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EU SUPPORT FOR PROMOTING SUSTAINABLE URBAN MOBILITY IN TURKISH CITIES

HANDBOOK FOR ORIGINATION AND COMMERCIALIZATION OF SUSTAINABLE URBAN MOBILITY PROJECT PORTFOLIOS FOR GREEN FINANCING

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List of Acronyms

ADB	Asian Development Bank
AFD	Agence Française de Développement
AHP	Analytical Hierarchy Process
AMB	Metropolitan Area of Barcelona
BCR	Benefit-Cost Ratio
BRT	Bus Rapid Transit
CAPEX	Capital Expenditures
CBA	Cost-Benefit Analysis
CEF	Connecting Europe Facility
EBRD	European Bank for Reconstruction and Development
EFSD	European Fund for Sustainable Development
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ESIA	Environmental and Social Impact Assessment
EU	European Union
GCF	Green Climate Fund
GHG	Greenhouse Gas
GIS	Geographic Information System
GPS	Global Positioning System
ICLEI	Local Governments for Sustainability
IFI	International Financial Institution
İLBANK	İller Bankası
IPA	Instrument for Pre-Accession Assistance
IRR	Internal Rate of Return
KPI	Key Performance Indicator
MaaS	Mobility as a Service
MCA	Multi-Criteria Analysis
MCDM	Multi-Criteria Decision-Making
MoEUCC	Ministry of Environment Urbanisation and Climate Change
MoTI	Ministry of Transport and Infrastructure
NGFS	Network for Greening the Financial System
OECD	Organisation for Economic Co-operation and Development
OPEX	Operational Expenditures
PPP	Public Private Partnerships
ROI	Return on Investment

SDLT	Stamp Duty Land Tax
SUMP	Sustainable Urban Mobility Plan
TEN-T	Trans-European Transport Network
UK	United Kingdom
US	United States
WB	World Bank

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1. Introduction

At present, the transition toward sustainable forms of urban mobility in Türkiye is not sufficiently supported through the required funding and financing. Mobility-related budgets are predominantly allocated to motorised individual transport. Non-motorized transportation modes, including public transport and walking infrastructure, are receiving insufficient resources. In particular, the improvement of public transport is hampered by low cost-recovery and the required high upfront investments. Next to allocating a greater share of urban transportation budgets to sustainable forms of mobility, municipalities in Türkiye must make greater use of innovative mechanisms for medium- and longer-term recovery of initial expenses.

This handbook aims to serve as a practical guide for municipalities in Türkiye in structuring, financing, and commercialising sustainable urban mobility project portfolios. It outlines financing sources, project origination strategies, financial evaluation techniques, and commercialisation pathways aligned with Türkiye's national climate commitments and international green finance standards.

This handbook provides municipalities in Türkiye with a number of practical tools, helping them to use innovative financing mechanisms for sustainable urban mobility development. In doing so, this handbook builds on the more theoretical first financial handbook. In addition, this handbook should be used in combination with the White Policy Paper, presenting municipalities and national urban mobility parties with a comprehensive roadmap for achieving sustainable urban mobility by 2050.

1.1 Understanding the Role of Funding and Finance in SUMPs

Financing means to mobilise financial resources to cover upfront investments for the construction of infrastructure, the procurement of vehicles and resources, or the provision of services. Sources of financing are public budgets or forms of debt financing from private banks and investors. **Funding, on the other hand, relates to structuring financial resources to (re-)pay the upfront and ongoing expenditures** over the lifecycle. Funding sources for urban mobility comprise project-generated revenues, local taxation and transfer payments from other tiers of government or the EU, as some examples. The combination of funding and financing sources will vary widely from city to city and from project to project.

Making the transition toward sustainable and universally accessible mobility systems in municipalities in Türkiye requires significant upfront investments. Therefore, public budgets need to be combined with innovative funding mechanisms for medium- and longer-term

repayment of initial expenses. New revenue streams must be generated using project-related incomes. Pricing measures for individual car use will both influence the mobility behaviour of individuals and create additional revenues, including through congestion charging, road pricing, and parking management. Revenues raised through transport demand management measures should be earmarked to be spent for investments into public transport, walking, cycling, public and shared mobility. The *Polluter Pays* principle should be adopted to secure finance for sustainable urban mobility projects. Value capture mechanisms in land use and real estates can be designed to come in different forms of taxation or private capital mobilization and can be employed for the delivery of transport services such as infrastructure levies, special assessments, transport levies, business rate supplements, developer obligations, and taxation based on infrastructure cost.

To ensure risk diversification, a mix of financial instruments including bonds and green bonds with predictable returns and maturity schedules should be used. Reducing (direct) costs of projects and services to the public is another approach. In this regard, private investment should be attracted through public-private partnerships (PPPs), considering risk-taking and efficient risk transfer mechanisms. Furthermore, efficiency gains can be created through competition. Allocating concessions to operate route networks via periodically repeated competitive tenders can improve service quality and lower costs.

1.2 Structure of this Handbook

This handbook provides practical information on the origination and commercialisation of a sustainable urban mobility project portfolio in line with green financing in Türkiye. Its aim is to assist municipalities in Türkiye in creating investment portfolios for sustainable urban mobility projects while guiding them through the financial evaluation of these projects and prioritisation within their investment pools. The handbook outlines key steps for achieving financial structuring for green and sustainable infrastructure projects, tailored to the local context. It details national and municipal financing schemes, as well as national and international sources, loans, and bonds specifically targeting green infrastructure. By supporting municipalities in developing investment portfolios, evaluating projects financially, prioritising within investment pools, and creating models for commercialisation, this handbook serves as a comprehensive guide for advancing sustainable urban mobility initiatives across Türkiye.

The Handbook is structured as follows:

- Chapter 2 provides guidance on project origination, guiding municipalities in identifying needs and opportunities for sustainable urban mobility projects;

- Chapter 3 covers how to structure an investment portfolio for sustainable mobility projects tailored to municipalities in Türkiye and discusses criteria for including projects and provide examples of successful portfolios. It also lists the actions or processes that municipalities need to follow to arrange and organise the financing for their sustainable urban mobility projects;

- Chapter 4 provides an overview of the funding sources, introduces green financing and highlights its importance for Turkish municipalities, as well as details available funding instruments, including national and municipal/local schemes, and international sources targeting sustainable infrastructure and provides an overview of accessing and integrating international funding sources;

- Chapter 5 covers Local Revenue Streams

- Chapter 6 presents the Financial Evaluation of Projects, presenting key financial metrics and analysis techniques for evaluating mobility projects, as well as methodologies such as cost-benefit analysis (CBA) and return on investment (ROI);

- Chapter 7 describes the process for prioritising projects within an investment pool, establishing criteria for ranking based on impact, cost, and urgency. This chapter provides methodologies and examples from successful municipalities;

- Chapter 8 covers commercialisation strategies and provides an overview of how to develop viable business models for mobility projects;

- Chapter 9 focuses on municipalities' planning and implementation of relevant projects. It offers a framework for creating an action plan for project implementation, including setting key performance indicators (KPIs) for monitoring progress and addressing the need for training municipal staff; and

- Chapter 10 summarises the key takeaways and recommendations for municipalities.

2. Project Origination

Project origination typically includes activities such as initial prioritization of projects within a programme, conducting feasibility studies, evaluating potential impacts, determining project scope, and identifying potential funding sources. It is the starting point for formally defining and advancing a transportation project from an initial idea to a well-defined concept that can be further developed and eventually implemented.

Project origination is the critical process of transforming initial concepts into well-defined, structured proposals that are technically, financially, and socially viable. It serves as the foundation for sustainable urban mobility initiatives. This phase involves identifying specific needs, assessing opportunities, and formulating projects that are ready for subsequent development and implementation.

Municipalities in Türkiye have different approaches towards project origination which may involve relevant technical and coordination departments. The technical units, which are responsible for project preparation, design, procurement, finance, and monitoring work together in terms of a new year's pipeline assessment process. In general, the Finance and/or the Strategy Departments act as the coordinating unit to harmonize the pipeline for review and approval.

In Turkish municipalities, project origination assumes a strategic role in bridging the gap between mobility needs and implementing tangible improvements. It begins with identifying mobility challenges and opportunities, conducting feasibility assessments, and evaluating potential funding and financing options. The process is inherently iterative and collaborative, requiring active engagement from stakeholders, integration with sustainability frameworks, and alignment with broader urban development goals. The bottlenecks facing the development of project include formulating the project concept, project screening, project preparation, guidance on project selection and information gap within technical units.

Through systematic project origination, municipalities can shift from abstract ideas to actionable projects that are not only technically feasible but also financially attractive and aligned with Türkiye's development goals and sustainability ambitions. This ensures that urban mobility projects contribute to reducing congestion, improving air quality, and enhancing overall quality of life.

2.1 Assessing Local Context and Challenges

In Türkiye municipal projects are often originated as wish lists of individual departments and are on based service shortcomings local demands and projects announced before elections. Understanding the unique socio-economic, geographical, and institutional contexts of a municipality is critical in the project origination phase. Each city or district in Türkiye presents a distinct set of challenges that require tailored solutions. Urban centres, for instance, are often characterised by issues such as traffic congestion, air pollution, and a reliance on individual car use. Conversely, suburban and rural areas may struggle with inadequate connectivity and limited access to public services.

A thorough assessment of the local context involves analysing mobility patterns, demographic trends, future transport demand and existing infrastructure gaps. Data collection and analysis play a pivotal role in this phase, with tools like Geographic Information Systems (GIS) and transport demand models enabling municipalities to visualise and quantify their mobility challenges. Moreover, engaging with local communities and stakeholders provides valuable insights into specific mobility needs, ensuring that proposed projects are relevant and impactful.

Municipalities must also consider broader trends and drivers of change, such as urbanisation, climate change, and technological advancements. By aligning project origination with these trends, Turkish cities can ensure that their mobility initiatives remain forward-looking and resilient.

The Istanbul Metropolitan Municipality's use of GIS for mapping transport deserts highlights a data-driven approach to targeted interventions, such as improving public transport availability in under-served areas (Istanbul Metropolitan Municipality, 2022).

2.2 Integrating Sustainability Goals

The integration of sustainability goals into project origination is essential for creating urban mobility systems that are environmentally friendly, socially inclusive, and economically viable. Türkiye's Sustainable Finance Framework underscores the importance of embedding Environmental, Social, and Governance (ESG) considerations into infrastructure planning and development. This approach aligns with the country's commitments under international agreements such as the Paris Agreement and the European Union's Green Deal.

Sustainability in urban mobility projects can be achieved through several approaches. For example, projects should prioritise reducing greenhouse gas emissions by promoting public and active transportation modes, such as cycling and walking. Investments in electric and low-emission vehicles can further contribute to decarbonising urban transport systems.

Equity and accessibility are equally important. Mobility projects must be designed to ensure that all residents, regardless of income level, physical ability, or location, have access to affordable and efficient transportation options. This can be achieved by integrating public transit networks with last-mile connectivity solutions, such as shared mobility services.

Lastly, projects must seek to minimise their environmental footprint by incorporating nature-based solutions and adopting sustainable construction practices. Measures such as green corridors, permeable pavements, and energy-efficient infrastructure contribute to both environmental sustainability and improved urban liveability.

2.3 Criteria for Project Selection

The selection of urban mobility projects should be guided by a strong framework of criteria that ensures alignment with sustainability, technical feasibility, and financial soundness. These criteria serve as the basis for evaluating potential initiatives and prioritising those that offer the greatest value. Finally, stakeholder support is an important criterion. The scheme below presents a general step-by-step guidance on how to come from a long list of projects to a shorter prioritised version.

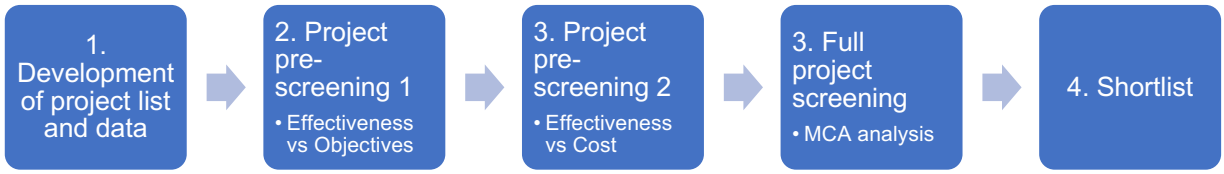


Figure 1. Example General Step-By-Step Project Selection Process

While the process may vary from one municipality to another depending on its priorities, an effective way to begin an initial screening of potential project priorities is by evaluating how well a proposed project aligns with the municipality's sustainable mobility goals. In this context, effectiveness refers to the extent to which the proposed initiatives and strategies successfully achieve their intended outcomes–enhancing the transportation system and improving mobility for individuals and goods across the region. If a measure does not have a direct connection to the municipality's goals, it should be considered a lower priority.

Another step for prioritising projects is just considering the effectiveness and the cost. The selection of effective measures should take cost considerations into account from the early planning stages. Project costs can be estimated based on data from previous projects, local and national standards, and expert assessments. These estimates–which encompass all project-related expenses, including planning, execution, operation, and follow-up costs–serve as a foundation for further studies, such as feasibility analyses, to refine projections. Measures that are highly effective and low cost should, in principle, be a priority. Measures that are not that effective and with a high cost, can be considered not a priority. Some measures that have high impact but that have higher costs (i.e. public transport systems), should not be disregarded since these can be financed by different mechanisms.

The effectiveness-cost evaluation methodology provides consistent and transparent outcomes. However, this goal-oriented approach does not encompass certain essential criteria that should be considered in the decision-making process from technical, commercial, administrative, or political standpoints.

This is when a Multi-Criteria Analysis (MCA) comes into play. The MCA is a tool that enables decision-makers to move beyond single-criterion approaches, which often prove inadequate in addressing environmental and urban planning issues, by incorporating a broad range of criteria. To effectively apply a MCA to urban transport challenges, various types of knowledge must be integrated. Practical knowledge is crucial for assessing feasibility, local travel behaviour, and adherence to legal constraints. Scientific knowledge is necessary to evaluate the impact of measures on air pollutant levels, greenhouse gas emissions, and noise pollution. Furthermore, alongside political motivations, normative considerations are significant in addressing social equity and acceptability in urban planning.

In order to consider the above-mentioned aspects, alongside effectiveness and costs, additional criteria can be integrated into the MCA. This depends entirely on the municipalities and the importance that they give to these factors. Some relevant examples are:

- Financial – Technical Considerations: As mentioned before, cost-effectiveness and funding potential are critical factors and should be considered. Municipalities should assess whether a project with high efficiency but higher costs can be financed within their budgetary constraints or through external funding sources. Projects that leverage private sector investment, such as public-private partnerships (PPPs), should also be given due consideration.

- Sustainability Impact: Projects demonstrating significant potential to reduce emissions, enhance air quality, or promote sustainable urban development should be prioritised. For instance, a proposed mass transit project that reduces car dependency and encourages walking and cycling may have a higher impact than isolated road infrastructure improvements.

- Technical and Regulatory Feasibility: Projects can be evaluated for their engineering viability, alignment with local and national regulations, and compatibility with existing urban plans. The technical evaluation should also consider potential implementation challenges, such as land acquisition or public resistance. This could also include the number of studies that need to be developed before implementation.

- Institutional Readiness: This refers to the municipality's ability to effectively plan, implement, and manage sustainable urban mobility initiatives and projects. This requires having sufficient personnel with the necessary technical, financial, and managerial expertise, along with institutional knowledge of best practices and innovative mobility solutions. Additionally, the municipality should have access to reliable and up-to-date transport data to support evidence-based decision-making. A well-defined legal and regulatory framework must be in place to facilitate the development, financing, and implementation of sustainable transport projects. Lastly,

effective coordination among municipal departments, national and regional authorities, the private sector, and civil society is essential for successful mobility planning and execution.

- Jurisdiction: Priority could be given to projects that are entirely dependent on the local municipality.

- Stakeholder Support: Projects aligning with community needs and garnering public support are more likely to succeed. Early and continuous engagement with stakeholders builds trust, addresses concerns, and ensures that projects reflect community aspirations.

2.4 Creation of a Project Pipeline

A well-organised project pipeline is essential for managing and implementing multiple urban mobility initiatives over time. This pipeline represents a sequence of projects, each at different stages of development, which together contribute to achieving broader mobility goals.

The creation of a project pipeline begins with the identification and screening of potential projects. Municipalities should evaluate each project against the selection criteria outlined earlier, ensuring that only those with high potential are included in the pipeline. Feasibility studies play a critical role in this phase, providing detailed assessments of technical, financial, and environmental viability.

Prioritization is the next step in pipeline development. Municipalities must rank projects based on factors such as urgency, expected impact, and available resources. For example, a project addressing a critical safety issue, such as the construction of pedestrian crossings near schools, may be given priority over a long-term infrastructure development.

The key steps to be taken are:

1. Identification and Screening: Evaluate potential projects against criteria to include high-potential initiatives in the pipeline.
2. Feasibility Studies: Conduct detailed assessments of technical, financial, and environmental viability.
3. Prioritisation: Rank projects based on urgency, expected impact, and available resources.

Formulating the project pipeline by Municipalities in Türkiye is constrained by a mismatch between the time horizons of annual investment budgets (or three-year general budget estimates) and the five-year strategic plans. Project selection criteria at the central and local levels are not linked with systematic project appraisal practises and tend to give a wide scope for political discretion and other non-economic factors. Project appraisal processes tend to be more limited in scope, with less attention to business case justification, economic appraisal, project management arrangements, risk mitigation, and procurement strategies.

The role of İLBANK, Türkiye's municipal development bank, is particularly significant in this context. Although the bank becomes fully engaged to provide technical assistance and financing to municipalities once there is a strong prospect for lending, it helps them design and evaluate projects, conduct feasibility studies, and secure funding through its own sources or partner international lenders. In doing so İLBANK practices in project pipeline development serve to establish a blueprint for the entire municipal sector.

2.5 Identifying Potential Funding Sources

Securing adequate funding is a cornerstone of project origination. Municipalities in Türkiye have access to a range of funding and financing sources, each with its own advantages and challenges. These include local revenue streams, national grants, international financing programmes, private sector investments and green bonds. Although other sources are increasingly used, private and market-based financing of municipal investments is hampered due to a lack of data and information that would enable an assessment of the commercial viability of the potential investment. Specifically, the planning and pipeline assessment processes lack detailed project design and pre-feasibility studies.

Local revenue streams, such as public transport fares, parking fees, and road usage charges, provide a stable source of funding for urban mobility projects. However, these revenues are often insufficient to cover large-scale infrastructure investments, necessitating the exploration of additional options.

National and international loans and grants are a critical source of funding for sustainable mobility initiatives. Programmes such as the Ministry of Environment, Urbanisation, and Climate Change (MoEUCC) Directorate of Climate Change Grant Programme or EU financial support through the Instrument for Pre-accession Assistance (IPA) offer financial support for projects that align with their objectives. Municipalities must carefully prepare grant applications, ensuring compliance with eligibility criteria and reporting requirements.

Public-private partnerships (PPPs) offer a valuable mechanism for mobilising private sector expertise and capital. By transferring certain risks and responsibilities to private partners, municipalities can enhance efficiency and reduce the burden on public budgets.

Similarly, green bonds provide an opportunity to raise funds for environmentally beneficial projects while appealing to institutional and private investors. Green bonds are innovative financial instruments designed to fund projects with clear environmental benefits, such as sustainable transport and renewable energy. These bonds attract institutional and private investors seeking environmentally aligned investments while offering municipalities access to cost-effective capital. Building on the experience of the debut green bond issuance by Istanbul Metropolitan Municipality by issuing green bonds, municipalities in Türkiye can advance their urban mobility initiatives while contributing to global climate goals.

2.6 Collaboration and Institutional Capacity Building

The success of project origination depends on effective collaboration among stakeholders and the capacity of municipalities to manage complex processes. Local governments must work closely with public agencies, private sector partners, and community groups to ensure that projects are well-conceived and widely supported.

Capacity building is particularly important for municipalities that lack the technical expertise and institutional resources needed for project development. Training programmes, workshops, and knowledge-sharing initiatives can help municipal staff develop skills in areas such as project appraisal, cost-benefit analysis, and financial structuring. İLBANK's financing programmes, developed in coordination with its multilateral and international financing partners, provide significant opportunities for institutional capacity building through their specifically designed technical assistance components.

2.7 Commercialisation of Mobility Projects

Commercialisation of new urban mobility projects forms an important aspect that must be included from the start of the project origination. Commercialisation options are a key aspect of the viability assessment of investment planning. This paragraph introduces the initial commercialisation strategies. Chapter 8 will provide a full elaboration of commercialisation strategies involved in the more advanced stages of project maturity.

Commercialisation involves transforming sustainable transport initiatives into financially viable ventures, ensuring that these projects are not only environmentally and socially impactful but also economically sustainable. Successful commercialisation strategies integrate innovative revenue models, leverage technology partnerships, and establish frameworks for monitoring and maintenance.

Key Components of Commercialisation

Developing Revenue Models: Revenue models should balance affordability for users with financial viability for the service. Public transport fare optimisation, for instance, involves pricing strategies that consider peak and off-peak hours, subscription-based discounts, and tiered pricing for different user groups. Additional revenue streams can include advertising on public transport vehicles, naming rights for transport hubs, and co-branding opportunities. Example: The Istanbul Metropolitan Municipality implemented dynamic fare systems on metro and bus networks, enhancing affordability for frequent travellers while ensuring sustainable revenue generation.

Partnerships with Technology Firms: Collaborations with technology firms can unlock advanced solutions such as smart ticketing systems, mobile payment platforms, and real-time passenger information systems. These innovations not only streamline operations but also improve user experience by reducing queues and ensuring seamless multi-modal integration.

Case Study: The London Oyster Card system, a globally recognised example, demonstrates the benefits of a smart card payment system integrated with buses, trains, and ferries, setting a benchmark. Similar travel cards are also used to varying extent by large Turkish municipalities.

Asset Monetisation: Leveraging transport-related assets to generate additional income is a growing trend in urban mobility projects. Municipalities can explore options such as leasing commercial spaces in transport hubs, offering premium services (e.g., express buses), and collaborating with delivery companies for last-mile logistics solutions.

Sponsorships and Public-Private Partnerships (PPPs): PPPs can play a crucial role in funding and managing commercialisation projects. Private entities often bring innovative solutions and operational expertise, reducing the financial burden on municipalities. For example, partnerships with ride-sharing companies can expand last-mile connectivity while generating shared revenue.

Monitoring and Maintenance: Ensuring long-term financial and operational sustainability requires regular monitoring and maintenance of infrastructure and services. Key performance indicators (KPIs), such as passenger satisfaction, revenue per kilometre, and asset utilisation rates, should guide operational decisions. Adopting predictive maintenance technologies can minimise downtime and reduce costs.

Expanding Mobility as a Service (MaaS): The concept of Mobility as a Service integrates multiple transport modes (public transport, shared bikes, car-sharing) into a single digital platform. MaaS platforms generate revenue through subscription fees while promoting sustainable transport by reducing private vehicle usage. Example: Helsinki's Whim app provides unlimited access to public transport, ride-hailing, and rental cars for a flat monthly fee, serving as a model for urban mobility commercialisation.

Challenges and Solutions in Commercialisation

Balancing Accessibility and Profitability: Striking a balance between affordable services and financial sustainability can be challenging. Subsidies for low-income users and revenue from secondary sources (e.g., advertising) can mitigate this issue.

Adopting Technology Across Demographics: Ensuring that older or less tech-savvy populations can access smart mobility services is vital. This can be addressed by providing alternative payment methods and user-friendly designs.

Regulatory Frameworks: Municipalities must create policies to govern private partnerships, ensuring public interest and fair competition.

3. Investment Portfolio Structuring

Investment portfolio structuring is a critical process for municipalities aiming to advance sustainable urban mobility. A well-structured portfolio ensures that projects align with broader strategic objectives, balance immediate needs with long-term goals, and maximise environmental, social, and economic benefits (EIB, 2023). By integrating diverse projects of varying scales, municipalities can address short-term challenges while laying the groundwork for enduring improvements in urban mobility.

The transition to sustainable mobility necessitates careful allocation of resources across a variety of initiatives. For Turkish municipalities, designing and implementing investment portfolios tailored to local contexts while meeting green financing standards is an essential endeavour (NGFS, 2022). The role of structured portfolios is not merely to allocate resources effectively but to inspire confidence among stakeholders and funding bodies, ensuring sustainable urban mobility projects receive adequate support. In addition, structured cooperation with specialized institutions such as İLBANK can be expected to enhance stakeholders' trust in investments and drive financial and operational efficiency.

3.1 Criteria for Project Inclusion in Portfolio Structuring

The criteria for including projects in a sustainable urban mobility investment portfolio should ensure alignment with strategic objectives, comprehensive assessment of sustainability and impact, and rigorous feasibility studies (İLBANK, 2024).

Projects must align with both national and local development goals. National climate and sustainability goals require contributions to Türkiye's climate action plans, including reductions in greenhouse gas emissions and fostering resilience. On a local level, projects should support urban development priorities such as improving access and reducing congestion (World Bank, 2020, 2023). A key example is the SMART Ankara project which aims to prepare a SUMP for the city in accordance with the best EU practices and standards. Among other components, this initiative includes the development of a Smart Bike System (SBS) to promote cycling as a sustainable mode of transport. The project is supported by the Transport Sectoral Operational Programme (SOPT), a major instrument for providing financial assistance of the European Union to the transport sector in Türkiye. These efforts not only address the city's congestion challenges but also contribute directly to Türkiye's broader decarbonisation efforts. The integration of smart traffic management systems and low-emission zones further strengthens Ankara's commitment to sustainable urban mobility while aligning with national financing mechanisms designed to support green infrastructure development.

The assessment of sustainability and impact involves evaluating environmental, social, and economic outcomes. In line with the sustainability goals, priority should be given to initiatives that reduce air pollution, enhance energy efficiency, and promote renewable energy use. Social equity is another critical dimension, ensuring mobility solutions that enhance accessibility for underserved communities. Additionally, projects must demonstrate their potential to generate economic growth, create jobs, and increase land value (Shura Energy Transition Centre, 2019).

Feasibility studies are crucial to determine the viability of proposed initiatives. Technical feasibility focuses on engineering and operational requirements, while financial feasibility evaluates funding sources, cost-efficiency, and return on investment. The outputs of the technical feasibility study are critical as they inform main parameters of financial feasibility. Social feasibility ensures community acceptance and stakeholder support. A comprehensive risk assessment identifies regulatory, environmental, and financial uncertainties and proposes mitigation strategies (OECD, 2021).

3.2 Diverse Project Structuring

A diverse portfolio balances small, medium, and large-scale projects, ensuring both immediate impact and long-term sustainability. This diversification mitigates risks and enhances resilience to changing economic and environmental conditions (EIB, 2023). By structuring portfolios to include projects of varying scales, municipalities can address immediate needs while ensuring infrastructure supports future growth.

Small-scale projects, such as pedestrian schemes and expanded cycling infrastructure, address immediate urban mobility challenges. These projects typically require lower capital investments but can yield substantial social and environmental benefits, particularly in densely populated areas. Medium-scale projects, including Bus Rapid Transit (BRT) systems or electric vehicle charging networks, provide scalable solutions for urban areas. BRT systems in cities like Istanbul have illustrated how medium-scale investments can effectively alleviate traffic congestion. Similarly, Large-scale projects, such as metro systems or regional rail networks, create transformative impacts on regional mobility (NGFS, 2022). Suburban rail network projects in İzmir and Ankara are typical examples in Türkiye.

Phased implementation enhances scalability and adaptability. Projects can start with pilot programmes or initial phases, which are expanded based on performance evaluations and funding availability. This approach allows municipalities to adapt projects based on feedback and evolving needs, ensuring resources are optimally utilised (İLBANK, 2024).

3.3 Green Financing Compliance

Compliance with green financing standards is essential to secure funding from national and international sources. Projects must demonstrate significant positive environmental impacts, address climate adaptation and mitigation goals, and adhere to relevant guidelines (World Bank, 2020).

The measures of the Paris Agreement form the backbone of Türkiye's climate policy architecture, which is currently being integrated into national strategies through instruments such as the Climate Law and Türkiye Climate Change Adaptation Strategy and Action Plan. The agreement has introduced the following measures:

1. Install Nationally Determined Contributions (NDCs) to reduce greenhouse gas (GHG) emissions.
2. Carbon Pricing and Emission Reduction Policies
3. Promoting Zero-Emission Mobility
4. Climate Adaptation Strategies for Urban Transport
5. Green Financing and Climate Funds

Documented reductions in greenhouse gas emissions and tangible improvements in air quality and public health are essential metrics. Additionally, evidence of social inclusion and accessibility enhancements strengthens the case for funding (EIB, 2023). For example, international funding mechanisms, such as the Green Climate Fund, require detailed environmental impact assessments as part of their application process, underscoring the importance of compliance.

Although, green financing provides a structured framework for municipalities to secure funding for sustainable transport initiatives, it is important to recognize that in practice, this financing comes with specific conditions. Municipalities must allocate the funds to pre-designated areas which are typically defined under the specific eligibility rules of each financing mechanism. Examples include expanding bike lane networks, purchasing electric buses, or extending tramway systems. Additionally, compliance with environmental and social safeguards is a critical component of the financing process. These safeguards must be embedded into project design to ensure sustainability and to meet the funding requirements set by financial institutions and regulatory bodies.

Beyond these financial conditions, municipalities may also need to adopt guiding tools and frameworks to support their green financing efforts. This could include conducting greenhouse gas (GHG) inventories to assess emissions reductions, developing monitoring mechanisms to track environmental and social impacts, and aligning projects with broader sustainability strategies. Ensuring compliance with these requirements not only secures funding but also enhances the long-term viability and effectiveness of sustainable mobility initiatives.

The World Bank, for instance, requires municipalities to demonstrate financial sustainability, a strong commitment to project objectives, and compliance with its environmental and social safeguards. On the other hand, the European Investment Bank (EIB) supports municipalities through concessional loans with long repayment periods, but only if they have a clear sustainability strategy and align with EU environmental policies (EIB, 2024). Similarly, the European Bank for Reconstruction and Development (EBRD) offers financing for municipalities when projects meet specific environmental impact criteria and are aligned with its Green Cities Programme, with a particular focus on fostering public-private partnerships (EBRD, 2024).

All these considerations should be systematically incorporated into the relevant sections of the project planning and implementation process to ensure a well-structured and finance-ready approach.

3.4 Practical Examples and Case Studies

Practical examples illustrate the application of these principles. Case studies from Turkish municipalities, such as Istanbul or Ankara, showcase successful investment portfolios utilising diverse funding sources. These include the deployment of electric bus fleets, the construction of multimodal transfer hubs, and the development of integrated fare systems across public transport modes.

The İLBANK "Sustainable Cities" programme financed by the World Bank serves as a domestic example of integrating loans and technical assistance to address urban mobility (İLBANK, 2024). The programme's focus on environmentally friendly infrastructure projects highlights the potential for leveraging national resources effectively.

International examples from European cities highlight best practices, such as leveraging green bonds and public-private partnerships to fund innovative mobility solutions (EIB, 2023). Cities like Amsterdam and Stockholm have successfully employed green bonds to finance public transport projects, providing benchmark models for municipalities in Türkiye.

3.5 Steps to Develop and Manage an Investment Portfolio

Developing and managing an investment portfolio involves several key steps. Identifying needs and gaps through comprehensive assessments is the starting point, ensuring alignment with national and local strategic objectives (NGFS, 2022). Assessments should involve consultations with key stakeholders, including urban planners, financial experts, and local communities, to identify priority areas for investment.

Screening and prioritising projects require robust evaluation frameworks. Multi-Criteria Decision-Making (MCDM) tools, including scoring models and the Analytic Hierarchy Process (AHP), facilitate objective assessments based on impact, feasibility, and strategic alignment. Cost-Benefit Analysis (CBA), integrated with sustainability metrics, provides a comprehensive evaluation (OECD, 2021). These tools are essential for balancing financial viability with broader social and environmental goals.

Detailed financial and implementation plans must be developed for selected projects, ensuring compliance with green financing criteria and addressing potential risks. Stakeholder engagement is critical throughout the process, securing support from local authorities, financial institutions, and community members. Transparent communication about project objectives and benefits fosters trust and collaboration (İLBANK, 2024).

3.6 Tools and Resources

Municipalities can leverage a range of tools and resources to support their investment portfolios. Decision-making tools such as MCDM frameworks and AHP help evaluate and prioritise projects effectively. Templates and guidelines provide clear criteria weighting and scoring systems for consistent evaluations. Stakeholder engagement frameworks outline strategies for involving community members and institutional partners in decision-making processes (World Bank, 2020).

Collaborative platforms and workshops can also play a crucial role in fostering shared knowledge and expertise. For example, initiatives led by EIB often include training sessions and resources tailored for municipalities seeking to adopt best practices in sustainable urban mobility planning.

4. National and International Funding Sources

Today, mobility related central funding and financing is predominantly allocated to motorised individual transport. The distribution of national budgets for non-motorized transportation modes, including public transport and walking infrastructure, is insufficient. Long cost-recovery periods and required high upfront investments hamper the improvement of public transport. For the transition to sustainable urban mobility in Turkish cities, a greater share of mobility related budgets needs to be allocated to public transport and active mobility infrastructure. In addition, wider-spread usage of innovative funding mechanisms for medium- and longer-term repayment of initial expenses, beyond using public budgets and classic debt financing, are needed to enlarge financing possibilities for municipalities of Türkiye. Public budgets need to be combined with innovative funding mechanisms for medium- and longer-term repayment of initial expenses. Where available, international funding and green finance can be acquired and added to the mix.

In general, there are various green finance mechanism for sustainable mobility projects. These mechanisms facilitate investment by mobilizing capital from public and private sources, ensuring long-term sustainability and environmental benefits. Below is a breakdown of some of the key financial instruments and options available for municipalities.

1. Commercial Debt (Green Bonds and Loans)

Commercial debt includes green bonds and green loans, which provide capital for environmentally sustainable projects.

- Green Bonds: Fixed-income instruments issued by governments, municipalities, or corporations to finance projects with environmental benefits. They offer investors stable returns while ensuring funds are allocated to green initiatives.

- Green Loans: Loans specifically designed for green projects, often with lower interest rates or incentives for sustainability performance. These loans support businesses and municipalities in financing renewable energy, electric vehicles, and sustainable transport infrastructure.

2. Public & Institutional Finance (Sovereign & Multilateral Finance)

Public and institutional finance refers to funding from government entities and international financial institutions.

- Sovereign Finance: National governments provide funding through budget allocations, tax incentives, and national green funds to support sustainability projects.
- Multilateral Finance: International financial institutions (e.g., World Bank, EIB, ADB) offer grants, concessional loans, and technical assistance for green mobility projects. These funds help reduce investment risks and leverage private capital.

3. Equity (Private Equity & Venture Capital)

Equity financing involves investments where investors take an ownership stake in sustainable mobility projects.

- Private Equity: Large-scale investors provide capital to established companies looking to scale sustainable transport solutions.
- Venture Capital: Early-stage investments in innovative green transport start-ups, supporting new technologies such as electric vehicle infrastructure, smart mobility solutions, and alternative fuels.

4. Climate and Carbon Finance (Carbon Credits & Climate Funds)

Climate finance mechanisms provide incentives for reducing carbon emissions and funding sustainable initiatives.

- Carbon Credits: Tradable permits that allow organizations to offset emissions by investing in certified sustainability projects, such as green transport initiatives.
- Climate Funds: Dedicated funds from international institutions, governments, and private investors that support low-carbon transport solutions, such as the Green Climate Fund (GCF).

In general, the most promising mechanisms in Türkiye are grants, green bonds and loans. The table below presents a comparison among all of these.

Table 1. Comparison between Grants, Green Loans and Green Bonds

Financing mechanism	Grants	Green Loans	Green Bonds
Issuer	Governments, multilateral institutions	Banks, IFIs	Governments, municipalities, corporations
Structure	Non-repayable funds	Customized loan agreements	Tradable fixed-income securities
Use of proceeds	Specific sustainability projects	Green projects, flexible allocation	Specific green infrastructure projects
Market accessibility	Limited, based on eligibility criteria	Private negotiations, limited to eligible borrowers	Public capital markets, attracts institutional investors
Risk and Pricing	No financial risk	Interest-based, may have performance-linked pricing	Interest rates vary with market conditions and credit ratings
Regulatory and reporting requirements	Requires compliance with grant conditions	Fewer regulatory obligations than bonds	Requires adherence to Green Bond Principles and detailed impact reporting
Pros	• No repayment required. • Encourages innovation. • Reduces financial burden on municipalities.	• Can offer lower interest rates. • Flexible repayment terms. • Can be combined with other funding sources.	• Attracts institutional investors. • Can finance large-scale projects. • Long-term funding stability.
Cons	• Highly competitive. • Limited availability. • Often comes with strict eligibility and reporting requirements	• Requires repayment with interest. • May have conditions linked to sustainability performance. • Risk of debt accumulation.	• Requires credit rating and market confidence • Regulatory compliance and reporting obligations. • Higher initial costs for issuance.

4.1 National Level Funding

Funds secured through various sources should be strategically directed towards sustainable mobility initiatives. Financial transfers from the national budget to municipalities are commonly used to subsidise the operation of public transport services. Beyond this, some national governments also provide grants and funding schemes for projects or other purposes, such as research and development or market diffusion of low-carbon technologies. Approval of grants is often linked to specific conditions, such as the assumption of own contributions from the municipal budget or from other funding sources.

4.1.1 İLBANK Project Financing and Loan Facility

İLBANK is the key institution supporting municipalities in Türkiye by acting as a financial intermediary, technical assistance provider, and national revenue transfer facilitator, enabling access to both central budget allocations and external financing mechanisms for sustainable infrastructure and urban mobility investments.

Leveraging its experience with diverse funding sources and financial models, İLBANK offers the "Project Financing and Loan Facility" to support Sustainable Urban Mobility Plans (SUMPs) and broader municipal infrastructure needs[1]. This facility provides a multi-channel financing platform, combining resources from national and international sources and aiming to promote sustainable mobility solutions, including walking, cycling, and public transportation.

İLBANK works with local governments under the following five main service categories:

- Provision of financing
- Project development/Technical Assistance
- Consultancy and technical services
- Funds transfers (allotment of shares) to local governments
- Project execution (investment activities)

1. Provision of Financing (Domestic Loans from İLBANK)

İLBANK provides loans from its own capital to its shareholder administrations including municipalities and special provincial administrations to finance construction works and the procurement of materials, equipment, and vehicles required for municipal services and infrastructure.

[1] https://www.ilbank.gov.tr/sayfa/proje-finansmani-ve-kredilendirme

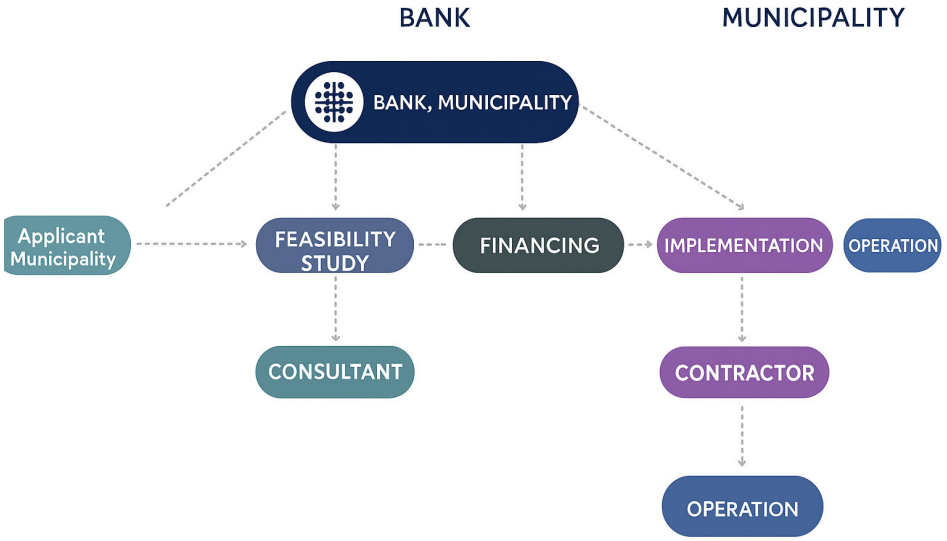


Figure 2. Loan Application and Evaluation Process

Applications are submitted to İLBANK's Regional Directorates, located across 17 hubs nationwide.

A preliminary assessment is conducted and forwarded to the General Directorate.

The Project Evaluation Department conducts a comprehensive evaluation, covering technical, economic, environmental, and financial dimensions. Final approval is given by either the General Directorate or the Board of Directors.

İLBANK also provides supervision services for the implementation phase of projects it finances. The level of involvement is adjusted based on project complexity and may include full control, joint control, or monitoring.

2. Provision of Loans from International Funds

In addition to its domestic resources, İLBANK also offers foreign currency loans sourced from international financial institutions (IFIs), primarily for infrastructure investments. Drawing on its institutional experience with externally financed projects, İLBANK has established a dedicated Project Management Unit (PMU) under its International Relations Department.

3. Project Development/Technical Assistance

İLBANK supports municipalities through the development and assessment of urban infrastructure and superstructure projects, including zoning plans, geographic information systems, urban information systems, and related engineering studies. These activities are carried out within a "Project Management" framework, ensuring technical consistency,

efficiency, and scale optimization. Additionally, İLBANK can review the compliance of externally prepared project designs with regulatory and technical standards.

4. Fund Transfers (Allotment of Shares) to Local Governments

İLBANK plays a central role in managing the distribution of tax revenue shares from the national government to local authorities. In accordance with Law No. 5779 on Apportionments from the National Budget Tax Revenues, a total of 6.5% of the net national tax revenue (after refunds) is allocated to local governments

5. Project Implementation (Investment Activities)

As part of its investment support role, İLBANK cooperates with municipalities in delivering a wide range of infrastructure projects, including drinking water, sanitation services, renewable energy, solid waste, geothermal energy, and municipality premises.

4.2 International Funding Mechanisms

The European Commission has implemented a vast number of initiatives and programmes that can be used for (co)funding and financing sustainable mobility measures. Primarily aimed at the EU's Member States, a number of these sources are also available for Türkiye. European funding programmes will mostly contribute to investments (e.g. building a tram line or procuring buses), but rarely to operating costs of infrastructures and services. Türkiye is eligible for EU financial support through the Instrument for Pre-accession Assistance (IPA III 2021-2027) and from the European Fund for Sustainable Development Plus (EFSD+). To support public and private investments in the priority areas of the EFSD+ (Green Deal, Global Gateways and Decent Jobs), the Türkiye Investment Platform was established in 2022[2].

European Funding Sources for sustainable urban mobility available for Türkiye:

- **The Instrument for Pre-accession Assistance (IPA-III)** is a financial instrument from the EU for reforms in the enlargement countries, which aims to improve Türkiye's capacity for implementing the EU *acquis*. The aim in terms of transport, is connecting to TEN-T rail network, and developing sustainable, low-carbon, intelligent and safe transport. There are annual action plans and yearly calls for proposals – for example, Izmir SUMP is financed with IPA funding. IPA III 2021-27 activities (C1.1-4) include: Urban mass transit public transport; non-motorised transport infrastructure, small scale public transport services, and urban transport intermodality; smart and pilot projects; and clean and low-carbon public transport vehicles/fleets. The funds are managed by the EU Delegation in Türkiye.

- **The Action Document Sustainable Urban Mobility and Reliable Transport (SUMART)**, financed under IPA-III, is a common programme between **EU and the AFD** (Agence Française de Développement). Its aim is to encourage, improve and facilitate the efforts of municipalities in Türkiye in pursuing sustainable and smart urban mobility services across city jurisdictions. This will be done by blending EU grants with a loan programme

by the French Development Agency (AFD), combining an EU grant financing of € 15,000,000 with loans amounting to € 200,000,000. The grant financing will be implemented by the AFD as the entrusted entity. There are multiple investment schemes within the urban mobility sector: Mass transit public transport (BRT, urban rail); Parking management; Congestion charging; Electric buses and charging networks; Bicycle and pedestrian networks; Infrastructures for enhanced public transport networks; Green and low carbon solutions for public transport; and Smart urban mobility initiatives. This includes, but is not limited to, preparing feasibility and design studies.

- **The European Fund for Sustainable Development Plus (EFSD+)** is one of the financing tools of Global Gateway, promoting sustainable investments in the European Union's (EU) partner countries. Offering a variety of risk-sharing instruments of up to €40 billion, the EFSD+ aims to mobilise up to €135 billion of public and private financing to help partner countries achieve the Sustainable Development Goals (SDGs). The EFSD+ Guarantee is deployed via a range of eligible development finance institutions, which act as the EU's implementation partners on the ground. The European Investment Bank (EIB) is the largest implementation partner for the EFSD+ Guarantee, alongside the other Team Europe partners. The Team Europe approach is an inclusive process open to all EU Member States, their implementing organisations and financing institutions as well as international financial institutions. The Türkiye Investment Platform (TIP), established in 2022 by the EU, supports investment proposals by EU financial institutions in the areas of decarbonisation, digitalisation, access to finance, innovation, and green investments, through a wide range of budgetary guarantee mechanisms for public and private investments. More than €2.4 billion of investments are expected to be leveraged through up to €400 million in EU budget guarantees.

- **The Connecting Europe Facility (CEF)** is a fund for pan-European infrastructure investment in transport, energy and digital projects, which aim at a greater connectivity between member states. It operates through grants, financial guarantees and project bonds. CEF investments fill the missing links in Europe's energy, transport and digital backbone. To be eligible for any CEF Transport grant contribution, projects need be located on the TEN-T network. For third countries, a link with an EU Member State located on TEN-T needs to be shown to be eligible for funding. Eligibility is limited and subject to cross-border TEN-T integration and specific conditions for non-EU countries.

- **The European Investment Bank (EIB)** is the lending arm of EU. Financing of projects that support EU policy objectives, such as smart and sustainable urban mobility. The EIB provides loans, guarantees, and equity financing, and evaluates the feasibility, economic viability, and potential impact of proposed projects. This assessment includes financial, technical, environmental, and social considerations to ensure that funded projects meet high standards of sustainability and contribute to EU objectives. Operates globally, but its focus is on projects within the EU and candidate countries.

- **The European Bank for Reconstruction and Development (EBRD)** is an international financial institution founded in 1991 to support the transition towards market economies in Central and Eastern Europe, Central Asia, and more recently, some Southern and Eastern Mediterranean countries. The EBRD offers a wide range of financial instruments and takes a flexible approach in structuring its financial products, such as loans, equity investments, and guarantees. Note: focus on private sector

- **Horizon Europe** is the biggest EU Research and Innovation programme and aims to achieve smart, sustainable and inclusive economic growth. H2020 is organised in seven thematic sections called "Societal Challenges", of which challenge No. 4 is on smart, green and integrated transport. Local authorities are able to partner with researchers and other stakeholders to access funding under the programme and they may also benefit from the outcomes of Horizon 2020 actions. Horizon 2020 also finances the ELENA programme and co-finances the CIVITAS network. CIVITAS is network of cities for cities dedicated to cleaner, better transport.[2]

- **Climate-KIC:** the European Institute of Innovation & Technology's (EIT) Climate-KIC supports initiatives aiming at decarbonising. Inter alia, the KIC supports cities on how to decarbonise urban environments, including the urban mobility sector.

[2] https://civitas.eu/

5. Local Revenue Streams

Local revenue streams complement municipal budgets and national-level transfers as key instruments for financing sustainable urban mobility initiatives. Local revenue streams are a variety of possible income sources such as pricing mechanisms, specific taxes, or value capture instruments. Still, depending on the country's legal system and the constitutional competencies of local administrations, municipalities may exploit additional sources for financing the urban mobility system. This section outlines local revenue streams that are (or: can be) linked to sustainable urban mobility.

Local revenue sources are, in principle, among the major contributors to financing urban mobility projects. Those are directly accessible to local organisations, offer a variety of options and (at least some degree of) freedom on their use, compared to some other financial sources that come with strict allocation regulations. All these make local revenue sources an appealing choice. Here, we outline a list of popular local revenue streams along with practical details corresponding each:

Pricing Measures for Private Car Use

Pricing measures are mechanisms that directly charge motorists for the use of infrastructure such as a parking space or a road. Existing taxes and fees levied on private car use – such as fuel taxes, vehicle taxes or registration fees – neither fully reflect the social and environmental costs nor achieve a shift towards more sustainable mobility options. Moreover, these financial streams normally go into the national general budget and cities do not benefit directly.

Adopting the *user-pays* or *polluter-pays* principle is a key component of a sustainable urban mobility system. The rationale behind these pricing measures is to charge private car users for at least some of the externalities they generate. Local level pricing measures aim at changing travel habits and managing transport demand. Price signals link car uses to directly discernible out-of-pocket costs and thus may encourage the use of more sustainable transport options. They also generate revenues that might be ring-fenced for enhancing public transport and active modes in so-called push & pull approaches.

Transport demand management measures that aim at discouraging private car usage through pricing mechanisms usually meet political resistance. Public acceptance of pricing measures tends to be low, as they are often perceived to be socially unacceptable, to deter customers, and to add an additional burden on motorists who already pay large amount of taxes. When estimating future revenues, it is important to keep in mind that the primary objective of pricing

measures is to reduce private car use. That means that, if successful, the measure will undermine its income-generating base in the mid-term.

Road Pricing and Congestion Charging

In line with the above-mentioned measure on making revenue from private car use, road pricing and congestion charging are other sources of local revenues through targeting car users. There are various ways of implementing such systems:

- as toll roads, where a fee is paid for the right to use a specific asset such as a highway or a bridge;
- as zonal schemes where vehicles travelling inside a specific bounded area are charged; as cordon schemes, where vehicles must pay for entering the city centre; or
- as distance-based schemes, where car drivers pay per km travelled. Distance-based schemes require the use of car positioning systems and thus are technically demanding and may interfere with personal data protection (Gu et al. 2018).

Dynamic road charges that are higher during peak hours or are linked to emission standards (or potentially to vehicle weight or size) may also affect mobility behaviour and the composition of the car fleet. The City of Milan, for example, exempts electric vehicles, hybrids, motorcycles and vehicles emitting less than 100g CO2/km from fees to enter its Urban Road Toll and Low Emission Zone Area C.

Costs of implementing and operating a charging system vary according to technologies employed: fully automated systems with number plate recognition or GPS monitoring demand higher upfront investments than the regulation via the sale of licence stickers, while the latter require higher staff costs for sale, control and enforcement. Still, due to the often-lacking legal power of municipalities to introduce such charges, to political resistance, to high upfront investments and concerns about privacy (linked to automatic number plate recognition), only few cities in the EU have implemented road charging systems, including London, Durham, Stockholm, Gothenburg, Milano, or Valletta.

Parking Management

Parking management is a powerful tool to influence car usage and shift the modal split of commuters and visitors towards more sustainable options. Since the 1990s, European cities have increasingly adopted parking policies as a means to manage traffic volumes and reduce car dependency in and around urban areas (Mingardo et al., 2015). Similarly, in the U.S. context, Shoup (2005) emphasized the inefficiencies of free parking and advocated for market-based pricing mechanisms to regulate demand. Parking management is typically a municipal-level responsibility, granting local authorities' significant autonomy in policy design and implementation.

According to Mingardo et al. (2015), a comprehensive municipal parking policy usually serves four main objectives:

- to contribute to a better accessibility and mobility of the urban area;
- to contribute to a better quality of life in the city (mainly a better air quality and quality of the living environment);
- to support the local economy;
- to raise municipal revenue.

Parking measures often focus on regulating visitor parking. Adequate provisions for residents such as reasonably priced annual permits in combination with a reduced parking pressure may increase the acceptability of parking management schemes.

The availability of cheap or unmanaged parking space can make investments in high quality public transport ineffective, most of all when car parking in the city centre is cheaper than travelling by public transport. Parking fees should exceed the total cost of a return public transport trip for at least two persons, in order to effectively discourage car use.

Heavy Goods Vehicles Charging Schemes

Most European countries have implemented some form of nationwide truck charging scheme, where all hauliers pay for using public roads, either by time or distance. Whilst most heavy goods vehicles charging systems are distance-based and managed at the national level, roads within cities could also be included in the system. Participating cities would then receive their fair share of the proceeds, which they could spend on maintaining their local road network and on investing into more sustainable transportation and mobility schemes.

Value Capture Instruments

Public capital expenditures for infrastructure and transportation services are a precondition for urban development, and specifically for transit-oriented development (TOD) which aims at enhancing public transport accessibility of new settlements. These investments contribute to increasing values of land and real estate in proximity to transport access points and thus generate additional benefits for private property owners. On the other hand, new residential developments produce more road traffic and greater demand for public transport services. Local authorities are faced with a situation in which the development puts increased pressure on the infrastructure they provide, while being unable to benefit from the added value that they have created through granting planning permissions.

In recent years, cities introduced a variety of instruments to capture at least part of the additional value from key beneficiaries of a project, including property owners and land developers. The rationale that those who benefit from a development and/or the provision of infrastructure and public services should make some financial contribution is a broadly accepted and powerful narrative. Value capture mechanisms are a means of linking increasing land and property values

with the delivery of public transport services. The approaches differ according to the stage of the project cycle from which the income is available and according to the parties that are financially burdened.

Stamp Duty Land Tax

Stamp duty land tax (SDLT), as introduced in England and Northern Ireland in 2003, is one such method of capturing increases in land values. Owners of properties above a certain value are required to pay it when the property is purchased. The tax can be applied in areas that specifically benefit from public transport services. The main argument for the tax is that the availability of high-quality transport services increases the value of land and that these benefits for landowners are partly captured through the SDLT (Sintropher, 2015).

Mobility Taxes

This category of taxes is levied on the value of real estate and is calculated based on its cadastral value. Revenues are invested into public transport system (increasing territorial and time coverage and frequency, integrated fares systems, subsidising ticket prices etc.). As an example, the Metropolitan Area of Barcelona (AMB) raises a metropolitan surcharge on property tax which is used for enhancing connectivity, mobility and functionality of the Metropolitan Area. AMB estimates revenue from the metropolitan tax of 123 million in 2019. The tax generates recurrent revenues which can be used both for capital investment and operational costs.

Voluntary Capture

Increasing private property value could also be captured voluntarily, through direct contributions to the funding of that investment. Voluntary capture is based on an agreement between developers or property owners and a local authority, where the developers or property owners offer a voluntary contribution towards the costs of a public infrastructure project. Voluntary contributions tend to be offered when the developer or the property owner estimates that the expected benefits outweigh the financial contribution required. Since voluntary capture normally is a one-off payment, revenues will be used for the construction of infrastructure, not for covering the long-term operation of services.

Local Option Sales Tax

Several cities and counties in the United States have introduced Local Option Sales Taxes (LOST) to fund transportation projects. The respective authorities levy a surcharge on sales taxes for a limited period of time (e.g. 1% over 10 years). Revenues are used locally and earmarked to fund transport improvements, which are pre-defined in a project list. Local Options Sales Taxes have to pass a public referendum and are often administered by a designated transportation authority that oversees the use of the income. Such instruments are primarily applicable in countries with decentralized taxation systems that allow municipalities to levy surcharges on consumption taxes. Hence, the legal feasibility of such tax instruments must be assessed under national legislation in EU member states and Türkiye.

6. Financial Evaluation of Projects

This chapter will provide key financial metrics and analysis techniques for evaluating mobility projects.

Financial evaluation forms the backbone of sustainable urban mobility initiatives, serving as a critical tool for assessing the feasibility, impact, and long-term viability of proposed projects. For municipalities in Türkiye, where financial constraints often challenge infrastructure development, adopting sound evaluation methodologies is paramount. In most cases, feasibility studies are outsourced as they require considerable expertise and man-hours. However, the lack of knowledge at municipal administration level is a limiting factor in using these studies in making sound decisions. This chapter investigates the intricacies of financial evaluation, offering a thorough exploration of methodologies, metrics, and practical applications. Drawing from local and international examples, it provides a comprehensive guide for policymakers and practitioners to align their projects with sustainability goals and ensure financial foresight.

6.1 Financial and Economic Evaluation

The process of financial evaluation is not merely an administrative formality but a strategic exercise that shapes the success of urban mobility projects. It enables municipalities to assess the economic, environmental, and social benefits of investments, ensuring alignment with national and international sustainability objectives. In Türkiye, where cities deal with increasing urbanisation and limited financial resources, the importance of meticulous project evaluation is to be underlined.

A sound financial evaluation framework allows municipalities to prioritise projects that offer the highest returns on investment, whether measured in monetary terms or broader societal benefits with the addition of economic analysis dimension. For instance, investments in public transit systems not only reduce traffic congestion and emissions but also promote social equity by improving access to essential services. For example, the successful deployment of Istanbul's Metrobus system, which significantly reduced commuting times and carbon emissions, exemplifies the transformative impact of well-evaluated urban mobility initiatives.

However, achieving such outcomes requires an accurate approach to financial evaluation, one that integrates traditional metrics like cost-benefit analysis with emerging considerations such as environmental sustainability and social inclusivity. This chapter seeks to equip municipalities in Türkiye with the knowledge and tools necessary to navigate these complexities effectively.

The methodologies discussed here were drawn on structured approaches outlined in the Guide to Cost-Benefit Analysis by EIB (2021) and the OECD report: Broadening Transport Appraisal: Summary and Conclusions (OECD, 2022). These frameworks provide municipalities with effective tools for evaluating project viability and aligning with sustainability goals.

6.2 Key Financial Metrics

Evaluating the financial viability of mobility projects necessitates the use of diverse metrics that capture both direct and indirect benefits. Among the most widely utilised methodologies are cost-benefit analysis, return on investment, and environmental and social impact metrics.

Cost-Benefit Analysis (CBA)

Cost-benefit analysis remains a cornerstone of financial evaluation, providing a structured framework for comparing the anticipated costs and benefits of a project over its lifecycle. This methodology is particularly effective in urban mobility contexts, where investments often yield both tangible and intangible benefits. Insights from the World Bank's Infrastructure Project Preparation Facility: Lessons Learned (2020) underline the significance of CBA in strategic project planning.

The analysis typically begins with the calculation of capital expenditure (CapEx), which encompasses the upfront costs of infrastructure development, vehicle procurement, and technology deployment. For example, the construction of the metro projects involves significant CapEx, covering tunnelling operations, station construction, and the acquisition of rolling stock. Alongside these initial costs, operating expenditure (OpEx) must also be accounted for, capturing the ongoing expenses related to maintenance, staffing, and energy consumption.

On the benefits side, CBA considers both monetary and non-monetary gains. Monetary benefits often include revenue from ticket sales, congestion charges, and parking fees. In contrast, non-monetary benefits capture broader societal advantages, such as reduced air pollution, improved public health, and enhanced quality of life. For instance, a comprehensive cost-benefit analysis of Istanbul's public transport expansion revealed a benefit-cost ratio (BCR) of 2.1, highlighting the substantial societal returns generated by the investment.

Beyond these standard considerations, CBA must also address opportunity costs. By committing funds to one initiative, municipalities may forgo alternative projects that could offer comparable or greater benefits. This trade-off necessitates a rigorous prioritisation process, ensuring that resources are allocated to projects with the highest overall value.

Components of CBA

Costs:

- Direct costs – costs directly associated with the project
  - Capital costs – large, one-time expenses for infrastructure, equipment
  - Operating costs – ongoing expenses for maintenance, staffing, etc.
- Indirect costs – secondary costs, such as environmental impact, traffic disruption

Benefits:

- Direct benefits – immediate positive outcomes, such as fare revenues, travel time savings
- Indirect benefits – secondary positive outcomes, such as reduced congestion, environmental improvements
- Tangible benefits – easily measurable benefits, such as reduced vehicle operating costs
- Intangible benefits – non-monetary, such as improved accessibility, quality of life.

Financial metrics of CBA – Benefit-Cost Ratio (BCR)

- Definition: the ratio of the present value of benefits to the present value of costs
- Importance: BCR helps in comparing the relative efficiency of different projects
- Calculation: **BCR = Present value of benefits / present value of costs**
- A BCR greater than 1 indicates that the project's benefits outweigh its costs.

Return on Investment (ROI)

Return on investment provides a straightforward measure of financial profitability, expressed as a percentage of the initial investment. While this metric is widely used in private sector evaluations, its application in public infrastructure projects requires a more nuanced interpretation.

The evaluation metrics applied to the tram system expansion in Kayseri, including ROI and environmental impacts, are detailed in the municipality's Feasibility Study for Tram System Expansion (2022). This approach highlights the financial and social returns of strategic public transportation investments.

For instance, a tram system expansion in Kayseri demonstrated a 12% ROI, highlighting its financial viability. However, this figure alone does not capture the broader benefits of the project, such as improved accessibility for low-income communities or reductions in greenhouse gas emissions. To address this limitation, municipalities can supplement ROI calculations with shadow pricing techniques, assigning monetary values to non-market benefits like improved air quality or reduced traffic accidents.

Environmental and Social Impact Metrics

In recent years, the integration of environmental and social metrics into financial evaluations has gained prominence. These metrics provide a more holistic assessment of project impacts, capturing dimensions often overlooked in traditional analyses.

Environmental metrics typically focus on greenhouse gas emissions, air quality improvements, and energy efficiency. Reports like Izmir Metropolitan Municipality's Cycling Infrastructure Expansion Report (2023) emphasize the inclusion of sustainability metrics to assess project impacts holistically. For example, the expansion of bicycle lanes in Izmir not only reduced vehicle traffic but also contributed to significant reductions in particulate matter and nitrogen oxide levels in the city centre. Similarly, social metrics evaluate a project's contributions to inclusivity, equity, and public health. Projects that prioritise access for vulnerable populations, such as children, the elderly, and individuals with disabilities, often align more closely with sustainability goals and are more likely to attract green financing. In cooperation with İLBANK, municipalities may also apply Environmental, Social, and Governance (ESG) value creation metrics.

6.3 Methodologies for Assessing Feasibility

The feasibility of urban mobility projects hinges on a thorough understanding of their financial, environmental, and social dimensions. To this end, municipalities must adopt a multi-faceted approach to evaluation, integrating environmental and social impact assessments, risk analyses, and stakeholder engagement strategies.

Environmental and Social Impact Assessment (ESIA)

Environmental and social impact assessments provide a comprehensive evaluation of how proposed projects interact with natural ecosystems and human communities. In the context of urban mobility, ESIA often addresses issues such as air quality, biodiversity conservation, and equitable access to transportation services. In addition, items such as public health, social inclusion and traffic safety are given attention.

The Marmaray Project in Istanbul

The project stands as a prominent example of how Environmental and Social Impact Assessment (ESIA) can guide the implementation of large-scale mobility infrastructure. During the planning and implementation phases, the project underwent extensive ESIA procedures to identify and mitigate its impacts on sensitive environmental and cultural assets. The project, which included the construction of an undersea rail tunnel connecting Europe and Asia, involved extensive ESIA measures to address risks to marine biodiversity, historical structures, and dense residential areas.

Significant archaeological findings, including the Byzantine-era port of Theodosius, led to design modifications and construction delays, but also increased public interest and transparency in the project. Moreover, ESIA studies informed mitigation measures such as sediment control during underwater tunnelling and the relocation of sensitive infrastructure. The project also engaged stakeholders through consultations with local communities and civil society groups, facilitating broader acceptance and smoother implementation.

By embedding ESIA throughout the project lifecycle, Marmaray not only reduced environmental and social risks but also enhanced its legitimacy and acceptance among stakeholders. The experience demonstrates how comprehensive assessments can improve both the sustainability and resilience of urban mobility investments and ensure smooth implementation when tied to adaptive planning and stakeholder engagement.

Risk Analysis

Risk analysis plays a critical role in ensuring the resilience of urban mobility projects. By identifying potential challenges—ranging from fluctuating fuel prices to regulatory changes—municipalities can develop robust mitigation strategies. Sensitivity analysis and scenario planning are particularly effective tools in this regard, enabling decision-makers to model different outcomes and adapt their strategies accordingly.

Izmir Fahrettin Altay-Narlıdere Metro Project:

For the financing planning, flexible financing structures were employed to address potential economic shocks during the construction phase. This proactive approach not only safeguarded the project's financial stability but also enhanced its credibility among investors.

Stakeholder Engagement

Effective stakeholder engagement is essential for aligning projects with local needs and securing community buy-in. By involving residents, businesses, and advocacy groups in the planning process, municipalities can identify potential concerns early and incorporate them into project designs.

Bicycle Infrastructure in Izmir

Izmir's cycling initiative serves as a compelling example of how small-scale mobility projects can generate significant societal and environmental benefits. The project involved an initial investment of €5 million, complemented by annual operating costs of €200,000. Despite its modest scale, the initiative delivered remarkable outcomes, including a 15% reduction in urban congestion and a substantial boost to local tourism revenues. Moreover, the project's calculated benefit-cost ratio of 2.3 highlighted its economic viability.

In addition to these benefits, the initiative exemplified innovative funding strategies, such as partnerships with local businesses to sponsor bike-sharing stations. This collaborative approach not only diversified revenue streams but also strengthened community engagement, ensuring the project's long-term sustainability.

6.4 Practical Applications in Municipalities in Türkiye

In their financial and economic evaluation studies of infrastructure investments, municipalities in Türkiye generate widely used financial indicator such as Return on Investment (ROI) and CBA metrics including Net Present Value (NPV), Internal Rate of Return (IRR) and benefit to cost ratio (BCR). These metrics are based on discount rates that may be designated specific to sector and economic environment as advised by central government authorities. In addition to reflecting project's viability, these analytical output ratios also facilitate investment proposal reviews at the national level by the Strategy and Budget Office or İLBANK. The analysis is assessed based on the quality of data and information used, the viability of assumptions employed, and soundness of the methodology adopted.

Electric Bus Network in Istanbul

Istanbul's deployment of an electric bus network further highlights the importance of innovative financial evaluation. The project focused on replacing diesel-powered buses with electric alternatives, reducing greenhouse gas emissions by 40% annually. A cost-benefit analysis demonstrated the long-term financial advantages of the transition, including lower fuel and maintenance costs. Additionally, social impact assessments revealed increased accessibility for underserved areas, bolstering public support for the initiative.

Tram System Expansion in Kayseri

The expansion of Kayseri's tram network illustrates the transformative potential of integrating financial and environmental metrics into project evaluations. With an investment of €50 million, the initiative achieved a 12% ROI and reduced annual greenhouse gas emissions by 25,000 tonnes. These outcomes underscore the project's alignment with both financial prudence and sustainability objectives.

Phased implementation played a pivotal role in the project's success. By prioritising high-demand corridors during the initial phase, the municipality maximised ridership and revenue generation, laying a solid foundation for future expansions.

6.4.1 Applicability of Revenue Streams for Mobility Projects

Municipalities seeking to fund urban mobility projects must adopt a diversified approach to revenue generation. Traditional sources, such as farebox revenue, remain significant, yet innovative mechanisms are increasingly essential to bridge funding gaps. Farebox revenue, derived from ticket sales, often forms the backbone of revenue streams. However, this alone may not suffice, particularly for large-scale projects requiring sustained investment.

Congestion charges as explained in Chapter 5 have emerged as a notable solution, leveraging financial incentives to reduce traffic congestion while generating additional funds. For instance, London's congestion charge scheme not only reduced peak-hour traffic but also channelled revenues into expanding public transit options. Similarly, parking fees, when integrated with smart parking systems, optimise parking space utilisation while providing a consistent revenue stream. Istanbul's implementation of dynamic pricing for parking in central districts exemplifies how smart parking management can achieve both financial and urban mobility objectives. By linking parking fees to demand, the city not only discouraged excessive use of private vehicles but also generated significant funding for public transport projects. Congestion charges have long been considered as a pilot implementation in the antiquated old city quarters of Istanbul known as 'historical peninsula' although its application is yet to start.

Value capture mechanisms offer another innovative revenue stream, leveraging the increase in property values that often accompanies infrastructure development. This method has been successfully applied along Istanbul's new metro corridors, where property owners contributed to project funding through special assessments and incremental taxes. These contributions reflect the economic benefits that improved accessibility confers on local properties, creating a sustainable financing loop.

Finally, public-private partnerships (PPPs) provide opportunities for municipalities to share revenue streams with private entities in exchange for infrastructure investments. For instance, in Izmir, PPP agreements for transit-oriented development projects ensured private sector investment in mobility hubs, further diversifying funding sources.

6.4.2. Financing Urban Mobility Projects

Public financing remains the cornerstone of urban mobility initiatives, supported by national and municipal budgets. However, reliance solely on public funds often limits the scale and scope of projects. To address this, blended financing models have emerged as a transformative approach, combining public funds with private capital and international loans to maximise impact.

Blended finance leverages public funding to de-risk projects, making them more attractive to private investors. For example, in the Izmir Metro expansion project, municipal funds were combined with low-interest loans from international development banks. This partnership reduced financial risks while ensuring adherence to global best practices in sustainability.

International financing mechanisms, such as green bonds, have also gained traction. Green bonds allow municipalities to access global capital markets by issuing debt specifically earmarked for environmentally beneficial projects as in the debut issuance for Türkiye by Istanbul Metropolitan Municipality in November 2023.

Innovative approaches, such as climate funds and impact investments, further enhance the financing landscape. By aligning projects with climate and social impact goals, municipalities can access grants and concessional loans from global organisations like the Green Climate Fund and EIB.

6.4.3 Developing Comprehensive Financial Plans

A robust financial plan is indispensable for the successful execution of urban mobility projects. This plan must encompass detailed assessments of capital requirements, revenue projections, and risk mitigation strategies. For instance, Ankara's Bus Rapid Transit (BRT) project incorporated a phased funding strategy, ensuring that financial commitments aligned with construction milestones.

Key components of a financial plan include accurate forecasting of capital and operational costs, identification of diverse revenue streams, and compliance with green finance standards. Adhering to international standards, such as the Green Bond Principles or the Sustainable Development Goals (SDGs), enhances a project's credibility, making it more attractive to investors.

Furthermore, financial plans should integrate sensitivity analyses to anticipate resilience of the project feasibility metrics against potential economic fluctuations. The Marmaray Project exemplifies this approach, as its financial strategy accounted for currency volatility and inflation, securing the project's long-term stability.

IFI backed financing and technical assistance programmes, such as Türkiye's Sustainable Cities Programme, provide municipalities with the expertise needed to develop comprehensive financial plans. By offering guidance on accessing international funds and aligning projects with sustainability criteria, these programmes significantly enhance municipal capacity for financial planning.

6.5 Recommendations

In the planning and development of sustainable transport projects, feasibility studies and financial evaluations serve as essential tools that provide comprehensive technical, financial, and environmental assessments. For these studies to be effectively utilised, it is crucial that technical departments and decision-makers within the municipality possess a sufficient understanding of their contents, methodologies, and implications.

A well-conducted feasibility study offers insights into project viability, potential risks, and financial structuring options. However, its impact is only as strong if the Municipality teams can critically interpret its findings. Without a solid grasp of these analyses, decision-making may be driven by incomplete or misunderstood information, leading to challenges in the project design and financing choices. Enhancing the municipality team's capacity and knowledge on these matters ensures the following:

- **Ensure Sound Decision-Making**: A clear understanding of key assumptions, demand projections, cost estimates, and risk assessments allows for informed choices that align with project goals and long-term sustainability.

- **Enhance Project Design:** Insights from feasibility studies can help refine project scope, optimise service delivery models, and ensure that infrastructure investments are appropriately scaled and structured.

- **Improve Financing Strategies:** Knowledge of financial analysis, funding mechanisms, and risk-sharing models enables decision-makers to select financing approaches that best suit the project's sustainability and economic feasibility.

To achieve this, municipalities must prioritise capacity-building initiatives to strengthen their financial evaluation capabilities. In addition to incentives created by the central government, training programmes on financial analysis, risk management, and sustainability metrics can empower local governments to undertake complex evaluations with confidence.

Standardised evaluation frameworks, such as those developed by EIB, should be adopted to ensure consistency and comparability across projects. These frameworks streamline the evaluation process, enabling municipalities to present compelling cases to potential investors.

Collaboration with development banks, private sector partners, and international institutions is critical. Such partnerships not only provide access to funding but also offer technical expertise and innovative solutions. For example, partnerships with technology firms in Istanbul's smart transit projects have demonstrated how collaboration can drive both financial and operational efficiency.

Lastly, municipalities should actively engage with communities to ensure that projects align with local needs and priorities. Transparent communication and participatory planning processes build public trust, enhancing the social acceptability of projects and ensuring their long-term success.

7. Project Evaluation and Prioritization

The effective evaluation and prioritisation of projects within an investment portfolio is a cornerstone for achieving sustainable urban development. With limited resources, municipalities must ensure that the projects selected align with strategic goals, deliver measurable benefits, and are feasible to implement. This chapter outlines the key criteria, methodologies, frameworks, and stakeholder engagement practices essential for prioritising projects. Examples from successful municipalities and international best practices are incorporated to provide practical insights.

This chapter elaborates on evaluating/prioritising projects within an investment portfolio, with a focus on:

- Criteria for ranking projects (e.g., economic impact, cost, social and environmental benefits)
- Methodologies for prioritisation (e.g., multi-criteria decision analysis)
- Examples from successful municipalities.

7.1 Establishing Prioritisation Criteria

Establishing clear and measurable criteria is the first step in project evaluation. Criteria must reflect both immediate objectives and long-term strategic goals, ensuring alignment with municipal policy and planning frameworks. Each criterion not only adds value but also establishes benchmarks for ensuring consistency and transparency in project selection. By employing comprehensive criteria, municipalities can set a solid foundation for decision-making.

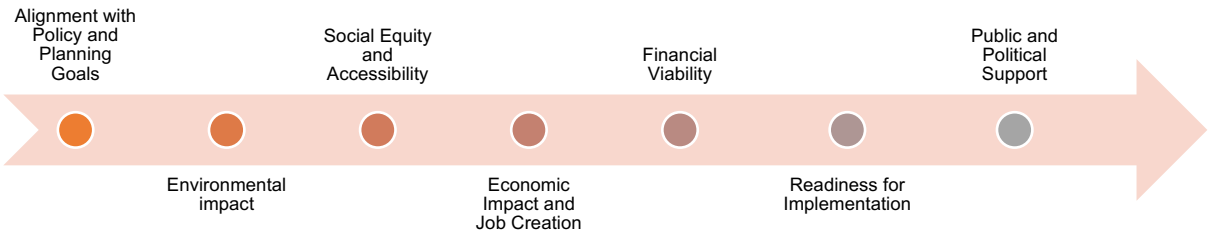


Figure 3. Project Evaluation Criteria

Alignment with Policy and Planning Goals

Projects should contribute to the municipality's broader development objectives, such as improving sustainability, reducing emissions, or enhancing mobility. This alignment ensures that individual projects are not only self-sustaining but also integrally connected to larger societal outcomes. For example, municipalities in Türkiye implementing their Sustainable Urban Mobility Plans (SUMPs) are expected to prioritize projects that reduce dependence on fossil fuels and increase the accessibility of non-motorised transport systems.

Environmental Impact

Environmental criteria assess how a project impacts natural resources, biodiversity, and ecosystem services. Projects with positive environmental outcomes such as reducing urban heat islands or conserving green spaces are frequently prioritized. Tools like environmental impact assessments (EIAs) and greenhouse gas inventories help quantify the environmental benefits of projects, providing municipalities with a reliable basis for evaluation (European Environment Agency, 2018). Moreover, integrating renewable energy into transport systems not only improves efficiency but also significantly lowers long-term environmental costs.

Social Equity and Accessibility

Ensuring equitable access to infrastructure and services is vital for reducing social disparities. Projects that improve mobility for disadvantaged groups, such as low-income residents, women, and the elderly, help foster inclusivity. For example, increasing the availability of affordable public transport options in underserved regions can dramatically improve community cohesion and economic participation (World Bank, 2020).

Economic Impact and Job Creation

Evaluating a project's economic benefits is multifaceted. Direct economic impacts include job creation during the construction and operational phases, while indirect impacts may involve increased productivity due to reduced travel times. Municipalities can use tools such as economic multipliers to estimate the broader economic benefits. For example, Copenhagen's investments in cycling infrastructure led to a measurable boost in local business revenues and a 10% reduction in health-related costs (Copenhagen Municipality, 2020).

Financial Viability

Financial sustainability remains a core consideration for prioritisation. Projects need to demonstrate a clear return on investment (ROI) or at least feasible cost recovery mechanisms. Financing strategies such as the use of green bonds, subsidies, and public-private partnerships (PPPs) enable municipalities to manage costs while achieving strategic goals. Financial viability also includes an analysis of operational and maintenance (O&M) costs, which ensures that orderly operation and long-term maintenance requirements are accounted for (EIB, 2021).

Readiness for Implementation

Projects that have completed feasibility studies, resolved legal hurdles, and secured preliminary funding are often prioritised due to their higher likelihood of success. Readiness also includes an assessment of technical capacity within the municipality to oversee implementation.

Public and Political Support

Strong community and political backing enhance the probability of project success. Political support ensures funding and policy alignment, while public endorsement minimizes opposition and promotes stakeholder buy-in. Municipalities can conduct public surveys or hold consultations to gauge support for proposed projects. Effective communication of a project's benefits often enhances public perception and increases participation in implementation processes (UN Habitat, 2019).

7.2 Multi-Criteria Decision-Making (MCDM) Tools

Given the complexity of balancing multiple priorities, municipalities can employ Multi-Criteria Decision-Making (MCDM) tools to systematically evaluate and rank projects. MCDM tools provide a structured methodology that balances qualitative and quantitative criteria, enabling municipalities to address trade-offs effectively.

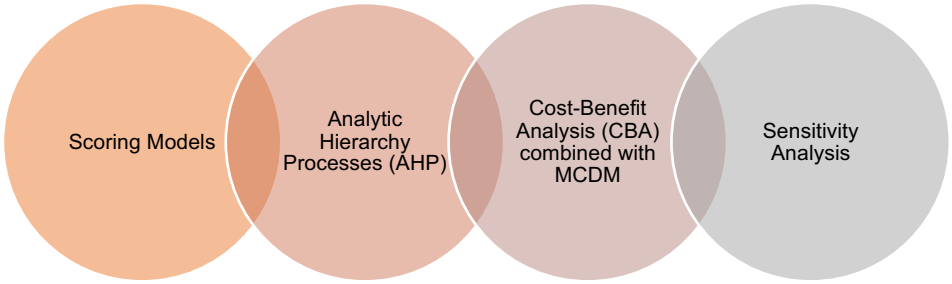


Figure 4. MCDM Tools

Scoring Models

Scoring models are a straightforward and transparent way to evaluate projects. Criteria are assigned weights based on their importance, and projects are scored against each criterion. The total weighted scores are then used to rank projects. For example, a municipality prioritising environmental sustainability might assign higher weights to carbon reduction metrics. This method also facilitates accountability by documenting the reasoning behind prioritisation decisions (Saaty, 1980).

Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP) is a robust MCDM tool that organises criteria into a hierarchical structure. Decision-makers perform pairwise comparisons of criteria to calculate their relative importance. This approach is particularly effective when qualitative judgments need to be combined with quantitative data. AHP has been successfully employed in urban planning to balance competing objectives such as cost efficiency, environmental impact, and social equity (Saaty & Vargas, 2012).

Cost-Benefit Analysis Combined with MCDM

Integrating Cost-Benefit Analysis (CBA) with MCDM provides a comprehensive evaluation framework. While CBA focuses on the financial and economic aspects of a project, MCDM adds dimensions such as social and environmental impacts. This combined approach allows for a holistic analysis, ensuring that short-term economic gains do not overshadow long-term sustainability goals (Janssen et al., 2018).

Sensitivity Analysis

Sensitivity analysis evaluates how changes in criteria weights or assumptions affect project rankings. For example, a municipality might explore how shifting priorities from economic to environmental benefits alters the order of preferred projects. This analysis helps identify robust projects that perform well under various scenarios, reducing the risk of suboptimal decision-making (Macharis and Bernardini, 2015).

7.3 Developing a Prioritisation Framework for Local Authorities

A comprehensive prioritisation framework ensures that decision-making processes are consistent, transparent, and aligned with strategic goals. Municipalities can tailor these frameworks to reflect local contexts while adhering to best practices.

Criteria Weighting and Scoring Guidelines

Standardised weighting guidelines ensure uniformity in project evaluations. For example, Municipalities in Türkiye implementing green infrastructure projects might give higher weight to environmental criteria, reflecting national sustainability goals. Weighting systems can be periodically reviewed to adapt to evolving priorities and policy shifts (European Commission, 2020).

Project Evaluation Templates

Templates standardise the documentation of project evaluations, including sections for objectives, expected impacts, resource requirements, and alignment with criteria. Templates simplify comparisons across projects and serve as a repository for institutional knowledge, enabling continuity even amidst staff changes (World Resources Institute, 2021).

7.4 Engaging Stakeholders in the Decision-Making Process

Stakeholder engagement enhances the legitimacy and effectiveness of prioritisation processes. Inclusive approaches ensure that diverse perspectives are considered, fostering broader acceptance of decisions.

Community Consultations

Community consultations create a dialogue between residents and municipal authorities, ensuring that projects address real-world needs. Techniques such as participatory mapping, surveys, and workshops can uncover valuable insights. These interactions also build trust, making implementation smoother (Arnstein, 1969).

Collaboration with Experts

Expert input adds technical rigour to project evaluations. Municipalities can collaborate with urban planners, environmental scientists, and economists to refine their criteria and methodologies. For example, expert analyses can validate environmental impact assessments or refine cost estimates, ensuring that decisions are data-driven (Meadowcroft, 2009).

Political and Institutional Coordination

Ensuring alignment across departments and with broader political agendas streamlines the prioritisation process. Coordination mitigates the risk of resource duplication and aligns project goals with national policies. Regular interdepartmental meetings and joint task forces can enhance coherence (Crosby & Bryson, 2005).

7.5 Developing a Phased Approach to Implementation

A phased implementation approach balances resource allocation, mitigates risks, and allows for adaptive management. By sequencing projects based on urgency, feasibility, and impact, municipalities can maximise their investment returns.

Immediate Priorities

Projects addressing critical issues, such as compliance with regulations or urgent repairs, should be prioritised in the initial phases. Immediate actions often involve addressing bottlenecks in existing systems, such as upgrading ageing public transport fleets (United Nations, 2018).

Medium-Term Goals

Medium-term projects, such as scaling successful pilot programmes or modernising infrastructure, can follow once immediate priorities are addressed. These projects bridge the gap between short-term fixes and long-term transformations (World Bank, 2020).

Long-Term Vision

Long-term projects often involve significant investment and extended timelines, such as transitioning to fully sustainable mobility systems or constructing new metro lines. These initiatives require robust planning, consistent funding, and sustained public support (ICLEI, 2019).

International Example: Copenhagen's Bicycle Infrastructure

Copenhagen's comprehensive approach to prioritising bicycle infrastructure illustrates the benefits of MCDM tools in urban planning. By balancing environmental goals with economic and social considerations, the city has achieved a high modal share for cycling while fostering local economic growth (Copenhagen Municipality, 2020).

In 2016 the bicycle's market share in the Copenhagen region was 58% of commuting trips below 5 km and 24% of commuting trips between 5 and 20 km. However, still more commuters are to use the bicycle to tackle the challenges of congestion and climate change. The bicycle is recognised as an independent mode of transport and as a connector for public transport.

In recent decades cycling has developed considerably, giving this mode of transportation new and considerable credibility in terms of solving the regional mobility challenges. This development is due in part to new initiatives and technologies like electric bikes and other emerging bicycle innovations. These new opportunities give the bike an increased range and thus a greater role to play in regional mobility.

Calculations show that the average commuting distance between home and work in the Copenhagen area will be approximately 11 km in 2035. This is a realistic distance for the future cyclist using a prioritized cycle superhighway to a public mobility hub or cycling all the way to work or school on an electric bicycle.

7.6 Recommendations for Municipalities in Türkiye

On the basis of previous sections, the following recommendations for municipalities in Türkiye apply:

- **Establish Clear Criteria**: Define prioritisation criteria that align with local and national goals.
- **Adopt MCDM Tools**: Employ robust decision-making frameworks to evaluate and rank projects.
- **Engage Stakeholders**: Involve community members, experts, and policymakers to ensure balanced perspectives.
- **Develop Standardised Frameworks**: Create templates and guidelines for consistent project evaluation.
- **Implement Phased Approaches**: Sequence projects based on urgency, feasibility, and long-term vision.

By adopting these practices, municipalities in Türkiye can optimise resource allocation, achieve strategic goals, and enhance the impact of their investment portfolios.

8. Commercialisation Strategies

Municipalities play a critical role in fostering sustainable urban mobility. To ensure long-term viability and success, commercialisation strategies must be integrated into project planning and implementation. This chapter explores viable business models for sustainable mobility projects, focusing on revenue generation, public-private partnerships (PPPs), risk management, and effective marketing. It explores how to develop business models for sustainable mobility projects, discussing:

- Revenue-generating strategies (e.g., user fees, service concessions)
- Public-private partnerships and risk management
- Marketing strategies for mobility projects

8.1 Revenue-Generating Strategies

Sustainable urban mobility projects require reliable income streams to remain operational and impactful. Revenue generation methods can vary significantly based on the context and project type.

Revenue generation in the context of urban mobility often begins with understanding the financial sustainability of a project. Municipalities need to identify mechanisms to ensure that the costs associated with infrastructure maintenance, operations, and service improvements are met consistently. Traditional methods such as fare collection and user fees remain foundational. For instance, public transport systems typically adopt ticketing systems where passengers are charged based on flat rates or distance travelled. These systems are straightforward to implement and offer predictability in revenue flows. However, modern advancements are pushing municipalities toward integrating digital and contactless payment systems, enhancing efficiency and user convenience (Smith, 2020).

In addition to fare systems, subscription models have gained traction, particularly in shared mobility services. Bicycle-sharing schemes, for instance, offer monthly or yearly subscriptions that provide users with unlimited access within specified terms. This model not only ensures a steady revenue stream but also encourages habitual use, embedding these services into the daily lives of residents (Jones & Miller, 2019).

Another avenue for revenue generation lies in service concessions. Here, municipalities partner with private operators to manage certain public services or assets. Parking facilities often fall under this category. By leasing parking management to private entities, municipalities can secure consistent revenue while offloading operational responsibilities (Brown, 2021). Similarly, transit hubs present opportunities for generating income through the leasing of retail spaces, allowing small businesses to flourish while adding vibrancy to public spaces.

Innovative pricing mechanisms have emerged as critical tools for municipalities aiming to balance revenue generation with sustainability goals. Congestion charging, a system where vehicles are charged for entering specific urban zones during peak hours, serves as both a revenue source and a traffic management strategy (Transport for London, 2022). Dynamic pricing, on the other hand, adjusts rates based on real-time demand, ensuring optimal utilization of infrastructure while maximizing income.

Expanding Revenue Potential

In expanding revenue streams, municipalities can explore novel approaches that combine sustainability goals with financial imperatives. For instance, "green tariffs" for utilities linked to electric vehicle charging stations can provide dual benefits of promoting electric mobility and generating income (Green Energy Council, 2021).

Congestion Charging in London

London's congestion charge is a globally recognized example of a revenue-generating strategy that has successfully reduced traffic congestion while funding public transport improvements (Transport for London, 2022).

On introduction, the Congestion Charge:

- Limited traffic entering the zone by 18 percent during weekday charging hours
- Reduced congestion by 30 percent
- Boosted bus travel in central London by 33 percent
- Enabled 10 percent of journeys to switch to walking, cycling and public transport.

In addition to these immediate impacts, the Congestion Charge has helped reduce the trend of worsening congestion that other cities have seen. Analysis has shown there would have been three million additional journeys by car across London in 2019 without the changes.

Transport for London (TfL) has introduced to encourage more sustainable travel patterns over the last couple of decades, of which the Congestion Charge was a critical first step. This has helped ensure London's growth has been sustainable as high levels of traffic make deliveries less reliable, delay bus journeys, worsen air pollution, and make it less safe for people walking and cycling.

Additionally, advertising partnerships within urban mobility infrastructure such as branded bus shelters, transit screen ads and sponsored bike-share stations offer untapped revenue opportunities. These strategies not only provide financial benefits but also foster corporate social responsibility partnerships (Global Mobility Report, 2020).

8.2 Public-Private Partnerships (PPPs)

Public-private partnerships (PPP) are known as a smart method in financing infrastructure projects including those related to urban mobility. Infrastructure projects are capital-intensive, with most of the costs incurred during the construction phase. Since potential revenues are not generated until after commissioning, PPPs can be a means of leveraging private funds for transport infrastructure projects to finance upfront investments. Private sector companies are repaid either by contractual repayments or they are entitled to future user charges and fares under a long-term concession arrangement (European Court of Auditors 2018). After the concession contract expires, the concession holder hands over asset to the public authority.

Although PPP arrangements encompass various phases and roles, some of the typical functions include (World Bank, 2017):

- **Design** (or Engineering Work): Involves transforming the initial project concept and performance requirements into detailed, construction-ready design specifications.
- **Construction or Rehabilitation**: For new infrastructure projects, PPPs typically require the private partner to construct the asset and install necessary equipment. In cases involving existing infrastructure, the private partner may be tasked with rehabilitating or expanding the asset.
- **Financing**: When a PPP includes construction or rehabilitation, the private party is generally responsible for funding all or part of the capital investment.
- **Maintenance**: PPP contracts usually assign the private partner the responsibility of maintaining the infrastructure asset to an agreed standard throughout the contract period–a core aspect of PPP arrangements.
- **Operation**: The scope of operational responsibilities for the private partner varies depending on the type of asset and the nature of services provided.

Figure 5 below illustrates the different types of PPPs and the extent of involvement of the private or public sector.

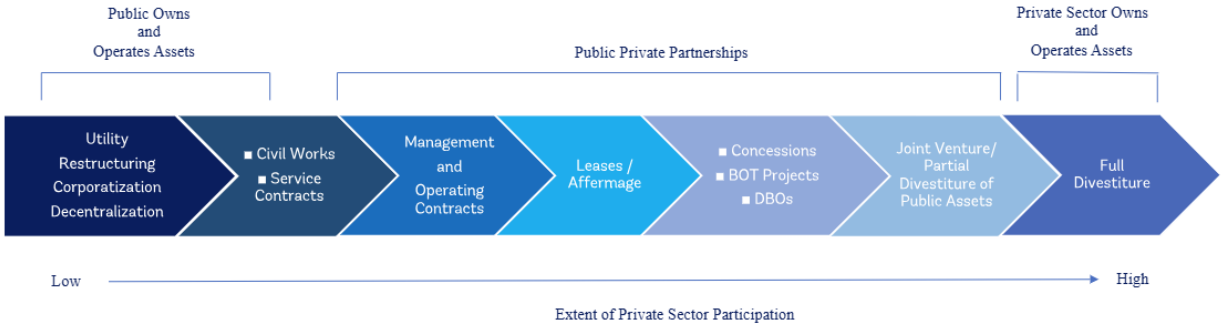


Figure 5. The Extent of Public and Private Participation
(https://ppp.worldbank.org/public-private-partnership/agreements)

PPP models

Public-Private Partnerships (PPPs) encompass various contractual frameworks that delineate the collaboration between governmental bodies and private sector entities in delivering public infrastructure or services. These frameworks can be categorized based on the nature of the asset involved, the responsibilities allocated to the private entity, and the payment mechanisms employed. Below is a rephrased overview of common PPP contract types and their defining characteristics.

Table 2. Types of PPP Models

(based on World Bank https://ppp.worldbank.org/public-private-partnership/applicable-all-sectors/ppp-contract-types-and-terminology)

Contract Type	Type of project	Private Sector Responsibilities	Payment Mechanism
Design-Build-Finance-Operate-Maintain (DBFOM) / Design-Build-Finance-Operate (DBFO)	New infrastructure	Encompasses the design, construction, financing, operation, and maintenance of the asset.	Government payments, user fees, or a combination of both
Build-Operate-Transfer (BOT) / Build-Own-Operate-Transfer (BOOT) / Build-Transfer-Operate (BTO)	New infrastructure	Involves designing, constructing, financing, and operating the asset, with ownership transferring to the public sector upon contract completion	Government payments, user fees, or a combination of both

Contract Type	Type of project	Private Sector Responsibilities	Payment Mechanism
Rehabilitate-Operate-Transfer (ROT)	Existing infrastructure	Entails refurbishing the asset, followed by its operation and maintenance	Government payments, user fees, or a combination of both
Concession	New and existing infrastructure	Involves financing, designing, constructing or rehabilitating, operating, and maintaining the asset, typically providing services directly to users	Primarily funded through user fees; in certain cases, the private entity might pay a concession fee to the government or receive subsidies
Private Finance Initiative (PFI) (UK)	New infrastructure	Covers designing, building, financing, and maintaining the asset; operational services may be included but often exclude direct user service provision	Government payments
Operations and Maintenance (O&M) Contracts	Existing infrastructure	Focuses on operating and maintaining the asset to specified standards	Government payments

Pros and Cons of PPPs

The advantages of PPPs are multifaceted. One primary benefit is the acceleration of project delivery. By involving private entities with the necessary expertise and resources, municipalities can bypass bureaucratic delays. Additionally, PPPs enable risk-sharing, with construction and operational risks often transferred to the private partner (EIB, 2019). Below, a number of these advantages are explained.

- **Long-term financing solutions.** PPPs allow for flexible financing structures, such as equity investment, loans, bonds, or revenue-sharing models, to fund the project over time. This can include tolls, fare collection, or advertising revenues, ensuring that the project can be self-financing over the long term. Besides, combining public funds with private financing allows making large-scale urban mobility projects more feasible.

- **Accelerated project delivery.** The collaboration between public and private sectors can reduce the duration of implementing project. With private companies incentivized by profits, they may be motivated to complete projects faster and more efficiently, meeting public demand for improved mobility services. Additionally, in some cases, PPPs can help bypass bureaucratic inefficiencies that may delay publicly funded projects.

- **Public Benefits.** PPPs can lead to better quality of services for the public. Since the private sector often has a profit motive, they are driven to ensure high standards, such as more reliable transport services, better customer service, or specific transport

services when necessary (e.g., on-demand transit). In some cases, PPPs can make urban mobility more affordable, for example, through fare systems or subsidies that are subsidized by the private partner's revenue from commercial activities (like retail, advertising, or parking).

- **Improved Risk Management.** PPPs enable effective allocation of risks between the public and private sectors. While the private sector often takes on risks related to financing, construction, and operation, the public sector typically handles political, regulatory, and demand risks. This balanced risk-sharing framework can make executing large-scale urban mobility projects more feasible.

- **Flexibility in Project Design.** PPP agreements allow for flexibility in the design and implementation of urban mobility projects, ensuring that the project meets the specific needs of the urban population. Private entities may be more responsive to changing demands and adaptable in integrating new transport needs.

However, PPPs are not without challenges. The complexity of agreements requires meticulous planning and negotiation. Moreover, the long-term nature of these contracts can sometimes lead to higher overall costs compared to traditional public funding routes. Municipalities must also be vigilant in monitoring private partner performance to ensure compliance with agreed standards (Smith and Johnson, 2020).

PPP frameworks necessitate a clear understanding of local regulatory environments and market dynamics. For instance, in Türkiye, where PPPs have traditionally been more common in airport terminals and intercity and motorway projects, adopting this model for urban mobility requires tailored approaches. Learning from these experiences can provide valuable insights into structuring successful urban PPPs.

Risks of PPP

While PPPs are often seen as an effective and efficient means to deliver infrastructure projects, they also present notable risks and challenges that require careful management. The European Court of Auditors has highlighted several shortcomings and potential pitfalls associated with involving private entities in public projects.

Successful implementation of PPPs demands a high level of administrative capacity, sector-specific expertise, and strong negotiation skills from local authorities to an extent well beyond what is typically required in conventional public procurement processes. However, many municipalities may lack the institutional capacity needed for effective project preparation, risk assessment, and contract management. This can result in poorly structured agreements and increased vulnerability during project execution.

The Court also warns that if expected revenues from future concessions fall short, private partners may withdraw, jeopardizing the project's financial viability. Additionally, the complexity and administrative burden of public procurement processes may discourage private

sector participation, limit competition and weakening the public authority's negotiation position.

Additionally, one major concern is the improper allocation of risks. Transferring responsibilities such as demand risk or land acquisition to the private partner without adequate analysis can lead to cost overruns, project delays, or even failure. Moreover, municipalities may feel compelled to offer overly generous guarantees or financial incentives to attract private investment, which can place undue pressure on public finances and compromise long-term value for money (Global Infrastructure Hub, 2019). Finally, a lack of experience in managing long-term contracts can result in disputes, renegotiations, or subpar service delivery, ultimately eroding public trust and undermining the sustainability of PPP initiatives.

Evaluation and Implementation

To determine whether a PPP is the right choice for a project, municipalities should undertake comprehensive cost-benefit analyses. Risk assessments play a crucial role in understanding which party is best equipped to handle specific challenges. Furthermore, stakeholder engagement is vital to ensure transparency and public trust in the process. This involves not only engaging private partners but also communicating openly with residents about the benefits and implications of the partnership (Public Infrastructure Research Institute, 2021).

Implementing a successful PPP also requires capacity building within municipal teams. Training programmes on financial structuring, contract management, and risk allocation can empower local authorities to negotiate better terms and oversee project execution effectively.

PPP Schemes in Türkiye

In Türkiye, as there is no customized legal framework for PPPs at the local government level; municipalities resort to legislation known as Build-Operate-Transfer Law No. 3996. Nonetheless, due to some difficulties arising from the implementation of this law, municipalities prefer to use State Procurement Law No. 2886, which regulates procedures for the state entities to sell or lease their movable and immovable assets in developing their PPP projects. This has been the case as most of the municipal PPP projects are structured to involve the lease of a municipal land to a private company in exchange for the commitment by investor to construct a facility on such land and to operate it for a certain period. Moreover, the lack of proper legal requirements for PPP projects in Law No:2886 limits incentives to engage in detailed project preparation and feasibility studies for municipalities. This eliminates the prospects for assessment of a project as a candidate to be approved using the PPP delivery method at the central government level. Scarcity of data on project specifics and limited know how at the municipality departmental level hamper the engagement of private debt financiers further, thus increasing transaction costs for potential investors.

8.3 Risk Management in Commercialisation

Every commercialisation effort comes with inherent risks. These risks can be financial, operational, or even reputational. Effective risk management is, therefore, essential for the success of urban mobility projects.

Effective risk-sharing forms the cornerstone of effective risk management in PPPs. By allocating risks to the party most capable of managing them, municipalities can reduce potential project vulnerabilities. For instance, construction risks are typically better handled by private entities with relevant expertise, while regulatory risks might be retained by public authorities (European PPP Research Group, 2018).

Contingency planning, i.e. financial reserves or timeline buffers is another critical element. Municipalities should prepare for various scenarios, including delays, cost overruns, or technological failures. Developing contingency plans ensures that projects remain resilient in the face of unexpected challenges (Brown & Taylor, 2019).

Finally, establishing robust monitoring mechanisms allows for continuous evaluation of project performance. Regular audits and performance reviews can help identify issues early, enabling corrective actions to be taken promptly.

8.4 Marketing Strategies for Mobility Projects

Marketing is an often-overlooked aspect of sustainable mobility projects. However, effective marketing can significantly enhance public acceptance and adoption.

Branding plays a pivotal role in shaping public perception. A strong brand identity, complete with a clear mission and visually appealing design, can make mobility projects more relatable to residents. Community engagement is equally important. Workshops, public forums, and media campaigns provide platforms for residents to voice their concerns and suggestions, fostering a sense of ownership (Walker, 2020).

The digital age offers numerous tools for marketing mobility projects. Mobile applications, for instance, can serve as comprehensive platforms for ticketing, navigation, and feedback. Social media, on the other hand, offers a cost-effective way to reach large audiences, sharing updates, success stories, and promotional content (Global Urban Mobility Report, 2021).

8.5 Recommendations for Municipalities in Türkiye

To improve the commercial viability and long-term sustainability of urban mobility initiatives, municipalities in Türkiye should adopt a more strategic approach to commercialisation. This involves combining diversified revenue models, tailored PPP frameworks, and stronger institutional capacities with public engagement and effective communication.

- **Developing context-specific PPP models:** Municipalities should leverage international best practices while adapting PPP structures to Türkiye's legal and administrative context. Given the limitations of Law No. 3996 and Law No. 2886, there is a need for interim practical models that can combine land-lease, service outsourcing, and risk-sharing principles.

- **Diversifying revenue streams:** Relying solely on farebox income is insufficient. Municipalities should incorporate complementary revenue tools such as congestion pricing, dynamic parking tariffs, advertising rights, shared mobility subscriptions, and electric vehicle charging tariffs. Adopting integrated ticketing systems and data-driven pricing models can also improve revenue predictability and service efficiency.

- **Improving institutional capacity:** Commercialisation strategies require a higher level of financial planning, legal expertise, and contract management capabilities. Municipalities should establish dedicated units or task forces responsible for PPP planning, risk assessment, and financial oversight. Collaborating with İLBANK and the Union of Municipalities of Türkiye (TBB) for staff training and technical assistance will be instrumental in this regard.

- **Strengthening public communication and marketing:** Successful mobility projects must be supported by public trust. Municipalities should deploy targeted communication strategies that highlight the environmental, economic, and social benefits of mobility investments. Community consultation processes, branding strategies, and digital platforms (e.g., smart mobility apps) can be used to build citizen buy-in and increase service uptake.

By integrating these approaches, municipalities in Türkiye can ensure that their sustainable urban mobility projects are not only impactful but also financially viable over the long term. The completion of the implementation with enabling legislative environment for municipal PPPs will ensure a wider adoption of innovative investment financing.

9. Planning and Implementation

This chapter outlines the planning and implementation processes essential for the success of sustainable urban mobility projects. It emphasises the critical financial and operational considerations in the planning phase and addresses the practical challenges associated with implementation in Turkish municipalities. The chapter also proposes solutions to overcome these challenges, drawing on best practices and case studies from both local and global contexts.

9.1 Planning Phase

Effective planning is a cornerstone of sustainable urban mobility projects. Municipalities embarking on such accomplishments must carefully structure their strategies to integrate financial planning, stakeholder engagement, and sustainability considerations. At the heart of the planning phase lies the necessity to define clear objectives and establish robust evaluation criteria. These elements provide a foundation for assessing project viability, identifying risks, and quantifying anticipated impacts.

For example, municipalities should define project boundaries and consider the timeframes over which costs and benefits will accrue (EIB, 2021). Inherent delays and financial uncertainties often accompany large-scale mobility projects. Evaluating these factors during the planning stage ensures municipalities are better equipped to mitigate risks (OECD, 2023). Additionally, comparing alternative scenarios, including a "do-nothing" approach, helps refine project prioritisation, paving the way for evidence-based decision-making (World Bank, 2020).

To quantify the impacts of proposed interventions, municipalities must utilise cost-benefit analysis tools such as standardised WB CBA template or EIB Economic Appraisal Tool. Non-quantifiable risks can be mitigated by integrating qualitative risk factors. For instance, Istanbul Metropolitan Municipality employed such methods to refine their post-implementation evaluations, improving the accuracy of future financial projections (Istanbul Metropolitan Municipality, 2022).

9.2 Implementation Challenges and Solutions

Moving from planning to implementation introduces a host of challenges, two of which are particularly pronounced in Turkish municipalities: budgetary allocation biases and the significant upfront costs associated with sustainable mobility systems.

One notable issue is the disproportionate allocation of funding toward motorised individual transport. This preference often results in underfunding for non-motorised and public transport initiatives. To address this imbalance, municipalities can strategically direct funds obtained from institutions like İLBANK into projects that enhance pedestrian and cycling infrastructure, as well as public transport systems. Transparency measures, such as requiring municipalities to publicly disclose their investment allocations, further encourage equitable funding practices (World Bank, 2020).

High upfront costs also represent a significant barrier to sustainable urban mobility projects. These costs include the infrastructure investments necessary for new transport systems, such as electric buses or dedicated cycling lanes. Short-term approaches might focus on identifying projects with strong returns on investment or bundling with other urban projects, while long-term solutions could involve diversifying revenue streams through congestion charges and innovative taxation mechanisms (Helsinki Mobility Systems, 2021; Australian Transit Authority, 2021). Leveraging green city bonds and climate-related financial instruments provides another avenue to secure the necessary funding (World Bank, 2020).

9.3 Capacity Building and Institutional Support

The implementation of urban mobility projects often requires significant institutional capacity building. Municipalities should establish dedicated planning and implementation units. Equipping these units with advanced training on financial structuring and risk management ensures that municipalities can effectively manage the complexities of mobility projects. Targeted training initiatives, offered through collaborations with universities or international organisations, have proven particularly effective in other contexts (UN Habitat, 2019).

Institutional collaboration also plays a critical role. For instance, coordinated efforts between the MoEUCC and İLBANK can streamline project approval processes, while enhancing access to external funding (OECD, 2023). Digital platforms designed for real-time updates and interactive planning could further enhance this collaborative potential, fostering efficient decision-making and accountability.

In Türkiye multi-tier (municipal versus central government) and dispersed (among various authorities) planning processes complicate and delay financial approval for foreign financed (mostly large-ticket) investment projects. Institutional capacity building at municipal level will both help local plans come to fruition in a better prepared shape. Hence opening the possibilities for consideration of wider range of financing instruments apart from direct loans under more diverse sustainability/green themed programmes.

9.4 Best Practices and Case Studies

Case studies from around the world provide a wealth of insights for municipalities seeking to innovate. For example, London's Congestion Charge highlights how targeted pricing measures can simultaneously reduce urban traffic and generate revenue (Transport for London, 2022). Closer to home, Izmir's cycling infrastructure initiatives demonstrate the impact of relatively modest investments in promoting sustainable transport.

Globally, the integration of advanced technologies has proven transformative. Amsterdam's Mobility-as-a-Service (MaaS) platform exemplifies how digital tools can optimise urban transport systems, while Australia's solar-powered transit solutions showcase the potential for renewable energy integration in mobility projects (Helsinki Mobility Systems, 2021; Australian Transit Authority, 2021).

9.5 Monitoring and Evaluation

Monitoring and evaluation frameworks are indispensable for assessing the effectiveness of mobility projects. Key performance indicators (KPIs) provide a quantitative basis for measuring progress, with metrics typically focusing on ridership growth, emission reductions, and financial sustainability (World Bank, 2020). Digital tools such as dashboards and mobile applications can facilitate the real-time tracking of these metrics, enabling municipalities to respond dynamically to emerging challenges (OECD, 2023).

Citizen engagement also enhances monitoring efforts. Mobile applications designed to solicit user feedback ensure projects remain aligned with community needs, fostering greater public trust and project buy-in (London Transportation Authority, 2022). Benchmarking progress against international standards further encourages continuous improvement, ensuring that municipalities in Türkiye remain competitive in adopting cutting-edge mobility solutions (OECD, 2023).

9.6 Future Directions

The future of urban mobility in Türkiye hinges on embracing innovative funding models, resilient planning practices, and inclusive designs. Emerging tools such as blockchain-based funding and AI-driven project evaluation represent promising avenues for securing and optimising investments (OECD, 2023). Incorporating climate resilience into project designs ensures that municipalities are prepared for environmental challenges, while equity-centred initiatives ensure that urban mobility systems are accessible to all residents, regardless of socioeconomic status (UN Habitat, 2019).

Regional integration represents another critical opportunity. By collaborating across municipal boundaries, Turkish cities can develop cohesive transport networks that enhance connectivity and economic vitality.

9.7 Conclusion

Planning and implementing sustainable urban mobility projects require an integrated approach that combines financial insight, institutional capacity, and a commitment to innovation. By addressing current challenges and leveraging global best practices, municipalities in Türkiye can transform their urban mobility landscapes. The potential benefits–ranging from reduced emissions to improved quality of life–underscore the urgency and importance of these initiatives.

10. Recommendations for Municipalities

This Handbook provides a comprehensive set of approaches and practical tools to facilitate the effective use of the different financial options in relation to SUMP. There are specific gaps in the through-the-cycle project management processes starting from project origination to implementation, hampering the outcomes of strategic goals and undermining the efficiency of utilized municipal sources.

Given the weak linkage between strategic planning and budget process, project concepts are driven by budgetary constraints. As a result, projects often lack a coordinated approach, with delays and gaps in the preparation process. Furthermore, the structuring of the project portfolios is often curtailed by lack of specific project data and information as well as inadequate screening practices.

While there are number of financing sources available for sustainable urban mobility projects, municipalities require a holistic approach to investment origination and commercialisation in order to achieve best match between projects and financial options. A thorough understanding of a diverse set of instruments ranging from loans to grants and from bonds to PPPs is a prerequisite for the municipalities to assess the full implications of using their chosen instrument.

Financial and economic valuation is a critical step in both internal decision-making process as well as presenting the project to third parties including financiers, regulatory authority and other key stakeholders. This step is also crucial for project design, as it helps municipalities make informed choices that will influence the project lifespan.

There have been important strides in the improvement of municipalities' capacities in planning and implementation of relevant projects. Many municipalities, often in collaboration with their financing partners, such as İLBANK, have established project implementation units. The implementation of SUMPs should be embedded within the working processes of these units to ensure well-coordinated and effective outcomes.

Based on the preceding chapters, the following set of priority recommendations emerges to support municipalities in Türkiye in strengthening their institutional readiness and financial strategy for sustainable mobility project development:

- Establish a well-structured project organization framework from initial idea to concept development
- Use globally accepted tools and methodologies to structure a through the cycle project action plan
- Remain in constant contact with financiers including banks, multilaterals, DFIs and specialized municipal finance institutions to collaborate on potential finance options
- Emphasize capacity building in technical domains as well as project management disciplines including financial management, fiduciary, E&S safeguards and climate-related functions
- Establish a proficient project implementation unit in house and ensure cross-departmental coordination mechanisms between this unit and all relevant municipal departments and entities.

By following these recommendations, municipalities can significantly increase their preparedness, access to funding, and execution capacity for sustainable mobility investments that are both technically and financially sound.

References

Arnstein, S. R. (1969). A Ladder of Citizen Participation. Journal of the American Institute of Planners.

Asian Development Bank (2023). Municipal Project Pipelines: Best Practices.

Australian Transit Authority. (2021). "Solar-Powered Transit Systems: A Case Study." Sydney: ATA Reports.

Brown, L. (2021). Sustainable Urban Parking Management. Municipal Innovations Journal.

Brown, L., & Taylor, J. (2019). Risk Management in PPP Projects. European Journal of Infrastructure Studies.

Copenhagen Municipality. (2020). Strategies for Bicycle Infrastructure Development. Copenhagen Mobility Plan (Traffic_and_mobility_plan_for_the_CapitalRegion_UK_Final.pdf)

Crosby, B. C., & Bryson, J. M. (2005). Leadership for the Common Good. Wiley.

European Bank for Reconstruction and Development (2024). Green Cities Framework 3.

European Commission. (2020). Prioritising Sustainable Infrastructure. EC Publications.

European Commission (2023). Green Urban Transport Framework.

European Environment Agency. (2018). Environmental Impact Assessments in Urban Planning. EEA Reports.

European . (2019). Guide to Public-Private Partnerships. EIB Publications.

European Investment Bank. (2021). Financing Green Infrastructure. EIB Publications.

European Investment Bank. (2021). Guide to Cost-Benefit Analysis. Luxembourg: EIB.

European Investment Bank (2023). "Guidelines for Green Urban Mobility Projects."

European Investment Bank. (2024). Sustainability Report 2023. Luxembourg: EIB. https://www.eif.org/news_centre/publications/eib_group_sustainability_report_2023_en.pdf

European PPP Research Group. (2018). The PPP Framework: Best Practices. European Institute of Policy Research.

Financial Viability Analysis and Capital Structure Optimization in Privatized Public Infrastructure Projects, Xueqing Zhang, Journal of Construction Engineering and Management, ASCE, June 2005

German Federal Transit Agency. (2020). "Adopting Hydrogen-Powered Buses in Urban Areas." Berlin: GFTA Reports.

Global Mobility Report. (2020). Innovative Revenue Streams for Sustainable Cities. Global Urban Mobility Institute.

Global Urban Mobility Report. (2021). The Role of Digital Tools in Mobility Marketing. International Urban Studies.

Green Energy Council. (2021). EV Charging and Green Tariffs. Green Economy Journal.

Helsinki Mobility Systems. (2021). "Innovations in Mobility-as-a-Service Platforms." Helsinki: HSL Publications.

ICLEI. (2019). Transformative Urban Strategies. ICLEI Case Studies.

İlbank (2024). Climate and Disaster Resilient Cities Project – Environmental and Social Management Framework.

İlbank, 2024. "Sustainable Cities Programme Report."

İlbank (2025) Project Financing and Loan Facility (https://www.ilbank.gov.tr/sayfa/project-financing-and-loan-facility)

Istanbul Metropolitan Municipality. (2022). "GIS Integration in Mobility Planning." Istanbul Municipality.

Izmir Metropolitan Municipality. (2023). Cycling Infrastructure Expansion Report. Izmir

Janssen, R., et al. (2018). Integrated Approaches to Multi-Criteria Decision-Making. Springer.

Jones, M., & Miller, S. (2019). Subscription Models in Shared Mobility. Journal of Sustainable Transportation.

Kayseri Municipality. (2022). Feasibility Study for Tram System Expansion. Kayseri: Kayseri Municipality.

Macharis, C., & Bernardini, A. (2015). Reviewing the Multi-Actor Multi-Criteria Analysis Approach. Transport Policy.

Meadowcroft, J. (2009). Planning for Sustainability. Journal of Environmental Policy and Planning.

Mingardo, G., van Wee, B., & Rye, T. (2015). Urban parking policy in Europe: A conceptualization of past and current trends. *Transportation Research Part A: Policy and Practice, 74*, 268–281.

Network for Greening the Financial System (NGFS), 2022. "Sustainable and Responsible Investment Guide."

OECD. (2021). Public-Private Partnerships: Trends and Lessons. OECD Publishing.

OECD (2022) Broadening Transport Appraisal Summary and Conclusions, retrieved from Broadening Transport Appraisal | OECD.

Organisation for Economic Co-operation and Development (OECD), 2021. "Improving Transport Project Appraisals in Member Countries."

OECD. (2023). "Transport Project Appraisals: Guidelines and Case Studies." Paris: OECD Publishing.

Public Infrastructure Research Institute. (2021). Stakeholder Engagement in PPPs. Infrastructure Policy Journal.

Saaty, T. L. (1980). The Analytic Hierarchy Process. McGraw-Hill.

Saaty, T. L., & Vargas, L. G. (2012). Decision-Making with the Analytic Network Process. Springer.

Shoup, D. C. (2005**).** *The high cost of free parking*. Planners Press, American Planning Association.

Shura Energy Transition Centre, 2019. "Financing the Energy Transition in Türkiye."

Smith, D. (2020). Fare Collection Modernization in Public Transport. Urban Mobility Review.

Smith, D., & Johnson, E. (2020). Challenges of PPPs in Urban Mobility. Journal of Urban Economics.

Smith, J., Taylor, R., & Walker, H. (2021). Comprehensive Approaches to Sustainable Mobility. Urban Systems and Sustainability.

Transport for London. (2022). Impact Analysis of Congestion Charging. TfL Publications.

Transport for London (2022). "Congestion Charge and Urban Traffic Management." London: Transport for London.

UN Habitat. (2019). Participatory Urban Decision-Making. UN Publications.

UN-Habitat (2023). Sustainable Cities and Commercialization Models.

United Nations. (2018). Guidelines for Infrastructure Development. UN Economic Commission.

Walker, H. (2020). Engaging Communities in Mobility Projects. Journal of Public Engagement.

World Bank, European Bank of Reconstruction and Development (2017) PUBLIC-PRIVATE PARTNERSHIPS. Reference Guide

World Bank. (2020). Hybrid PPP Models: Opportunities and Challenges. World Bank Group.

World Bank. (2020). Infrastructure Project Preparation Facility: Lessons Learned. Washington, DC: World Bank.

World Bank. (2020). "Sustainable Urban Development Practices." Washington, DC: World Bank Reports.

World Bank, (2020). "Green Financing Opportunities for Urban Mobility."

World Bank, 2023. Decarbonizing Urban Transport for Development.

World Resources Institute. (2021). Templates for Project Evaluation. WRI Publications.

World Resources Institute (2023). Urban Mobility and Sustainability Report.

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