 Question 12:

- Kocaeli, Eskişehir, Mersin, İstanbul, Malatya and Sakarya, 6 out of 13 metropolitan municipalities (46%) selected Content of current Transport Master Plan is the most rated strength towards developing a successful SUMP.

- Şanlıurfa, 1 out of 13 metropolitan municipalities (8%), selected Urban pattern/Infrastructure is among the strengths towards developing a successful SUMP.

- Diyarbakır and İzmir, 2 out of 13 metropolitan municipalities (15%), selected Political will and vision is among the strengths towards developing a successful SUMP.

- Manisa and Samsun, 2 out of 13 metropolitan municipalities (15%), selected Stakeholder support is among the strengths towards developing a successful SUMP.

- Van and Tekirdağ, 2 out of 13 metropolitan municipalities (15%), selected Innovative potential is among the strengths towards developing a successful SUMP.

Content of current Transport Master Plan's selection as a most rated strength shows that current Transport Master Plans are not far away from SUMPs, includes SUMP elements. This will ease metropolitan municipalities' workload when converting Transport Master Plans to SUMPs.

According to the Table 18 Question 13:

- Diyarbakır, Samsun, Van and Malatya, 4 out of 13 metropolitan municipalities (31%) selected Financial resources are the most rated weakness towards developing a successful SUMP.

- Manisa, 1 out of 13 metropolitan municipalities (8%), selected Content of current Transport Master Plan is among the weaknesses towards developing a successful SUMP.

- İzmir, 1 out of 13 metropolitan municipalities (8%), selected Expertise availability/Unavailability is among the weaknesses towards developing a successful SUMP.

- Mersin and Tekirdağ, 2 out of 13 metropolitan municipalities (15%), selected Urban pattern/Infrastructure is among the weaknesses towards developing a successful SUMP.

- Kocaeli and Sakarya, 2 out of 13 metropolitan municipalities (15%), selected Political will and vision is among the weaknesses towards developing a successful SUMP.

- Eskişehir, İstanbul and Şanlıurfa, 3 out of 13 metropolitan municipalities (23%), selected Innovative potential is among the weaknesses towards developing a successful SUMP.

Selection of Financial resources as a most rated weakness shows that metropolitan municipalities will need extra budget, incentive to develop SUMPs. As is seen from Table 5, annual budgets of urban transport departments are insufficient and current Transport Master Plans were prepared with these limited budgets. By thinking SUMP will reimburse its costs economically, environmentally and socially in the near future, it is more feasible for metropolitan municipalities to prepare SUMPs with their limited budgets than preparing current Transport Master Plans.

According to the Table 18 Question 14:

- Diyarbakır, Manisa, Eskişehir and Tekirdağ, 4 out of 13 metropolitan municipalities (31%), selected Political will and vision is the most rated opportunity towards developing a successful SUMP.

- Kocaeli, İstanbul and İzmir, 3 out of 13 metropolitan municipalities (23%), selected Content of current Transport Master Plan is among the opportunities towards developing a successful SUMP.

- Şanlıurfa, 1 out of 13 metropolitan municipalities (8%), selected Data availability/Unavailability is among the opportunities towards developing a successful SUMP.

- Samsun, 1 out of 13 metropolitan municipalities (8%), selected Expertise availability/Unavailability is among the opportunities towards developing a successful SUMP.

- Van, 1 out of 13 metropolitan municipalities (8%), selected Urban pattern/Infrastructure is among the opportunities towards developing a successful SUMP.

- Mersin and Sakarya, 2 out of 13 metropolitan municipalities (15%), selected Citizens support is among the opportunities towards developing a successful SUMP.

- Malatya, 1 out of 13 metropolitan municipalities (8%), selected Innovative potential is among the opportunities towards developing a successful SUMP.

Political will/vision is selected as a most rated opportunity because the decision makers of current Transport Master Plans in Turkey are politicians. So, their desire means

that current Transport Master Plans will be easily converted to SUMPs in near future with the help of these politicians.

According to the Table 18 Question 15:

- Samsun, Van, Mersin, İstanbul, Sakarya and Şanlıurfa, 6 out of 13 metropolitan municipalities (46%), selected Financial resources are the most rated threats towards developing a successful SUMP.
- Tekirdağ, 1 out of 13 metropolitan municipalities (8%), selected Data availability/Unavailability is among the threats towards developing a successful SUMP.
- Eskişehir, 1 out of 13 metropolitan municipalities (8%), selected Expertise availability/Unavailability is among the threats towards developing a successful SUMP.
- Kocaeli, Diyarbakır, Malatya and İzmir, 4 out of 13 metropolitan municipalities (31%), selected Urban pattern/Infrastructure is among the threats towards developing a successful SUMP.
- Manisa, 1 out of 13 metropolitan municipalities (8%), selected Innovative potential is among the threats towards developing a successful SUMP.

As being most rated weakness, Financial resources are also selected as a most rated threat. As mentioned in weaknesses, this result also highlights the need for extra budget for SUMP planning. As a result, costs of developing SUMPs, their economic benefits and financial returns in future should be evaluated and explained clearly to decision makers and all related stakeholders to convince them to develop SUMPs.

### 4.2.5 SUMP Ranking

To take a full picture from the Sustainable Urban Mobility Questionnaire, the following list of 10 variables get from the Questionnaire questions, which sufficiently describe SUMPs, are identified to evaluate the SUMP Ranking:

1. Transport Master Plan Duration
2. Transport Master Plan Next Revision
3. Transport Master Plan Preparation
4. Urban Transport Departments Annual Budget
5. Urban Transport Departments Workforce
6. Qualified Workforce for SUMPs
7. Involvement of SUMP Elements to Transport Master Plans
8. Involvement of SUMP related Plans
9. Involvement of Stakeholders
10. Stakeholder Interest to SUMPs

Once the variables that describe SUMPs are identified, the impact of each variable is evaluated for SUMP Ranking. For the evaluation of the possible impacts of each variable, levels of influence are assigned (0, 1, 2, 3…….).

According to the questionnaire participation, 26 out of all 30 metropolitan municipalities of Turkey selected for the SUMP Ranking investigation are Gaziantep, Kocaeli, Konya, Ordu, Erzurum, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin,

Tekirdağ, Kayseri, İstanbul, Bursa, Malatya, Antalya, Trabzon, Muğla, İzmir, Balıkesir, Sakarya, Hatay, Ankara, Şanlıurfa and Denizli.

#### 4.2.5.1 Transport Master Plan Duration

According to Table 2, first group contains Samsun, Gaziantep, Şanlıurfa, Eskişehir and Denizli that are working with pretty-aged Transport Master Plans which were prepared between 2002 and 2004. Second group contains Sakarya, Kocaeli, Mersin, İstanbul, Konya, Antalya, Ankara, Tekirdağ, İzmir, Diyarbakır and Erzurum with their Transport Master Plans prepared in the period between 2009 and 2013. Third group contains Van, Kayseri, Malatya, Trabzon, Hatay, Ordu and Manisa that have elaborated new Transport Master Plans within two years.

By considering that the sustainable mobility concept is very new in Turkey and Transport Master Plans in group one includes less SUMP elements than group two and three, 1 is assigned for group 1, 2 is assigned for group 2, 3 is for group 3, 0 is assigned for Bursa, Muğla and Balıkesir that didn't answer the question.

#### 4.2.5.2 Transport Master Plan Next Revision

According to Table 3, first group contains Mersin, Antalya, Tekirdağ, İzmir, Diyarbakır, Eskişehir, Gaziantep, Samsun, Sakarya, İstanbul, Şanlıurfa and Denizli that will have a revision within two years. Second group contains Kocaeli, Konya, Manisa, Hatay, Malatya, Ankara, Kayseri and Van that will have a revision in between 2019 and 2021.

By considering the SUMP planning period of 1-3 years, first group won't have time to convert their plans to SUMPs, second group have time. So, 1 is assigned for group 1, 2 is assigned for group 2, 0 is assigned for Bursa, Muğla, Balıkesir, Ordu, Trabzon and Erzurum that didn't answer the question.

#### 4.2.5.3 Transport Master Plan Preparation

According to Table 4, first group contains Malatya, Sakarya, Gaziantep, Konya, Diyarbakır, Manisa, Samsun, Mersin, Tekirdağ, Van, Eskişehir, Denizli, Kocaeli, Şanlıurfa and Hatay that their Transport Master Plans were prepared by just outsourcing. Second group contains İzmir and Ankara that prepared their Transport Master Plans together with outsourcing. Group 3 contains Kayseri, İstanbul and Antalya that prepared their Transport Master Plans on their own.

By considering the capacity of Transport Master Plan preparation in metropolitan municipalities, 1 is assigned for group 1, 2 is assigned for group 2, 3 is assigned for group 3. 0 is assigned for Ordu, Erzurum, Bursa, Trabzon, Muğla and Balıkesir that didn't answer the question.

#### 4.2.5.4 Urban Transport Departments Annual Budget

According to Table 6, first group contains Diyarbakır, Samsun, Sakarya, Antalya, Gaziantep, Konya, Manisa, Tekirdağ, Malatya, Van, İstanbul and Denizli that their Urban Transport Departments annual budget is 1-50 m TRY. Second group contains Hatay, Şanlıurfa, Eskişehir and Kayseri that their Urban Transport Departments annual budget is 50-100 m TRY. Third group contains Kocaeli, Mersin and İzmir that their Urban Transport Departments annual budget is more than 100 m TRY.

By considering having the higher annual budget is more advantageous, 1 is assigned for group 1, 2 is assigned for group 2, 3 is assigned for group 3. 0 is assigned for Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir and Ankara that didn't answer the question.

#### 4.2.5.5 Urban Transport Departments Workforce

According to Table 7, first group contains Gaziantep, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Tekirdağ, Kayseri, İstanbul, Malatya, Antalya, Sakarya and Hatay that have less than 10 workers employed in Urban Transport Departments. Second group contains Şanlıurfa and İzmir that have 25-50 workers. Third group contains Kocaeli, Konya, Mersin and Denizli that have more than 50 workers in their Urban Transport Departments.

By considering the workforce necessary for SUMPs is more than 50 workers, 1 is assigned for group 1, 2 is assigned for group 2, 3 is assigned for group 3. 0 is assigned for Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir and Ankara that didn't answer the question.

#### 4.2.5.6 Qualified Workforce for SUMPs

According to Table 8, first group contains Gaziantep, Kocaeli, Konya, Diyarbakır, Manisa, Samsun, Van, Eskişehir, Mersin, Tekirdağ, Kayseri, İstanbul, Malatya, İzmir, Sakarya, Hatay and Şanlıurfa that have less than 10 qualified workers for SUMP planning. Second group contains Antalya that has 10-25 qualified workers for SUMp planning. Third group contains Denizli that has more than 50 qualified workers for SUMP planning.

By considering the qualified workforce necessary for SUMP planning, 1 is assigned for group 1, 2 is assigned for group 2, 3 is assigned for group 3. 0 is assigned for Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir and Ankara that didn't answer the question.

#### 4.2.5.7 Involvement of SUMP Elements to Transport Master Plans

In Table 19, 1 for ‘currently not included’, 2 for ‘not included but planned for the next master plan’, 3 for ‘not included but partially implemented’, 4 for ‘not included but fully implemented and in usage’, 5 for ‘included but not yet implemented’, 6 for ‘included and partially implemented’ and 7 for ‘included, fully implemented and in usage’ are assigned for the metropolitan municipalities answers to the involvement of 8 SUMP Elements.

Total column in Table 19 shows the sum of assigned numbers in parenthesis for each municipality. 48 for Gaziantep, 30 for Kocaeli, 45 for Konya, 29 for Diyarbakır, 24 for Manisa, 20 for Samsun, 23 for Van, 50 for Eskişehir, 42 for Mersin, 25 for Tekirdağ, 48 for Kayseri, 24 for İstanbul, 36 for Malatya, 25 for Antalya, 33 for İzmir, 29 for Sakarya, 30 for Hatay, 47 for Şanlıurfa, 17 for Denizli are found as a total. Higher the total scores mean higher the SUMP elements involvement to current Transport Master Plans. 0 is assigned for Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir and Ankara that didn’t answer the question.

## Table 19

## Total Sum of SUMP Elements Involvement

| | Non-motorised transport (walking and cycling) | Public transport (PT) | Inter-modality | Urban logistics | Road transport (flowing and stationary) | Urban road safety | Mobility management | Intelligent transport systems (ITS) | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Gaziantep Metropolitan Municipality** | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | included, fully implemented and in usage (7) | included, fully implemented and in usage (7) | 48 |
| **Kocaeli Metropolitan Municipality** | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) | 30 |
| **Konya Metropolitan Municipality** | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | 45 |
| **Ordu Metropolitan Municipality** | | | | | | | | | 0 |
| **Erzurum Metropolitan Municipality** | | | | | | | | | 0 |
| **Diyarbakır Metropolitan Municipality** | not included but planned for the next master plan (2) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | 29 |
| **Manisa Metropolitan Municipality** | currently not included (1) | included and partially implemented (6) | not included but partially implemented (3) | currently not included (1) | not included but partially implemented (3) | currently not included (1) | included and partially implemented (6) | not included but partially implemented (3) | 24 |
| **Samsun Metropolitan Municipality** | currently not included (1) | included and partially implemented (6) | not included but fully implemented and in usage (4) | currently not included (1) | not included but partially implemented (3) | currently not included (1) | not included but partially implemented (3) | currently not included (1) | 20 |
| **Van Metropolitan Municipality** | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but planned for the next master plan (2) | not included but partially implemented (3) | not included but partially implemented (3) | 23 |
| **Eskişehir Metropolitan Municipality** | included, fully implemented and in usage (7) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | 50 |
| **Mersin Metropolitan Municipality** | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | 42 |
| **Tekirdağ Metropolitan Municipality** | not included but partially implemented (3) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | 25 |
| **Kayseri Metropolitan Municipality** | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | 48 |
| **İstanbul Metropolitan Municipality** | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | 24 |
| **Bursa Metropolitan Municipality** | | | | | | | | | 0 |
| **Malatya Metropolitan Municipality** | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | currently not included (1) | included and partially implemented (6) | currently not included (1) | included and partially implemented (6) | included and partially implemented (6) | 36 |
| **Antalya Metropolitan Municipality** | currently not included (1) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | included and partially implemented (6) | 25 |
| **Trabzon Metropolitan Municipality** | | | | | | | | | 0 |
| **Muğla Metropolitan Municipality** | | | | | | | | | 0 |
| **İzmir Metropolitan Municipality** | currently not included (1) | included and partially implemented (6) | included, fully implemented and in usage (7) | currently not included (1) | included, fully implemented and in usage (7) | currently not included (1) | included but not yet implemented (5) | included but not yet implemented (5) | 33 |
| **Balıkesir Metropolitan Municipality** | | | | | | | | | 0 |
| **Sakarya Metropolitan Municipality** | currently not included (1) | included and partially implemented (6) | included and partially implemented (6) | currently not included (1) | not included but planned for the next master plan (2) | currently not included (1) | included and partially implemented (6) | included and partially implemented (6) | 29 |
| **Hatay Metropolitan Municipality** | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) | 30 |
| **Ankara Metropolitan Municipality** | | | | | | | | | 0 |
| **Şanlıurfa Metropolitan Municipality** | included and partially implemented (6) | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | 47 |
| **Denizli Metropolitan Municipality** | not included but partially implemented (3) | not included but planned for the next master plan (2) | currently not included (1) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | not included but partially implemented (3) | 17 |

**Source:** Author's calculations

#### 4.2.5.8 Involvement of SUMP Related Plans

In Table 20, 1 for currently not included, 2 for not included but planned for the next master plan, 3 for included are assigned for the metropolitan municipalities' answers to the involvement of out region Transport Plans and local Land-use Plans.

Total column in Table 20 shows the sum of assigned numbers in parenthesis for each municipality. 5 for Gaziantep, 6 for Kocaeli, 6 for Konya, 5 for Diyarbakır, 5 for Manisa, 2 for Samsun, 5 for Van, 5 for Eskişehir, 6 for Mersin, 4 for Tekirdağ, 6 for Kayseri, 4 for İstanbul, 6 for Malatya, 3 for Antalya, 6 for İzmir, 2 for Sakarya, 6 for Hatay, 6 for Şanlıurfa, 4 for Denizli are found as a total. Higher the total scores mean higher the out-region Transport Plans and local Land-use Plans involvement to current Transport Master Plans. 0 is assigned for Ordu, Erzurum, Bursa, Trabzon, Muğla, Balıkesir and Ankara that didn't answer the question.

## Table 20

### Total Sum of SUMP Related Plans Involvement

| Metropolitan Municipality | Consideration of out region Transport Plans | Consideration of the local Land-use Plans | Total |
|---|---|---|---|
| Gaziantep Metropolitan Municipality | not included but planned for the next master plan (2) | included (3) | 5 |
| Kocaeli Metropolitan Municipality | included (3) | included (3) | 6 |
| Konya Metropolitan Municipality | included (3) | included (3) | 6 |
| Ordu Metropolitan Municipality | | | 0 |
| Erzurum Metropolitan Municipality | | | 0 |
| Diyarbakır Metropolitan Municipality | not included but planned for the next master plan (2) | included (3) | 5 |
| Manisa Metropolitan Municipality | not included but planned for the next master plan (2) | included (3) | 5 |
| Samsun Metropolitan Municipality | currently not included (1) | currently not included (1) | 2 |
| Van Metropolitan Municipality | not included but planned for the next master plan (2) | included (3) | 5 |
| Eskişehir Metropolitan Municipality | not included but planned for the next master plan (2) | included (3) | 5 |
| Mersin Metropolitan Municipality | included (3) | included (3) | 6 |
| Tekirdağ Metropolitan Municipality | currently not included (1) | included (3) | 4 |
| Kayseri Metropolitan Municipality | included (3) | included (3) | 6 |
| İstanbul Metropolitan Municipality | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | 4 |
| Bursa Metropolitan Municipality | | | 0 |
| Malatya Metropolitan Municipality | included (3) | included (3) | 6 |
| Antalya Metropolitan Municipality | not included but planned for the next master plan (2) | currently not included (1) | 3 |
| Trabzon Metropolitan Municipality | | | 0 |
| Muğla Metropolitan Municipality | | | 0 |
| İzmir Metropolitan Municipality | included (3) | included (3) | 6 |
| Balıkesir Metropolitan Municipality | | | 0 |
| Sakarya Metropolitan Municipality | currently not included (1) | currently not included (1) | 2 |
| Hatay Metropolitan Municipality | included (3) | included (3) | 6 |
| Ankara Metropolitan Municipality | | | 0 |
| Şanlıurfa Metropolitan Municipality | included (3) | included (3) | 6 |
| Denizli Metropolitan Municipality | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | 4 |

**Source:** Author's calculations

#### 4.2.5.9 Involvement of Stakeholders

In Appendix 4 Question 10 at pages 154, 155 and 156, 1 for ‘inexistent’, 2 for ‘existent, but not an active role’, 3 for ‘existent, playing a minor role’ and 4 for ‘existent, playing an important role’ are assigned for the metropolitan municipalities answers to existence and importance of 34 stakeholders (Other local authorities; Neighbouring cities; Metropolitan municipality related transport authorities (IETT, EGO,.....); Private transport authorities (Minibus cooperatives, taxi,…..); Ministry of Transport, Maritime Affairs and Communications; Ministry of Environment and Urbanisation; Provincial Directorate of Health; Provincial Directorate of Security; EU authorities/funds; Development agencies; Transport consultants; Car sharing companies; Bicycle rental operators; Business associations; Municipality associations; Major employers; Small businesses; Utility services (energy, water, ……); NGOs; Motorist associations; Media; Forums; Cycling groups; Walking groups; PT user groups; Citizens; Tourists; Disabled people; Landowners; Parents/children; Elderly people; Research institutions; Universities; Training institutions).

According to the sum of assigned numbers in parenthesis for each municipality’s answers: 81 for Gaziantep, 95 for Kocaeli, 82 for Diyarbakır, 88 for Manisa, 62 for Samsun, 103 for Van, 73 for Eskişehir, 79 for Mersin, 69 for Tekirdağ, 38 for İstanbul, 98 for Malatya, 36 for İzmir, 106 for Sakarya, 109 for Şanlıurfa, 68 for Denizli are found as a total. Higher the total scores mean higher the existence and importance of stakeholders in current Transport Master Plans. 0 is assigned for Konya, Ordu, Erzurum, Kayseri, Bursa, Antalya, Trabzon, Muğla, Balıkesir, Hatay and Ankara that didn’t answer the question.

#### 4.2.5.10 Stakeholder Interest to SUMPs

In Appendix 4 Question 11 at pages 157, 158 and 159, 1 for ‘negative’, 2 for ‘neutral’, 3 for ‘positive’, 4 for ‘actively supportive’ are assigned for the metropolitan municipalities answers to 34 stakeholders interest to SUMPs (Other local authorities;

Neighbouring cities; Metropolitan municipality related transport authorities (IETT, EGO,.....); Private transport authorities (Minibus cooperatives, taxi,…..); Ministry of Transport, Maritime Affairs and Communications; Ministry of Environment and Urbanisation; Provincial Directorate of Health; Provincial Directorate of Security; EU authorities/funds; Development agencies; Transport consultants; Car sharing companies; Bicycle rental operators; Business associations; Municipality associations; Major employers; Small businesses; Utility services (energy, water, ……); NGOs; Motorist associations; Media; Forums; Cycling groups; Walking groups; PT user groups; Citizens; Tourists; Disabled people; Landowners; Parents/children; Elderly people; Research institutions; Universities; Training institutions).

According to the sum of assigned numbers in parenthesis for each municipality's answers: 100 for Kocaeli, 103 for Diyarbakır, 98 for Manisa, 116 for Samsun, 135 for Van, 105 for Eskişehir, 127 for Mersin, 101 for Tekirdağ, 68 for İstanbul, 104 for Malatya, 118 for İzmir, 129 for Sakarya, 106 for Şanlıurfa, 67 for Denizli are found as a total. Higher the total scores mean higher the existence and importance of stakeholders in current Transport Master Plans. 0 is assigned for Gaziantep, Konya, Ordu, Erzurum, Kayseri, Bursa, Antalya, Trabzon, Muğla, Balıkesir, Hatay and Ankara that didn't answer the question.

## Table 21

## Total Sum of SUMP Variables

| Metropolitan Municipality | 1. Transport Master Plan Duration | 2. Transport Master Plan next Revision | 3. Transport Master Plan preparation | 4. Urban Transport Departments Annual Budget | 5. Urban Transport Departments Workforce | 6. Qualified Workforce for SUMPs | 7. Involvement of SUMP Elements to Transport Master Plans | 8. Involvement of SUMP related Plans | 9. Involvement of Stakeholders | 10. Stakeholder Interest to SUMPs | TOTAL SCORES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gaziantep** | 1 | 1 | 1 | 1 | 1 | 1 | 48 | 3 | 81 | 0 | **138** |
| **Kocaeli** | 2 | 2 | 1 | 3 | 3 | 1 | 30 | 4 | 95 | 100 | **241** |
| **Konya** | 2 | 2 | 1 | 1 | 3 | 1 | 45 | 4 | 0 | 0 | **59** |
| **Ordu** | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** |
| **Erzurum** | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| **Diyarbakır** | 2 | 1 | 1 | 1 | 1 | 1 | 29 | 3 | 82 | 103 | **224** |
| **Manisa** | 3 | 2 | 1 | 1 | 1 | 1 | 24 | 3 | 88 | 98 | **222** |
| **Samsun** | 1 | 1 | 1 | 1 | 1 | 1 | 20 | 0 | 62 | 116 | **204** |
| **Van** | 3 | 2 | 1 | 1 | 1 | 1 | 23 | 3 | 103 | 135 | **273** |
| **Eskişehir** | 1 | 1 | 1 | 2 | 1 | 1 | 50 | 3 | 73 | 105 | **238** |
| **Mersin** | 2 | 1 | 1 | 3 | 3 | 1 | 42 | 4 | 79 | 127 | **263** |
| **Tekirdağ** | 2 | 1 | 1 | 1 | 1 | 1 | 25 | 2 | 69 | 101 | **204** |
| **Kayseri** | 3 | 2 | 3 | 2 | 1 | 1 | 48 | 4 | 0 | 0 | **64** |
| **İstanbul** | 2 | 1 | 3 | 1 | 1 | 1 | 24 | 2 | 38 | 68 | **141** |
| **Bursa** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Malatya** | 3 | 2 | 1 | 1 | 1 | 1 | 36 | 4 | 98 | 104 | **251** |
| **Antalya** | 2 | 1 | 3 | 1 | 1 | 2 | 25 | 1 | 0 | 0 | **36** |
| **Trabzon** | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** |
| **Muğla** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **İzmir** | 2 | 1 | 2 | 3 | 2 | 1 | 33 | 4 | 36 | 118 | **202** |
| **Balıkesir** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Sakarya** | 2 | 1 | 1 | 1 | 1 | 1 | 29 | 0 | 106 | 129 | **271** |
| **Hatay** | 3 | 2 | 1 | 2 | 1 | 1 | 30 | 4 | 0 | 0 | **44** |
| **Ankara** | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **6** |
| **Şanlıurfa** | 1 | 1 | 1 | 2 | 2 | 1 | 47 | 4 | 109 | 106 | **274** |
| **Denizli** | 1 | 1 | 1 | 1 | 3 | 2 | 17 | 2 | 68 | 67 | **163** |
| **HIGHEST SCORES** | **3** | **2** | **3** | **3** | **3** | **2** | **56** | **6** | **136** | **136** | |

**Source:** Author's calculations

As a summary of the SUMP Ranking part, the evaluation of each variable's assigned numbers are listed in Table 21. Total Scores column in Table 21 shows the sum of the variables that describe SUMPs according to metropolitan municipalities. Highest Scores line in Table 12 shows the highest scores can get from each variable.

As seen from Table 21, 0 is assigned for municipalities that didn't answer the question. Since getting 0 from question will decrease the Total Score, metropolitan municipalities that answer all questions will be evaluated for SUMP Ranking at the Table 22.

**Table 22**

**SUMP Ranking**

| Metropolitan Municipality | TOTAL SCORES | HIGHEST SCORE | SUCCESS RATE |
|---|---|---|---|
| **Şanlıurfa** | 274 | 350 | 78% |
| **Van** | 273 | 350 | 78% |
| **Mersin** | 263 | 350 | 75% |
| **Malatya** | 251 | 350 | 72% |
| **Kocaeli** | 241 | 350 | 69% |
| **Eskişehir** | 238 | 350 | 68% |
| **Diyarbakır** | 224 | 350 | 64% |
| **Manisa** | 222 | 350 | 63% |
| **Tekirdağ** | 204 | 350 | 58% |
| **İzmir** | 202 | 350 | 58% |
| **Denizli** | 163 | 350 | 47% |
| **İstanbul** | 141 | 350 | 40% |

**Source:** Author's calculations

Table 22 shows the Total Scores column of Table 21 from highest to lowest by excluding the metropolitan municipalities getting 0 from one of each question. Highest Score column in Table 22 is the sum of Highest Scores line in Table 21. 350 is found as

the Highest Score of the SUMP Ranking which refers to the sum of maximum score can get from each variable. To analyse easily, Success Rate of the SUMP Ranking is evaluated by calculating the percentage of each municipality's Total Score inside Highest Score.

If a Success Rate is found in between 0%-50%, variables that describe SUMPs are not included in current Transport Master Plans. 2 metropolitan municipalities from 12 (17%), Denizli and İstanbul get rates in this range. İstanbul get the lowest rate as the most crowded city in Turkey.[99] Since İstanbul is suffering from urban mobility problems at most, İstanbul's involvement in this category proves the necessity of sustainable urban mobility solutions to solve urban mobility problems. But Transport Master Plans adaptation to SUMPs are much more difficult in these cities regarding the cities involved in 50%-100% Success Rate category. But as seen from Table 22, even Denizli and İstanbul's Success Rates are the lowest and in between 0%-50% rate, these two cities rates are around %40s, not so much under 50% which means some SUMP elements have already involved in their ongoing Transport Master Plans. So SUMP adaptation for these cities are not difficult as expected.

If a Success Rate is found in between 50%-100%, variables that describe SUMPs are included in current Transport Master Plans. 10 metropolitan municipalities from 12 (83%), Şanlıurfa, Van, Mersin, Malatya, Kocaeli, Eskişehir, Diyarbakır, Manisa, Tekirdağ, İzmir, get rates in this range. Şanlırfa and Van together get the highest score which means most of the SUMP elements have already involved in their ongoing Transport Master Plans. But as seen from Table 22, all 12 cities get scores in between 58%-78% rate. By considering the low difference in between the scores that cities get in this Success Rate category, these cities Transport Master Plans will be more easily converted to SUMPs regarding the cities involved in 0%-50% category.

[99] Turkey's most crowded cities.

Even necessities are higher for SUMPs, it is harder to plan and develop SUMPs for the cities in between 0%-50% than the cities in between 50%-100%.

# 5. SUSTAINABLE URBAN MOBILITY SOLUTION FOR TURKEY: CITY OF ESKIŞEHIR CASE

In previous chapters, urban mobility problems in Turkey that people are suffering from are explained. These problems are to be solved by converting Transport Master Plans to SUMPs by including sustainable urban mobility solutions: PT and non-motorised transport (walking and cycling). According to the survey results in Table 10, PT is the most included while non-motorised transport (walking and cycling) is the least included transport modes in current Transport Master Plans of Turkey.

In March 2012 Ministry of Environment and Urbanisation announced to financially support implementing bike lanes up to 45% of the projected cost to decrease traffic related air and noise pollution and to increase human and environmental health.[100] But there was no Regulation on Cycling in 2012 and submitted bike lane projects by the municipalities were found inadequate and none of the municipalities could benefit from this support.

Schronously with this thesis, in November 2015 Regulation on Cycling was issued by Ministry of Environment and Urbanisation. And then the Ministry of Environment and Urbanisation again announced to support bike lane implementation financially which was planned according to the Regulation.[101] But at the end of 2016 there was still no selected municipality to be financially supported. In August 2016, a bike lane sample project which was planned according to the Regulation was shared in Ministry of Environment and Urbanisation's web page with the municipalities as a best practice.[102]

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[100] Bike Lane, 2012, http://www.csb.gov.tr/gm/cygm/index.php?Sayfa=sayfahtml&Id=2266 (15 November 2016).

[101] Bike Lane, 2016, http://www.csb.gov.tr/gm/cygm/index.php?Sayfa=sayfa&Tur=banner&Id=124 (15 November 2016).

[102] Bike Lane Sample Project Files, 2016, http://www.csb.gov.tr/gm/meslekihizmetler/index.php?Sayfa=duyurudetay&Id=137855 (15 November 2016).

And also in 2016, Ministry of Health announced to donate 300.000 bikes to municipalities, children and youth in order to increase the physical activity and to motivate municipalities for implementing bike lanes.[103] This improvements in Turkey shows that cycling is at the focal point of the Government.

Complying with the Turkish Government's pleasing support to municipalities on cycling in 2016, cycling is found the most important sustainable urban mobility solution for Turkey to decrease car usage and avoid from ongoing urban mobility problems in Turkish cities. So, inclusion of cycling to the Transport Master Plans is crucial. With this assumption, there is need to assess the impact of the future bike lane projects as a new sustainable urban mobility solution to accelerate Turkish metropolitan municipalities to plan and implement bike lanes.

The new cycling economy is also the increasing trend in the EU. In 2010, 7% of the EU citizens selected cycling as their main mode of transport.[104] This represents 94 billion km cycled in 2010 and their economic benefit for the EU is 205,2 – 217,3 billion Euro.[105]

This chapter starts by identifying the data and methodology of sustainable urban mobility indicators for cycling that evaluate bike lane projects in Turkish cities in a comprehensive way. The target group of the indicators is decision makers who is responsible from bike lane planning and implementation. This selection of indicators includes finding out how to parameterize each of the indicators: Defining how to quantify

[103] Ministry of Health distribute 300.000 bikes in order to increase physical activity, 2016, http://www.saglik.gov.tr/TR/belge/1-47620/saglik-bakanligi-fiziksel-aktiviteyi-tesvik-icin-300-bi-.htm (15 November 2016).

[104] Eurobarometer, Future of transport Analytical report, 2011, http://ec.europa.eu/public_opinion/flash/fl_312_en.pdf (13 December 2016).

[105] Fabian Küster and Benoit Blondel, Calculating the economic benefits of cycling in EU-27, 2013, https://ecf.com/sites/ecf.com/files/Fabians%20ECF_Economic-benefits-of-cycling-in-EU-27-3.pdf (13 December 2016).

them by selecting a unit of measurement for the parameter and composing a formula to calculate it. The next step is to calculate the indicators for the city of Eskişehir case. City of Eskişehir is selected as an example to perform the indicators because Eskişehir is now revising its master plan to SUMP by including sustainable transport modes.

## 5.1 DATA AND METHODOLOGY

In recent years the impact of mobility on quality of life is becoming increasingly recognized by citizens and city authorities.[106] Since fatalities are direct threats to human life, fatalities are found the most important indicator to evaluate the quality of life.

To assess the future impacts of bike lane projects, indicator set are created from quality of life perspective according to the available data in Turkey. The indicator set is a tool for cities to evaluate the future situation of the bike lane projects and to evaluate the potential impact of selected indicators. There are no indicators in the literature evaluated with the formulas below. 6 indicators are developed for Turkish metropolitan municipalities to evaluate new bike lane projects from quality of life perspective:

- Total bike lane implemented: Comprises total kilometer of bike lanes in the city after the new bike lane project.

- Total bike commuters served: Comprises total number of bike commuters in the city after the new bike lane project.

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[106] World Business Council for Sustainable Development, **Methodology and indicator calculation method for sustainable urban mobility**, Switzerland, 2015, p.14.

- Annual bike commuters served: Comprises annual bike commuters in the city during the new bike lane project.

- Annual bike commuters' fatalities occurred: Comprises annual bike commuters' fatalities in the city during the new bike lane project.

- Total bike commuters' fatalities prevented: Comprises total number of bike commuters' fatalities prevented in the city after the new bike lane project.

- Economic value of total bike commuters' fatalities prevented: Comprises current economic value of the total number of bike commuters' fatalities prevented in the city after the new bike lane project.

These indicators are not meant to be a comprehensive list of indicators; there are many potential ways to measure the impact of bike lane projects. But the above indicators allow us to focus on quality of life methodology with the available data in Turkish metropolitan municipalities collected for their current Transport Master Plans.

At first to evaluate the impact of bike lane projects in terms of quality of life, without bike lane project scenario and with bike lane project scenario should be calculated. The impact of bike lane projects is evaluated by comparing the impact of a without the project situation with the estimated project impact in future years. This approach is before and after approach where conditions before the bike lane project implementation are compared to the conditions after the bike lane project implementation to capture the future benefit of the project. Future projected situation is an estimated situation so estimated calculations should be done about how commuters, fatalities and their economic value would have changed if new bike lane project will be implemented.

The indicators are described with SMART (specific, measurable, attainable, relevant, time-based) methodologies that will allow Turkish cities to perform a

standardized evaluation of their new bike lane projects and measure the improvements resulting from the implementation of new bike lane projects.

"Since decision makers need to measure economic value of the health benefits of non-motorised transport (walking and cycling) by estimating the value of reduced mortality, World Health Organization (WHO) created Health Economic Assessment Tool (HEAT) in 2014."[107] "This tool can be used when planning a new cycling or walking infrastructure."[108] HEAT for cycling is also applied in this thesis in order to get bike commuters fatalities prevented with new bike lane project.

After methodological development, cycling indicators have been calculated for the city of Eskişehir from Turkey as an example. Eskişehir is a medium-sized Anatolian city with a population of 812.589 in 2015.[109] Although the population increased 15% in between 2002 and 2015, car ownership increased 133% which means there is car in every 2 houses.[110] While transport with private cars increased, non-motorised transport (walking and cycling) decreased.

City of Eskişehir is selected as an example because Eskişehir is the first city in Turkey which decided to revise its Transport Master Plan to SUMP in 2015. Revision process is still continuing with İstanbul Technical University and Osmangazi University to bring new and permanent solutions to city's ongoing urban mobility problems. To solve

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[107] WHO, HEAT, 2014, http://www.heatwalkingcycling.org/ (21.11.2016).

[108]WHO, Health economic assessment tool (HEAT) for cycling and walking, http://www.euro.who.int/en/health-topics/environment-and-health/Transport-and-health/activities/guidance-and-tools/health-economic-assessment-tool-heat-for-cycling-and-walking (28 March 2017).

[109] İTÜ, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.38.

[110]Metropolitan Municipality's 20 Years New Journey to Transport, 2016, http://www.eskisehir.bel.tr/icerik_dvm.php?icerik_id=2176&cat_icerik=1&menu_id=24 (27 March 2017).

problems, people oriented, non-motorised transport (walking and cycling) prioritised, environment friendly SUMP idea is pursuing and under this plan preperation household surveys; countings for pedestrians, cyclists and parking areas; face to face interviews were conducted in 2016.[111] Findings from the surveys, countings and interviews were shared in Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report in 2016.[112] When completed, this plan will be the first SUMP in Turkey. Under SUMP, Eskişehir decided to implement 8,478 km bike lane in between years 2015-2019. Necessary data for the calculation is obtained from Calibration Report[113] and city of Eskişehir Clean Air Action Plan (2014-2019)[114].

Calculations for estimating each indicator for new bike lane projects and Eskişehir example are explained detailedly in the next sections.

### 5.1.1 Total Bike Lane Implemented

First of all, bike lane kilometers in the city before the new bike lane project and projected bike lane kilometers with the new bike lane project should be obtained from metropolitan municipality. By adding projected bike lane kilometer to current bike lane kilometer, total bike lane kilometer after bike lane project can be found:

[111] Eskişehir's Transport Plan from Karacasu, 2016, http://mobil.kurtulusgazetesi.com.tr/eskisehirin-ulasim-plani-karacasudan/124850/ (27 March 2017).

[112] İTÜ, pp.1-142.

[113] İTÜ, pp.30-40.

[114] Ministry of Environment and Urbanisation Eskişehir Environment and Urbanisation Provincial Directorate, **City of Eskişehir Clean Air Action Plan (2014-2019),** 2014, p.56.

$$Bl_a = Bl_b + Bl_p$$

Where:

$Bl_b$: Bike lane before project (km)

$Bl_p$: Projected bike lane (km)

$Bl_a$: Bike lane after project (km)

### 5.1.2 Total Bike Commuters Served

Since there is no bike commuter data in Turkey, to calculate bike commuters before the new bike lane project, it is convenient to calculate it with the bike commuters' percentage data collected by household surveys for Transport Master Plans. By multiplying bike commuters' percentage with the same year's city population, number of bike commuters before the new bike lane project is found.

$$Bc_b = P_b * Bc_{b\%}$$

Where:

$P_b$: Population of the city before project

$Bc_{b\%}$: Bike commuters' percentage before project

$Bc_b$: Bike commuters before project

For calculating the bike commuters after the new bike lane project, projected bike commuters should be calculated at first, then summed up with bike commuters before project. Projected bike commuters are not increasing directly proportional with the projected bike lanes. Elasticity number should be used in order to calculate the change rate of the projected bike commuters according to the projected bike lanes. Common procedure of transforming the bike lane per 100,000 population is followed and 0,25 elasticity at mean is found. [115] As a projected bike commuter elasticity, 0,25 is used per 100.000 population. To use elasticity, first of all projected bike lane kilometer for the city which was known at the beginning of the project should be calculated for 100.000 population:

$$Bl_{p100.000} = (Bl_p * 100.000) / P_b$$

Where:

$Bl_p$: Projected bike lane (km)

$P_b$: Population of the city before project

$Bl_{p100.000}$: Projected bike lane per 100.000 population (km)

And then projected bike lane per 100.000 population is multiplied with projected bike commuters' elasticity per 100.000 to find projected bike commuters change rate:

[115] Ralph Buehler and John Pucher, "Cycling to work in 90 large American cities: new evidence on the role of bike paths and lanes", **Transportation**, Vol.39, (2012), p.420.

$$Bc_{pcr} = Bl_{p100.000} * Bc_{pe}$$

Where:

$Bl_{p100.000}$: Projected bike lane per 100.000 population (km)

$Bc_{pe}$: Projected bike commuters' elasticity per 100.000 population (0,25)

$Bc_{pcr}$: Projected bike commuters change rate

Projected bike commuters can now be calculated by multiplying bike commuters before the project with the projected bike commuters change rate:

$$Bc_p = Bc_b * Bc_{pcr}$$

Where:

$Bc_b$: Bike commuters before project

$Bc_{pcr}$: Projected bike commuters change rate

$Bc_p$: Projected bike commuters

At last bike commuters after project is found by summing up bike commuters before project and projected bike commuters.

$$Bc_a = Bc_b + Bc_p$$

Where:

$Bc_b$: Bike commuters before project

$Bc_p$: Projected bike commuters

$Bc_a$: Bike commuters after project

### 5.1.3 Annual Bike Commuters Served

To find annual bike commuters increase during the bike lane project, bike commuters' percentage after project should be calculated at first:

$$Bc_{a\%} = Bc_a / P_b$$

Where:

$Bc_a$: Bike commuters after project

$P_b$: Population of the city before project

$Bc_{a\%}$: Bike commuters' percentage after project

Then to find the bike commuters annual increase percentage, change between bike commuters' percentage before and after project is calculated and divided into

number of years of the project. Number of years of the project is calculated by subtracting the project beginning year from the project end year:

$$Y_p = Y_e - Y_b$$

Where:

$Y_e$: Project end year

$Y_b$: Project beginning year

$Y_p$: Total number of years of the project

$$Bc_{i\%} = (Bc_{a\%} - Bc_{b\%}) / Y_p$$

Where:

$Bc_{a\%}$: Bike commuters' percentage after project

$Bc_{b\%}$: Bike commuters' percentage before project

$Y_p$: Total number of years of the project

$Bc_{i\%}$: Bike commuters annual increase percentage

To find bike commuters percentage for every year of the project:

- For the first year of the project, bike commuters annual increase percentage is summed with bike commuters' percentage before project:

$$Bc_{y1\%} = Bc_{b\%} + Bc_{i\%}$$

Where:

$Bc_{b\%}$: Bike commuters' percentage before project

$Bc_{i\%}$: Bike commuters annual increase percentage

$Bc_{y1\%}$: Bike commuters' percentage for the project year 1

- For the next years of the project, bike commuters annual increase percentage is summed with bike commuters' percentage for the previous year of the project:

$$Bc_{ny\%} = Bc_{py\%} + Bc_{i\%}$$

Where:

$Bc_{py\%}$: Bike commuters' percentage for the previous year

$Bc_{i\%}$: Bike commuters annual increase percentage

$Bc_{ny\%}$: Bike commuters' percentage for the next year

To find bike commuters for every year of the project:

- For the bike commuters at the first year of the project, direct proportion is done according to the bike commuters and their percentage before project. Bike commuters before project is divided into bike commuters' percentage before project and then multiplied with bike commuters' percentage for the first project year:

$$Bc_{y1} = (Bc_b / Bc_{b\%}) * Bc_{y1\%}$$

Where:

$Bc_b$: Bike commuters before project

$Bc_{b\%}$: Bike commuters' percentage before project

$Bc_{y1\%}$: Bike commuters' percentage for the project year 1

$Bc_{y1}$: Bike commuters for the project year 1

- For the bike commuters in other years of the project, direct proportion is done according to bike commuters and their percentage of the previous years. Bike commuters for the previous year is divided to bike commuters' percentage for the previous year and then multiplied with bike commuters' percentage for the next year:

$$Bc_{ny} = (Bc_{py} / Bc_{py\%}) * Bc_{ny\%}$$

Where:

$Bc_{py}$: Bike commuters for the previous year

$Bc_{py\%}$: Bike commuters' percentage for the previous year

$Bc_{ny\%}$: Bike commuters' percentage for the next year

$Bc_{ny}$: Bike commuters for the next year

### 5.1.4 Annual Bike Commuters Fatalities Occurred

According to the new bike lane project, to evaluate annual bike commuter fatalities, at first bike commuters' rate to the before project situation should be calculated:

- For the first year of the project, bike commuters rate to the before project is found by dividing bike commuters for the project year 1 to the bike commuters before project:

$$Bc_r = (Bc_{y1} / Bc_b)$$

Where:

$Bc_{y1}$: Bike commuters for the project year 1

$Bc_b$: Bike commuters before project

$Bc_r$: Bike commuters rate to the before project

- For the next years of the project, bike commuters rate to the before project is found by dividing bike commuters for the next year of the project to the bike commuters before project:

$$Bc_r = (Bc_{ny} / Bc_b)$$

Where:

$Bc_{ny}$: Bike commuters for the next year

$Bc_b$: Bike commuters before project

$Bc_r$: Bike commuters rate to the before project

Then bike commuters' daily trips before project is calculated by multiplying bike commuters' percentage before project with daily trips for all modes before project. Both data can get from city's Transport Master Plans.

$$Bc_{bdt} = Bc_{b\%} * Dt_b$$

Where:

$Bc_{b\%}$: Bike commuters' percentage before project

$Dt_b$: Daily trips for all modes before project

$Bc_{bdt}$: Bike commuters' daily trips before project

By using bike commuters' daily trips before project, bike commuters' fatalities before project can be calculated. Traffic fatalities for all modes before project can be obtained from General Directorate of Security and daily trips for all modes before project can be obtained from metropolitan municipality. With the direct proportion, bike commuters' daily trips before project is multiplied with traffic fatalities for all modes before project and then divided to daily trips for all modes before project:

$$Bc_{fb} = (Bc_{bdt} * Tf_b) / Dt_b$$

Where:

$Bc_{bdt}$: Bike commuters' daily trips before project

$Tf_b$: Traffic fatalities for all modes before project

$Dt_b$: Daily trips for all modes before project

$Bc_{fb}$: Bike commuters' fatalities before project

Since new bike lane is likely to increase the concentration of cyclists in specific areas and therefore increase the visibility of cyclists to drivers, fatalities are admitted to be decreasing 0,4 power of bike commuters. [116] So to find the bike commuters fatalities

[116] P. L. Jacobsen, "Safety in Numbers", **Injury Prevention**, Vol.9, (2003), p.208.

for the each project year, bike commuters rate to the before project situation for every project year should be decreased by annual bike commuters fatality decrease rate (0,4 power) and then multiplied with bike commuters fatalities before project.

$$Bc_{fny} = (Bc_r \wedge Bc_{fdr}) * Bc_{fb}$$

Where:

$Bc_r$: Bike commuters rate to the before project

$Bc_{fdr}$: Annual bike commuters' fatalities decrease rate (0,4 power)

$Bc_{fb}$: Bike commuters' fatalities before project

$Bc_{fny}$: Bike commuters' fatalities for the next year

### 5.1.5 Total Bike Commuters Fatalities Prevented

After evaluating annual bike commuters' fatalities occurred, annual bike commuters' fatalities increase can be calculated by subtracting bike commuters' fatalities before project from every year's bike commuters' fatalities:

$$Bc_{fi} = Bc_{fny} - Bc_{fb}$$

Where:

$Bc_{fny}$: Bike commuters' fatalities for the next year

$Bc_{fb}$: Bike commuters' fatalities before project

$Bc_{fi}$: Annual bike commuters' fatalities increase

HEAT for cycling is applied besides annual bike commuters' fatalities increase formula to get bike commuters fatalities prevented with new bike lane project. By entering data which is obtained from previous calculations, annual bike commuters fatalities prevented and their economic value can be easily calculated by using HEAT for cycling as is seen at Appendix 7.

In addition to the data from previous calculations, just one extra data, population after project which can be easily obtained, should be entered to HEAT. And 124 days for "annual bike commuters' trips", 100 for "proportion of cycling data attributable to your intervention", 0 for "time needed to reach full level of cycling", 5 for "discount rate to apply to future benefits" should be advised to use as default values in HEAT.

Bike commuters' daily trips after project should be calculated by direct proportion in order to enter HEAT:

$$Bc_{adt} = (Bc_a * Bc_{bdt}) / Bc_b$$

Where:

$Bc_a$: Bike commuters after project

$Bc_{bdt}$: Bike commuters' daily trips before project

$Bc_b$: Bike commuters before project

$Bc_{adt}$: Bike commuters' daily trips after project

After entering all data to the HEAT, a number is found for annual bike commuters' fatalities prevented by HEAT as an outcome. But to find annual bike commuters fatalities prevented for every year of the project, annual bike commuters' fatalities increase for each project year should be subtracted from annual bike commuters' fatalities prevented by HEAT:

$$Bc_{fp} = Bc_{fpH} - Bc_{fi}$$

Where:

$Bc_{fpH}$: Annual bike commuters' fatalities prevented by HEAT

$Bc_{fi}$: Annual bike commuters' fatalities increase

$Bc_{fp}$: Annual bike commuters' fatalities prevented

Total bike commuters prevented after project is calculated by summing up annual bike commuters' fatalities prevented for every year of the project:

$$Bc_{atfp} = Bc_{fpy1} + Bc_{fpy2} + Bc_{fpy3} + \ldots\ldots\ldots$$

Where:

$Bc_{fpy1}$: Annual bike commuters' fatalities prevented (for the project year 1)

$Bc_{fpy2}$: Annual bike commuters' fatalities prevented (for the project year 2)

$Bc_{fpy3}$: Annual bike commuters' fatalities prevented (for the project year 3)

.

.

$Bc_{atfp}$: Total bike commuters' fatalities prevented after project

### 5.1.6 Economic Value of Total Bike Commuters Fatalities Prevented

Since annual bike commuters' fatalities prevented by HEAT and economic value of the total bike commuters' fatalities prevented by HEAT can be obtained from HEAT, economic value of total bike commuters fatalities prevented after project can now be calculated.

First of all, annual bike commuters' fatalities prevented by HEAT is multiplied with the number of project years to get total bike commuters fatalities prevented by HEAT:

$$Bc_{tfpH} = Bc_{fpH} * Y_p$$

Where:

$Bc_{fpH}$: Annual bike commuters' fatalities prevented by HEAT

$Y_p$: Total number of years of the project

$Bc_{tfpH}$: Total bike commuters' fatalities prevented by HEAT

Then to find economic value of total bike commuters' fatalities prevented after project, direct proportion is done by first multiplying total bike commuters fatalities

prevented after project with economic value of the total bike commuters' fatalities prevented by HEAT and then divided to total bike commuters' fatalities prevented by HEAT:

$$EBc_{atfp} = (Bc_{atfp} * EBc_{tfpH}) / Bc_{tfpH}$$

Where:

$Bc_{atfp}$: Total bike commuters' fatalities prevented after project

$EBc_{tfpH}$: Economic value of the total bike commuters' fatalities prevented by HEAT (TRY)

$Bc_{tfpH}$: Total bike commuters' fatalities prevented by HEAT

$EBc_{atfp}$: Economic value of the total bike commuters' fatalities prevented after project (TRY)

## 5.2 RESULTS AND DISCUSSIONS

Following tables show the cycling indicators' calculation for Eskişehir Bike Lane Project under SUMP which their formulas are explained in detail at the previous section.

**Table 23**

**Total Bike Lane Implemented Formula**

| $Bl_a = Bl_b + Bl_p$ | | | |
|---|---|---|---|
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bl_b$ | Bike lane before project (km) (2015) | 47,389 | Ministry of Environment and Urbanization Eskişehir Environment and Urbanization Provincial Directorate, **City of Eskişehir Clean Air Action Plan (2014-2019),** 2014, p.56. |
| $Bl_p$ | Projected bike lane (km) (2019) | 8,478 | Ministry of Environment and Urbanization Eskişehir Environment and Urbanization Provincial Directorate, **City of Eskişehir Clean Air Action Plan (2014-2019),** 2016, p.56. |
| $Bl_a$ | Bike lane after project (km) (2019) | 55,867 | |

**Source:** Author's calculations

Table 23 shows the formula and the calculation of first cycling indicator: Total Bike Lane Implemented. Given data is written with references and total bike lane kilometers after project in Eskişehir for 2019 is calculated and found as 55,867.

## Table 24

## Total Bike Commuters Served Formula

| $Bc_b = P_b * Bc_{b\%}$ | | | |
|---|---|---|---|
| **Abbreviation** | **Definition** | **Data** | **References** |
| $P_b$ | Population of the city before project (2015) | 812.589 | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.38. |
| $Bc_{b\%}$ | Bike commuters percentage before project (2015) | 1,200% | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.40. |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | |
| $Bl_{p100.000} = (Bl_p * 100.000) / P_b$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bl_p$ | Projected bike lane (km) (2019) | 8,478 | Ministry of Environment and Urbanization Eskişehir Environment and Urbanization Provincial Directorate, **City of Eskişehir Clean Air Action Plan (2014-2019),** 2014, p.56. |
| $P_b$ | Population of the city before project (2015) | 812.589 | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.38. |
| $Bl_{p100.000}$ | Projected bike lane per 100.000 population (km) (2019) | 1,043 | |
| $Bc_{pcr} = Bl_{p100.000} * Bc_{pe}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bl_{p100.000}$ | Projected bike lane per 100.000 population (km) (2019) | 1,043 | calculated above |
| $Bc_{pe}$ | Projected bike commuters elasticity per 100.000 population | 0,250 | Ralph Buehler and John Pucher, "Cycling to work in 90 large American cities: new evidence on the role of bike paths and lanes", **Transportation**, Vol.39, (2012), p.420. |
| $Bc_{pcr}$ | Projected bike commuters change rate | 0,261 | |
| $Bc_p = Bc_b * Bc_{pcr}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_{pcr}$ | Projected bike commuters change rate | 0,261 | calculated above |
| $Bc_p$ | Projected bike commuters (2019) | 2.543 | |
| $Bc_a = Bc_b + Bc_p$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_p$ | Projected bike commuters (2019) | 2.543 | calculated above |
| $Bc_a$ | Bike commuters after project (2019) | 12.294 | |

**Source:** Author's calculations

Table 24 shows the formula and the calculation of second cycling indicator: Total Bike Commuters Served. Given data is written with references and total bike commuters after project in Eskişehir for 2019 is calculated and found as 12.294.

## Table 25

## Annual Bike Commuters Served Formula

| $Bc_{a\%} = Bc_a / P_b$ | | | |
|---|---|---|---|
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_a$ | Bike commuters after project (2019) | 12.294 | calculated above |
| $P_b$ | Population of the city before project (2015) | 812.589 | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.38. |
| $Bc_{a\%}$ | Bike commuters percentage after project (2019) | 1,513% | |
| $Y_p = Y_e - Y_b$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Y_e$ | Project end year | 2.019 | Ministry of Environment and Urbanization Eskişehir Environment and Urbanization Provincial Directorate, **City of Eskişehir Clean Air Action Plan (2014-2019),** 2014, p.56. |
| $Y_b$ | Project beginning year | 2.015 | Ministry of Environment and Urbanization Eskişehir Environment and Urbanization Provincial Directorate, **City of Eskişehir Clean Air Action Plan (2014-2019),** 2014, p.56. |
| $Y_p$ | Total number of years of the project | 4 | |
| $Bc_{i\%} = (Bc_{a\%} - Bc_{b\%}) / Y_p$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{a\%}$ | Bike commuters percentage after project (2019) | 1,513% | calculated above |
| $Bc_{b\%}$ | Bike commuters percentage before project (2015) | 1,200% | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.40. |
| $Y_P$ | Total number of years of the project | 4 | calculated above |
| $Bc_{i\%}$ | Bike commuters annual increase percentage | 0,078% | |
| $Bc_{y1\%} = Bc_{b\%} + Bc_{i\%}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{b\%}$ | Bike commuters percentage before project (2015) | 1,200% | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.40. |
| $Bc_{i\%}$ | Bike commuters annual increase percentage | 0,078% | calculated above |
| $Bc_{y1\%}$ | Bike commuters percentage for the project year 1 (2016) | 1,278% | |
| $Bc_{ny\%} = B_{py\%} + Bc_{i\%}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{py\%}$ | Bike commuters percentage for the previous year (2016) | 1,278% | calculated above |
| $Bc_{i\%}$ | Bike commuters annual increase percentage | 0,078% | calculated above |
| $Bc_{ny\%}$ | Bike commuters percentage for the next year (2017) | 1,356% | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{py\%}$ | Bike commuters percentage for the previous year (2017) | 1,356% | calculated above |
| $Bc_{i\%}$ | Bike commuters annual increase percentage | 0,078% | calculated above |
| $Bc_{ny\%}$ | Bike commuters percentage for the next year (2018) | 1,435% | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{py\%}$ | Bike commuters percentage for the previous year (2018) | 1,435% | calculated above |
| $Bc_{i\%}$ | Bike commuters annual increase percentage | 0,078% | calculated above |
| $Bc_{ny\%}$ | Bike commuters percentage for the next year (2019) | 1,513% | |
| $Bc_{y1} = (Bc_b / Bc_{b\%}) * Bc_{y1\%}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_{b\%}$ | Bike commuters percentage before project (2015) | 1,200% | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.40. |
| $Bc_{y1\%}$ | Bike commuters percentage for the project year 1 (2016) | 1,278% | calculated above |
| $Bc_{y1}$ | Bike commuters for the project year 1 (2016) | 10.387 | |
| $Bc_{ny} = (Bc_{py} / Bc_{py\%}) * Bc_{ny\%}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{py}$ | Bike commuters for the previous year (2016) | 10.387 | calculated above |
| $Bc_{py\%}$ | Bike commuters percentage for the previous year (2016) | 1,278% | calculated above |
| $Bc_{ny\%}$ | Bike commuters percentage for the next year (2017) | 1,356% | calculated above |
| $Bc_{ny}$ | Bike commuters for the next year (2017) | 11.023 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{py}$ | Bike commuters for the previous year (2017) | 11.023 | calculated above |
| $Bc_{py\%}$ | Bike commuters percentage for the previous year (2017) | 1,356% | calculated above |
| $Bc_{ny\%}$ | Bike commuters percentage for the next year (2018) | 1,435% | calculated above |
| $Bc_{ny}$ | Bike commuters for the next year (2018) | 11.659 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{py}$ | Bike commuters for the previous year (2018) | 11.659 | calculated above |
| $Bc_{py\%}$ | Bike commuters percentage for the previous year (2018) | 1,435% | calculated above |
| $Bc_{ny\%}$ | Bike commuters percentage for the next year (2019) | 1,513% | calculated above |
| $Bc_{ny}$ | Bike commuters for the next year (2019) | 12.294 | |

**Source:** Author's calculations

Table 25 shows the formula and the calculation of third cycling indicator: Annual Bike Commuters Served. Given data is written with references and annual bike commuters in Eskişehir for the project years 2015-2019 is calculated and found as 10.387 for 2016, 11.023 for 2017, 11.659 for 2018, 12.294 for 2019.

## Table 26

## Annual Bike Commuters Fatalities Occurred Formula

| $Bc_r = Bc_{y1} / Bc_b$ | | | |
|---|---|---|---|
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{y1}$ | Bike commuters for the project year 1 (2016) | 10.387 | calculated above |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_r$ | Bike commuters rate to the before project (2016) | 1,065 | |
| $Bc_r = Bc_{ny} / Bc_b$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{ny}$ | Bike commuters for the next year (2017) | 11.023 | calculated above |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_r$ | Bike commuters rate to the before project (2017) | 1,130 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{ny}$ | Bike commuters for the next year (2018) | 11.659 | calculated above |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_r$ | Bike commuters rate to the before project (2018) | 1,196 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{ny}$ | Bike commuters for the next year (2019) | 12.294 | calculated above |
| $Bc_b$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_r$ | Bike commuters rate to the before project (2019) | 1,261 | |
| $Bc_{bdt} = Bc_{b\%} * Dt_b$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{b\%}$ | Bike commuters percentage before project (2015) | 1,200% | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.40. |
| $Dt_b$ | Daily trips for all modes before project (2015) | 1.431.825 | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.30. |
| $Bc_{bdt}$ | Bike commuters daily trips before project (2015) | 17.182 | |
| $Bc_{fb} = (Bc_{bdt} * Tf_b) / Dt_b$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{bdt}$ | Bike commuters daily trips before project (2015) | 17.182 | calculated above |
| $Tf_b$ | Traffic fatalities for all modes before project (2015) | 87 | General Directorate of Security Presidency of Traffic Services, Traffic Statistic Bulletin, 2015, http://www.trafik.gov.tr/Sayfalar/Istatistikler.aspx (9.12.2016), p.5. |
| $Dt_b$ | Daily trips for all modes before project (2015) | 1.431.825 | Istanbul Technical University, **Eskişehir Metropolitan Municipality Transport Master Plan's Revision Work Transport Model's Calibration Report**, 2016, p.30. |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | |
| $Bc_{fny} = (Bc_r \wedge Bc_{fdr}) * Bc_{fb}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_r$ | Bike commuters rate to the before project (2016) | 1,065 | calculated above |
| $Bc_{fdr}$ | Annual bike commuters fatalities decrease rate | 0,400 | P. L. Jacobsen, "Safety in Numbers", **Injury Prevention**, Vol.9, (2003), p.208. |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2016) | 1,071 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_r$ | Bike commuters rate to the before project (2017) | 1,130 | calculated above |
| $Bc_{fdr}$ | Annual bike commuters fatalities decrease rate | 0,400 | P. L. Jacobsen, "Safety in Numbers", **Injury Prevention**, Vol.9, (2003), p.208. |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2017) | 1,096 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_r$ | Bike commuters rate to the before project (2018) | 1,196 | calculated above |
| $Bc_{fdr}$ | Annual bike commuters fatalities decrease rate | 0,400 | P. L. Jacobsen, "Safety in Numbers", **Injury Prevention**, Vol.9, (2003), p.208. |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2018) | 1,121 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_r$ | Bike commuters rate to the before project (2019) | 1,261 | calculated above |
| $Bc_{fdr}$ | Annual bike commuters fatalities decrease rate | 0,400 | P. L. Jacobsen, "Safety in Numbers", **Injury Prevention**, Vol.9, (2003), p.208. |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2019) | 1,145 | |

**Source:** Author's calculations

Table 26 shows the formula and the calculation of fourth cycling indicator: Annual Bike Commuters Fatalities Occurred. Given data is written with references and annual bike commuters fatalities in Eskişehir for the project years 2015-2019 is calculated and found as 1,071 for 2016, 1,096 for 2017, 1,121 for 2018, 1,145 for 2019.

## Table 27

## Total Bike Commuters Fatalities Prevented Formula

| $Bc_{fi} = Bc_{fny} - Bc_{fb}$ | | | |
|---|---|---|---|
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2016) | 1,071 | calculated above |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2016) | 0,027 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2017) | 1,096 | calculated above |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2017) | 0,052 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2018) | 1,121 | calculated above |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2018) | 0,077 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fny}$ | Bike commuters fatalities for the next year (2019) | 1,145 | calculated above |
| $Bc_{fb}$ | Bike commuters fatalities before project (2015) | 1,044 | calculated above |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2019) | 0,101 | |
| **For HEAT:** $Bc_{adt} = (Bc_{a} * Bc_{bdt}) / Bc_{b}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{a}$ | Bike commuters after project (2019) | 12.294 | calculated above |
| $Bc_{bdt}$ | Bike commuters daily trips before project (2015) | 17.182 | calculated above |
| $Bc_{b}$ | Bike commuters before project (2015) | 9.751 | calculated above |
| $Bc_{adt}$ | Bike commuters daily trips after project (2019) | 21.664 | |
| $Bc_{fp} = (Bc_{fpH} - Bc_{fi})$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fpH}$ | Annual bike commuters fatalities prevented by HEAT | 0,170 | WHO, HEAT estimate, http://www.heatwalkingcycling.org./index.php?pg=cycling&cs=result&m= (21.11.2016). |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2016) | 0,027 | calculated above |
| $Bc_{fp}$ | Annual bike commuters fatalities prevented (2016) | 0,143 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fpH}$ | Annual bike commuters fatalities prevented by HEAT | 0,170 | WHO, HEAT estimate, http://www.heatwalkingcycling.org./index.php?pg=cycling&cs=result&m= (21.11.2016). |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2017) | 0,052 | calculated above |
| $Bc_{fp}$ | Annual bike commuters fatalities prevented (2017) | 0,118 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fpH}$ | Annual bike commuters fatalities prevented by HEAT | 0,170 | WHO, HEAT estimate, http://www.heatwalkingcycling.org./index.php?pg=cycling&cs=result&m= (21.11.2016). |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2018) | 0,077 | calculated above |
| $Bc_{fp}$ | Annual bike commuters fatalities prevented (2018) | 0,093 | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fpH}$ | Annual bike commuters fatalities prevented by HEAT | 0,170 | WHO, HEAT estimate, http://www.heatwalkingcycling.org./index.php?pg=cycling&cs=result&m= (21.11.2016). |
| $Bc_{fi}$ | Annual bike commuters fatalities increase (2019) | 0,101 | calculated above |
| $Bc_{fp}$ | Annual bike commuters fatalities prevented (2019) | 0,069 | |
| $Bc_{atfp} = Bc_{fb2016} + Bc_{fb2017} + Bc_{fb2018} + Bc_{fb2019}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fp2016}$ | Annual bike commuters fatalities prevented (2016) | 0,143 | calculated above |
| $Bc_{fp2017}$ | Annual bike commuters fatalities prevented (2017) | 0,118 | calculated above |
| $Bc_{fp2018}$ | Annual bike commuters fatalities prevented (2018) | 0,093 | calculated above |
| $Bc_{fp2019}$ | Annual bike commuters fatalities prevented (2019) | 0,069 | calculated above |
| $Bc_{atfp}$ | Total bike commuters fatalities prevented after project | 0,422 | |

**Source:** Author's calculations

Table 27 shows the formula and the calculation of fifth cycling indicator: Total Bike Commuters Fatalities Prevented. Given data is written with references and total bike commuters fatalities prevented after project in Eskişehir for 2019 is calculated and found as 0,422.

When calculating total bike commuters' fatalities prevented in Table 27, annual bike commuters' fatalities prevented by HEAT is used as an input data for the calculations. When calculating economic value of total bike commuters' fatalities prevented in Table 28, both annual bike commuters' fatalities prevented by HEAT and economic value of total bike commuters' fatalities prevented by HEAT are used as input data for the calculations. Annual bike commuters' fatalities prevented by HEAT and economic value of total bike commuters' fatalities prevented by HEAT is evaluated by entering Eskişehir Bike Lane Project data to the HEAT as is seen from the Appendix 7.

Bike commuters' daily trips after project (2019) is also calculated and found 21.664 at Table 27 to be entered to HEAT at Appendix 7 as Post-intervention cycling data Q6.3: Total number of trips. And 867.620[117] is entered to the HEAT at Appendix 7 as Post-intervention cycling data Q6.5: Study Population. By following the steps of HEAT in Appendix 7, HEAT Estimate for Eskişehir Bike Lane Project at page 195 is found as an output. 0,17 is found as annual bike commuters' fatalities prevented by HEAT and 670.000 TRY is found as economic value of total bike commuters' fatalities prevented by HEAT.

[117] Turkey's city by city 2023 population, http://www.takvim.com.tr/multimedya/galeri/turkiye/iste-turkiyenin-il-il-2023teki-nufusu/26 (10 November 2016).

**Table 28**

**Economic Value of Total Bike Commuters Fatalities Prevented Formula**

| $Bc_{tpH} = Bc_{fpH} * Y_p$ | | | |
|---|---|---|---|
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{fpH}$ | Annual bike commuters fatalities prevented by HEAT | 0,170 | WHO, HEAT estimate, http://www.heatwalkingcycling.org./index.php?pg=cycling&cs=result&m= (21.11.2016). |
| $Y_p$ | Total number of years of the project | 4 | calculated above |
| $Bc_{tfpH}$ | Total bike commuters fatalities prevented by HEAT | 0,680 | |
| $EBc_{atfp} = (Bc_{atfp} * EBc_{tfpH}) / Bc_{tfpH}$ | | | |
| **Abbreviation** | **Definition** | **Data** | **References** |
| $Bc_{atfp}$ | Total bike commuters fatalities prevented after project | 0,422 | calculated above |
| $EBc_{tfpH}$ | Economic value of total bike commuters fatalities prevented by HEAT (TRY) | 670.000 | WHO, HEAT estimate, http://www.heatwalkingcycling.org./index.php?pg=cycling&cs=result&m= (21.11.2016). |
| $Bc_{tfpH}$ | Total bike commuters fatalities prevented by HEAT | 0,680 | calculated above |
| $EBc_{atfp}$ | Economic value of total bike commuters fatalities prevented after project (TRY) | 415.850 | |

**Source:** Author's calculations

Table 28 shows the formula and the calculation of sixth cycling indicator: Economic Value of Total Bike Commuters Fatalities Prevented. Given data is written with references and economic value of bike commuters fatalities prevented after project in Eskişehir in 2019 is calculated and found as 415.850 TRY.

# 6. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This thesis is prepared to solve the most problematic issue in Turkish cities for citizens: Urban mobility problems which citizens are suffering from since 2010s with the increasing city population and traffic. The solution is offered by finding answers to the Main Questions of the thesis in Chapter 1. EU also faced these problems in 2000s and found the solution for these urban mobility problems by developing and implementing people oriented SUMPs which focus on sustainable urban mobility modes: PT and non-motorised transport (walking and cycling). By implementing SUMPs, urban mobility problems started to be solved in the EU cities and cities became more livable for their citizens and this brought environmental, economic and social benefit to the EU cities.

Since Turkish cities is now heavily suffering from the same urban mobility problems, pursuing EU cities proved sustainable urban mobility solution: SUMPs are advised in this thesis for the Turkish cities to solve their urban mobility problems.

Under this idea, first Sustainable Urban Mobility Questionnaire was held for all 30 Turkish Metropolitan Municipalities Urban Transport Departments to evaluate the current state of Turkish cities Transport Master Plans towards SUMPs. 26 out of 30 Turkish metropolitan municipalities answered the questionnaire. The participation rate is 87%. Findings are detailedly mentioned at Chapter 3 and analyses for each question are listed collectively.

Considering the sustainable mobility concept is very new in Turkey, aged Transport Master Plans include less SUMP elements than the new ones. Most of the metropolitan municipalities are not adhere to the Transport Master Plans duration of 15 years. When considering the SUMP planning period of 1-3 years, metropolitan municipalities which will revise their Transport Master Plans soon, don’t have enough planning time to convert their Transport Master Plans to SUMPs but they can include some SUMP elements into their Transport Master Plans. The metropolitan municipalities with later revisions have enough planning time to convert their plans to SUMPs.

Only large metropolitan municipalities are preparing their Transport Master Plans. Smaller sized cities do not possess the necessary resources, both financially and technically to involve in the Transport Master Plans' preparation.

Budgets of the urban transport departments are not compatible with the population of the cities. Converting Transport Master Plans to SUMPs is not directly a financial issue but considering it is a new process and planning from the beginning with all related stakeholders, including new SUMP elements in current Transport Master Plans, taking capacity building trainings and technical support from outside, SUMPs will be costy at the beginning. But SUMPs will reimburse these costs economically, environmentally and socially in the near future. So, the metropolitan municipalities that have higher budgets is more advantageous at the beginning when converting their Transport Master Plans to SUMPs.

The size of the city and the number of workers are not proportional. The number of workers in Urban Transport Departments are insufficient to prepare SUMPs and also, they are not qualified on SUMPs. It is urgently necessary to increase the number of workforce in Urban Transport Departments and then increase their capacity with trainings and consultancies.

PT and Inter-modality are the leading SUMP elements involved in current Transport Master Plans. PT's high involvement in current Transport Master Plans are pleasing when considering that PT is one of the main sustainable transport mode beside non-motorised transport (walking and cycling). Urban logistics and non-motorised transport (walking and cycling) are the least rated SUMP elements involved in current Transport Master Plans because these categories are comparatively new and not mostly focused in current transport planning. It seems to be crucial to support the least rated SUMP elements especially non-motorised transport (walking and cycling) and to raise awareness for cleaner and more sustainable planning for Turkish Cities. It is found surprising that all SUMP elements are partially implemented even some of them are not in their current Transport Master Plans. These results show that SUMP elements' importance and necessity are already recognised and SUMP elements are started to be

partially implemented by most of the metropolitan municipalities so the transition of these metropolitan municipalities to SUMPs from their current Transport Master Plans will be easier.

The importance of SUMP related plans' (Local Land-use Plans and Out Region Transport Plans) inside Transport Master Plans are already recognised by most of the metropolitan municipalities so that the transition to SUMPs from current Transport Master Plans with these metropolitan municipalities will be easier.

Private transport authorities, Citizens, Elderly people, Universities, Metropolitan municipality related transport authorities, Parents/children and Disabled people are the leading stakeholders involved in current Transport Master Plans. Private transport authorities are found as the most important stakeholder in current Transport Master Plans and their existence and importance at the current Transport Master Plans proved the ongoing urban mobility problems. Private transport authorities should be at the last rows because SUMPs offer sustainable transport modes like PT, non-motorised transport (walking and cycling) to solve the problems. Universities are also among the leading stakeholders because lack of qualified workforce in metropolitan municipalities, Transport Master Plans are prepared by universities. It is found surprising and pleasing that, groups from society such as Citizens, Elderly people, Parents/children and Disabled people are also among the most important stakeholders. This means that people have already taken as a partner when planning current Transport Master Plans. Since SUMPs are people focused plans, these results show that when converting current Transport Master Plans to SUMPs, people focused stakeholder participation is ready. Bicycle rental operators, Landowners and Car sharing companies are the least rated stakeholders involved in current Transport Master Plans because these categories are comparatively new and not mostly focused in Transport Master Plans. It is necessary to involve inexistent stakeholders to Master Plans and increase the roles of existent stakeholders for a better SUMP development. Bicyle rental operators' inexistency in some cities or existency but least involvement is the most important problem to be solved because SUMPs main dependency is sustainable transport modes like PT and non-motorised

transport (walking and cycling). So, Bicycle rental operators existency and full involvement to the Transport Master Plans should be provided.

Municipality associations, Disabled people, Citizens, Development agencies, EU authorities/funds, Universities and Metropolitan municipality related transport authorities are the leading stakeholders interested in SUMP implementation. Municipality associations' interest to SUMP implementation is also a very encouraging picture for Turkey because municipality associations' support will transfer the idea and also best cases of SUMPs to other municipalities and this will help metropolitan municipalities to convert their Transport Master Plans to SUMPs. It is also found pleasing that Disabled people, Citizens, Universities and Metropolitan municipality related transport authorities are interested to SUMP implementation because they are also among the most important stakeholders in current Transport Master Plans and their interest to SUMP implementation show that they are close to the SUMP idea and will help metropolitan municipalities on the way towards SUMPs. Expectedly, Development agencies and EU authorities are also among the most rated stakeholders on SUMP implementation because SUMP is an EU concept and Development Agencies in Turkey were established to develop the regions of Turkey on the Turkey's pre-accession period to the EU. Motorist associations, Private transport authorities and Landowners are the least rated stakeholders interested to SUMP implementation. They have interests in maintaining the current car-oriented planning approach since they benefit or believe to benefit from it. Improvement could be achieved by trainings and workshops to teach elements and clear up benefits and chances of SUMPs to negatively positioned stakeholders and gain higher degrees of acceptance overall. It is found surprising and pleasing that even Private transport authorities and Motorist associations are inside the least rated stakeholders, some metropolitan municipalities responded Private transport authorities and Motorist associations are actively supportive to SUMP implementation. By taking Private transport authorities and Motorist associations' support for SUMPs, it is easier to leave the car-oriented planning approach in Turkey. Since Ministry of Environment and Urbanisation are responsible from non-motorised transport (walking and cycling) strategy and Ministry of Transport, Maritime Affairs and Communications are responsible from motorised

transport strategy, their neutral sight to SUMP implementation should be immediately changed in order to develop SUMPs. Capacity building trainings about SUMPs including the concept, elements, best practices, benefits should be given to the technical experts and decision makers in these Ministries in order them to put SUMPs on Turkey's transport agenda.

"Content of current Transport Master Plans" is the most rated strength towards developing a successful SUMP. This shows that current Transport Master Plans are not far away from SUMPs, include SUMP elements. This will ease metropolitan municipalities' workload when converting Transport Master Plans to SUMPs.

"Financial resources" are the most rated weakness towards developing a successful SUMP. This shows that metropolitan municipalities will need extra budget, incentive in order to develop SUMPs. Even annual budgets of urban transport departments are insufficient, current Transport Master Plans were prepared with these limited budgets. By thinking SUMP will reimburse its costs economically, environmentally and socially in the near future, it is more feasible for metropolitan municipalities to prepare SUMPs with their limited budgets than preparing current Transport Master Plans.

It is found encouraging to see that "Political will/vision" is the most rated opportunity towards developing a successful SUMP because in Turkey the decision makers of Transport Master Plans are politicians. So, their desire means that current Transport Master Plans will be easily converted to SUMPs in near future with the help of these politicians.

As being most rated weakness towards developing a successful SUMP, "Financial resources" are also the most rated threat. This result also highlights the need for extra budget for SUMP planning. As a result, costs of developing SUMPs, their economic benefits and financial returns in future should be evaluated and explained clearly to decision makers and all related stakeholders to convince them to develop SUMPs.

To take a full picture from the Sustainable Urban Mobility Questionnaire, SUMP Ranking is prepared by evaluating the 10 variables of the questionnaire which sufficiently describe SUMPs: Transport Master Plan Duration, Transport Master Plan next Revision, Transport Master Plan Preparation, Urban Transport Departments Annual Budget, Urban Transport Departments Workforce, Qualified Workforce for SUMPs, Involvement of SUMP Elements to Transport Master Plans, Involvement of SUMP Related Plans, Involvement of Stakeholders, Stakeholder Interest to SUMPs. As a summary of the SUMP Ranking, 2 metropolitan municipalities from 12 (17%), Denizli and İstanbul get Success Rate in between 0%-50% which means variables that describe SUMPs are not included in their current Transport Master Plans. Since İstanbul is suffering from urban mobility problems at most, İstanbul's involvement in this category proves the necessity of sustainable urban mobility solutions to solve urban mobility problems. But Transport Master Plans adaptation to SUMPs are more difficult in these cities. 10 metropolitan municipalities from 12 (83%), Şanlıurfa, Van, Mersin, Malatya, Kocaeli, Eskişehir, Diyarbakır, Manisa, Tekirdağ, İzmir, get Success Rate in between 50%-100% which means variables that describe SUMPs are included in their current Transport Master Plans. Transport Master Plans will be more easily converted to SUMPs in these cities. Even necessities are higher for SUMPs, it is harder to plan and develop SUMPs for the cities in between 0%-50% than the cities in between 50%-100%.

As a result of the questionnaire, even PT included in current Transport Master Plans, non-motorised transport (walking and cycling) are found to be non-included. Since current Transport Master Plans are motorised modes and infrastructure oriented plans, the metropolitan municipalities are aware and close to the people oriented SUMP planning idea and starting to implement non-motorised transport (walking and cycling) partially even they are not in their Transport Master Plans. But there is not enough qualified, experienced human source, capacity and budget to plan and implement non-motorised transport (walking and cycling). Findings from the questionnaire proves the first Hypothesis of the thesis: Turkish cities have deficiencies on planning and implementing bike lane projects. By considering the metropolitan municipalities are close to the SUMP idea, the only missing issue is to accelerate decision makers in metropolitan

municipalities to convert their Transport Master Plans to SUMPs by including non-motorised transport (walking and cycling). Then the number of workforce in metropolitan municipalities needs to be increased and trained via capacity building trainings. When thinking the ongoing Transport Master Plans' high budgets and their congestion caused problematic results which brought more economic loss and unliveable cities, SUMPs costs are not higher than these costs and SUMPs will also reimburse their costs economically, environmentally and socially in the near future. So, it is more feasible for metropolitan municipalities to prepare SUMPs with their limited budgets than preparing current Transport Master Plans.

By taking into consideration Turkey's ongoing strategic, legal and financial support to cycling; cycling is found the most important sustainable urban mobility solution for Turkish cities to solve ongoing urban mobility problems. Findings from the questionnaire and Turkey's new regulation and incentives for cycling proves the second Hypothesis of the thesis: Bike lane projects implementation on behalf of SUMP adaptation to Turkish cities will solve urban mobility problems in Turkish cities. Since cycling is a very new planning and implementation concept in Turkey, their future impacts are not evaluated before. To fill this gap and to motivate decision makers at metropolitan municipalities to plan and implement bike lanes, cycling indicators are created to evaluate the future impacts of new bike lane projects according to the available data collected for current Transport Master Plans. Indicators are developed to calculate the bike commuters served with the project, how many bike commuters' fatalities will be prevented and its economic value.

As a case study, evaluation of Eskişehir Bike Lane Project with this cycling indicators are summarized collectively.

With the 8,478 kilometers long new bike lane project which was started in 2015 under SUMP, city of Eskişehir's total bike lane will be 55,867 kilometers long at the end of the project in 2019.

During the new bike lane project implementation in between 2016 and 2019, the annual number of bike commuters will increase. Number of bike commuters in 2016 in Eskişehir will be 10.387 people. Number of bike commuters in 2017 in Eskişehir will be 11.023 people. Number of bike commuters in 2018 in Eskişehir will be 11.659 people. At the end of the project in 2019, the 55,867 kilometers long new bike lane will serve to 12.294 bike commuters.

By using new bike lane in between 2016-2019, annual number of bike commuters' fatalities will also increase. Number of bike commuter fatality in 2016 in Eskişehir will be 1,071 person. Number of bike commuter fatality in 2017 in Eskişehir will be 1,096 person. Number of bike commuter fatality in 2017 in Eskişehir will be 1,121 person. At the end of the project in 2019, the 55,867 kilometers long new bike lane will cause 1,145 bike commuter fatality.

By thinking the health effects of implementing new bike lane project in Eskişehir with the help of HEAT; new bike lane will prevent 0,68 bike commuter fatality in 2019 and economic value of preventing 0,68 bike commuter fatality is 670.000 TRY.

By taking into consideration both the bike commuter fatality increase with the project and bike commuter fatality prevented during the project by HEAT, new bike lane project in Eskişehir will prevent 0,422 bike commuter fatality in 2019 as a conclusion. And economic value of preventing 0,422 bike commuter fatality is 415.850 TRY.

Since projected bike lane kilometers are not high in Eskişehir case, bike commuters' fatalities prevented after project seems to be low. But when it comes to the economic value of fatalities prevented, it is found significantly high. Economic value of Eskişehir case proves that if Turkish metropolitan municipalities will implement new bike lanes as a sustainable urban mobility solution to solve urban mobility problems, it will also bring high economic benefit besides solving urban mobility problems. Cycling indicators will help evidence-based decision making. This enhanced knowledge will help facilitate effective integration of non-motorised transport (walking and cycling) into Transport Master Plans, transforming them to SUMPs. In doing so Turkish cities will be

better places to improve health, increase economic efficiency, enhance access. This will also assist decision makers understand the economic return on investment that can be achieved through increasing expenditure on non-motorised transport (walking and cycling).

After summarizing the conclusions of this thesis, recommendations for future research is mentioned at the below paragraphs.

This thesis is important to be the first thesis in Turkey developed to solve Turkey's ongoing urban mobility problems by converting Turkey's Traditional Transport Master Plans to SUMPs by adding the missing sustainable transport mode: cycling. On the path towards motivating decision makers to plan and implement bike lanes to increase cycling, indicators to show future positive monetised health effects of bike lane projects are developed. By using the outcomes of this thesis as a base and develop these outcomes for future studies are seen very valuable and important for Turkey. Besides the developed indicators in this thesis; new indicators to evaluate ex-ante effects of bike lane projects or new indicators to evaluate the ex-post effects of implemented bike lane projects should be developed to pursue showing the social, economic and environmental benefits of bike lane projects. On the impact analyses with these indicators, the main missing issue in Turkey is the availability of data. For that reason, to analyse the effects of bike lane projects, collecting the necessary data by municipalities and make this date public available by central government are the main necessities.

Even cycling is found as the missing sustainable transport mode in Turkey on the path towards SUMPs; by taking the positive air quality, congestion, quality of life effects, cycling is now entering the focus of Turkish central government, local governments and user groups after the new cycling developments in the world. For that reason, cycling is found the next big thing for its openness to be developed as a sustainable transport mode to solve ongoing urban mobility problems. As a promising area, missing issues on cycling should be well determined and future studies should be developed to fulfill these missing issues. One of the main missing issue on cycling is the ongoing Regulation not covering the bike sharing systems; just covering the planning and

implementing of bike lanes, bike stations and bike parks. For that reason, ongoing Regulation should be revised by adding bike sharing systems because bike sharing systems are the main supporters to increase cycling as well as the bike lanes. Bike sharing systems, especially the dockless ones are the new developments in the world. To motivate decision makers to plan and implement bike sharing systems; studies should be done to bring new developments on bike sharing systems, show best practices and benefits.

As mentioned in this thesis, ongoing Regulation on Cycling is not obligatory but bike lane projects planned according to the Regulation are financially supported on the implementation. As none of municipalities benefitted from this financial support shows that current bike lane projects are not planned and implemented according to the regulation. This means there is a lack of capacity in the municipalities to plan and implement bike lanes according to the regulation. Capacity building trainings should be developed and given to technical experts in the municipalities which will bring new bike lane plans in align with the Regulation and municipalities can benefit from implementation support to decrease their costs. Including international site visits to this training will bring the new developments on cycling and experiences from best practices to Turkey. Besides trainings, academic studies to bring the world literature and best practices are very important to develop capacity on cycling.

# APPENDIX

## APPENDIX 1: SUMP Planning Cycle

According to the Figure 1, SUMP Planning Cycle includes 4 phases with 11 main steps made up of 32 activities:

### PHASE 1: PREPARING WELL

#### Step 1: Determine your Potential for a Successful SUMP

##### Activity 1: Commit to overall Sustainable Mobility Principles

The city should check what sustainability principles are already inside transport policy and their alignment with the current SUMP agenda.

##### Activity 2: Assess Impact of Regional/National Framework

The city should identify what relevant regional, national and European framework conditions are there and how they will influence the SUMP.

##### Activity 3: Conduct Self-Assessment

The city should conduct a self-assessment to identify strengths, weaknesses, opportunities, threats (SWOT Analysis) of current planning practices with regard to developing a SUMP in its own local context. The assessment results should be used for improving planning processes and policies of SUMPs.

##### Activity 4: Review Availability of Resources

Availability of human and financial resources in the city should be checked before developing the SUMP. Skill management plan should be developed; budget for running SUMP should be approved politically; local, regional, national and the EU funding opportunities should be considered.

**Activity 5: Define Basic Timeline**

Determining the right timeline for the city affects SUMP's success. Realistic timeline for developing SUMP by taking into consideration election periods, legislation and regulation processes, minimises the timing risks. It should be 1-3 years for the city to build a strategic and operational framework for the sustainable urban mobility planning. The sustainable urban mobility planning should be 1,5 years in the ideal case. Implementation of SUMP should be 3-10 years and SUMP should be updated at least every 5 years.

**Activity 6: Identify Key Actors and Stakeholders**

Identifying key actors and stakeholders and understanding their potential role and position is important for the city to develop and implement a successful SUMP.

**Step 2: Define the Development Process and Scope of Plan**

**Activity 7: Look beyond your own Boundaries and Responsibilities**

Firstly, SUMP area should be well identified, then responsibilities of authorities and planning team will be determined and last of all political agreement should be signed.

**Activity 8: Strive for Policy Coordination and an Integrated Planning Approach**

When SUMPs are planning for the city, the main problem is the coordination deficiency in between policies and organisations in the previous urban transport plans. SUMP should need to serve economic, social and environmental needs of society and should integrate with other policies of the city, should include integration of different transport modes.

**Activity 9: Plan Stakeholder and Citizen Involvement**

To involve all stakeholders like authorities, private businesses, civil society, citizens, organisations to the SUMP process, make SUMP more effective, democratic,

transparent and cost efficient. And this involvement also increases SUMP's acceptance and legitimacy.

**Activity 10: Agree on Workplan and Management Arrangements**

To prepare SUMP, work plan should be developed to determine management arrangements between all stakeholders with a political approval.

**Step 3: Analyse the Mobility Situation and Develop Scenarios**

**Activity 11: Prepare an Analysis of Problems and Opportunities**

Evaluating the current state assessment of transport and mobility situation of the city is very important in order to enhance SUMP.

**Activity 12: Develop Scenarios**

Most efficient and effective scenarios should be developed for future situations.

## PHASE 2: RATIONAL AND TRANSPARENT GOAL SETTING

**Step 4: Develop a Common Vision**

**Activity 13: Develop a Common Vision of Mobility and Beyond**

SUMP should be based on city's long term desired transport and mobility vision for all transport modes. This vision will be more effective if it is developed with all key stakeholders and includes other policy areas.

**Activity 14: Actively Inform the Public**

For developing a successful SUMP, citizen support by involving and informing about vision development processes should be taken.

### Step 5: Set Priorities and Measurable Targets

#### Activity 15: Identify the Priorities for Mobility

When building the vision of the SUMP, priorities of the city should be identified according to the social, environmental and economic needs.

#### Activity 16: Develop Smart Targets

To evaluate SUMPs, SMART (Specific, Measurable, Achievable, Realistic, Time-bound) targets should be developed to monitor changes.

### Step 6: Develop Effective Packages of Measures

#### Activity 17: Identify the most Effective Measures

To achieve the SUMP vision, measures should be selected in accordance with the available sources.

#### Activity 18: Learn from Others'Experience

For effective measure selection, it is easy and cost efficient to learn from the other city's experiences that have already implemented the same measures before.

#### Activity 19: Consider Best Value for Money

For effective measure selection, it is crucial to choose the measures that seem financially feasible and affordable.

#### Activity 20: Use Synergies and Create Integrated Packages of Measures

To increase the scale of impact, integrated packages of measures will have greater impact than isolated ones. Besides measures from transport and mobility, measures from other policy areas should be also in the plan.

## PHASE 3: ELABORATING THE PLAN

### Step 7: Agree on Clear Responsibilities and Allocate Budgets

#### Activity 21: Assign Responsibilities and Resources

After selecting measures of SUMPs, for implementation of measures; responsibilities and resources (human, knowledge, funds) should be assigned with close coordination with stakeholders.

#### Activity 22: Prepare an Action and Budget Plan

According to assigned responsibilities and resources, detailed action and budget plan including the measures and priorities should be prepared.

### Step 8: Build Monitoring and Assessment into the Plan

#### Activity 23: Arrange for Monitoring and Evaluation

Monitoring and evaluation helps to identify difficulties and effectiveness of the SUMP. The results should be shared with public and all stakeholders in order to make the necessary corrections.

### Step 9: Adopt SUMP

#### Activity 24: Check the Quality of the Plan

After finishing the final draft of the SUMP, quality of the SUMP should be checked and final amendments should be completed with stakeholders.

#### Activity 25: Adopt the Plan

SUMPs should be adopted by elected representatives of responsible public authorities. Adoption can take few months.

### Activity 26: Create Ownership of the Plan

SUMPs should be accepted among all stakeholders and citizens.

## PHASE 4: IMPLEMENTING THE PLAN

### Step 10: Ensure Proper Management and Communication (When Implementing the Plan)

### Activity 27: Manage Plan Implementation

Implementation of the SUMP is shorter than the planning process but in order to implement the SUMP according to the goals, agreements should be signed in order to manage responsibilities with all stakeholders responsible from implementation. This will eliminate risks and increase the transparency of implementation.

### Activity 28: Inform and Engage Citizens

When implementing SUMP, stakeholders and citizens should be informed about the progress to raise their awareness, acceptance and ownership.

### Activity 29: Check Progress towards Achieving the Objectives

When implementing the SUMP, implementation of the measures should be regularly monitored and shared with all stakeholders and citizens in order to see how much progress will be achieved towards objectives.

### Step 11: Learn the Lessons

### Activity 30: Update Current Plan Regularly

The evaluation of the SUMPs can help cities to update the plan and the implementation.

### Activity 31: Review Achievements– Understand Success and Failure

Effectiveness of the SUMPs should be reviewed in order to understand achievements and track the learnt lessons.

### Activity 32: Identify New Challenges for next SUMP Generation

Lessons learnt from current SUMP will definitely help the next SUMP.

**APPENDIX 2: SUMP Cities in the EU**

According to the Figure 2, the EU cities that implemented SUMPs are:

- Graz, Innsbruck, Linz, Salzburg, Wien from Austria
- Antwerpen, Brugge, Brussel, Charleroi, Gent, Liège, Namur, Burgas, Pleven, Plovdiv, Ruse, Sofia, Stara Zagora, Varna from Bulgaria
- Osijek, Rijeka, Split, Zagreb from Croatia,
- Lefkosia, Lemesos from Cyprus
- Brno, Liberec, Ostrava, Plzeň, Praha, Aalborg, Århus, København, Odense from Denmark
- Tallinn from Estonia
- Helsinki, Jyväskylä, Lahti, Oulu, Tampere, Turku from Finland
- Aix-en-Provence, Amiens, Angers, Angoulème, Annecy, Argenteuil – Bezons, Aubagne, Avignon, Bayonne, Besançon, Béziers, Bordeaux, Boulogne-sur-mer, Brest, CA de la Vallée de Montmorency, CA de Sophia-Antipolis, CA du Val d'Orge, CA Europ' Essonne, CA Val de France, Caen, CC de la Boucle de la Seine, Cergy-Pontoise, Chalon-sur-Saône, Chambery, Chartres, Clermont-Ferrand, Dijon, Douai, Dunkerque, Evry, Fort-de-France,Grenoble, Hénin – Carvin, La Rochelle, Le Havre, Le Mans, Lens – Liévin, Lille, Limoges, Lorient, Lyon, Marseille, Melun, Metz, Montbelliard, Montpellier, Mulhouse, Nancy, Nantes, Nice, Nimes, Niort, Orléans, Paris, Pau, Perpignan, Poitiers, Reims, Rennes, Rouen, Saint Denis, Saint-Brieuc, Saint-Etienne, Saint-Nazaire, Saint-Quentin en Yvelines, Strasbourg, Toulon, Toulouse, Tours, Troyes, Valence, Valenciennes, Vannes, Versailles from France
- Aachen, Augsburg, Bergisch Gladbach, Berlin, Bielefeld, Bochum, Bonn, Bottrop, Braunschweig, Bremen, Bremerhaven, Chemnitz, Cottbus, Darmstadt,

Dortmund, Dresden, Duisburg, Düsseldorf, Erfurt, Erlangen, Essen, Frankfurt am Main, Freiburg im Breisgau, Fürth, Gelsenkirchen, Göttingen, Hagen, Halle an der Saale, Hamburg, Hamm, Hannover, Heidelberg, Heilbronn, Herne, Hildesheim, Ingolstadt, Jena, Karlsruhe, Kassel, Kiel, Koblenz, Köln, Krefeld, Leipzig, Leverkusen, Lübeck, Ludwigshafen am Rhein, Magdeburg, Mainz, Mannheim, Moers, Mönchengladbach, Mülheim a.d.Ruhr, München, Münster, Neuss, Nürnberg, Oberhausen,Offenbach am Main, Oldenburg (Oldenburg), Osnabrück, Paderborn, Pforzheim, Potsdam, Recklinghausen, Regensburg, Remscheid, Reutlingen, Rostock, Saarbrücken, Salzgitter, Siegen, Solingen, Stuttgart, Trier, Ulm, Wiesbaden, Wolfsburg, Wuppertal, Würzburg from Germany

- Athina, Irakleio, Larisa, Pátra, Thessaloniki from Greece
- Budapest, Debrecen, Győr, Kecskemét, Miskolc, Nyíregyháza, Pécs, Szeged, Székesfehérvár from Hungary
- Cork, Dublin from Ireland
- Ancona, Bari, Bergamo, Bologna, Bolzano, Brescia, Cagliari, Catania, Ferrara, Firenze, Foggia, Forlì, Genova, Latina, Livorno, Messina, Milano, Modena, Napoli, Novara, Padova, Palermo, Parma, Perugia, Pescara, Prato, Ravenna, Reggio di Calabria, Reggio nell'Emilia, Rimini, Roma, Salerno, Sassari, Siracusa, Taranto, Terni, Torino, Trento, Trieste, Venezia, Verona, Vicenza from Italy
- Rīga from Latvia
- Kaunas, Klaipėda, Šiauliai, Vilnius from Lithuania
- Luxembourg from Luxembourg
- Valletta from Malta
- Almere, Amersfoort, Amsterdam, Apeldoorn, Arnhem, Breda, Dordrecht, Ede, Eindhoven, Enschede, Groningen, Haarlem, Haarlemmermeer, Leiden, Maastricht,

Nijmegen, Rotterdam, 's-Gravenhage, 's-Hertogenbosch, Tilburg, Utrecht, Venlo, Zoetermeer, Zwolle from Netherlands

- Białystok, Bielsko-Biała, Bydgoszcz, Częstochowa, Elbląg, Gdańsk, Gdynia, Katowice, Gorzów Wielkopolski, Kalisz, Kielce, Koszalin, Kraków, Legnica, Łódź, Lublin, Olsztyn, Opole, Płock, Poznań, Radom, Rybnik, Rzeszów, Szczecin, Tarnów, Toruń, Wałbrzych, Warszawa, Włocławek, Wrocław, Zielona Góra from Poland

- Braga, Coimbra, Funchal, Guimarães, Lisboa, Porto, Setúbal, Sintra, Vila Franca de Xira from Portugal

- Arad, Bacău, Baia Mare, Botoşani, Brăila, Braşov, Bucureşti, Buzău, Cluj-Napoca, Constanţa, Craiova, Drobeta-Turnu Severin, Galaţi, Iaşi, Oradea, Piatra Neamţ, Piteşti, Ploieşti, Râmnicu Vâlcea, Satu Mare, Sibiu, Suceava, Târgu Mureş, Timişoara from Romania

- Bratislava, Košice from Slovakia

- Ljubljana, Maribor from Slovenia

- A Coruña, Albacete, Alcalá de Henares, Alcobendas, Alcorcón, Algeciras, Alicante, Almería, Badajoz, Barcelona, Bilbao, Burgos, Cádiz, Cartagena, Castellón de la Plana, Córdoba, Dos Hermanas, Elche, Fuenlabrada, Getafe, Gijón, Granada, Huelva, Jaén, Jerez de la Frontera, Las Palmas, Leganés, León, Lleida, Logroño, Madrid, Málaga, Marbella, Mataró, Móstoles, Murcia, Ourense, Oviedo, Palma de Mallorca, Pamplona/Iruña, Parla, Reus, Salamanca, San Cristóbal de la Laguna, San Sebastián, Santa Cruz de Tenerife, Santander, Sevilla, Tarragona, Terrassa, Torrejón de Ardoz, Valencia, Valladolid, Vigo, Vitoria/Gasteiz, Zaragoza from Spain

- Borås, Göteborg, Helsingborg, Jönköping, Linköping, Lund, Malmö, Norrköping, Örebro, Stockholm, Umeå, Uppsala, Västerås from Sweden

- Aberdeen, Ashford, Barnsley, Basildon, Basingstoke and Deane, Bath and North East Somerset, Bedford, Belfast, Blackburn with Darwen, Blackpool,

Bournemouth, Bracknell Forest, Bradford, Brighton and Hove, Bristol, Cambridge, Cardiff, Carlisle, Chelmsford, Cheltenham, Cheshire West and Chester, Chesterfield, Colchester, Coventry, Crawley, Dacorum, Darlington, Derby, Derry, Doncaster, Dundee City, East Staffordshire, Edinburgh, Exeter, Falkirk, Glasgow, Gloucester, Gravesham, Manchester, Nottingham, Guildford, Halton, Ipswich, Kingston-upon-Hull, Kirklees, Leeds, Leicester, Lisburn, Liverpool, London, Luton, Maidstone, Mansfield, Medway, Middlesbrough, Milton Keynes, Newcastle-under-Lyme, Newport, North East Lincolnshire, North Lanarkshire, Northampton, Norwich, Nuneaton and Bedworth, Oxford, Peterborough, Plymouth, Poole, Portsmouth, Preston, Reading, Rotherham, Sheffield, Slough, Southampton, Southend-on-Sea, St Albans, Stockton-on-Tees, Stoke-on-trent, Sunderland, Swansea, Swindon, Telford and Wrekin, Thanet, Thurrock, Torbay, Tunbridge Wells, Newcastle upon Tyne, Wakefield, Warrington, Warwick, Waveney, Birmingham, Wirral, Worthing, Wrexham, Wycombe, York from UK

- Nysa from Poland.

## APPENDIX 3: Sustainable Urban Mobility Questionnaire

| **1. Part_Current Situation** | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| 1. When did your current Transport Master Plan starts? | | | | | | | | | | | | | | | | |
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| 2. Until when is your current Transport Master Plan running? | | | | | | | | | | | | | | | | |
| | 2016 | 2017 | 2018 | 2019 | 2020 | | | | | | | | | | | |
| 3. When will the next revision of the current Transport Master Plan take place? | | | | | | | | | | | | | | | | |
| | Metropolitan Municipality | University | Engineering/Research company | Academician/Researcher | | | | | | | | | | | | |
| 4. Which entity prepared the current Transport Master Plan? | | | | | | | | | | | | | | | | |

| **2. Part_Human and Financial Resources** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 m TRY | 1-10 m TRY | 10-20 m TRY | 20-30 m TRY | 30-40 m TRY | 40-50 m TRY | 50-60 m TRY | 60-70 m TRY | 70-80 m TRY | 80-90 m TRY | 90-100 m TRY | 100 m TRY< |
| 5. How high is your annual budget for your Urban Transport Department? | | | | | | | | | | | | |
| | <10 | 10-25 | 25-50 | 50< | | | | | | | | |
| 6. How many workers are currently employed in your planning authority? | | | | | | | | | | | | |
| | <10 | 10-25 | 25-50 | 50< | | | | | | | | |
| 7. How many are qualified to drive the process of the planning for a SUMP? | | | | | | | | | | | | |

| **3. Part_Situation of SUMPs in Current Transport Master Plans** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8. Which of the following SUMP elements comprise your current Transport Master Plan and to what extent? | currently not included (1) | not included but planned for the next master plan (2) | not included but partially implemented (3) | not included but fully implemented and in usage (4) | included but not yet implemented (5) | included and partially implemented (6) | included, fully implemented and in usage (7) |
| PT | | | | | | | |
| Non-motorised transport (walking and cycling) | | | | | | | |
| Inter-modality | | | | | | | |
| Urban road safety | | | | | | | |
| Road transport (flowing and stationary) | | | | | | | |
| Urban logistics | | | | | | | |
| Mobility Management | | | | | | | |
| Intelligent transport systems (ITS) | | | | | | | |
| 9. Which of the following SUMP related plans comprise your current Transport Master Plan? | currently not included | not included but planned for the next master plan | included | | | | |
| Consideration of out region Transport Plans | | | | | | | |
| Consideration of the local Land-use Plans | | | | | | | |

| **3. Part_Situation of SUMPs in Current Transport Master Plans** | | | | |
|---|---|---|---|---|
| 10. Which of the following authorities are stakeholders in your current Transport Master Plan and how important are they? | inexistent (1) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) |
| Other local authorities | | | | |
| Neighbouring cities | | | | |
| Metropolitan municipality related transport authorities (IETT, EGO,.....) | | | | |
| Private transport authorities (Minibus cooperatives, taxi,…..) | | | | |
| Ministry of Transport, Maritime Affairs and Communications | | | | |
| Ministry of Environment and Urbanisation | | | | |
| Provincial Directorate of Health | | | | |
| Provincial Directorate of Security | | | | |
| EU authorities/funds | | | | |
| Development agencies | | | | |
| Transport consultants | | | | |
| Car sharing companies | | | | |
| Bicycle rental operators | | | | |
| Business associations | | | | |
| Municipality associations | | | | |
| Major employers | | | | |
| Small businesses | | | | |
| Utility services (energy, water, ……) | | | | |
| NGOs | | | | |
| Motorist associations | | | | |
| Media | | | | |
| Forums | | | | |
| Cycling groups | | | | |
| Walking groups | | | | |
| PT user groups | | | | |
| Citizens | | | | |
| Tourists | | | | |
| Disabled people | | | | |
| Landowners | | | | |
| Parents/children | | | | |
| Elderly people | | | | |
| Research institutions | | | | |
| Universities | | | | |
| Training institutions | | | | |

| **3. Part_Situation of SUMPs in Current Transport Master Plans** | | | | |
|---|---|---|---|---|
| 11. How do you estimate their interests in the implementation of a SUMP in your municipality? | negative (1) | neutral (2) | positive (3) | actively supportive (4) |
| Other local authorities | | | | |
| Neighbouring cities | | | | |
| Metropolitan municipality related transport authorities (IETT, EGO,.....) | | | | |
| Private transport authorities (Minibus cooperatives, taxi,…..) | | | | |
| Ministry of Transport, Maritime Affairs and Communications | | | | |
| Ministry of Environment and Urbanisation | | | | |
| Provincial Directorate of Health | | | | |
| Provincial Directorate of Security | | | | |
| EU authorities/funds | | | | |
| Development agencies | | | | |
| Transport consultants | | | | |
| Car sharing companies | | | | |
| Bicycle rental operators | | | | |
| Business associations | | | | |
| Municipality associations | | | | |
| Major employers | | | | |
| Small businesses | | | | |
| Utility services (energy, water, ……) | | | | |
| NGOs | | | | |
| Motorist associations | | | | |
| Media | | | | |
| Forums | | | | |
| Cycling groups | | | | |
| Walking groups | | | | |
| PT user groups | | | | |
| Citizens | | | | |
| Tourists | | | | |
| Disabled people | | | | |
| Landowners | | | | |
| Parents/children | | | | |
| Elderly people | | | | |
| Research institutions | | | | |
| Universities | | | | |
| Training institutions | | | | |

| **4. Part_SWOT Analysis** | Content of current Transport Master Plan | Content of current Logistic Master Plan | Data availability/ Unavailability | Expertise availability/ Unavailability | Financial resources | Urban pattern/ Infrastructure | Political will and vision | Citizens support | Stakeholder support | Innovative potential |
|---|---|---|---|---|---|---|---|---|---|---|
| 12. Which strengths towards developing a successful SUMP does your city offer? | | | | | | | | | | |
| 13. Which weaknesses towards developing a successful SUMP does your city offer? | | | | | | | | | | |
| 14. Which opportunities towards developing a successful SUMP does your city offer? | | | | | | | | | | |
| 15. Which threats towards developing a successful SUMP does your city offer? | | | | | | | | | | |

# APPENDIX 4: Sustainable Urban Mobility Questionnaire Answers

| | 1. Part_Current Situation | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1. When did your current Transport Master Plan starts? | 2. Until when is your current Transport Master Plan running? | Duration of Master Plan | 3. When will the next revision of the current Transport Master Plan take place? | 4. Which entity prepared the current Transport Master Plan? | | | |
| Metropolitan Municipality | Response | Response | | Response | Metropolitan Municipality | University | Engineering/Research company | Academician/Researcher |
| Gaziantep | 2004 | 2016 | 12 | 2016 | | | Engineering/Research company | |
| Kocaeli | 2010 | 2030 | 20 | 2019 | | | Engineering/Research company | Academician/Researcher |
| Konya | 2012 | 2030 | 18 | 2019 | | | Engineering/Research company | |
| Ordu | 2016 | 2031 | 15 | | | | | |
| Erzurum | 2012 | 2016 | 4 | | | | | |
| Diyarbakır | 2011 | 2016 | 5 | 2016 | | | Engineering/Research company | |
| Manisa | 2015 | 2031 | 16 | 2020 | | | Engineering/Research company | |
| Samsun | 2004 | 2016 | 12 | 2016 | | | Engineering/Research company | |
| Van | 2016 | 2021 | 5 | 2021 | | University | | |
| Eskişehir | 2003 | 2020 | 17 | 2016 | | University | | |
| Mersin | 2010 | 2030 | 20 | 2016 | | | Engineering/Research company | |
| Tekirdağ | 2013 | 2025 | 12 | 2016 | | | Engineering/Research company | |
| Kayseri | 2016 | 2022 | 6 | 2021 | Metropolitan Municipality | | | |
| İstanbul | 2011 | 2030 | 19 | 2017 | Metropolitan Municipality | | | |
| Bursa | | | 0 | | | | | |
| Malatya | 2015 | 2025 | 10 | 2020 | | University | Engineering/Research company | |
| Antalya | 2013 | 2030 | 17 | 2016 | Metropolitan Municipality | | | |
| Trabzon | 2016 | 2026 | 10 | | | | | |
| Muğla | | | 0 | | | | | |
| İzmir | 2009 | 2024 | 15 | 2016 | Metropolitan Municipality | University | | Academician/Researcher |
| Balıkesir | | | 0 | | | | | |
| Sakarya | 2012 | 2031 | 19 | 2017 | | University | Engineering/Research company | |
| Hatay | 2015 | 2030 | 15 | 2020 | | University | | Academician/Researcher |
| Ankara | 2013 | 2028 | 15 | 2020 | Metropolitan Municipality | University | | |
| Şanlıurfa | 2002 | 2017 | 15 | 2017 | | | Engineering/Research company | Academician/Researcher |
| Denizli | 2002 | 2020 | 18 | 2018 | | University | | |

| 2. Part_Human and Financial Resources | | |
|---|---|---|
| **5. How high is your annual budget for your Urban Transport Department?** | **6. How many workers are currently employed in your Urban Transport Department?** | **7. How many are qualified to drive the process of the planning for a SUMP?** |
| **Response** | **Response** | **Response** |
| 20-30 m TRY | <10 | <10 |
| 100 m TRY< | 50< | <10 |
| 20-30 m TRY | 50< | <10 |
| | | |
| | | |
| 1-10 m TRY | <10 | <10 |
| 20-30 m TRY | <10 | <10 |
| 1-10 m TRY | <10 | <10 |
| 30-40 m TRY | <10 | <10 |
| 70-80 m TRY | <10 | <10 |
| 100 m TRY< | 50< | <10 |
| 20-30 m TRY | <10 | <10 |
| 80-90 m TRY | <10 | <10 |
| 30-40 m TRY | <10 | <10 |
| | | |
| 20-30 m TRY | <10 | <10 |
| 10-20 m TRY | <10 | 10 - 25 |
| | | |
| | | |
| 100 m TRY< | 25-50 | <10 |
| | | |
| 10-20 m TRY | <10 | <10 |
| 50-60 m TRY | <10 | <10 |
| | | |
| 60-70 m TRY | 10 - 25 | <10 |
| 40-50 m TRY | 50< | 50< |

| | 2. Part_Human and Financial Resources | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 8. Which of the following SUMP elements comprise your current Transport Master Plan and to what extent? | | | | | | | |
| **Metropolitan Municipality** | **Non-motorised transport (walking and cycling)** | **Public transport (PT)** | **Inter-modality** | **Urban logistics** | **Road transport (flowing and stationary)** | **Urban road safety** | **Mobility management** | **Intelligent transport systems (ITS)** |
| Gaziantep | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | included, fully implemented and in usage (7) | included, fully implemented and in usage (7) |
| Kocaeli | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) |
| Konya | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) |
| Ordu | | | | | | | | |
| Erzurum | | | | | | | | |
| Diyarbakır | not included but planned for the next master plan (2) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) |
| Manisa | currently not included (1) | included and partially implemented (6) | not included but partially implemented (3) | currently not included (1) | not included but partially implemented (3) | currently not included (1) | included and partially implemented (6) | not included but partially implemented (3) |
| Samsun | currently not included (1) | included and partially implemented (6) | not included but fully implemented and in usage (4) | currently not included (1) | not included but partially implemented (3) | currently not included (1) | not included but partially implemented (3) | currently not included (1) |
| Van | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but planned for the next master plan (2) | not included but partially implemented (3) | not included but partially implemented (3) |
| Eskişehir | included, fully implemented and in usage (7) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) |
| Mersin | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) |
| Tekirdağ | not included but partially implemented (3) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) |
| Kayseri | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) | included and partially implemented (6) |
| İstanbul | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) |
| Bursa | | | | | | | | |
| Malatya | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | currently not included (1) | included and partially implemented (6) | currently not included (1) | included and partially implemented (6) | included and partially implemented (6) |
| Antalya | currently not included (1) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | included and partially implemented (6) |
| Trabzon | | | | | | | | |
| Muğla | | | | | | | | |
| İzmir | currently not included (1) | included and partially implemented (6) | included, fully implemented and in usage (7) | currently not included (1) | included, fully implemented and in usage (7) | currently not included (1) | included but not yet implemented (5) | included but not yet implemented (5) |
| Balıkesir | | | | | | | | |
| Sakarya | currently not included (1) | included and partially implemented (6) | included and partially implemented (6) | currently not included (1) | not included but planned for the next master plan (2) | currently not included (1) | included and partially implemented (6) | included and partially implemented (6) |
| Hatay | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | not included but partially implemented (3) | included and partially implemented (6) | included and partially implemented (6) | not included but partially implemented (3) | not included but partially implemented (3) |
| Ankara | | | | | | | | |
| Şanlıurfa | included and partially implemented (6) | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | included, fully implemented and in usage (7) | included and partially implemented (6) | not included but partially implemented (3) | included and partially implemented (6) |
| Denizli | not included but partially implemented (3) | not included but planned for the next master plan (2) | currently not included (1) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | not included but planned for the next master plan (2) | not included but partially implemented (3) |

| | 2. Part_Human and Financial Resources | |
|---|---|---|
| | **9. Which of the following SUMP related plans comprise your current Transport Master Plan?** | |
| **Metropolitan Municipality** | **Consideration of out region Transport Plans** | **Consideration of the local Land-use Plans** |
| Gaziantep | not included but planned for the next masterplan | included |
| Kocaeli | included | included |
| Konya | included | included |
| Ordu | | |
| Erzurum | | |
| Diyarbakır | not included but planned for the next masterplan | included |
| Manisa | not included but planned for the next masterplan | included |
| Samsun | currently not included | currently not included |
| Van | not included but planned for the next masterplan | included |
| Eskişehir | not included but planned for the next masterplan | included |
| Mersin | included | included |
| Tekirdağ | currently not included | included |
| Kayseri | included | included |
| İstanbul | not included but planned for the next masterplan | not included but planned for the next masterplan |
| Bursa | | |
| Malatya | included | included |
| Antalya | not included but planned for the next masterplan | currently not included |
| Trabzon | | |
| Muğla | | |
| İzmir | included | included |
| Balıkesir | | |
| Sakarya | currently not included | currently not included |
| Hatay | included | included |
| Ankara | | |
| Şanlıurfa | included | included |
| Denizli | not included but planned for the next masterplan | not included but planned for the next masterplan |

| | 3. Part_Situation of SUMPs in Current Transport Master Plans | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10. Which of the following authorities are stakeholders in your current Transport Master Plan and how important are they? | | | | | | | | | | | |
| **Metropolitan Municipality** | **Other local authorities** | **Neighbouring cities** | **Metropolitan municipality related transport authorities (IETT, EGO,.....)** | **Private transport authorities (Minibus cooperatives, taxi,.....)** | **Ministry of Transport, Maritime Affairs and Communications** | **Ministry of Environment and Urbanisation** | **Provincial Directorate of Health** | **Provincial Directorate of Security** | **EU authorities/funds** | **Development agencies** | **Transport consultants** | **Car sharing companies** |
| Gaziantep | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, playing an important role (4) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | existent, playing an important role (4) | existent, but not an active role (2) |
| Kocaeli | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) | inexistent (1) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | playing an important role (4) | inexistent (1) |
| Konya | | | | | | | | | | | | |
| Ordu | | | | | | | | | | | | |
| Erzurum | | | | | | | | | | | | |
| Diyarbakır | existent, playing a minor role (3) | inexistent (1) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | not an active role (2) | playing a minor role (3) | inexistent (1) | inexistent (1) |
| Manisa | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | an important role (4) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | not an active role (2) | not an active role (2) | existent, playing an important | existent, but not an active role |
| Samsun | inexistent (1) | inexistent (1) | existent, but not an active role (2) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | existent, playing an important | inexistent (1) | existent, playing an important | inexistent (1) |
| Van | existent, playing an important role (4) | inexistent (1) | existent, playing an important role (4) | an important role (4) | existent, playing an important role (4) | existent, but not an active role (2) | inexistent (1) | an important role (4) | not an active role (2) | not an active role (2) | existent, playing an important | existent, but not an active role |
| Eskişehir | existent, but not an active role (2) | inexistent (1) | existent, playing an important role (4) | an important role (4) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | not an active role (2) | existent, playing an important role | not an active role (2) | inexistent (1) |
| Mersin | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | an important role (4) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Tekirdağ | inexistent (1) | inexistent (1) | inexistent (1) | an important role (4) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | not an active role (2) | not an active role (2) | inexistent (1) | inexistent (1) |
| Kayseri | | | | | | | | | | | | |
| İstanbul | existent, but not an active role (2) | inexistent (1) | existent, but not an active role (2) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Bursa | | | | | | | | | | | | |
| Malatya | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing an important role (4) | an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | not an active role (2) | not an active role (2) | existent, playing an important | inexistent (1) |
| Antalya | | | | | | | | | | | | |
| Trabzon | | | | | | | | | | | | |
| Muğla | | | | | | | | | | | | |
| İzmir | inexistent (1) | inexistent (1) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Balıkesir | | | | | | | | | | | | |
| Sakarya | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) | inexistent (1) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | playing an important role (4) | inexistent (1) |
| Hatay | | | | | | | | | | | | |
| Ankara | | | | | | | | | | | | |
| Şanlıurfa | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | inexistent (1) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) |
| Denizli | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | not an active role (2) | not an active role (2) | not an active role (2) | existent, but not an active role |

| | 3. Part_Situation of SUMPs in Current Transport Master Plans | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10. Which of the following authorities are stakeholders in your current Transport Master Plan and how important are they? | | | | | | | | | | | |
| **Metropolitan Municipality** | **Bicycle rental operators** | **Business associations** | **Municipality associations** | **Major employers** | **Small businesses** | **Utility services (energy, water, .....)** | **NGOs** | **Motorist associations** | **Media** | **Forums** | **Cycling groups** | **Walking groups** |
| Gaziantep | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) |
| Kocaeli | inexistent (1) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | inexistent (1) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) |
| Konya | | | | | | | | | | | | |
| Ordu | | | | | | | | | | | | |
| Erzurum | | | | | | | | | | | | |
| Diyarbakır | inexistent (1) | an active role (2) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) |
| Manisa | inexistent (1) | an active role (2) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, but not an active role (2) | inexistent (1) |
| Samsun | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Van | not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, but not an active role (2) | existent, playing an important role (4) | existent, but not an active role (2) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, but not an active role (2) |
| Eskişehir | not an active role (2) | inexistent (1) | inexistent (1) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) |
| Mersin | not an active role (2) | inexistent (1) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | inexistent (1) | existent, playing an important role (4) | existent, playing an important role (4) | inexistent (1) | inexistent (1) | existent, playing an important role (4) | an important role (4) |
| Tekirdağ | inexistent (1) | inexistent (1) | existent, playing a minor role (3) | inexistent (1) | inexistent (1) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | inexistent (1) | inexistent (1) | existent, playing a minor role (3) | existent, playing a minor role (3) |
| Kayseri | | | | | | | | | | | | |
| İstanbul | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Bursa | | | | | | | | | | | | |
| Malatya | not an active role (2) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) |
| Antalya | | | | | | | | | | | | |
| Trabzon | | | | | | | | | | | | |
| Muğla | | | | | | | | | | | | |
| İzmir | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Balıkesir | | | | | | | | | | | | |
| Sakarya | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, playing an important role (4) |
| Hatay | | | | | | | | | | | | |
| Ankara | | | | | | | | | | | | |
| Şanlıurfa | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing an important role (4) | inexistent (1) | inexistent (1) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) |
| Denizli | not an active role (2) | an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) |

| | 3. Part_Situation of SUMPs in Current Transport Master Plans | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 10. Which of the following authorities are stakeholders in your current Transport Master Plan and how important are they? | | | | | | | | | |
| **Metropolitan Municipality** | **Public transport user groups** | **Citizens** | **Tourists** | **Disabled people** | **Landowners** | **Parents/children** | **Elderly people** | **Research institutions** | **Universities** | **Training institutions** |
| Gaziantep | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | inexistent (1) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, but not an active role (2) |
| Kocaeli | existent, but not an active role (2) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | inexistent (1) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) |
| Konya | | | | | | | | | | |
| Ordu | | | | | | | | | | |
| Erzurum | | | | | | | | | | |
| Diyarbakır | an active role (2) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) |
| Manisa | existent, playing a minor role (3) | an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, but not an active role (2) |
| Samsun | an active role (2) | an important role (4) | inexistent (1) | existent, but not an active role (2) | inexistent (1) | existent, playing an important role (4) | an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | inexistent (1) |
| Van | an active role (2) | an important role (4) | inexistent (1) | existent, playing an important role (4) | existent, but not an active role (2) | existent, playing an important role (4) | an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | an important role (4) |
| Eskişehir | an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, playing an important role (4) | existent, but not an active role (2) |
| Mersin | an important role (4) | an important role (4) | existent, but not an active role (2) | existent, playing an important role (4) | inexistent (1) | inexistent (1) | an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) |
| Tekirdağ | an active role (2) | existent, playing a minor role (3) | existent, but not an active role (2) | existent, playing an important role (4) | inexistent (1) | existent, playing an important role (4) | an important role (4) | inexistent (1) | existent, but not an active role (2) | an important role (4) |
| Kayseri | | | | | | | | | | |
| İstanbul | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | existent, but not an active role (2) | inexistent (1) |
| Bursa | | | | | | | | | | |
| Malatya | an important role (4) | an important role (4) | existent, but not an active role (2) | existent, playing an important role (4) | existent, but not an active role (2) | existent, playing an important role (4) | an important role (4) | existent, but not an active role (2) | existent, playing a minor role (3) | existent, playing a minor role (3) |
| Antalya | | | | | | | | | | |
| Trabzon | | | | | | | | | | |
| Muğla | | | | | | | | | | |
| İzmir | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) | inexistent (1) |
| Balıkesir | | | | | | | | | | |
| Sakarya | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing a minor role (3) | existent, playing an important role (4) | existent, playing an important role (4) |
| Hatay | | | | | | | | | | |
| Ankara | | | | | | | | | | |
| Şanlıurfa | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing a minor role (3) | existent, playing an important role (4) | inexistent (1) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) | existent, playing an important role (4) |
| Denizli | an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) | existent, but not an active role (2) |

| | 3. Part_Situation of SUMPs in Current Transport Master Plans | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 11. How do you estimate their interests in the implementation of a SUMP in your municipality? | | | | | | | | | | | |
| **Metropolitan Municipality** | **Other local authorities** | **Neighbouring cities** | **Metropolitan municipality related transport authorities (IETT, EGO,.....)** | **Private transport authorities (Minibus cooperatives, taxi,.....)** | **Ministry of Transport, Maritime Affairs and Communications** | **Ministry of Environment and Urbanisation** | **Provincial Directorate of Health** | **Provincial Directorate of Security** | **EU authorities/ funds** | **Development agencies** | **Transport consultants** | **Car sharing companies** |
| Gaziantep | | | | | | | | | | | | |
| Kocaeli | neutral (2) | neutral (2) | actively supportive (4) | negative (1) | actively supportive (4) | neutral (2) | neutral (2) | positive (3) | positive (3) | actively supportive (4) | positive (3) | neutral (2) |
| Konya | | | | | | | | | | | | |
| Ordu | | | | | | | | | | | | |
| Erzurum | | | | | | | | | | | | |
| Diyarbakır | actively supportive (4) | positive (3) | positive (3) | positive (3) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | positive (3) | positive (3) | positive (3) | positive (3) |
| Manisa | neutral (2) | positive (3) | negative (1) | negative (1) | neutral (2) | neutral (2) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | positive (3) | negative (1) |
| Samsun | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | positive (3) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | positive (3) |
| Van | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Eskişehir | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Mersin | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Tekirdağ | actively supportive (4) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | positive (3) | positive (3) | positive (3) |
| Kayseri | | | | | | | | | | | | |
| İstanbul | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) |
| Bursa | | | | | | | | | | | | |
| Malatya | positive (3) | positive (3) | actively supportive (4) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Antalya | | | | | | | | | | | | |
| Trabzon | | | | | | | | | | | | |
| Muğla | | | | | | | | | | | | |
| İzmir | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | neutral (2) | negative (1) | neutral (2) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Balıkesir | | | | | | | | | | | | |
| Sakarya | actively supportive (4) | actively supportive (4) | actively supportive (4) | negative (1) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Hatay | | | | | | | | | | | | |
| Ankara | | | | | | | | | | | | |
| Şanlıurfa | positive (3) | positive (3) | actively supportive (4) | negative (1) | actively supportive (4) | actively supportive (4) | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | positive (3) |
| Denizli | negative (1) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) |

| | 3. Part_Situation of SUMPs in Current Transport Master Plans | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 11. How do you estimate their interests in the implementation of a SUMP in your municipality? | | | | | | | | | | | |
| **Metropolitan Municipality** | **Bicycle rental operators** | **Business associations** | **Municipality associations** | **Major employers** | **Small businesses** | **Utility services (energy, water, .....)** | **NGOs** | **Motorist associations** | **Media** | **Forums** | **Cycling groups** | **Walking groups** |
| Gaziantep | | | | | | | | | | | | |
| Kocaeli | actively supportive (4) | neutral (2) | actively supportive (4) | positive (3) | neutral (2) | neutral (2) | actively supportive (4) | negative (1) | positive (3) | positive (3) | positive (3) | positive (3) |
| Konya | | | | | | | | | | | | |
| Ordu | | | | | | | | | | | | |
| Erzurum | | | | | | | | | | | | |
| Diyarbakır | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | neutral (2) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) |
| Manisa | actively supportive (4) | neutral (2) | actively supportive (4) | neutral (2) | actively supportive (4) | neutral (2) | actively supportive (4) | negative (1) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) |
| Samsun | positive (3) | positive (3) | actively supportive (4) | positive (3) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | neutral (2) | neutral (2) | positive (3) | positive (3) |
| Van | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Eskişehir | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Mersin | actively supportive (4) | actively supportive (4) | actively supportive (4) | positive (3) | positive (3) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Tekirdağ | positive (3) | positive (3) | positive (3) | neutral (2) | neutral (2) | positive (3) | positive (3) | positive (3) | neutral (2) | neutral (2) | positive (3) | positive (3) |
| Kayseri | | | | | | | | | | | | |
| İstanbul | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) |
| Bursa | | | | | | | | | | | | |
| Malatya | positive (3) | positive (3) | actively supportive (4) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Antalya | | | | | | | | | | | | |
| Trabzon | | | | | | | | | | | | |
| Muğla | | | | | | | | | | | | |
| İzmir | actively supportive (4) | actively supportive (4) | actively supportive (4) | neutral (2) | neutral (2) | neutral (2) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Balıkesir | | | | | | | | | | | | |
| Sakarya | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | negative (1) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Hatay | | | | | | | | | | | | |
| Ankara | | | | | | | | | | | | |
| Şanlıurfa | positive (3) | positive (3) | actively supportive (4) | positive (3) | negative (1) | positive (3) | positive (3) | negative (1) | positive (3) | positive (3) | positive (3) | positive (3) |
| Denizli | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) |

| | 3. Part_Situation of SUMPs in Current Transport Master Plans | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11. How do you estimate their interests in the implementation of a SUMP in your municipality? | | | | | | | | | |
| **Metropolitan Municipality** | **Public transport user groups** | **Citizens** | **Tourists** | **Disabled people** | **Landowners** | **Parents/children** | **Elderly people** | **Research institutions** | **Universities** | **Training institutions** |
| Gaziantep | | | | | | | | | | |
| Kocaeli | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | neutral (2) | actively supportive (4) | actively supportive (4) | neutral (2) | positive (3) | positive (3) |
| Konya | | | | | | | | | | |
| Ordu | | | | | | | | | | |
| Erzurum | | | | | | | | | | |
| Diyarbakır | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | neutral (2) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Manisa | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | neutral (2) | actively supportive (4) | positive (3) | neutral (2) | positive (3) | positive (3) |
| Samsun | positive (3) | actively supportive (4) | neutral (2) | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Van | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Eskişehir | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | actively supportive (4) | positive (3) |
| Mersin | actively supportive (4) | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Tekirdağ | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Kayseri | | | | | | | | | | |
| İstanbul | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) |
| Bursa | | | | | | | | | | |
| Malatya | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) | positive (3) |
| Antalya | | | | | | | | | | |
| Trabzon | | | | | | | | | | |
| Muğla | | | | | | | | | | |
| İzmir | actively supportive (4) | actively supportive (4) | neutral (2) | actively supportive (4) | negative (1) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Balıkesir | | | | | | | | | | |
| Sakarya | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Hatay | | | | | | | | | | |
| Ankara | | | | | | | | | | |
| Şanlıurfa | positive (3) | positive (3) | positive (3) | positive (3) | neutral (2) | positive (3) | positive (3) | actively supportive (4) | actively supportive (4) | actively supportive (4) |
| Denizli | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) | neutral (2) |

| | 4. Part_SWOT Analysis | | | |
|---|---|---|---|---|
| | | | | |
| **Metropolitan Municipality** | **12. Which strengths towards developing a successful SUMP does your city offer?** | **13. Which weaknesses towards developing a successful SUMP does your city offer?** | **14. Which opportunities towards developing a successful SUMP does your city offer?** | **15. Which threats towards developing a successful SUMP does your city offer?** |
| Gaziantep | | | | |
| Kocaeli | Content of current Transport Master Plan | Political will and vision | Content of current Transport Master Plan | Urban pattern/Infrastructure |
| Konya | | | | |
| Ordu | | | | |
| Erzurum | | | | |
| Diyarbakır | Political will and vision | Financial resources | Political will and vision | Urban pattern/Infrastructure |
| Manisa | Stakeholder support | Content of current Transport Master Plan | Political will and vision | Innovative potential |
| Samsun | Stakeholder support | Financial resources | Expertise availability/Unavailability | Financial resources |
| Van | Innovative potential | Financial resources | Urban pattern/Infrastructure | Financial resources |
| Eskişehir | Content of current Transport Master Plan | Innovative potential | Political will and vision | Expertise availability/Unavailability |
| Mersin | Content of current Transport Master Plan | Urban pattern/Infrastructure | Citizens support | Financial resources |
| Tekirdağ | Innovative potential | Urban pattern/Infrastructure | Political will and vision | Data availability/Unavailability |
| Kayseri | | | | |
| İstanbul | Content of current Transport Master Plan | Innovative potential | Content of current Transport Master Plan | Financial resources |
| Bursa | | | | |
| Malatya | Content of current Transport Master Plan | Financial resources | Innovative potential | Urban pattern/Infrastructure |
| Antalya | | | | |
| Trabzon | | | | |
| Muğla | | | | |
| İzmir | Political will and vision | Expertise availability/Unavailability | Content of current Transport Master Plan | Urban pattern/Infrastructure |
| Balıkesir | | | | |
| Sakarya | Content of current Transport Master Plan | Political will and vision | Citizens support | Financial resources |
| Hatay | | | | |
| Ankara | | | | |
| Şanlıurfa | Urban pattern/Infrastructure | Innovative potential | Data availability/Unavailability | Financial resources |
| Denizli | | | | |

## APPENDIX 5: Most Responded Answers Percentage in Table 12

- 6 metropolitan municipalities from 15 (40%) responded Other local authorities are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Neighboring cities are inexistent on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Metropolitan municipality related transport authorities are existent, playing an important role on the current Transport Master Plans.

- 8 metropolitan municipalities from 15 (53%) responded Private transport authorities are existent, playing an important role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Ministry of Transport, Maritime Affairs and Communications are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Ministry of Environment and Urbanisation is existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Provincial Directorate of Health is existent but not an active role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Provincial Directorate of Security is existent, playing a minor role on the current Transport Master Plans.

- 8 metropolitan municipalities from 15 (53%) responded EU authorities/funds are existent but not an active role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Development agencies are existent but not an active role on the current Transport Master Plans.

- 8 metropolitan municipalities from 15 (53%) responded Transport consultants are existent, playing an important role on the current Transport Master Plans.

- 10 metropolitan municipalities from 15 (67%) responded Car sharing companies are inexistent on the current Transport Master Plans.

- There are 2 most responded answers for Bicycle rental operators as is seen from Table 12. 7 metropolitan municipalities from 15 (47%) responded Bicycle rental operators are inexistent on the current Transport Master Plans. 7 metropolitan municipalities from 15 (47%) responded Bicycle rental operators are existent but not an active role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Business associations are inexistent on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Municipality associations are existent, playing a minor role on the current Transport Master Plans.

- There are 2 most responded answers for Major employers as is seen from Table 12. 6 metropolitan municipalities from 15 (40%) responded Major employers are inexistent on the current Transport Master Plans. 6 metropolitan municipalities from 15 (40%) responded Major employers are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Small businesses are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Utility services are existent but not an active role on the current Transport Master Plans.

- 5 metropolitan municipalities from 15 (33%) responded NGOs are existent but not an active role on the current Transport Master Plans.

- 5 metropolitan municipalities from 15 (33%) responded Motorist associations are existent, playing a minor role on the current m Transport Master Plans.

- 5 metropolitan municipalities from 15 (33%) responded Media is inexistent on the current Transport Master Plans.

- There are 3 most responded answers for Forums as is seen from Table 12. 5 metropolitan municipalities from 15 (33%) responded that Forums are inexistent on the current Transport Master Plans. 5 metropolitan municipalities from 15 (33%) responded that Forums are existent but not an active role on the current Transport Master Plans. 5 metropolitan municipalities from 15 (33%) responded that Forums are existent, playing a minor role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Cycling groups are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Walking groups are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded PT user groups are existent but not an active role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Citizens are existent, playing an important role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Tourists are existent but not an active role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Disabled people are existent, playing an important role on the current Transport Master Plans.

- 8 metropolitan municipalities from 15 (53%) responded Landowners are inexistent on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Parents/children are existent, playing an important role on the current Transport Master Plans.

- 7 metropolitan municipalities from 15 (47%) responded Elderly people are existent, playing an important role on the current Transport Master Plans.

- There are 3 most responded answers for Research institutes as is seen from Table 12. 4 metropolitan municipalities from 15 (27%) responded that Research institutions are existent but not an active role on the current Transport Master Plans. 4 metropolitan municipalities from 15 (27%) responded that Research institutions are existent, playing a minor role on the current Transport Master Plans. 4 metropolitan municipalities from 15 (27%) responded that Research institutions are existent, playing an important role on the current Transport Master Plans.

- 6 metropolitan municipalities from 15 (40%) responded Universities are existent, playing a minor role on the current Transport Master Plans.

- There are 3 most responded answers for Training institutes as is seen from Table 12. 4 metropolitan municipalities from 15 (27%) responded that Training institutions are existent but not an active role on the current Transport Master Plans. 4 metropolitan municipalities from 15 (27%) responded that Training institutions are existent, playing a minor role on the current Transport Master Plans. 4 metropolitan municipalities from 15 (27%) responded that Training institutions are existent, playing an important role on the current Transport Master Plans.

## APPENDIX 6: Most Responded Answers Percentage in Table 15

- 6 metropolitan municipalities from 14 (43%) responded Other local authorities are actively supportive to SUMP implementation.

- 9 metropolitan municipalities from 14 (64%) responded Neighbouring cities are positive to SUMP implementation.

- 9 metropolitan municipalities from 14 (64%) responded Metropolitan municipality related transport authorities are actively supportive to SUMP implementation.

- 5 metropolitan municipalities from 14 (36%) Private transport authorities are actively supportive to SUMP implementation.

- There are 2 most responded answers for Ministry of Transport, Maritime Affairs and Communications as is seen from Table 14. 5 metropolitan municipalities from 14 (36%) responded Ministry of Transport, Maritime Affairs and Communications are neutral to SUMP implementation. 5 metropolitan municipalities from 14 (36%) Ministry of Transport, Maritime Affairs and Communications are actively supportive to SUMP implementation.

- 5 metropolitan municipalities from 14 (36%) responded Ministry of Environment and Urbanisation is neutral to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Provincial Directorate of Health is positive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Provincial Directorate of Security is actively supportive to SUMP implementation.

- 8 metropolitan municipalities from 14 (57%) responded EU authorities/funds are actively supportive to SUMP implementation.

- 8 metropolitan municipalities from 14 (57%) responded Development Agencies are actively supportive to SUMP implementation.

- There are 2 most responded answers for Transport consultants as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Transport consultants are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Transport consultants are actively supportive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Car sharing companies are positive to SUMP implementation.

- There are 2 most responded answers for Bicycle rental operators as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Bicycle rental operators are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Bicycle rental operators are actively supportive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Business associations are positive to SUMP implementation.

- 9 metropolitan municipalities from 14 (64%) responded Municipality associations are actively supportive to SUMP implementation.

- 7 metropolitan municipalities from 14 (50%) responded Major employers are positive to SUMP implementation.

- There are 2 most responded answers for Small businesses as is seen from Table 14. 5 metropolitan municipalities from 14 (36%) responded Small businesses are neutral to SUMP implementation. 5 metropolitan municipalities from 14 (36%) Small businesses are positive to SUMP implementation.

- 7 metropolitan municipalities from 14 (50%) responded Utility services are positive to SUMP implementation.

- There are 2 most responded answers for NGOs as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded NGOs are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded NGOs are actively supportive to SUMP implementation.

- There are 2 most responded answers for Motorist associations as is seen from Table 14. 4 metropolitan municipalities from 14 (29%) responded Motorist associations are negative to SUMP implementation. 4 metropolitan municipalities from 14 (29%) Motorist associations are actively supportive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Media are positive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Forums are positive to SUMP implementation.

- There are 2 most responded answers for Cycling groups as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Cycling groups are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Cycling groups are actively supportive to SUMP implementation.

- There are 2 most responded answers for Walking groups as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Walking groups are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Walking groups are actively supportive to SUMP implementation.

- 7 metropolitan municipalities from 14 (50%) responded PT user groups are positive to SUMP implementation.

- 8 metropolitan municipalities from 14 (57%) responded Citizens are actively supportive to SUMP implementation.

- There are 2 most responded answers for Tourists as is seen from Table 14. 5 metropolitan municipalities from 14 (36%) responded Tourists are positive to SUMP

implementation. 5 metropolitan municipalities from 14 (36%) Tourists are actively supportive to SUMP implementation.

- 8 metropolitan municipalities from 14 (57%) responded Disabled people are actively supportive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) Landowners are neutral to SUMP implementation.

- There are 2 most responded answers for Parents/children as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Parents/children are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Parents/children are actively supportive to SUMP implementation.

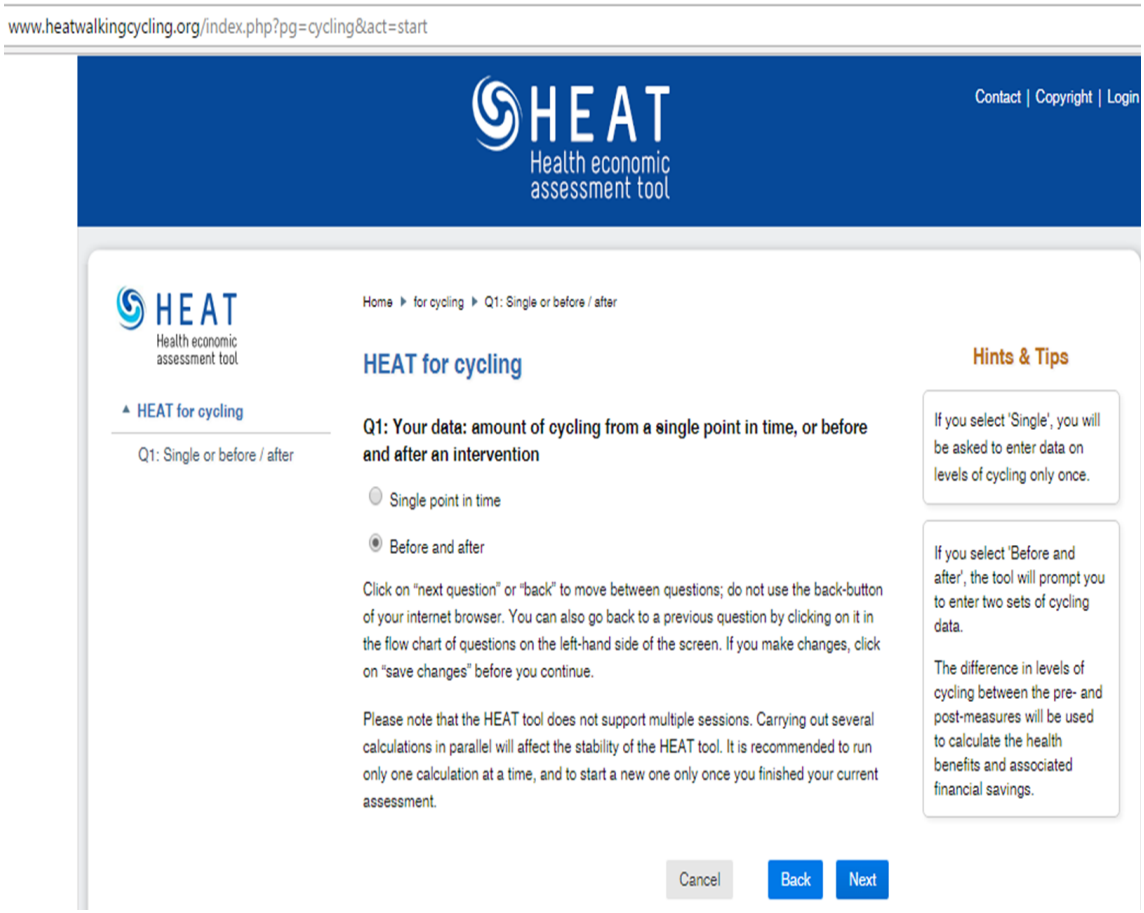
- There are 2 most responded answers for Elderly people as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Elderly people are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Elderly people are actively supportive to SUMP implementation.

- 6 metropolitan municipalities from 14 (43%) responded Research institutions are actively supportive to SUMP implementation.

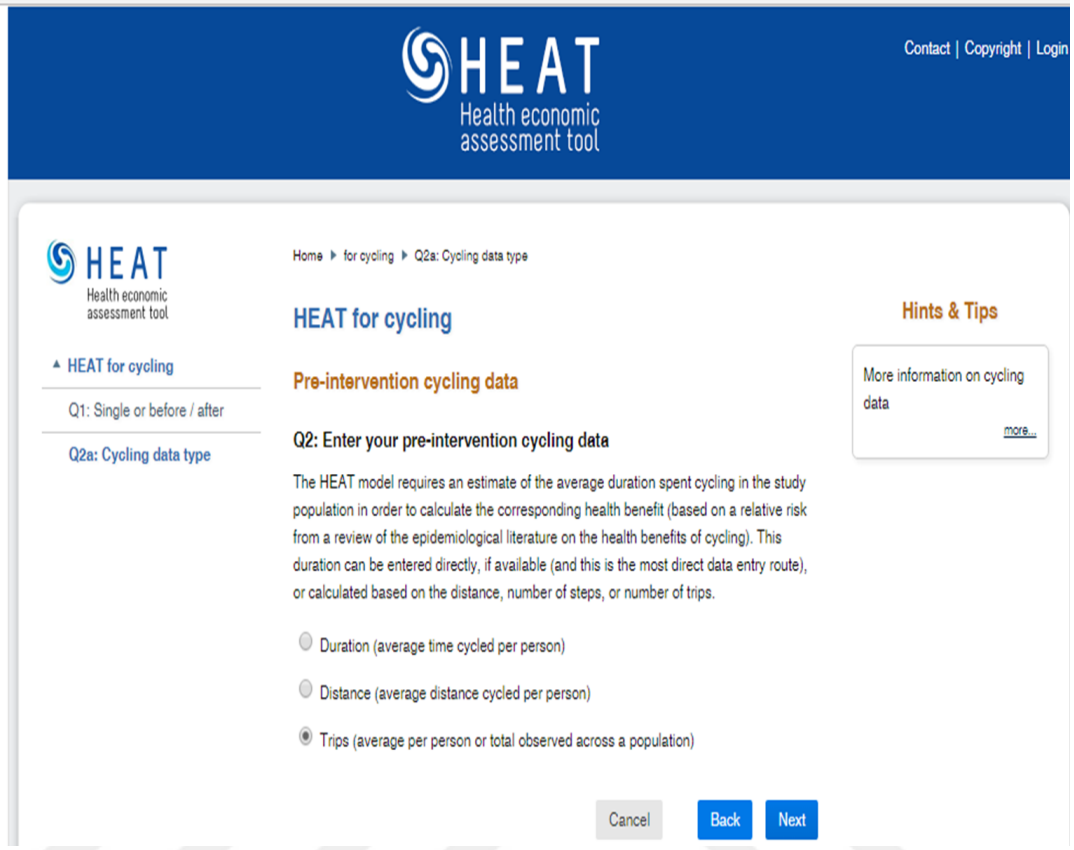
- 7 metropolitan municipalities from 14 (50%) responded Universities are actively supportive to SUMP implementation.

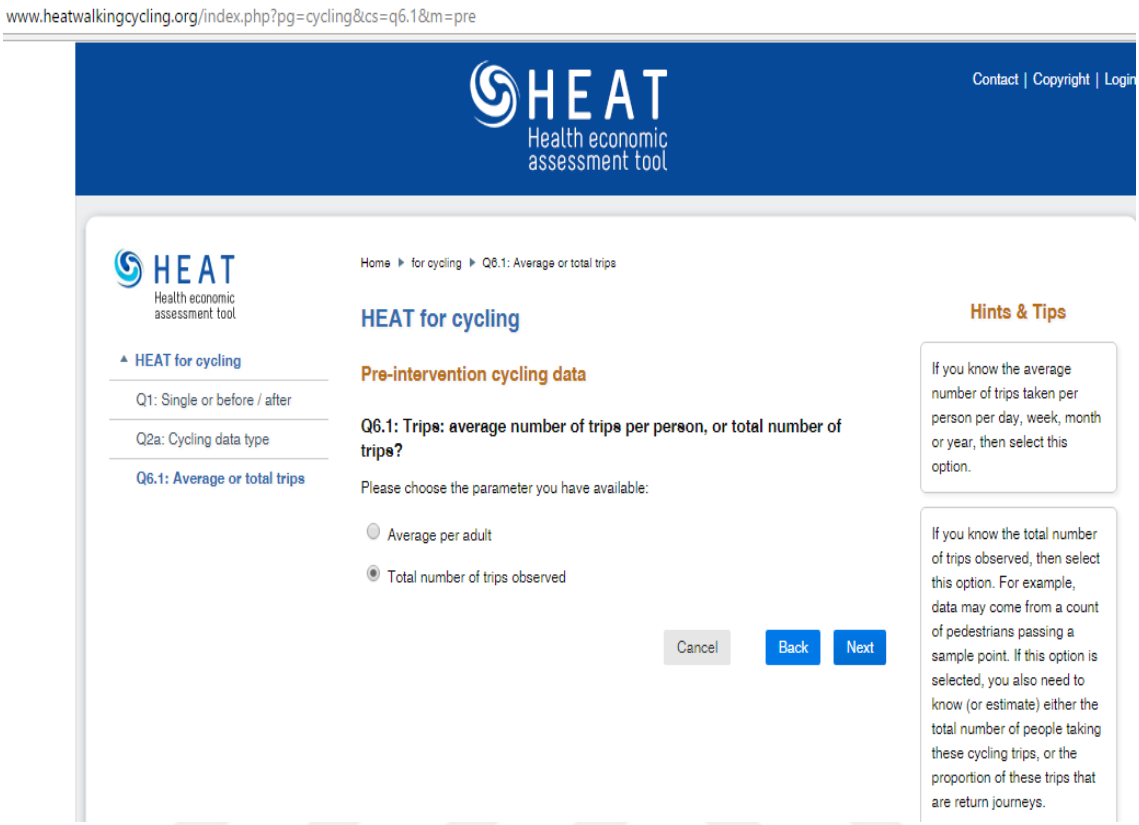
- There are 2 most responded answers for Training institutions as is seen from Table 14. 6 metropolitan municipalities from 14 (43%) responded Training institutions are positive to SUMP implementation. 6 metropolitan municipalities from 14 (43%) responded Training institutions are actively supportive to SUMP implementation.

## APPENDIX 7: HEAT Cycling Calculations for Eskişehir Bike Lane Project

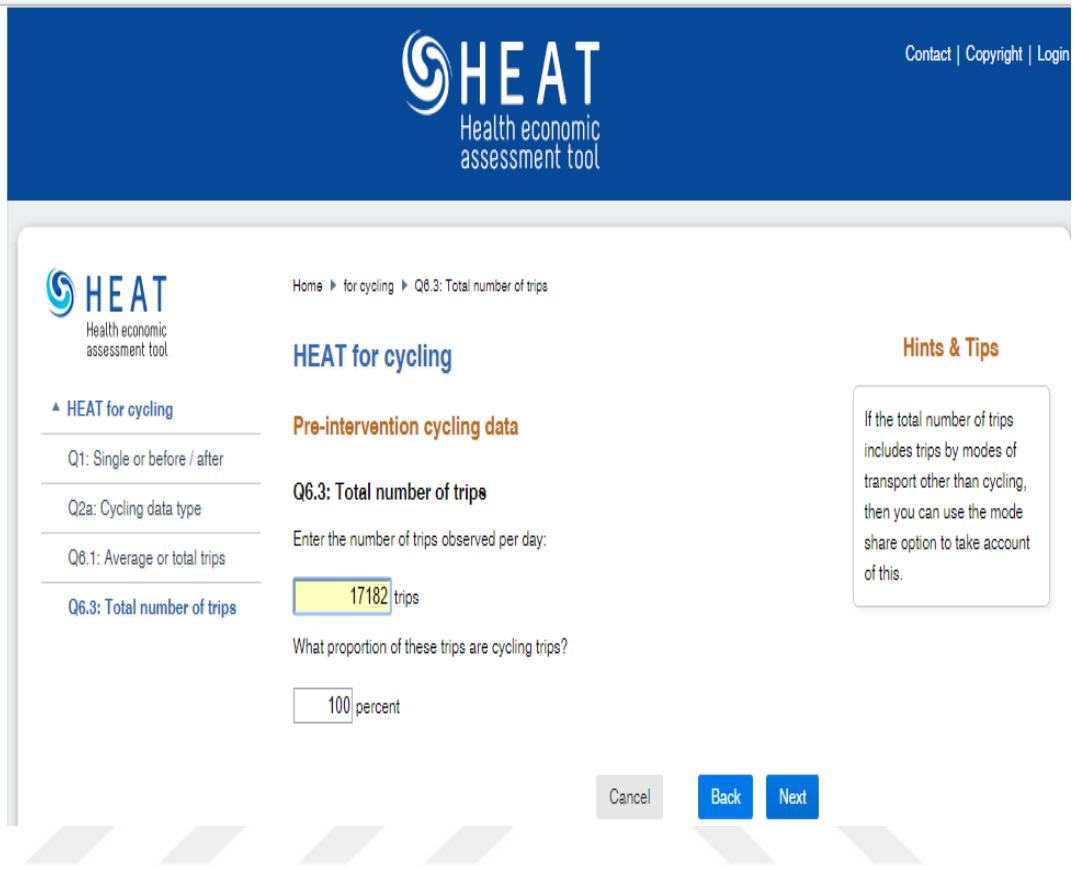


www.heatwalkingcycling.org/index.php?pg=cycling&cs=q2a&m=pre




www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.1&m=pre
HEAT
Health economic assessment tool
Contact | Copyright | Login
HEAT
Health economic assessment tool
HEAT for cycling
Q1: Single or before / after
Q2a: Cycling data type
Q6.1: Average or total trips
Home ▸ for cycling ▸ Q6.1: Average or total trips
HEAT for cycling
Pre-intervention cycling data
Q6.1: Trips: average number of trips per person, or total number of trips?
Please choose the parameter you have available:
Average per adult
Total number of trips observed
Cancel
Back
Next
Hints & Tips
If you know the average number of trips taken per person per day, week, month or year, then select this option.
If you know the total number of trips observed, then select this option. For example, data may come from a count of pedestrians passing a sample point. If this option is selected, you also need to know (or estimate) either the total number of people taking these cycling trips, or the proportion of these trips that are return journeys.

www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.3&m=pre



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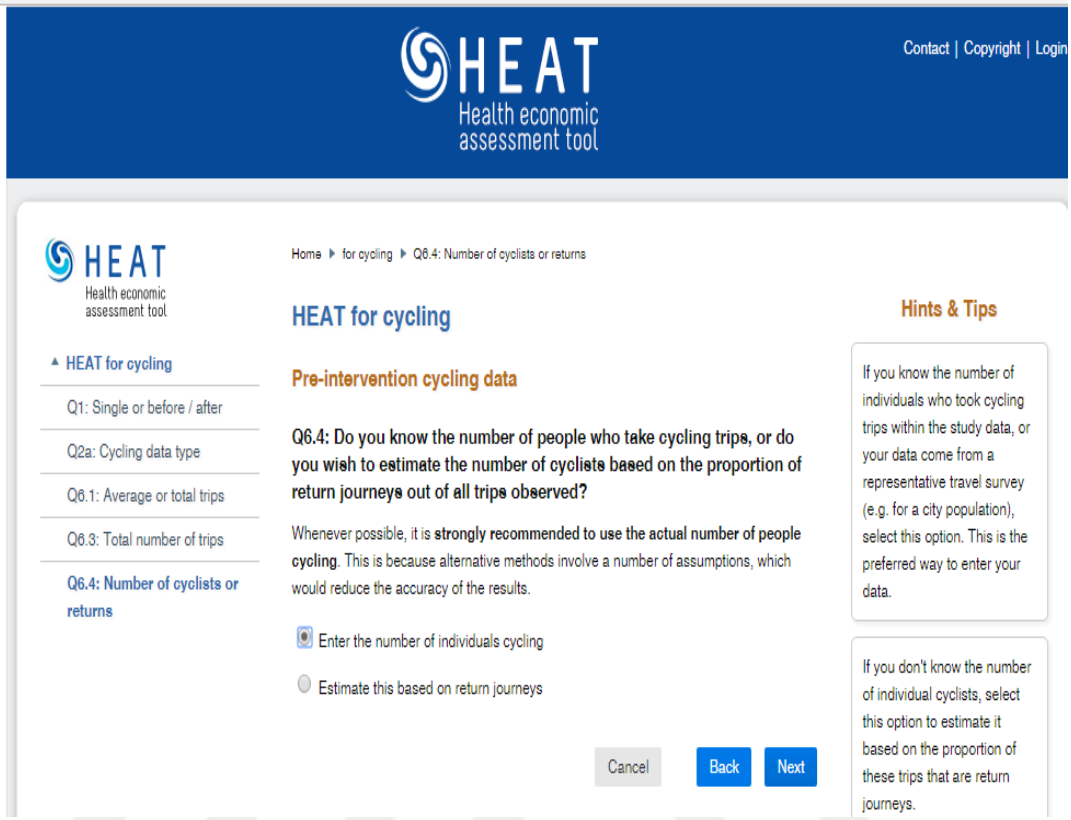

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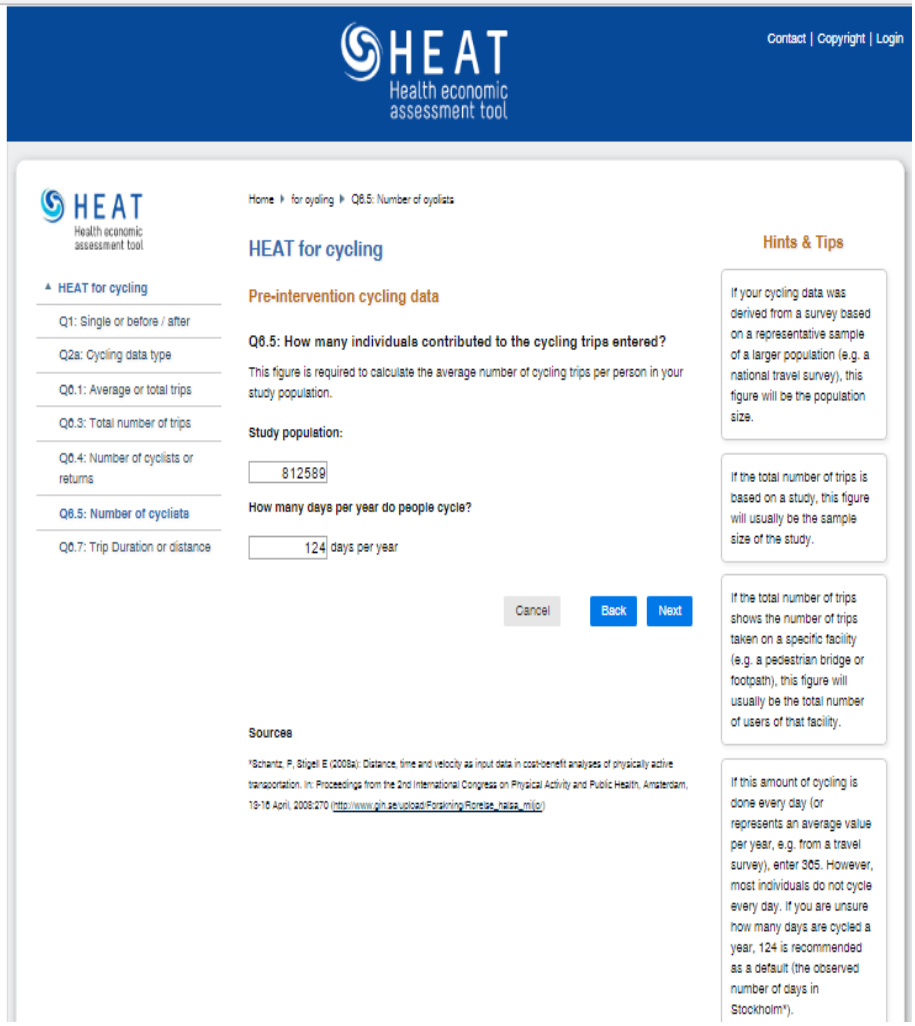
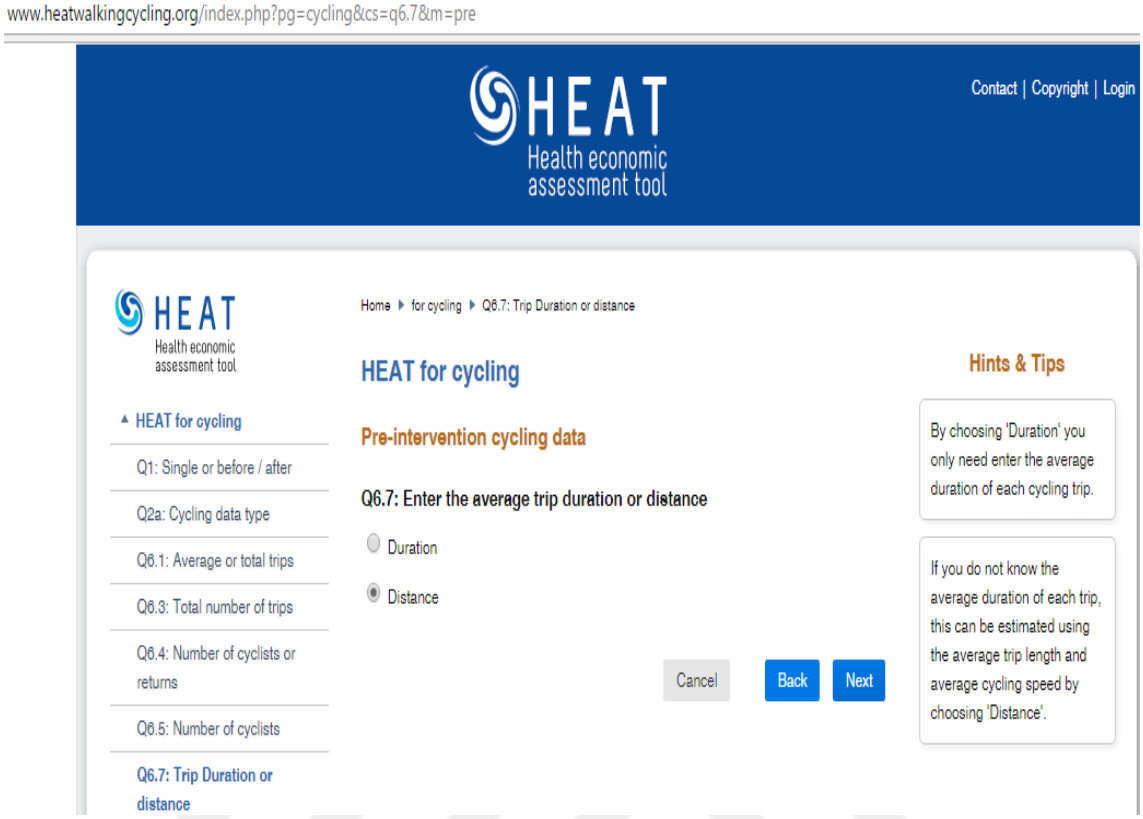
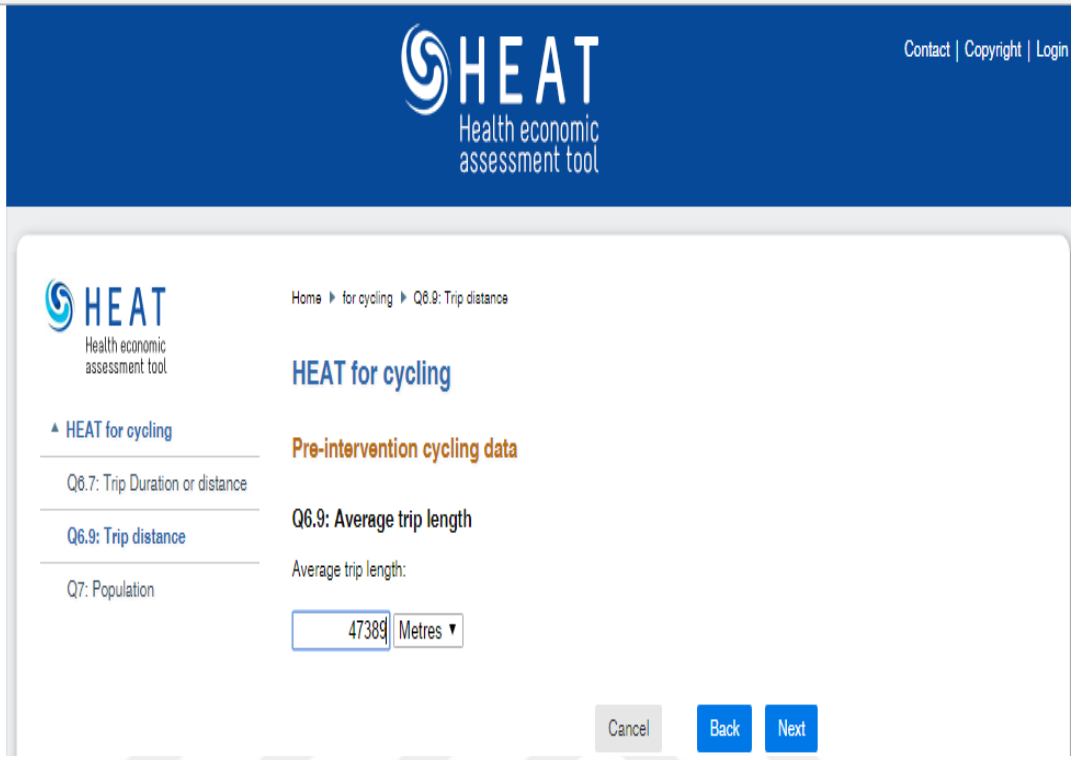
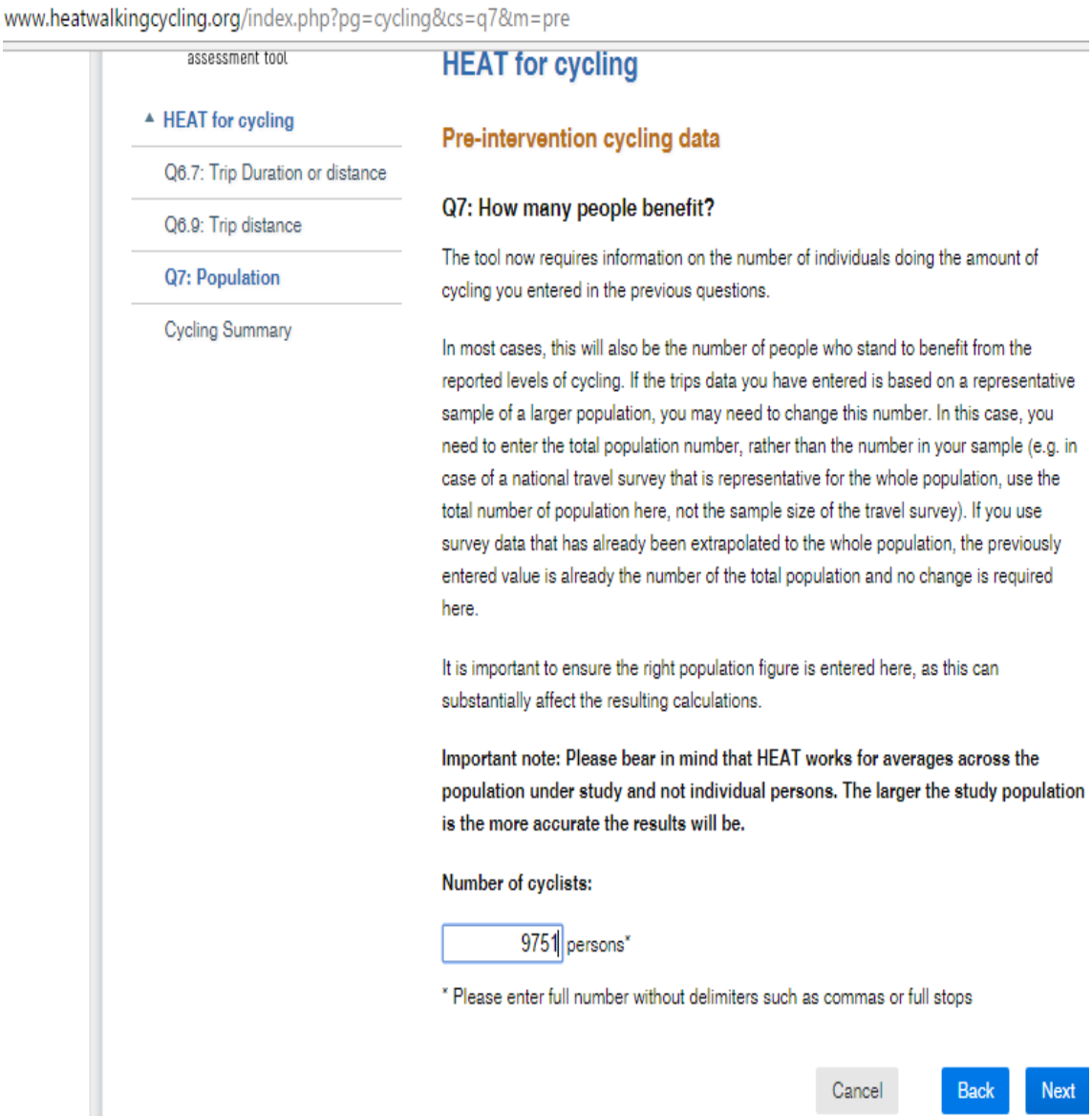


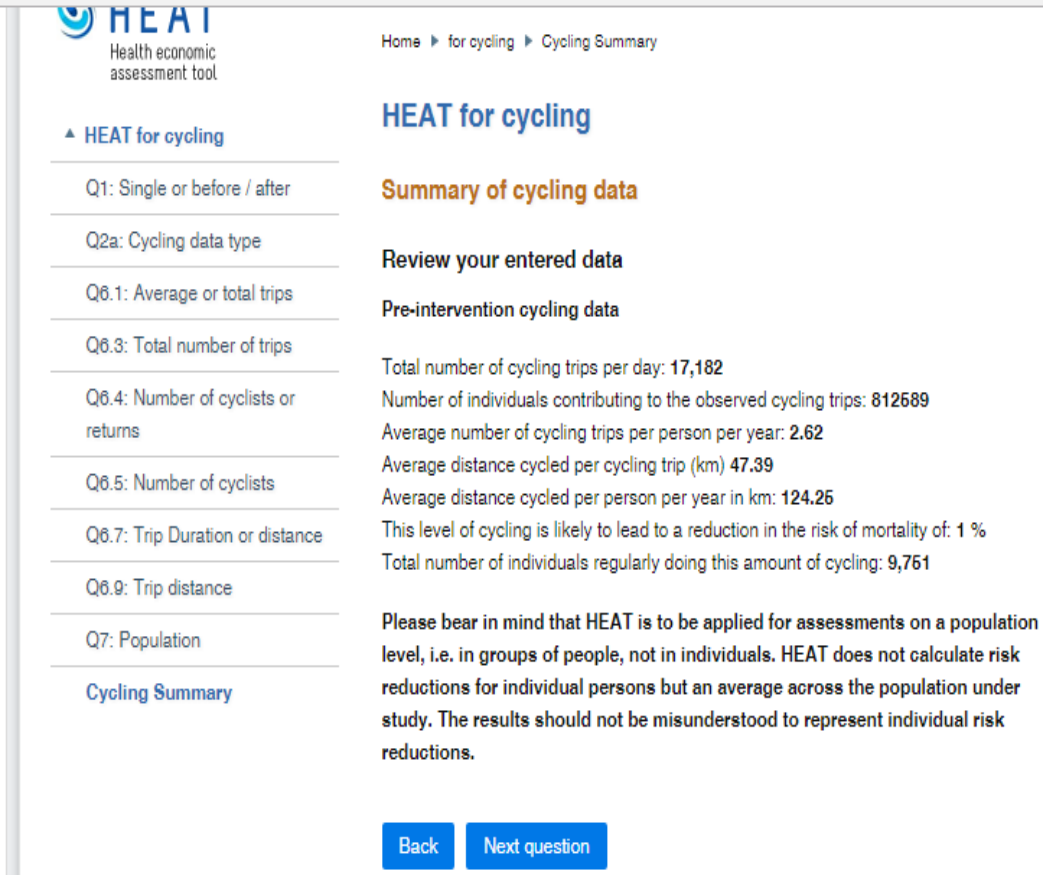

www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.7&m=pre
HEAT
Health economic assessment tool
Contact | Copyright | Login
HEAT
Health economic assessment tool
Home ▸ for cycling ▸ Q6.7: Trip Duration or distance
HEAT for cycling
Pre-intervention cycling data
Q6.7: Enter the average trip duration or distance
Duration
Distance
Cancel
Back
Next
Hints & Tips
By choosing 'Duration' you only need enter the average duration of each cycling trip.
If you do not know the average duration of each trip, this can be estimated using the average trip length and average cycling speed by choosing 'Distance'.
HEAT for cycling
Q1: Single or before / after
Q2a: Cycling data type
Q6.1: Average or total trips
Q6.3: Total number of trips
Q6.4: Number of cyclists or returns
Q6.5: Number of cyclists
Q6.7: Trip Duration or distance

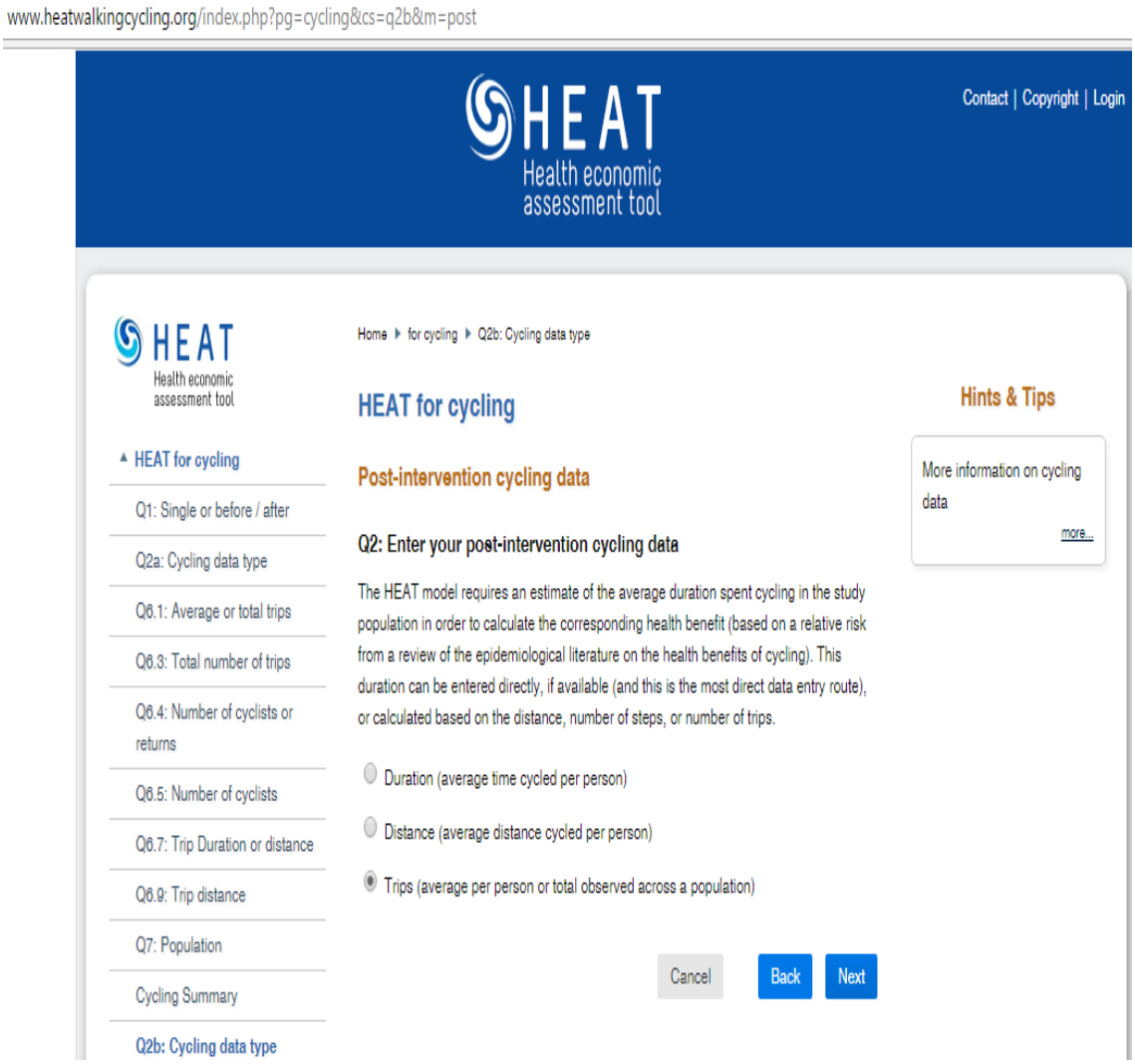
www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.9&m=pre



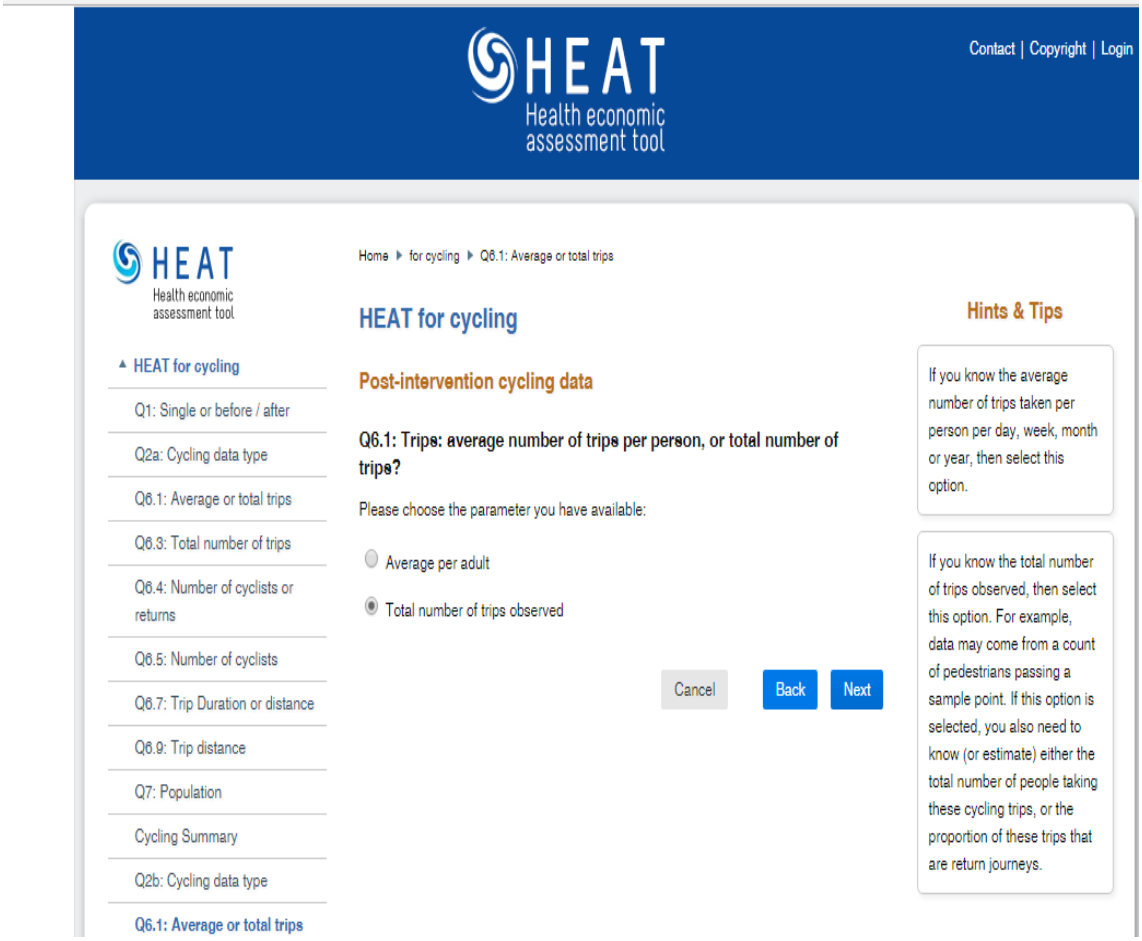

www.heatwalkingcycling.org/index.php?pg=cycling&cs=q7&m=pre
assessment tool
HEAT for cycling
Q6.7: Trip Duration or distance
Q6.9: Trip distance
Q7: Population
Cycling Summary
HEAT for cycling
Pre-intervention cycling data
Q7: How many people benefit?
The tool now requires information on the number of individuals doing the amount of cycling you entered in the previous questions.
In most cases, this will also be the number of people who stand to benefit from the reported levels of cycling. If the trips data you have entered is based on a representative sample of a larger population, you may need to change this number. In this case, you need to enter the total population number, rather than the number in your sample (e.g. in case of a national travel survey that is representative for the whole population, use the total number of population here, not the sample size of the travel survey). If you use survey data that has already been extrapolated to the whole population, the previously entered value is already the number of the total population and no change is required here.
It is important to ensure the right population figure is entered here, as this can substantially affect the resulting calculations.
Important note: Please bear in mind that HEAT works for averages across the population under study and not individual persons. The larger the study population is the more accurate the results will be.
Number of cyclists:
9751 persons*
* Please enter full number without delimiters such as commas or full stops
Cancel
Back
Next

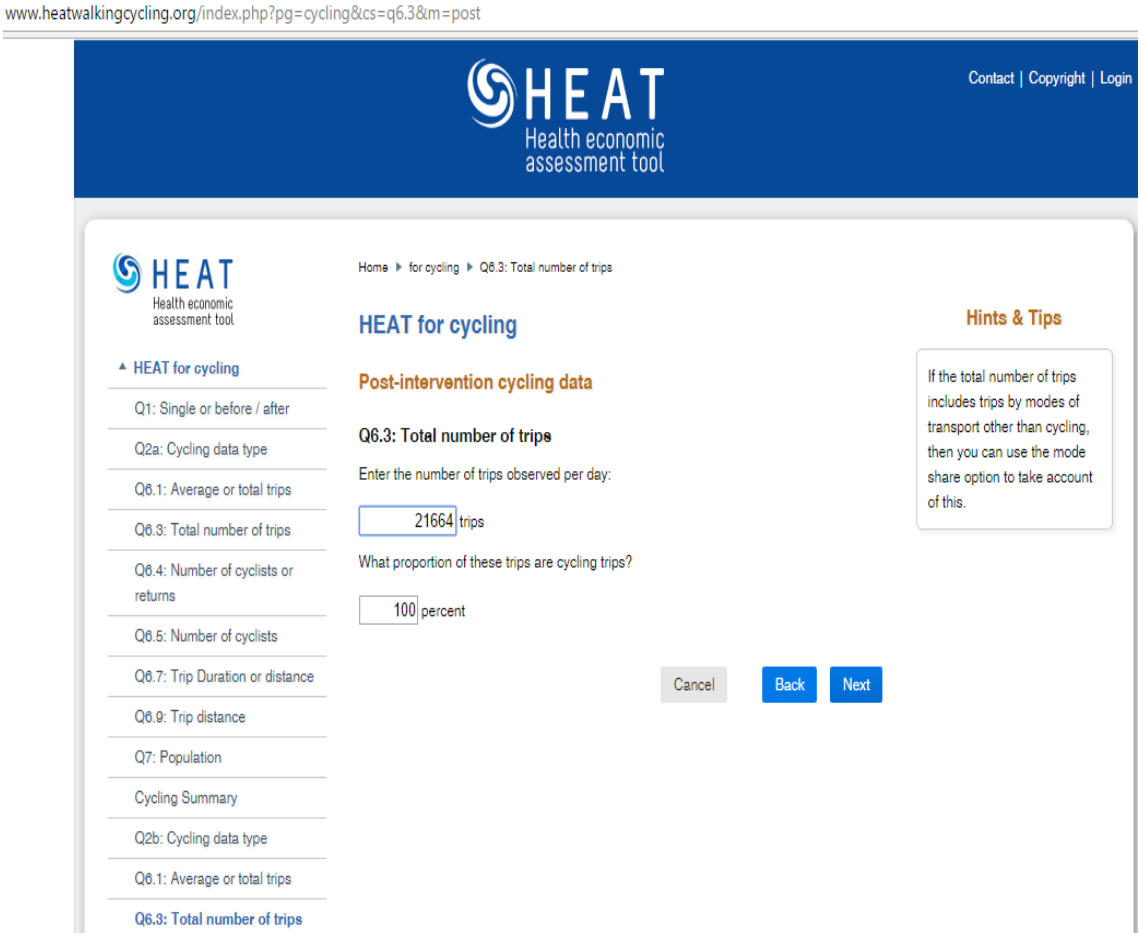
www.heatwalkingcycling.org/index.php?pg=cycling&cs=summary&m=pre



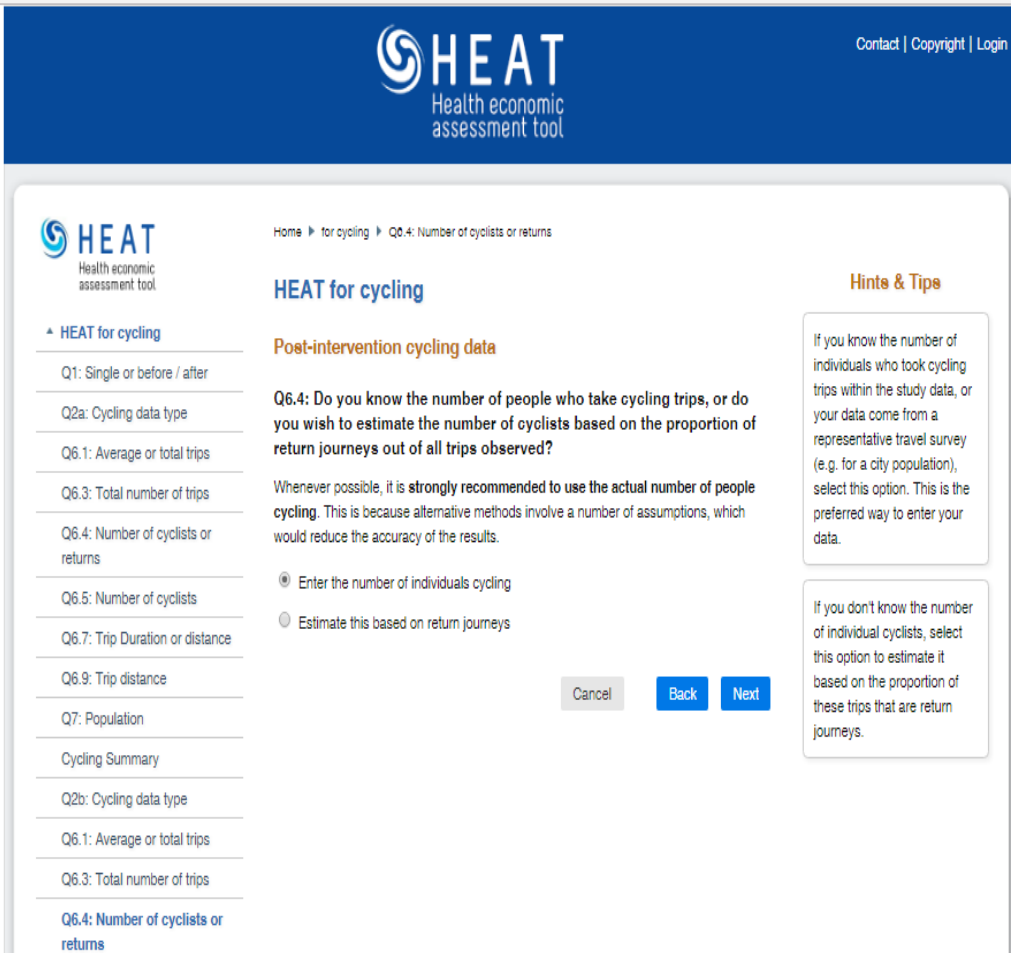

www.heatwalkingcycling.org/index.php?pg=cycling&cs=q2b&m=post
HEAT
Health economic assessment tool
Contact | Copyright | Login
HEAT
Health economic assessment tool
HEAT for cycling
Q1: Single or before / after
Q2a: Cycling data type
Q6.1: Average or total trips
Q6.3: Total number of trips
Q6.4: Number of cyclists or returns
Q6.5: Number of cyclists
Q6.7: Trip Duration or distance
Q6.9: Trip distance
Q7: Population
Cycling Summary
Q2b: Cycling data type
Home ▸ for cycling ▸ Q2b: Cycling data type
HEAT for cycling
Post-intervention cycling data
Q2: Enter your post-intervention cycling data
The HEAT model requires an estimate of the average duration spent cycling in the study population in order to calculate the corresponding health benefit (based on a relative risk from a review of the epidemiological literature on the health benefits of cycling). This duration can be entered directly, if available (and this is the most direct data entry route), or calculated based on the distance, number of steps, or number of trips.
Duration (average time cycled per person)
Distance (average distance cycled per person)
Trips (average per person or total observed across a population)
Cancel
Back
Next
Hints & Tips
More information on cycling data
more...

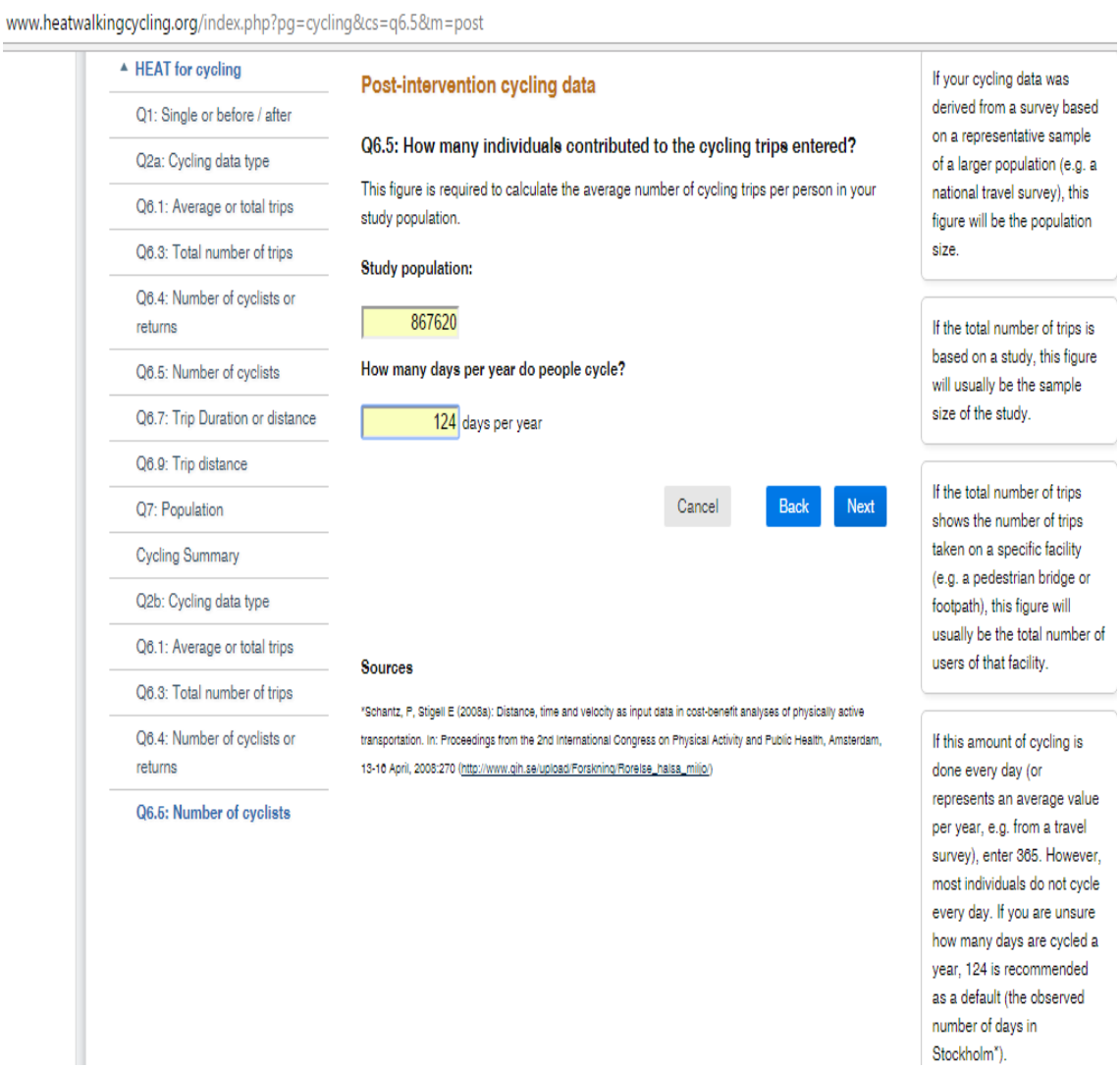
www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.1&m=post



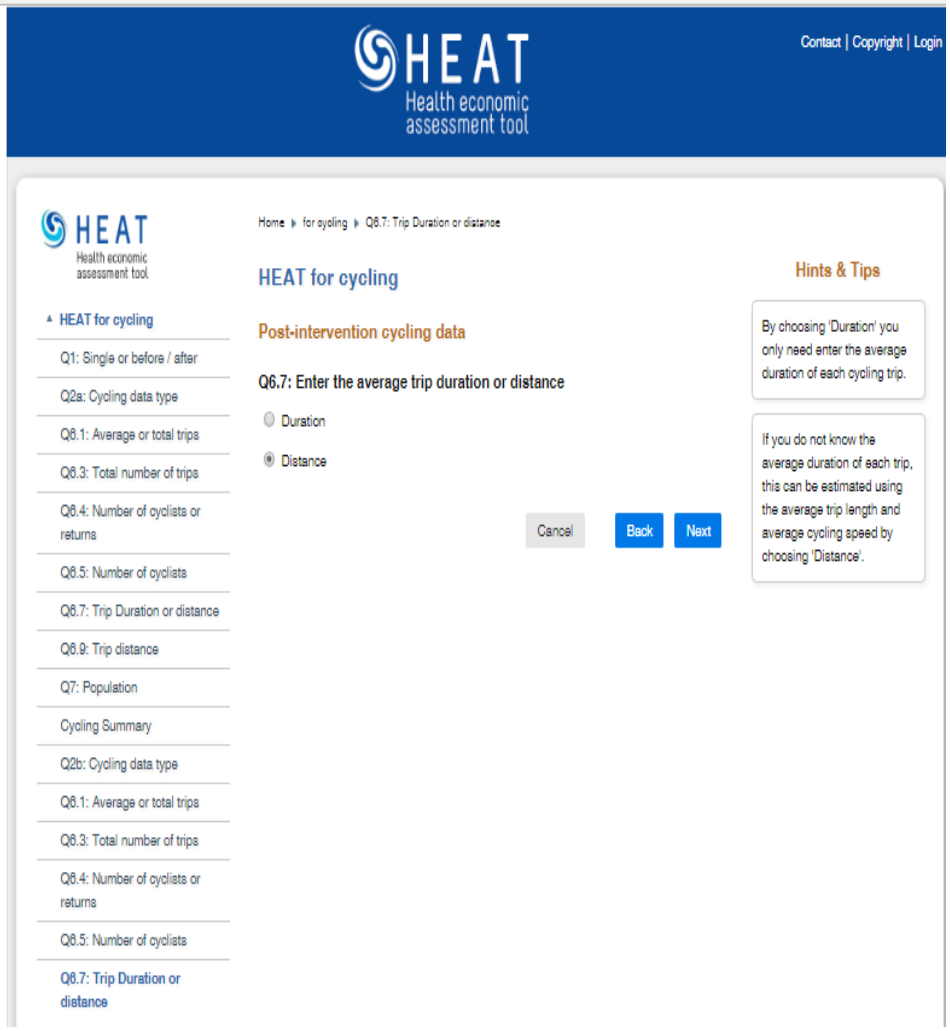

www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.3&m=post
HEAT
Health economic assessment tool
Contact | Copyright | Login
HEAT
Health economic assessment tool
Home ▸ for cycling ▸ Q6.3: Total number of trips
HEAT for cycling
Post-intervention cycling data
Q6.3: Total number of trips
Enter the number of trips observed per day:
21664 trips
What proportion of these trips are cycling trips?
100 percent
Cancel
Back
Next
Hints & Tips
If the total number of trips includes trips by modes of transport other than cycling, then you can use the mode share option to take account of this.
HEAT for cycling
Q1: Single or before / after
Q2a: Cycling data type
Q6.1: Average or total trips
Q6.3: Total number of trips
Q6.4: Number of cyclists or returns
Q6.5: Number of cyclists
Q6.7: Trip Duration or distance
Q6.9: Trip distance
Q7: Population
Cycling Summary
Q2b: Cycling data type
Q6.1: Average or total trips
Q6.3: Total number of trips

www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.4&m=post

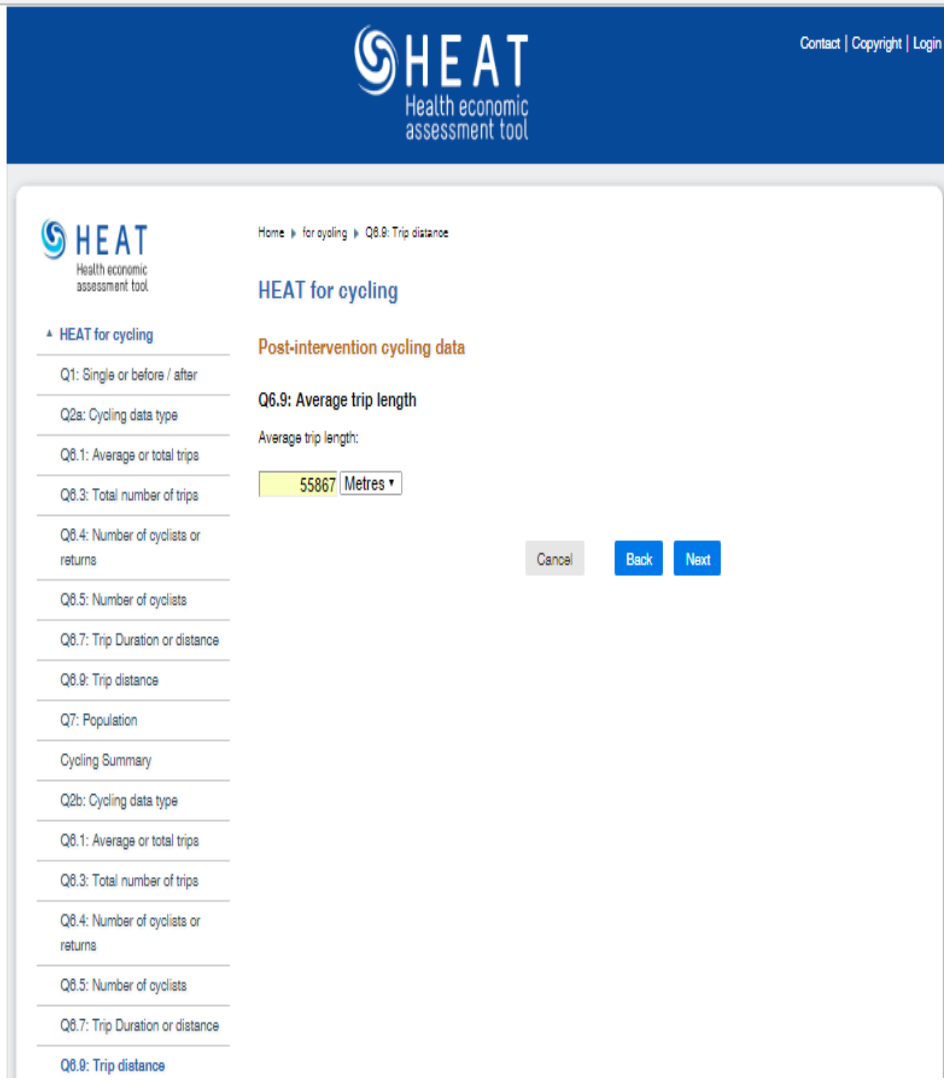



www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.5&m=post
HEAT for cycling
Q1: Single or before / after
Q2a: Cycling data type
Q6.1: Average or total trips
Q6.3: Total number of trips
Q6.4: Number of cyclists or returns
Q6.5: Number of cyclists
Q6.7: Trip Duration or distance
Q6.9: Trip distance
Q7: Population
Cycling Summary
Q2b: Cycling data type
Q6.1: Average or total trips
Q6.3: Total number of trips
Q6.4: Number of cyclists or returns
Q6.5: Number of cyclists
Post-intervention cycling data
Q6.5: How many individuals contributed to the cycling trips entered?
This figure is required to calculate the average number of cycling trips per person in your study population.
Study population:
867620
How many days per year do people cycle?
124 days per year
Cancel
Back
Next
Sources
*Schantz, P, Stigell E (2008a): Distance, time and velocity as input data in cost-benefit analyses of physically active transportation. In: Proceedings from the 2nd International Congress on Physical Activity and Public Health, Amsterdam, 13-16 April, 2008:270 (http://www.gih.se/upload/Forskning/Rorelse_halsa_miljo/)
If your cycling data was derived from a survey based on a representative sample of a larger population (e.g. a national travel survey), this figure will be the population size.
If the total number of trips is based on a study, this figure will usually be the sample size of the study.
If the total number of trips shows the number of trips taken on a specific facility (e.g. a pedestrian bridge or footpath), this figure will usually be the total number of users of that facility.
If this amount of cycling is done every day (or represents an average value per year, e.g. from a travel survey), enter 365. However, most individuals do not cycle every day. If you are unsure how many days are cycled a year, 124 is recommended as a default (the observed number of days in Stockholm*).

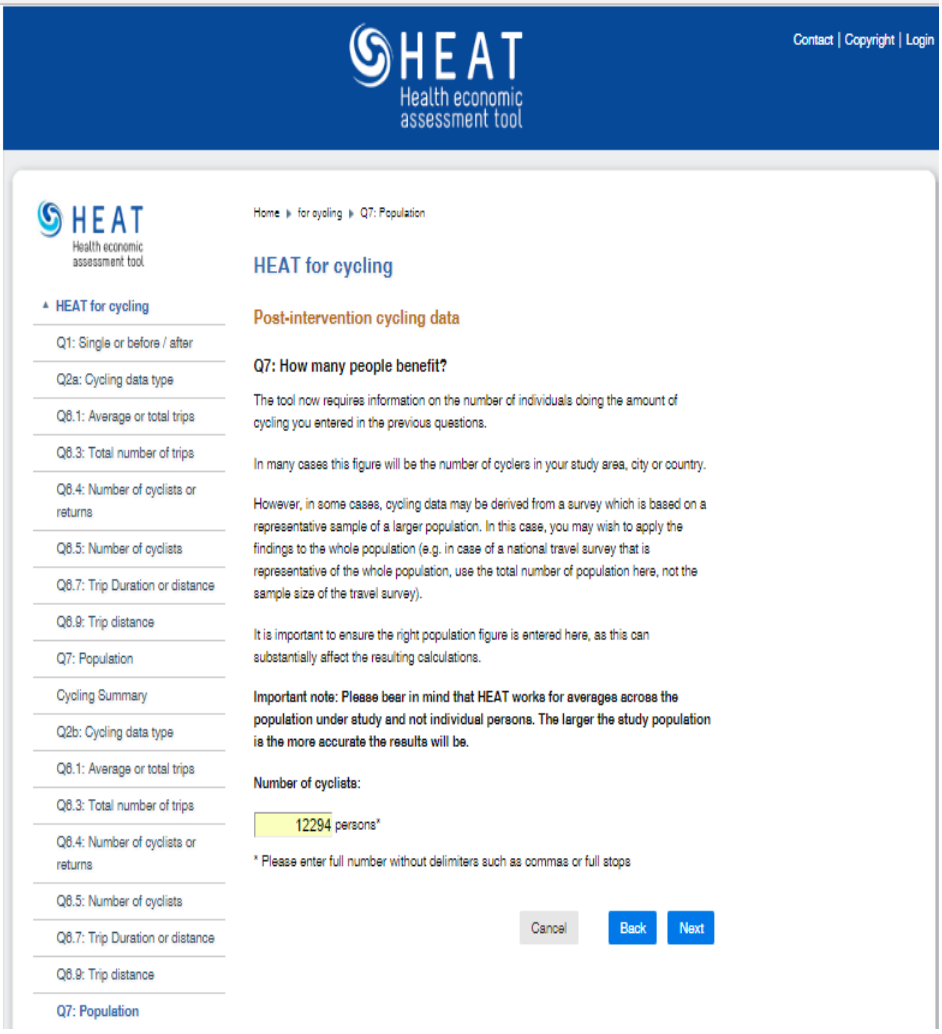
www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.7&m=post



www.heatwalkingcycling.org/index.php?pg=cycling&cs=q6.9&m=post



www.heatwalkingcycling.org/index.php?pg=cycling&cs=q7&m=post



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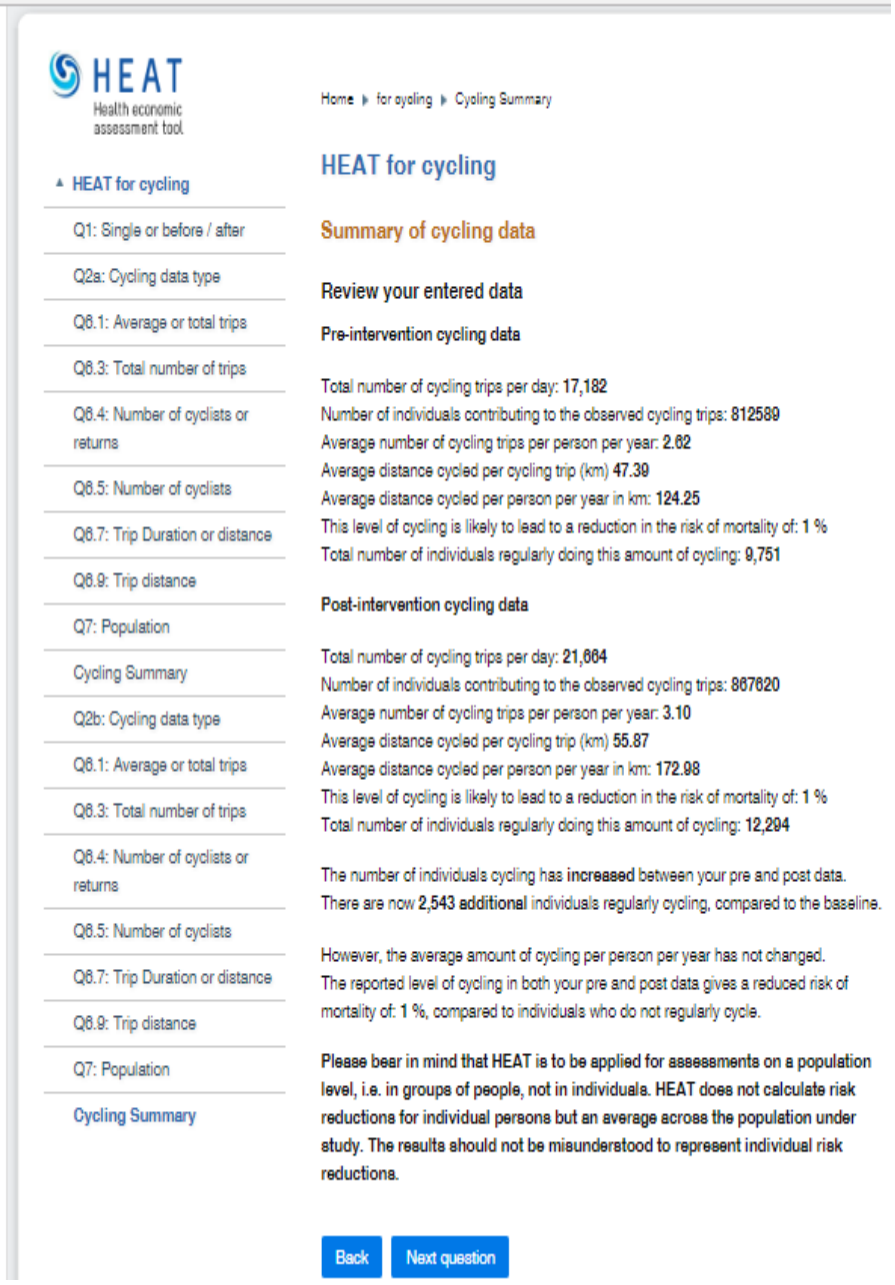

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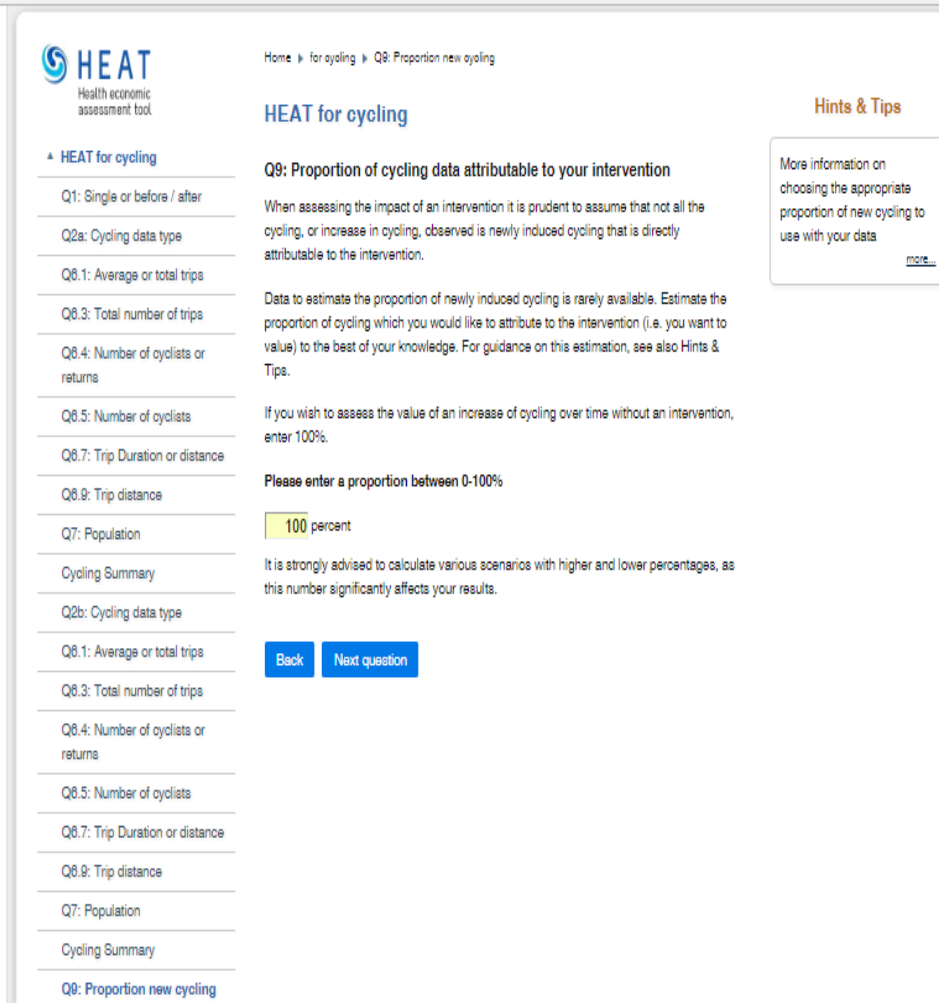

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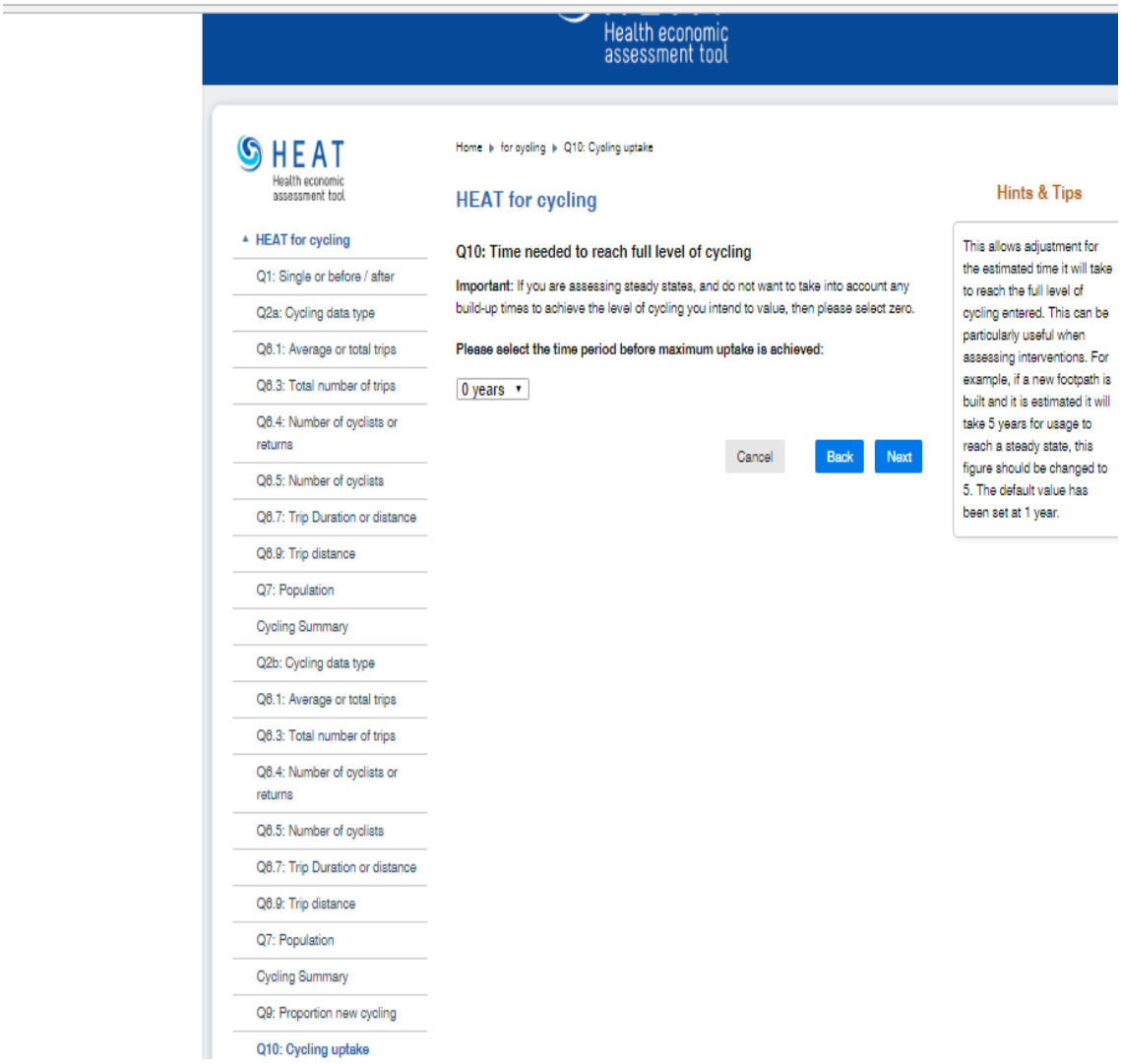

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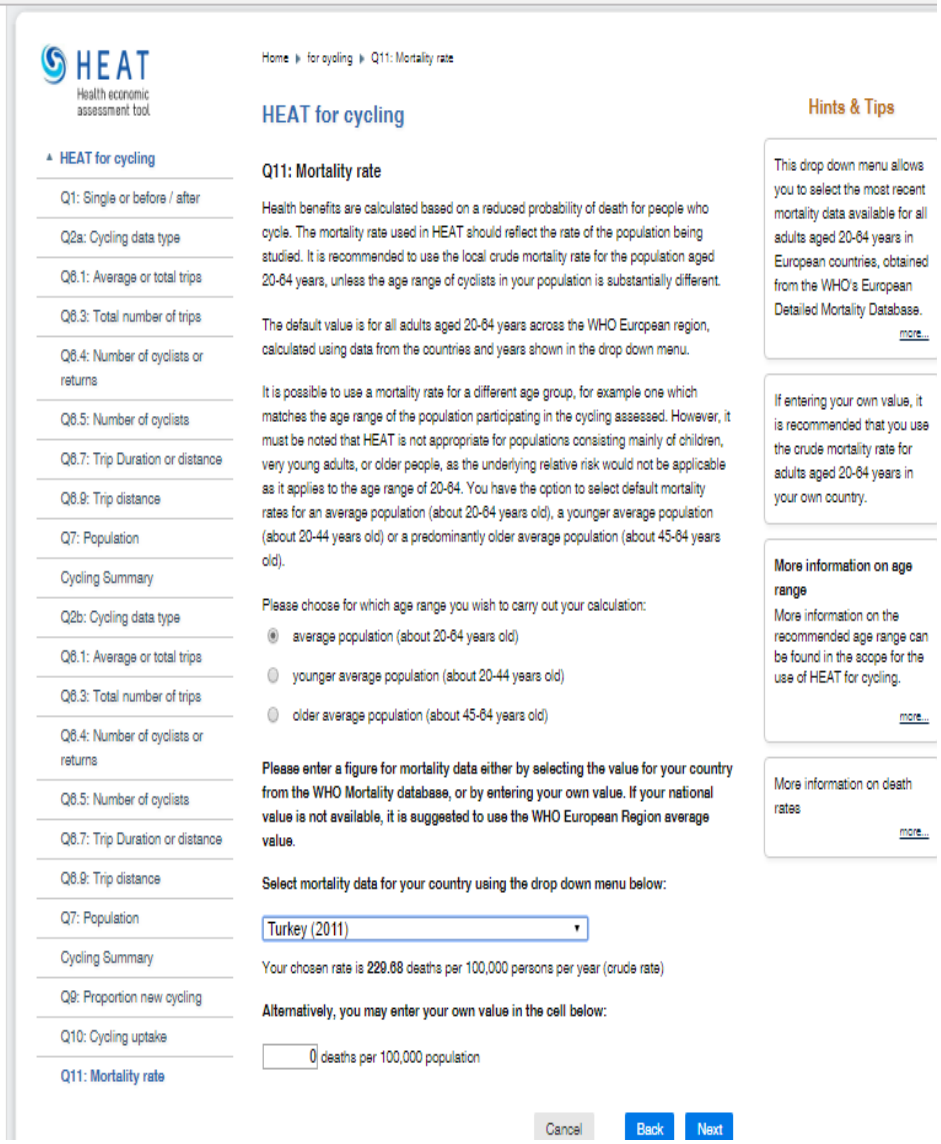

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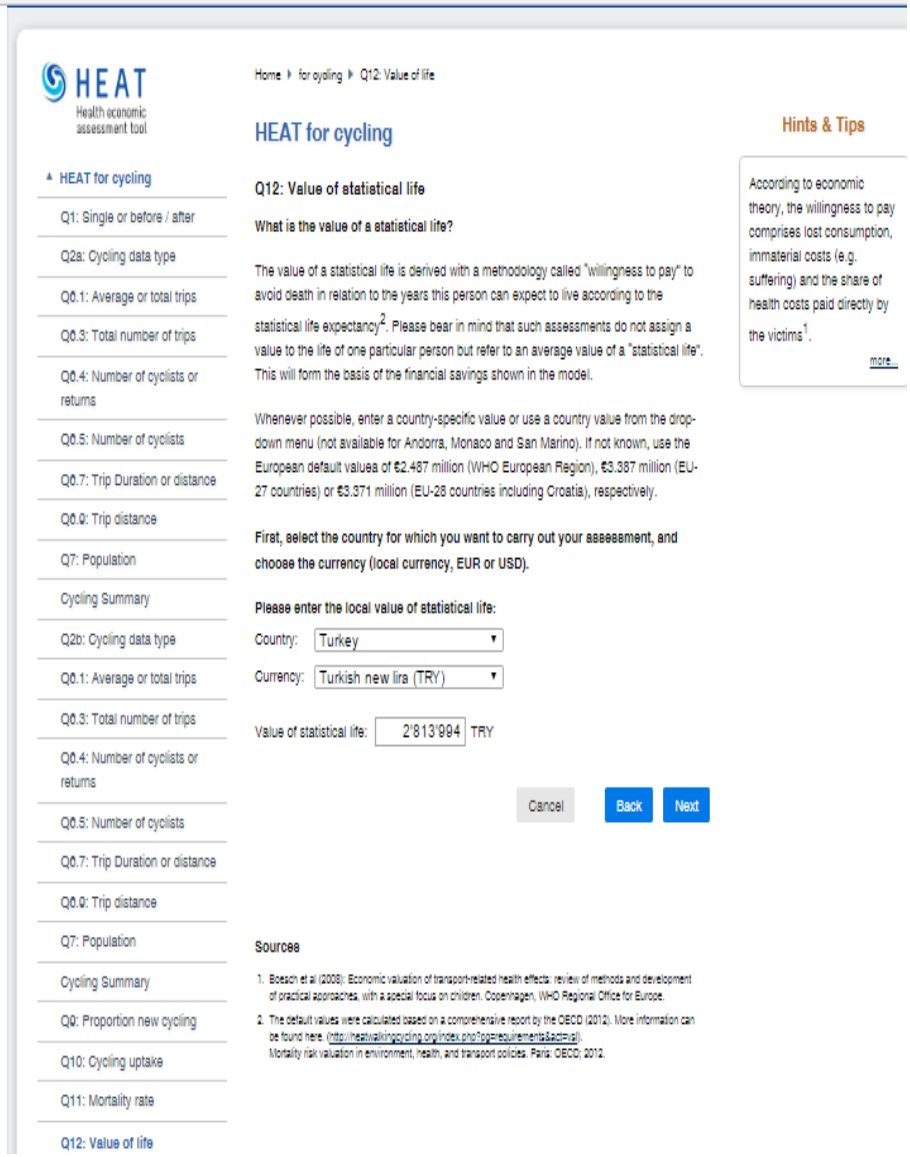

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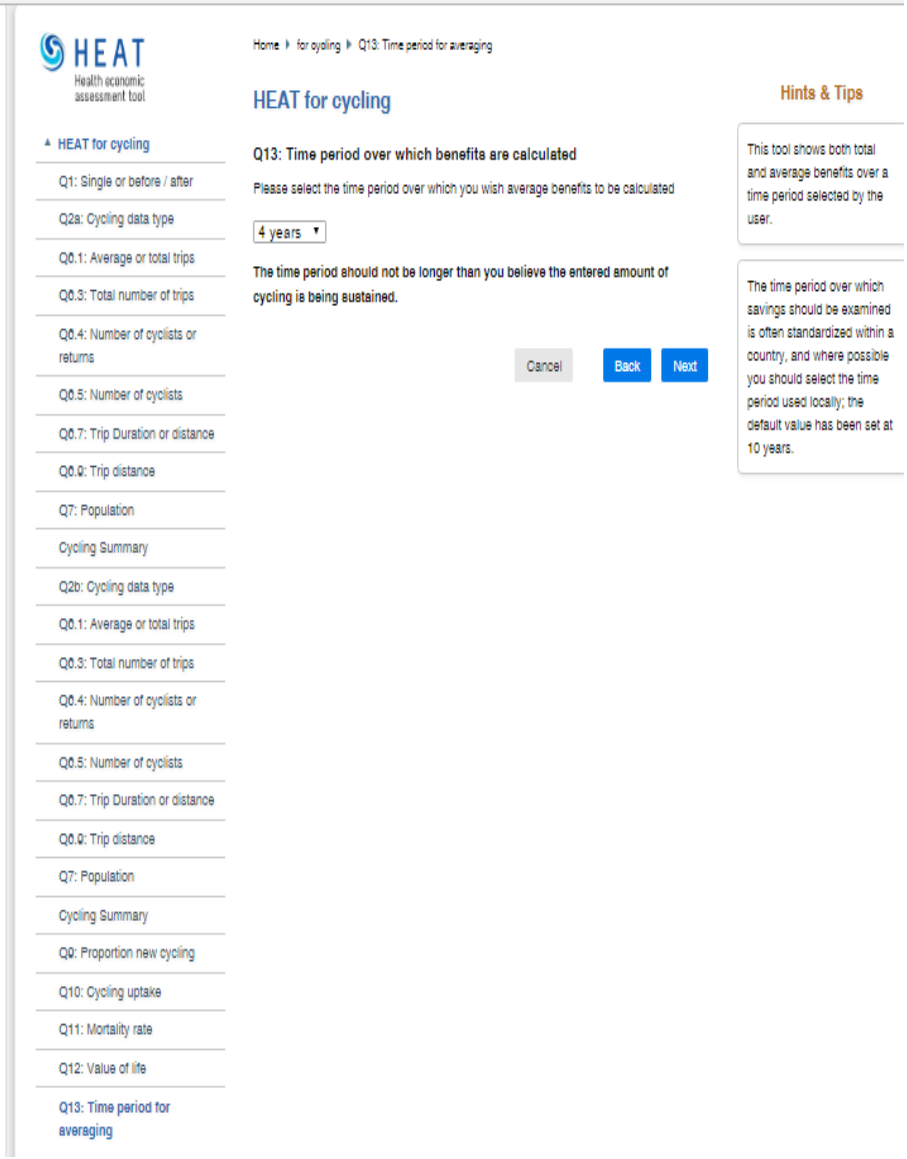

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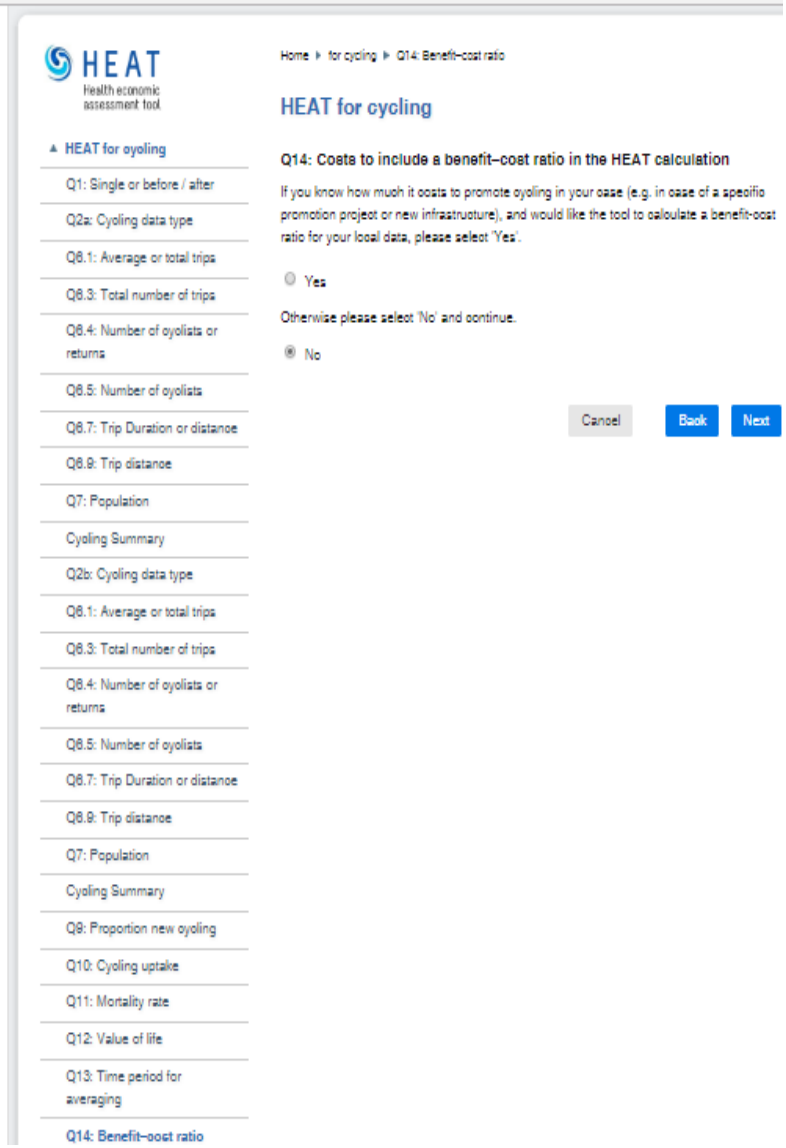

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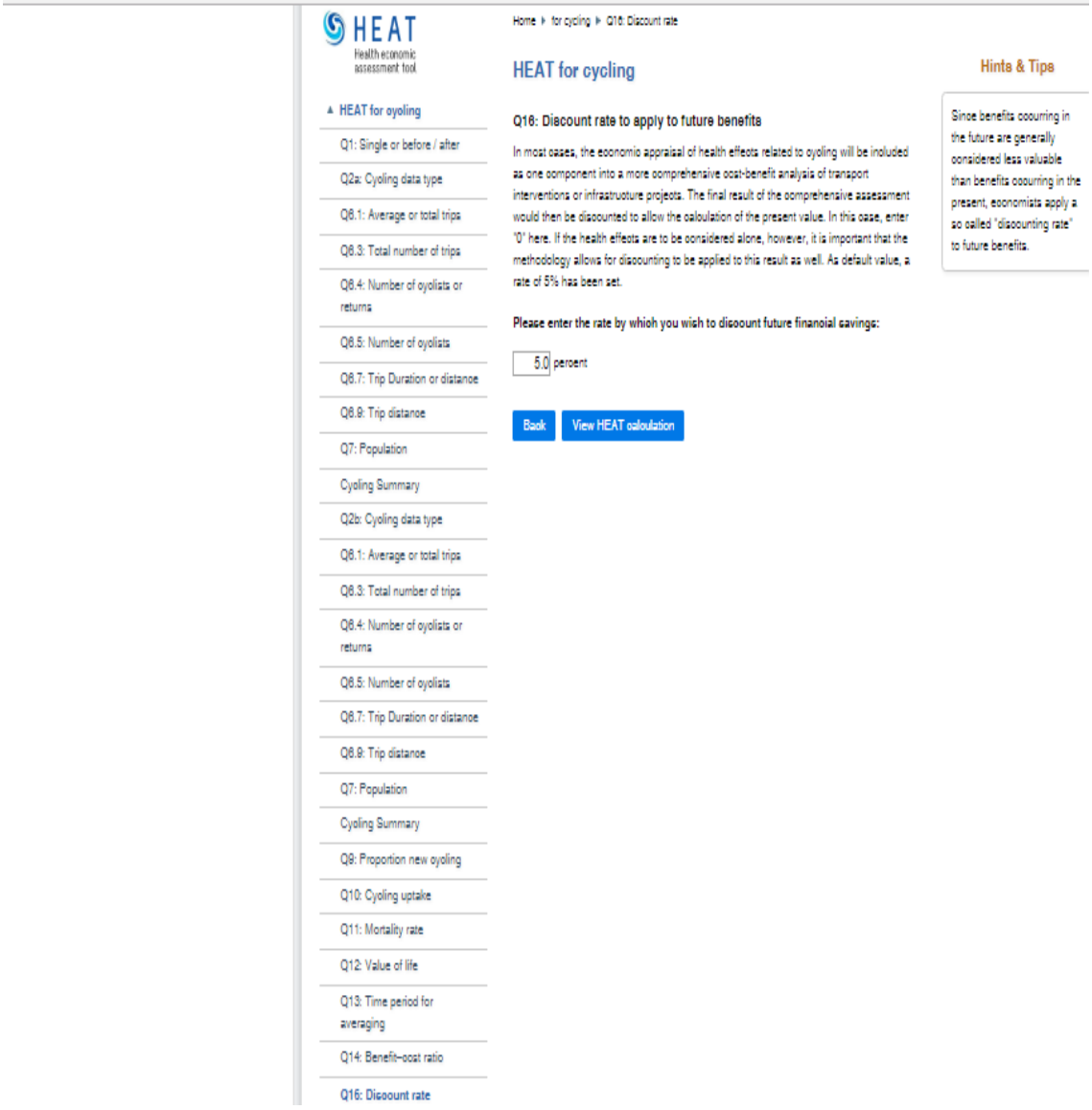

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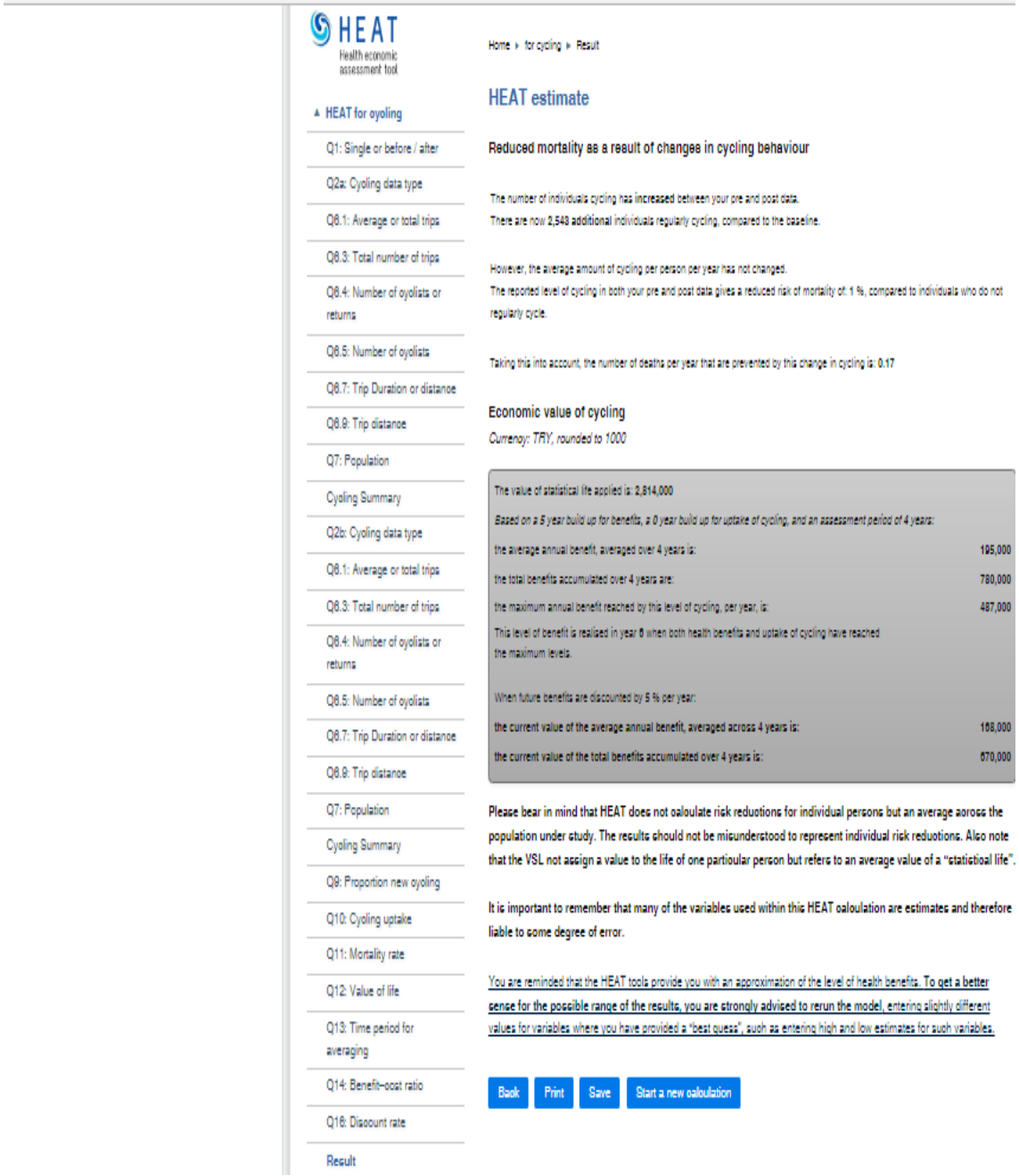

HEAT
Health economic assessment tool

- HEAT for cycling
- Q1: Single or before / after
- Q2a: Cycling data type
- Q8.1: Average or total trips
- Q8.3: Total number of trips
- Q8.4: Number of cyclists or returns
- Q8.5: Number of cyclists
- Q8.7: Trip Duration or distance
- Q8.8: Trip distance
- Q7: Population
- Cycling Summary
- Q2b: Cycling data type
- Q8.1: Average or total trips
- Q8.3: Total number of trips
- Q8.4: Number of cyclists or returns
- Q8.5: Number of cyclists
- Q8.7: Trip Duration or distance
- Q8.8: Trip distance
- Q7: Population
- Cycling Summary
- Q9: Proportion new cycling
- Q10: Cycling uptake
- Q11: Mortality rate
- Q12: Value of life
- Q13: Time period for averaging
- Q14: Benefit–cost ratio
- Q16: Discount rate
- Result

Home ▸ for cycling ▸ Result

## HEAT estimate

### Reduced mortality as a result of changes in cycling behaviour

The number of individuals cycling has increased between your pre and post data.
There are now **2,548 additional** individuals regularly cycling, compared to the baseline.

However, the average amount of cycling per person per year has not changed.
The reported level of cycling in both your pre and post data gives a reduced risk of mortality of: 1 %, compared to individuals who do not regularly cycle.

Taking this into account, the number of deaths per year that are prevented by this change in cycling is: **0.17**

### Economic value of cycling

*Currency: TRY, rounded to 1000*

The value of statistical life applied is: **2,814,000**

*Based on a 5 year build up for benefits, a 0 year build up for uptake of cycling, and an assessment period of 4 years:*

| | |
|---|---|
| the average annual benefit, averaged over 4 years is: | 195,000 |
| the total benefits accumulated over 4 years are: | 780,000 |
| the maximum annual benefit reached by this level of cycling, per year, is: | 487,000 |

This level of benefit is realized in year 6 when both health benefits and uptake of cycling have reached the maximum levels.

When future benefits are discounted by 5 % per year:

| | |
|---|---|
| the current value of the average annual benefit, averaged across 4 years is: | 168,000 |
| the current value of the total benefits accumulated over 4 years is: | 670,000 |

**Please bear in mind that HEAT does not calculate risk reductions for individual persons but an average across the population under study. The results should not be misunderstood to represent individual risk reductions. Also note that the VSL not assign a value to the life of one particular person but refers to an average value of a "statistical life".**

**It is important to remember that many of the variables used within this HEAT calculation are estimates and therefore liable to some degree of error.**

You are reminded that the HEAT tools provide you with an approximation of the level of health benefits. **To get a better sense for the possible range of the results, you are strongly advised to rerun the model**, entering slightly different values for variables where you have provided a "best guess", such as entering high and low estimates for such variables.

Back | Print | Save | Start a new calculation

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