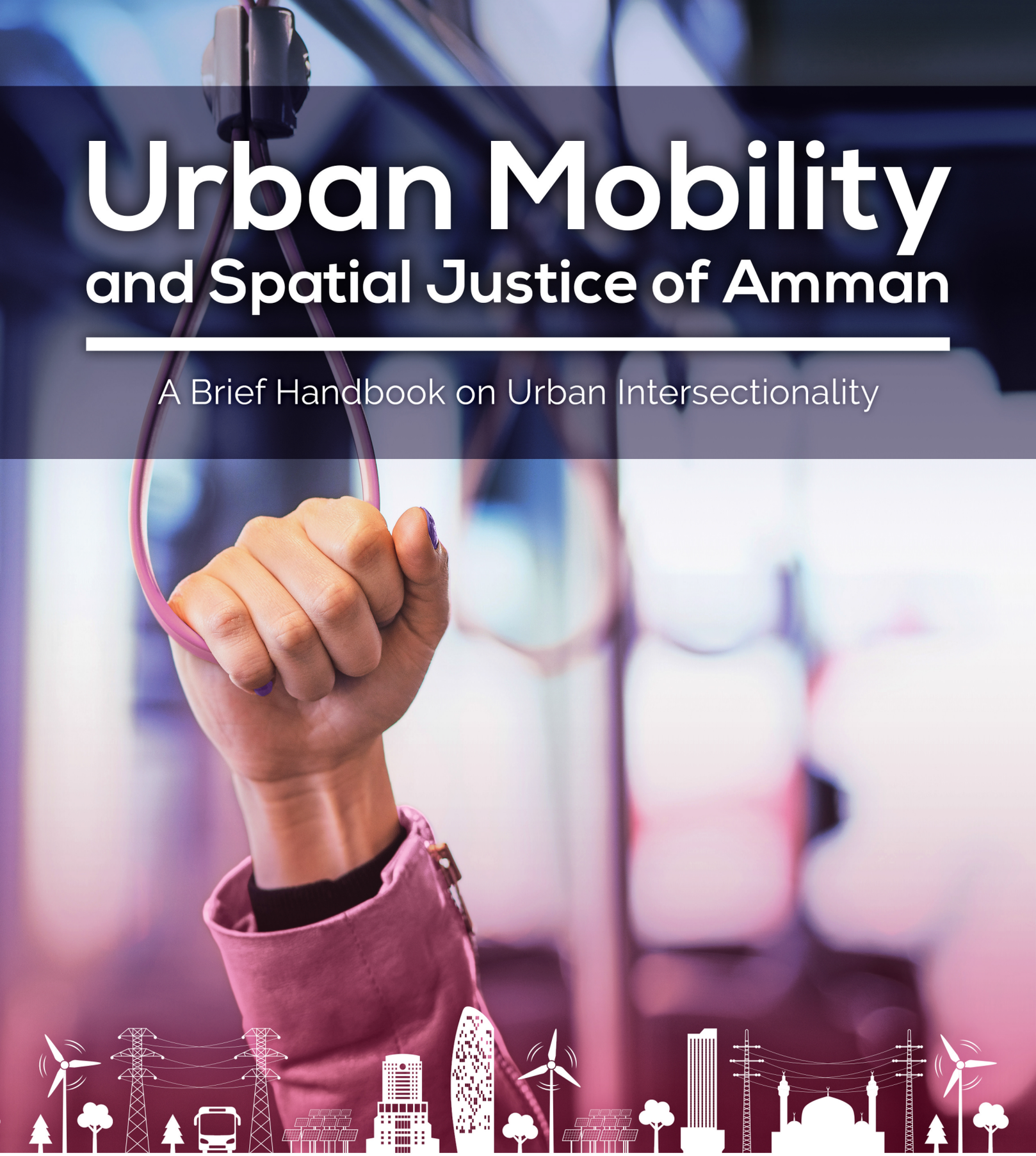
Urban Mobility and Spatial Justice of Amman

A Brief Handbook on Urban Intersectionality



December 2020

Written by:

Deyala Tarawneh
Ahmad Zeyad
Ronja Schiffer
Haroun Haitham Jweinat

FRIEDRICH EBERT STIFTUNG

Climate and Energy Project
مشروع الطاقة والمناخ

Greater Amman Municipality

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2.0: ACRONYMS

Acronym	Description
ADA	Americans with Disabilities Act
BAU	Business as Usual
BRT	Bus Rapid Transit
COVID 19	2019 Coronavirus Disease
FES	Friedrich Ebert Stiftung
GAM	Greater Amman Municipality
GAP	Gender Action Plan
GCAP	Green City Action Plan
GIS	Geographic Information System
GIZ	German Development Agency (Gesellschaft für Internationale Zusammenarbeit)
ITS	Intelligent Transport Systems
IWD	International Women's Day
IWDA	International Women's Development Agency
JSF	Jordan Strategy Forum
MENA	Middle East and North Africa
MoE	Ministry of Environment
MoT	Ministry of Transport
NACTO	National Association of City Transportation Official
NGO	Non-Governmental Organization
PM (2.5-10)	Particulate Matter (2.5-10)
SMO	Social Movement Organizations
SUMP	Sustainable Urban Mobility Plan
TUMI	Transformative Urban Mobility Initiative
UDG	Urban Design Guidelines
UITP	L'Union Internationale des Transports Publics
UNA	Urban Network Analysis
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UoJ	University of Jordan
WBG	World Bank Group
WFH	Work from Home

3.0: LETTER FROM THE TEAM

Amman is a unique city that has faced many challenges throughout history. What once was called the “City of Brotherly Love” and the “City of Many Hats” is now considered one of the most resilient cities in the Middle East. Amman is culturally diverse, with four million inhabitants from many different sociocultural backgrounds, all living together and accounting for 40% of Jordan’s population. Amman is the economic and political engine of the country; it is where the parliament, foreign embassies, Royal Court, and 80% of its capital enterprises are all located. With nearly 40% of Amman’s population under the age of 20, unemployment is a big concern for youth and women. This situation is further exacerbated by the absence of inclusive public transportation services, even on a national level.

We strongly believe in our city’s adaptability. For this reason, we want to share this report with you, highlighting the city’s mobility challenges and how we can effectively transform them into opportunities. Through our evidence-based methodologies and tools, we can create better urban policies for decision-makers and reinforce the city’s overall resiliency.

We want to thank the amazing team that made this publication a reality, as well as FES for their tremendous support. Without you, none of this would have been possible.

From the Academic Sector

Deyala Tarawneh

Assistant Professor and current Chairperson of the Architecture Department at the University of Jordan (UoJ), where she also teaches architectural design, housing, urban planning, and urban design modules. She is also a founding member and Treasurer for the Watershed and Development Initiative (WADI), as well as a counselor and advisor for the Women in Engineering (WIE) affinity group of the Institute of Electrical and Electronics Engineering (IEEE).

Her research focuses mainly on issues related to brownfield sites, temporary urbanism, and spatial justice. Deyala holds a BArch and MArch in Architectural Engineering, both obtained from the UoJ, as well as a PhD in Urban and Regional Studies obtained from the University of Birmingham/UK. Deyala has a particular interest in urban resilience forms and the right to urbanization.In her work, she constantly attempts to test Western-claimed concepts in Middle-Eastern contexts (Amman-Jordan in particular). Most recently, Deyala has been involved in research with several partners around topics related to mobility.

Fields of Interest: Spatial justice, brown fields, temporary urbanism, urban resilience, sustainability, and smart cities.

From the Public Sector

Ahmad Zeyad

Urban Planning Researcher currently working with the Greater Amman Municipality (GAM). He is also an External Instructor in the Department of Architecture, Faculty of Engineering, at UoJ, as well as a freelance architect of several architectural and urban projects.

He is an urbanist with interests in urban and regional planning trends, urban redevelopment, applied urban revitalization strategies, climate change, evidence-based policy-making, social equity, integrated urban planning, and tactical urbanism. His research focuses on connecting planning theories with empirical data, combining new sources of passive data and physical observations to learn about the process of urbanization in developing countries, especially in cities like Amman.

Fields of Interest: Research, design, psychology, urban planning, visual arts, and SDGs.

From Friedrich-Ebert-Stiftung

Ronja Schiffer

Program Manager currently working with the Friedrich-Ebert-Stiftung (FES) within the Regional Climate and Energy Project. Furthermore, she graduated with distinction from the University of Edinburgh with a concentration on international relations in the Middle East, Arabic, and gender politics. She also conducted mobility research for three projects and publications with different stakeholders.

She is an activist working in intersectionality, sustainable urban and mobility planning, climate change and migration, security, as well as streams of power relations and its effects on residents. Her research and work focus on integrated and intersectional analysis of phenomena related to mobility, urban planning, and climate change. She also employs local and multi-stakeholder approaches in her work, including qualitative interviews and experiments to give strategic, sustainable, inclusive, and effective policy/action recommendations.

Fields of Interest: SDGs, intersectionality, the struggle against discrimination and inequality, climate change, and mobility.

From the Private Sector

Haroun Haitham Jweinat

A multi-skilled individual with an affinity for fusing arts, culture, and urbanism. He is the Director of SCES, an environmental services company operating in Amman-Jordan.

His interest in localizing SDGs in Amman stems from his family's long experience in the public sector. With the wealth of knowledge on how to implement realistic urban solutions, he wants to take matters a step further and introduce evidence-based policies that can be successfully implemented, while also promoting them artistically to the broader public.

Fields of Interest: Research, culture, environmental issues, social justice, visual arts, and SDGs.

4.0: EXECUTIVE SUMMARY

Several urban mobility studies highlight the fact that female transit users share a unique experience that is wholly different from that of the typical male user, especially in developing countries. Whether due to society, culture, or matters of policy, female users feel compromised while taking public transportation, and remain dissatisfied with what should be considered a basic right. This dissatisfaction also extends to the experiences of minorities in general (e.g. persons with disabilities, persons from forced - displacement background, etc.). In an effort to further understand users' particular mobility experiences, the *Urban Mobility and Spatial Justice of Amman* represents an extension of a pilot study conducted in an ongoing collaboration with the FES that examines urban mobility through a gender/intersectional lens in various, but carefully selected, locations across the city of Amman.

The study consists of three parts: 1. Introduction and methodology, which provides the relevant context of the study and approach; 2. Current mobility trends and conditions in Amman, such as the construction of a Bus Rapid Transit (BRT) system; and 3. Approach and available datasets, which lay the foundation for analyzing current mobility trends through different intersectional mediums (poverty, politics, urban development, urban complexity and adaptation).

The main objective of this publication is to understand how a variety of developing and emerging urban mobility trends, whic successfully provide accessibility across multiple city infrastructures and its linked systems at the metropolitan level, will deliver greater access to urban services for all users, especially females. This publication explores how evidence-based urban policies extend well beyond the socioeconomic makeup of any city and pave the way to new concepts of urban intersectionality. From this analysis, the publication utilizes models, poses guiding questions, and presents four key principles to provoke and inspire action from policymakers, academics, designers, and local governments..

The publication also aims to provide policymakers with practical lessons derived from the five selected sites. Its primary audience, therefore, is city decision-makers, their financiers, technical advisers, academics, urban designers, and practitioners most interested in applying evidence to urban mobility.

5.1 Introduction

Public transportation is essential for urban and social life. Without public transportation, socioeconomic life becomes difficult to sustain, especially in cities. Providing a comprehensive and inclusive transportation system as part of a definitive urban mobility plan is considered a basic human right by various politicians, decision-makers and urban planners around the globe. Nevertheless, the provision of this vital service is lacking all around the globe, in particular the MENA region. In the era of COVID-19, it is now more important than ever to address the fragile mobility infrastructure to prepare it for future crises. In the MENA region, low (but quickly increasing) car ownership rates, extreme urbanization rates (e.g. in Egypt and Jordan), and transportation service privatization all lead to unsustainable and unjust transportation options.

Many cities across the globe are utilizing smart solutions to their public transportation systems and integrating active mobility into urban planning, such as cycling highways, responsive crosswalks, and low emission bus fleets. In this regard, we find Amman completely lacking in any sort of comprehensive mobility systems. The lack of a proper transport network greatly contributes to unjust mobility access, leading to higher social inequalities and lesser access to job opportunities and urban services. This can be seen in the rise of unemployment rates amongst vulnerable groups, such as women and youth. A study from 2018 by SADAQA and FES showed that 47% of women in Jordan have declined a job offer due to the lack of available, affordable, and accessible public transportation.[1] Amman's own specific mobility, social justice, and sustainability challenges can be alleviated and solved through a proper analysis of the situation at hand and a comprehensive toolkit of urban policies. These solutions also include digital infrastructure, awareness campaigns, and comprehensive training highlighting the relationship between policymakers and practitioners.

Amman is a city of more than 4 million inhabitants facing challenges related to urban flight, urban sprawl, and climate change. Some of these challenges include: (i) Extreme urban growth due to the influx of people from neighboring countries fleeing conflict and economic hardships; (ii) Extreme weather events, such as flash floods; and (iii) Climate-related conditions, such as droughts and water shortage. Over the years, the city managed to overcome some of these challenges through planning, policy instruments, and international financial assistance. As such, Amman is an example of how to turn challenges into opportunities (e.g. by integrating refugees into urban spaces). Nevertheless, mobility still needs improvement in order to create a sustainable and inclusive city as planned within the Green City Action Plan[2] (GCAP) and other visions Amman has in mind.

The study aims to achieve several goals that combine mobility, urban planning, and policy advice. This paper can be used as a case study for evaluating current mobility trends in the MENA region, where it can be easily adapted and applied. It also aims to identify the current promising mobility systems in Amman (Chapter II), as well as the selection criteria for the five different sites across the city (Chapter III). Then, it showcases the major themes for each site and how it can be used to enhance every citizen's access to the city. These sites can act as a catalyst for future urban paradigms (Chapter IV) by providing evidence-based mobility policy recommendations (Chapter V). The study will also analyze the current mobility recommendations given by the Amman GCAP and adjust them for the sake of intersectionality and inclusivity, while also mentioning some recommendations and plans that were missing.

1 SADAQA, FES (2019) "A Perspective of Women Users of Public Transportation," ISBN 978 - 9957 - 484 - 94 - 1, Available at: http://library.fes.de/pdf-files/bueros/amman/15221.pdf

2 The GCAP is still under review and has not yet been published. The authors nevertheless have been part of the creation process and thus know its objectives and vision.

5.2 Methodology

Selecting our study areas was based on different factors: density, socio-economic indicators, location, and access to critical urban services during the Covid-19 lockdown. This method ensures a healthy integration of any future urban mobility policies. We enhanced the accuracy of our methodological approach through utilizing technological toolkits (Urban Network Analysis Toolkit) that analyze access to urban services within neighborhoods on foot where the focus locations were preliminarily diagnosed. Then, the results were cross-referenced with the outcomes of the site visits that the students conducted before the lockdown during a UoJ urban planning course in January 2020. Comprehensive multi-level examinations were later conducted by experts from the private sector and academia on each focus area. This paved the way for adopting a participatory approach aimed at including an array of stakeholders associated with the research to improve the accuracy of our findings and recommendations.

The research was split into 6 phases: (1) Preliminary data collection and understanding the context through site visits and general observations; (2) Introduce urban sustainability concepts to the different stakeholder groups through workshops and discussion sessions; (3) Data analysis and context visualization; (4) Utilize digital mobility toolkits (as well as attempt to localize/contextualize them as needed) to establish measurable indicators and parameters; (5) Suggest potential interventions within existing policies and urban practices; and lastly, (6) Share the research findings for increased awareness impact. The research and data collection were mostly achieved through desk research, digital stakeholder meetings, and limited in-person field research, which was impacted by COVID-19 movement restrictions.

In an attempt to further understand the characteristics and components of urban mobility, a comprehensive intersectional system was incorporated into the research. The introduction of urban intersectionality is relatively new to this type of research. Typically, if gender was the topic of interest to be discussed, then it is usually done in a clear, female-centric way. For this study, however, we opted for a broader spectrum of targeted vulnerable groups, as this seems more representative of any social fabric.

Thus, five main themes emerged during our research: (1) Mobility through politics, which shed light on Amman's political landscape and highlighted the role mobility plays in improving political participation; (2) Urban poverty and mobility, which addressed the spatial injustice resulting from poor connectivity and accessibility, as well as concepts such as time poverty and the lack of economic involvement; (3) Tactical approach to upgrading urban mobility, which introduced the concept of tactical urbanism and small-scale solutions that may have large-scale impacts, especially in highly populated and compact areas; (4) Urban mobility for improved livability and livelihood, which shed light on the connection between urban indicators and mobility . It also showcased how improved mobility aids in more livable cities through more sustainable livelihood strategies and a better quality of life; and lastly, (5) The future of urban mobility, which laid the foundation for identifying potential future research and how this research can contribute to the broader, intersectional discussion on mobility.

As an additional part of the study, a social experiment was designed to measure the levels of discomfort women face in all modes of transportation. The experiment was supposed to be quantified using an application that measures the levels of discomfort during the "last mile" phase. In this context, users can enter when they feel any psychological stress while walking towards bus stops, as well as to measure their average heart rate during the stressful situation. Due to the enforced Covid-19 lockdown in Jordan from March to June 2020, and the restricted ability to move afterward, this experiment was not carried out and will be planned for future development.

Mobility is key to development. As such, it is a critical part of urban planning, in Amman as well as in other cities. For the Amman Governorate, with a population of approximately 4,430,700 residents (Department of Statistics, 2019), housing almost 42% of the Jordanian population, this notion holds true all the more. It is worth mentioning that GAM houses 3,816,980 of these people, as the Governorate also includes neighboring towns which have their own city administrations (Department of Statistics, 2019). The rapid rise in the city's population has had tremendous impact on mobility: constant traffic jams; insufficient infrastructure; missing public transportation networks; and lack of other mobility options, such as walking and biking. The important thing missing here is longterm, data-based planning.

City-data is an essential element that helps with the overall approach to public policies and related urban services. As of right now in Amman, there are several discrepancies between governmental sectors and ministries when trying to localize the National Urban Data on a city scale. This is primarily due to: (i) the discrepancy between the GAM's borders and the Metropolitan borders of the Amman Governorate; and (ii) the lack of horizontal channels of communication between different sectors within the same public institution. The data is inconclusive, but it can be upgraded. We resorted to using the latest toolkits in urban analysis to act as a catalyst for future methodologies to enhance public life. Since data usage is a key aspect of mobility planning, this study utilizes the most up-to-date and available data, as well as new collected data, to showcase several models for inclusivity in public realms, all of which will help provide some remedies to the inadequate transportation network and mobility planning problems.

6.1 Amman Urban Mobility

Amman has received institutional, technical, and financial support from various agencies and organizations to solve its main urban issues, such as its housing crisis, insufficient water and sewage networks, and incomplete highway network.

However, despite international technical assistance, Amman's infrastructure has not kept up with the pace of its demographic and urban growth rate. Because its population has doubled in just a decade and a half, jumping from 1.8 million in 2004 to 3.5 million in 2015 and 4.0 million in 2019, the city is no longer functional in terms of transportation, housing, and access to public spaces.

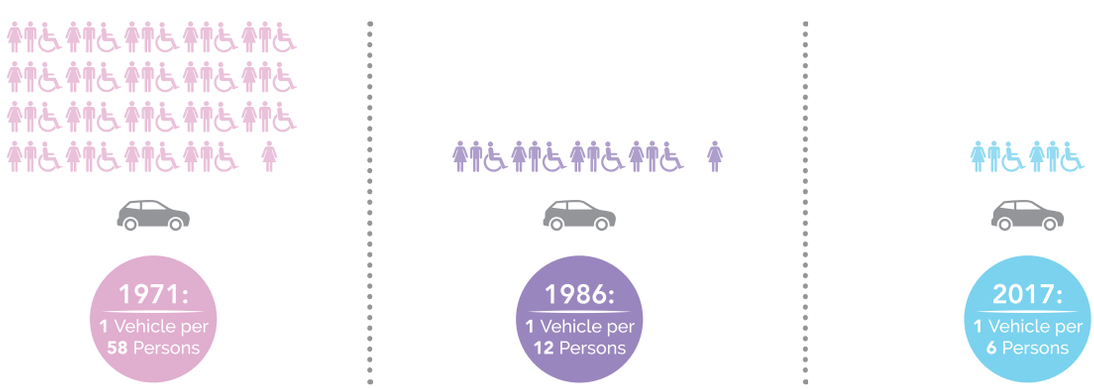


Figure 1: Persons per vehicle in Jordan
Source: http://library.fes.de/pdf-files/bueros/amman/16656.pdf

Car ownership has greatly increased in Amman, while public transportation is a minor part of the modal share, with taxis and ride hailing representing a large portion of that percentage. The most recent, but outdated, survey from 2008 stated that only 13% of daily trips are done through public transportation, out of which 8% use taxis and 5% buses (Shbeeb, 2018). Furthermore, those users represent "captive riders" with an average monthly income of less than 400 Jordanian Dinar (JAD), many of whom do not own a car (65% in the GAM area) (ibid.). The outdated data also shows the urgency for implementing comprehensive data harvesting plans to improve mobility understanding and planning. The low rate of public transportation and walking is primarily due to bad infrastructure and "captive riders" lacking safe, accessible, and affordable means of transportation. All of this directly impacts the increase in private vehicles and, hence, emissions, air pollution, and traffic jams. By increasing the modal share of both public transportation and active mobility, many intersecting issues can be improved, such as reducing emissions and air pollution, increasing political and economic participation, improving livelihoods, and reducing social injustices linked to lack of mobility.

As part of the modal mobility share in Amman, public transportation is inaccessible, unaffordable, unavailable, unreliable, and unsafe. The lack of access to public spaces and public transport creates an unsafe environment, especially for vulnerable groups, such as women, refugees, and people with disabilities. By granting these groups more presence and access within the public space, public transportation becomes healthier, which leads to improved socioeconomic opportunities, as well as reduced vehicle emissions. Higher demand for public transportation from improved accessibility will lead to higher availability of services, thereby decreasing costs due to higher ridership patterns. This pressures service providers to become more accountable and reliable, as the state, in particular, will provide alternatives to compete with unreliable service providers. In the end, this will lead to greater safety and comfort for all.

6.2 BRT in Amman

The BRT work started in 2008, was suspended in 2011, resumed in 2015, and will be fully operational in 2021. The current project includes the construction, planning, and equipping of two BRT dedicated corridors having a total length of 25km and will cost around $250 Million USD, two-thirds of which will be financed by the "Agence française de développement" (AFD). It is expected that 140 coordinated buses will eventually carry more than 315,000 passengers per day. The two routes will serve major transit routes in the city (e.g. the UoJ, Sport City, and Mahatta Terminal) (GAM, 2019a; GAM, 2020). In conjunction with this project, the GAM launched a green infrastructure project in the city's poor and dense neighborhoods. This project promotes walkability and increases pedestrian safety by linking upgraded informal areas to the BRT lines through staircase renovation. The 5-million-euro project (July 2017 – July 2021) is being implemented by the expert German development agency Gesellschaft für Internationale Zusammenarbeit (GIZ) in partnership with Jordan's Ministry of Environment and Greater Amman, and with funding from the German development ministry Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ). It aims at improving living conditions in poverty stricken areas in Amman by rehabilitating stair networks that connect poorer neighborhoods with BRT bus stations in Ras al Ayn (in Badr and Basman) and through the creation of two small community parks. These small projects focus on both making the city greener and increasing walkability. At the neighborhood level, the aim is to counteract the degradation of urban spaces, improve social cohesion, and foster interaction between different population groups. More broadly, the infrastructure networks will help filter air and water pollutants, preserve local biodiversity, decrease the impact of urban heat waves, and stabilize the soil.

6.3 Amman Bus

The first phase of the project covers 11 out of 22 areas affiliated with GAM, including Al Madina, Abdali, Basman, Tareq, Abu Nuseir, Shafa Badran, Sweileh, Jubeiha, Tla Al Ali, Al Naser, and Marka with 135 buses, 52 of which will accommodate 59 passengers, while the remaining 83 buses will carry 42 passengers. Expansion plans include 150 more buses and 34 new routes. To use the Amman Bus, a user must buy a passenger card and charge it with the desired balance at one of our point of sales, either at the main bus stations or through a vending machine available in several strategic locations. The passenger card can be recharged and used for two years.

The project aims to improve public transportation in the capital by operating 135 buses throughout 27 routes in central Amman. Amman Bus will provide a convenient transportation experience with an advanced information system and electronic payments through a prepaid, rechargeable card. Amman Buses will be regular and frequent, and all its buses clean, safe, and easy to use. Buses will be equipped with an electronic payment system and an advanced security system. Amman Bus will also be handicap-accessible and will accommodate elderly passengers (Amman Bus, 2020).

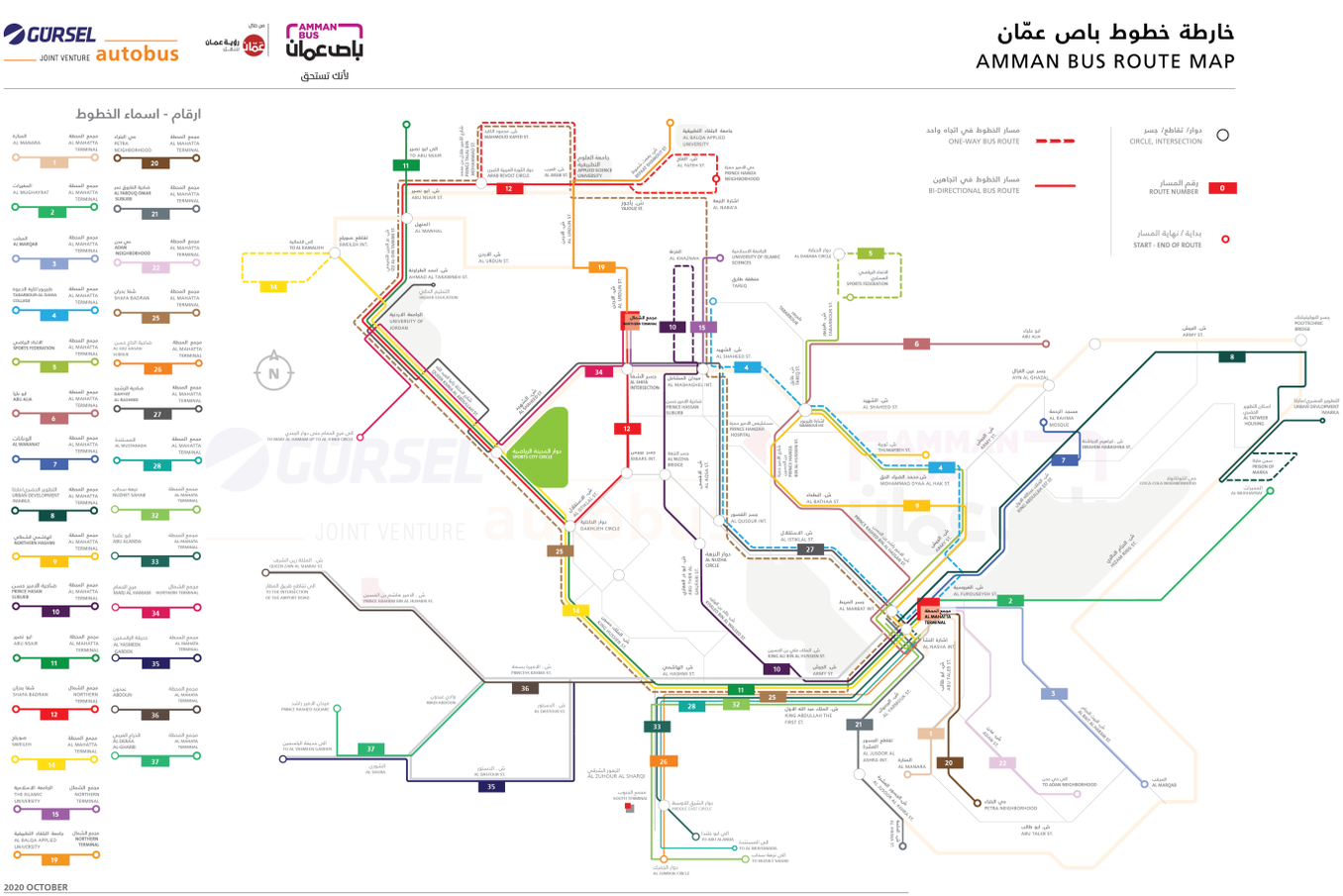


Figure 2: Amman Bus Route Map

6.4 Mobility for Her in Amman

Even policy makers and academics are starting to realize that everybody has different travel needs, modes, and patterns. It is also clear that our current system does not effectively serve vulnerable groups, and that these groups were not considered in mobility nor urban planning. While more women, especially in developing countries, tend to use public transportation for their day-to-day activities and to take active roles in different sectors, the majority of them suffer from the complications associated with their daily commute (Adeel, Yeh, & Zhang, 2017; Arshad, Bahari, Hashim, & Halim, 2016; Jaitman, 2019).

According to research, women use poorly-resourced, less-luxurious, higher-cost, and multi-purpose modes of transportation more often. There are several reasons for this, mostly related to sociocultural stereotypes, tasks still associated only with women (i.e. household tasks), as well as the lack of economic privilege. This results in the widening of the gap in the economic, social, and time resources between different genders, ages, and social classes.

In an attempt to unravel the intricacies of a so-called "typical day trip," Mobility For Her wanted to explore the untold stories of urban mobility from an intersectional perspective by focusing on three main areas: (1) Design of the environment constructed to support active transportation and sustainable mobility patterns; (2) Performance of public transit modes for underrepresented/ marginalized groups; and, most importantly, (3) The often overlooked distance between starting points to public transportation and distance from public transportation stops to final destinations, referred to here as the "last mile."

Mobility for Her has short-term and long-term goals and objectives. In the long-run, the research aims to raise the awareness on sustainable urban mobility principles that foster a more gender-sensitive perspective in policy and practice. The project also aims at adopting more multidisciplinary, cross-sectorial approaches by emphasizing connections between different stakeholders. In the short-run, the research aims to present Amman as a catalyst for future opportunities in urban mobility for the region and to show how all these challenges can transform into rewarding outcomes.

Considered one of the most important cities in the region, Amman acts as a base for various organizations working on multiple refugee-related issues in the region. Amman is a regional shock absorber and has managed to take in hundreds of thousands of refugees throughout its history. People forced to come to Amman throughout the 1980s established informal settlements, which are now integrated into the city's fabric. Nevertheless, integrating informal settlements is neither easy nor does it promote equal access to services within the city. Amman could not manage this sudden population increase and that lead to mobility issues, a housing crisis, and a lack of both green spaces and reachability to urban services, despite having two transportation development master plans (in 1987 and 2008). Considering the long-term effects of the erratic and sudden population growth in the years to come, more people will lack the ability to access critical urban services through its current mobility structure.

This research summarizes the urban narrative of 187 neighborhoods by focusing on five of them, each with a distinct urban theme to analyze the mobility trends of the groups residing therein. These five locations will act as a pilot for future research and can help with modeling a healthier mobility structure that is intersectional, sustainable, and dynamic. It is worth noting that in 2017, Amman adopted a Resilience Strategy to enhance the livelihood of its citizens through five main pillars: (i) Integrated and Smart City, (ii) Environmentally Proactive City, (iii) Innovative and Prosperous City, (iv) Young and Equal City and (v) United and Proud City (100RC & GAM, 2017). With these pillars as a start, and the Amman Climate Action Plan of 2019, urban justice can be achieved through providing evidence-based urban trends, as well as identifying and prioritizing urban actions to be implemented (GAM, 2019b).

Why do neighborhoods matter? Accessibility to services, public transportation and green spaces within your radius is essential for reducing the need for private vehicles, increasing quality of life, as well as adapting to crises, such as COVID-19 and the ensuing lockdown in Jordan. Nevertheless, the current focus is still from an ableist, male gaze, one which excludes most from equal opportunities. Rather, employing an intersectional focus through integrating women, children, people with disabilities, as well as refugees into neighborhood and mobility planning will benefit all parts of the society. As climate change and urban sprawl are challenging mobility justice more and more, this study shows an alternative approach, learning from the experiences of COVID-19 to recommend enhanced and resilient solutions.

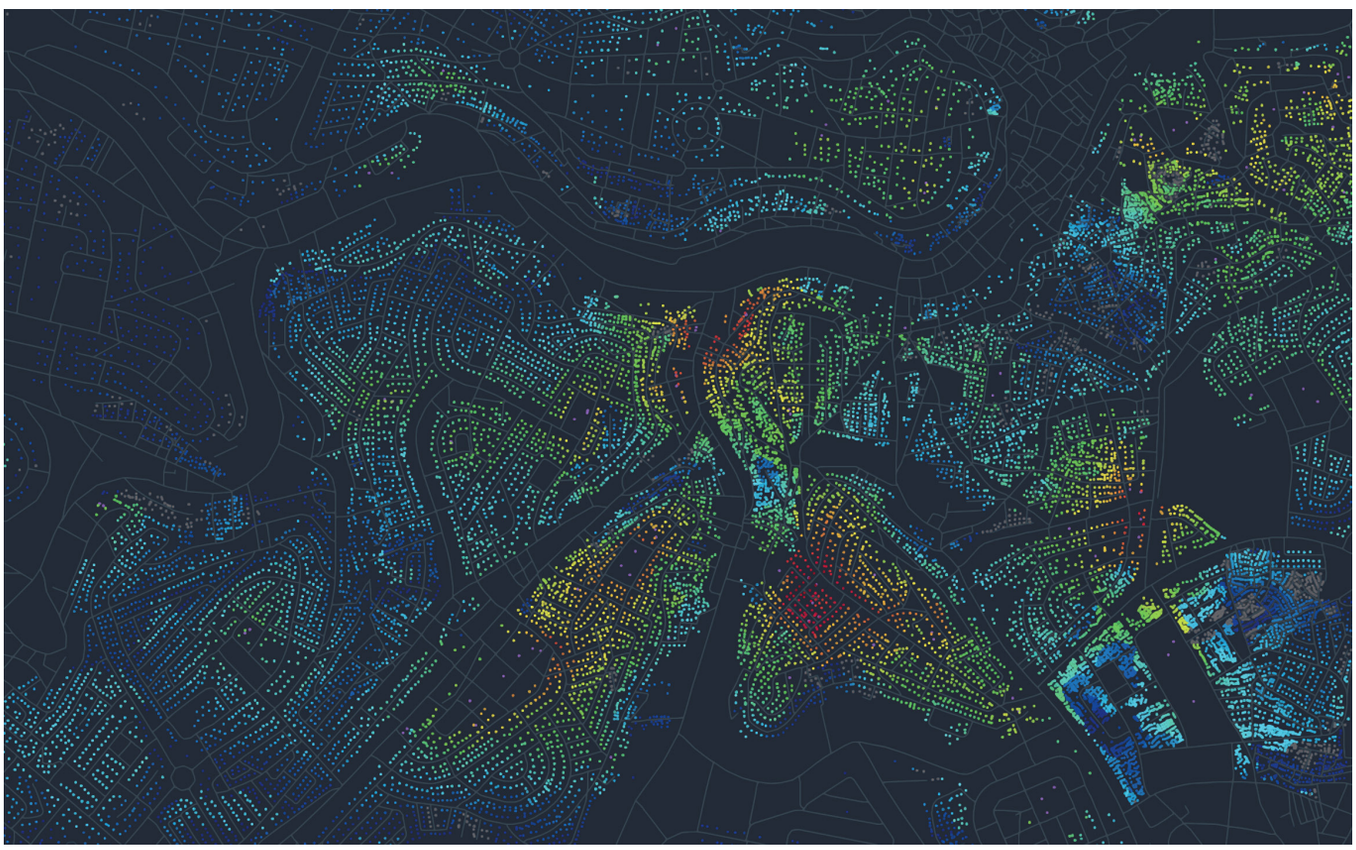
7.1 Urban Network Analysis

During the period of Covid-19 lockdown from March to May of 2020, our main concern was analyzing the existing mobility trends in the selected sites. The biggest challenge was producing a methodology to scientifically develop accessibility maps through the Geographic Information System (GIS), then enhancing their accuracy by factoring topography into the tool itself.

The maps were created using a toolkit developed by the City Form Lab for Urban Network Analysis (UNA). This ArcGIS toolbox can be used to compute five types of graph analysis measures on spatial networks: Reach; Gravity; Betweenness; Closeness; and Straightness. Redundancy tools also calculate the Redundancy Index, Redundant Paths, and the Way-finding Index (City Form Lab, 2016).

The gravity type index captures both the attraction of the destinations, as well as the spatial impediments of the travel required to reach those destinations in a combined measure of accessibility.

To explain this further, consider two homes nearby a grocery store. The first home is located 200 meters away, while the second home is 100 meters away from the store. Even though both homes have the same number of destinations available (one store) and the destinations are identical in weight, the gravity index would consider the closer home to be more accessible than the further home. In our analysis, we focused on the gravity index, and developed five gravity maps for the selected sites with a radius of 600 meters, wherein the different transportation lines acted as the destination points.



● : *High Reachability*
● : *Low Reachability*

Figure 3: Gravity Map showing reachability to grocery shops in three different neighborhood, developed using UNA

7.2 Areas of Study

Five locations were selected in five different neighborhoods to act as a catalyst for future research about mobility in Amman and how it is affected by urban mobility trends. Students from the UoJ were grouped and given these locations to analyze and explore all of their social and physical aspects, under the project team's supervision. After introducing all five neighborhoods, the three most relevant are analyzed in-depth in Chapter 4. As you can see in Figure (4), the five locations are as follows: Al Waha Circle, Al Khaznah (Mashagel Circle), Zahran Area (Abdoun Bridge), Abdoun Corridor and Al Hashmi Al Shimali (Al Mahatta). These sites were carefully selected out of 15 according to their population density, socio-economic trends, land-use, reachability to urban services, public spaces, mobility networks, and topography.

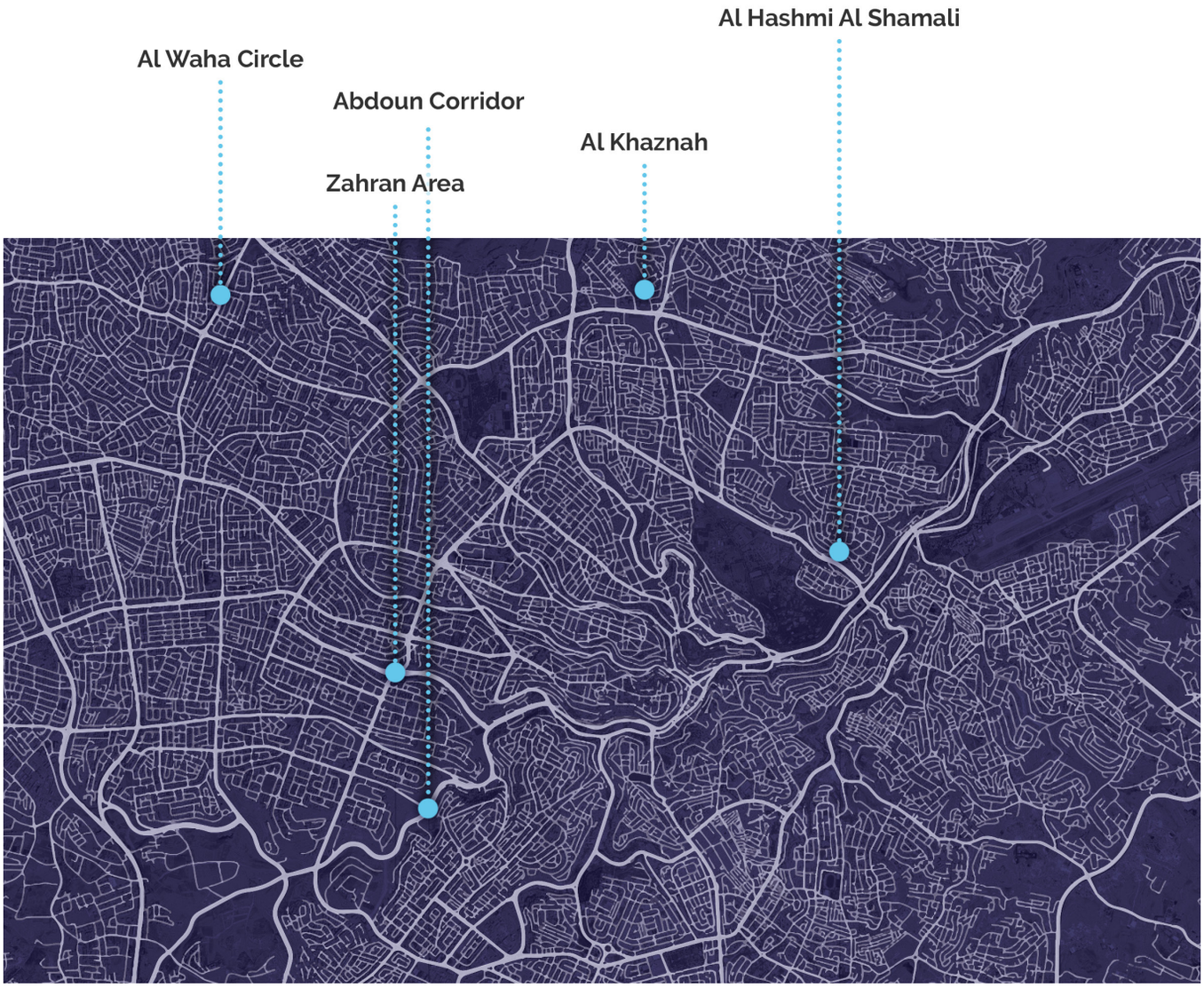


Figure 4: Areas of Study

Population Density

Based on the 2015 census of Jordan, a density map was developed for all neighborhoods in Amman, including the net area of all buildings. The population density is shown per Donum (1,000m²)

The five selected areas lie within the four different density categories: light blue for low density (Zahran Area/Abdoun Bridge and Abdoun Corridor); light purple for average density (Al Waha Circle); dark purple for medium density (AlKahzneh/Mashagel Circle); and pink for high density (Hashmi al Shimali/ Mahatta).

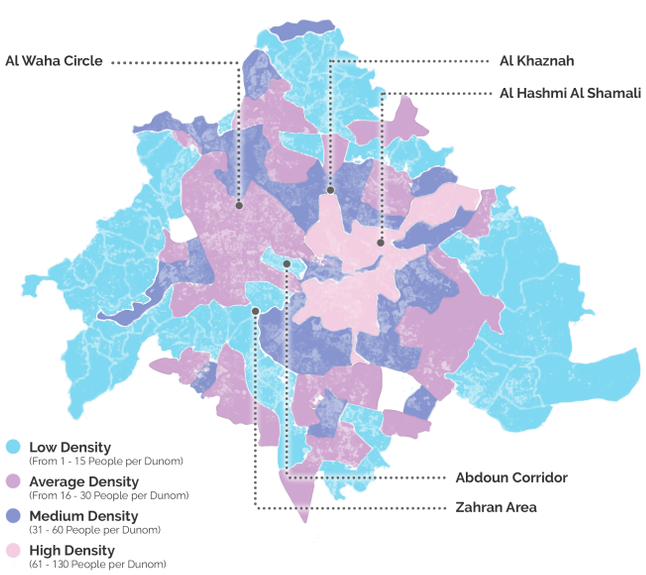


Figure 5: Density distribution in Greater Amman Borders, Source: Institutional Performance and City's Response to Covid19 Report, GAM 2020

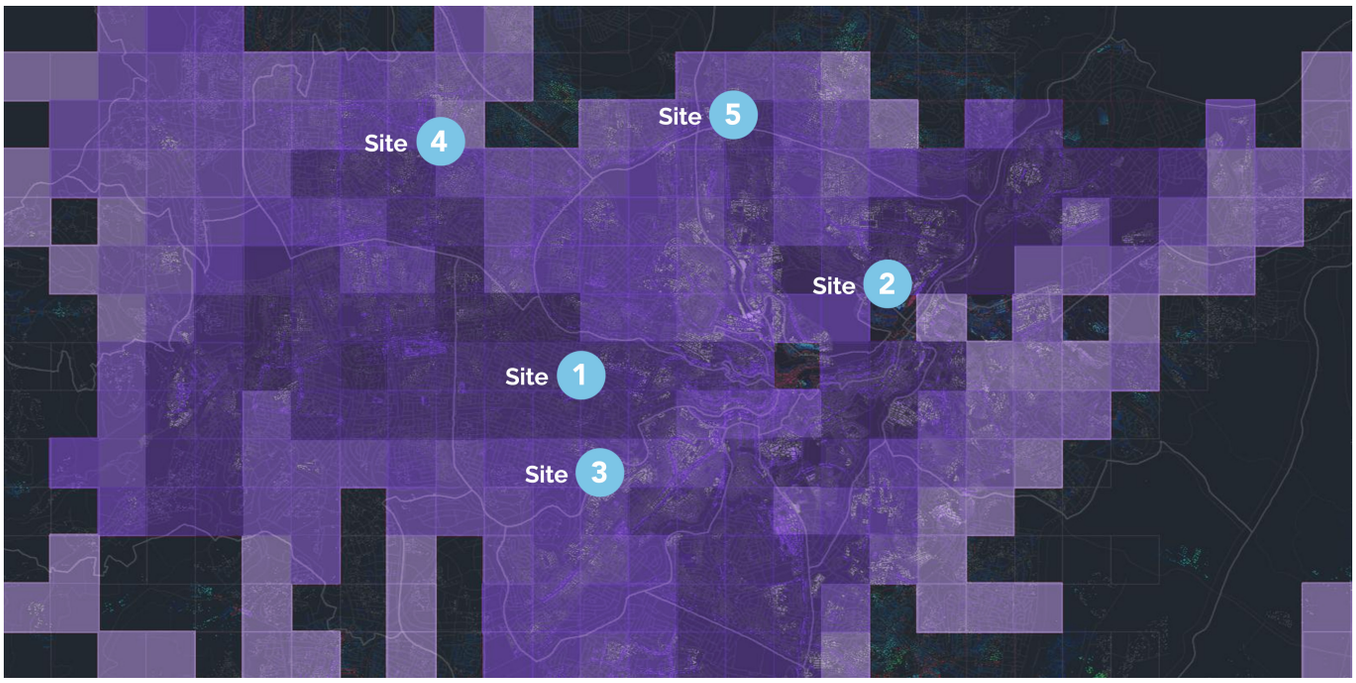


Figure 6: shows the population density per kilometer across the city and through the selected sites.
Source: Greater than Parts / Maps: Comprehensive Climate Plans
Amman, Jordan

Urban Network

Modes of transportation and road hierarchy are also factors for selecting the study areas, as some areas lack any network, while others are highly dense. For example, to the right are the five locations cross-referenced with the existing network, reachability, and density based on the 2015 census.

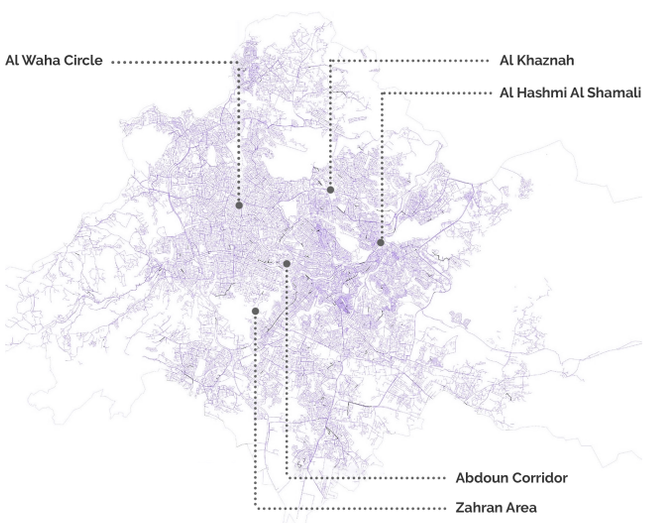
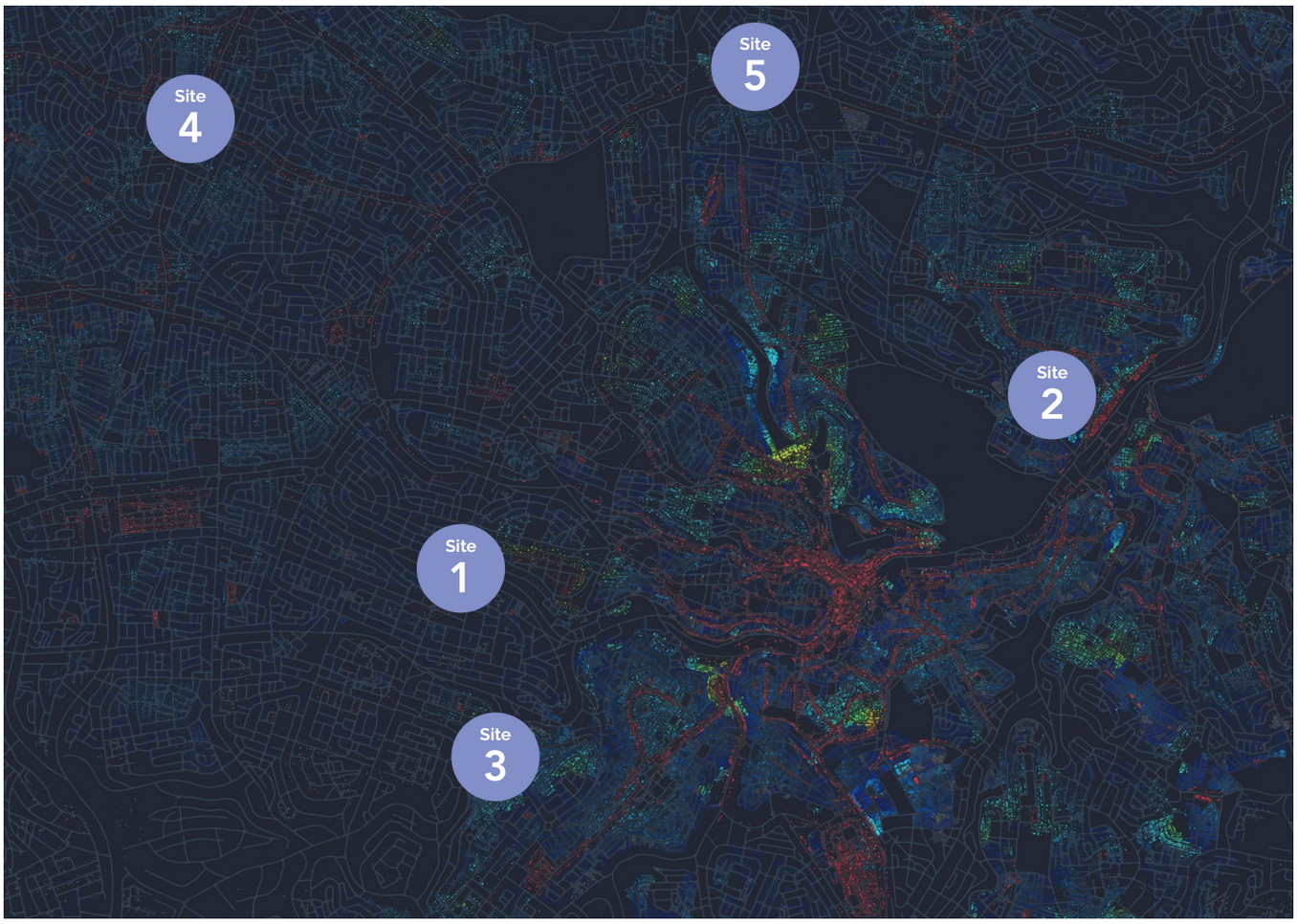


Figure 7: Infrastructure Network, Shows the overall network density in the city of Amman. Source: GIS / Department at GAM

Reachability to Urban Services

During the lockdown between March and May of 2020, the need to establish a comprehensive reachability map for the city became imperative. By utilizing the UNA toolkit, GAM constructed an image that demonstrated the reachability from neighborhoods to critical urban services on foot within a radius of 600 meters.

This gravity map indicates the gaps between our study areas in relation to density and existing network. We will identify the necessary actions during the in-depth analysis later.



● : *High Reachability*
● : *Low Reachability*

Figure 8: Shows the the reachability maps for the selected sites in Amman. Source: GIS / Department at GAM

Study Area 1

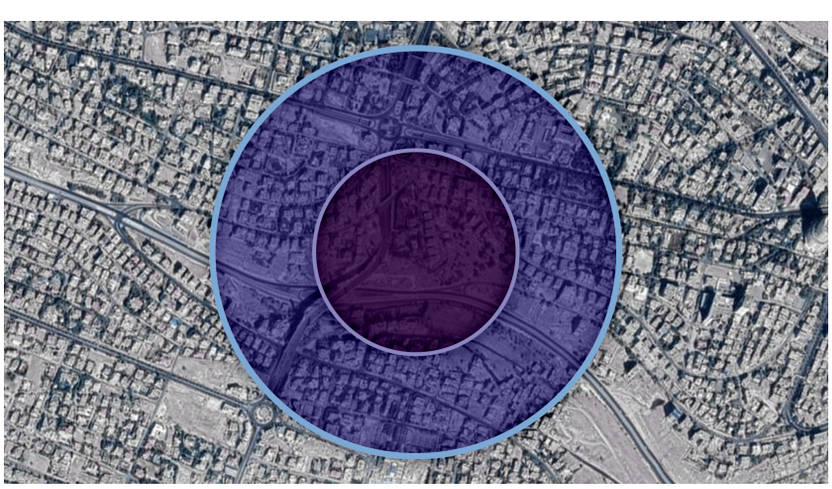
The first study area is located under Abdoun Bridge. The aim is to investigate the inhabitants' reachability to all modes of transportation, as this area is the center of the city's diplomatic institutions. The Prince Ghazi bin Muhammad Square is officially named after the personal representative and special advisor to His Majesty King Abdullah II Bin Al Hussein. Prince Ghazi is also in charge of the Al-Bayt Foundation for Islamic Thought.

Goals and Objectives:

- Improve public transportation
- Enhance walkability
- Preserve its urban identity

Challenges:

- The BRT does not pass directly through the site
- The area is known for its political gatherings and mass protests
- Frequency of public transport is erratic



Study Area 2

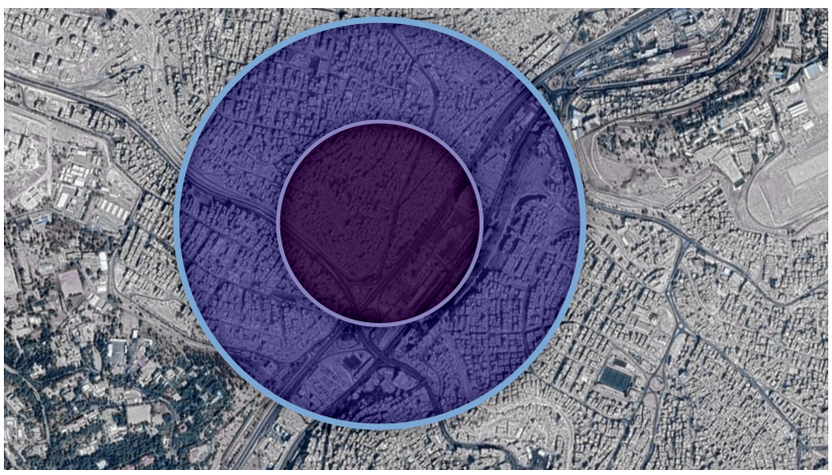
The second study area is located around the Mahatta Terminal in Al Hashmi Al Shamali. The aim is to investigate the inhabitants' reachability to all modes of transportation, as it is a main transportation hub. This area suffers tremendously from the lack of proper urban infrastructure, and most of its communities suffer from poverty.

Goals and Objectives:

- Enhance infrastructure
- Enhance social cohesion and security
- Enhance green and open spaces

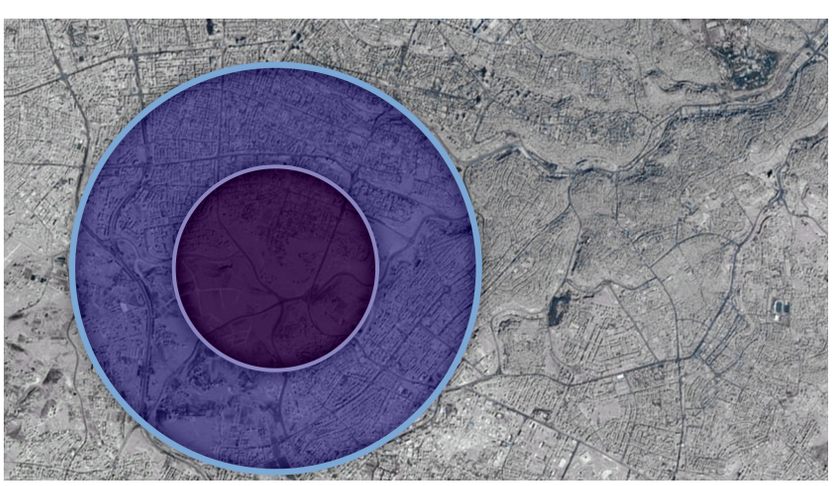
Challenges:

- High population density
- Gender-based struggles
- Poverty and unemployment
- Lack of urban safety



Study Area 3

The third study area is located near Abdoun Corridor. The aim is to provide insight to potential urban services and network solutions, as this area is devoid of people and services. A proper masterplan for bus stops can also be generated.



Goals and Objectives:

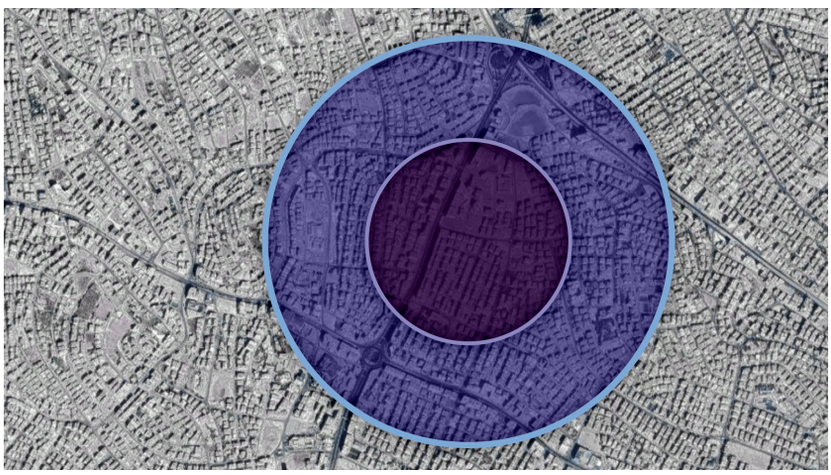
- Enhance investments for development
- Propose a cycling lane
- Propose a master plan for cutting-edge bus stops

Challenges:

- Connection to the future BRT development
- Connection between two different social classes in the area
- Attract investments for urban development

Study Area 4

The fourth study area is located around Al Waha Circle. Highly dynamic and busy, several food services are located there, and it is a popular destination for many UoJ students. This location's importance stems from its high density and high urban development. As such, it can be a catalyst for future urban developments for the city.



Goals and Objectives:

- Generate a development module for future locations
- Enhance walkability
- Enhance public spaces and urban safety

Challenges:

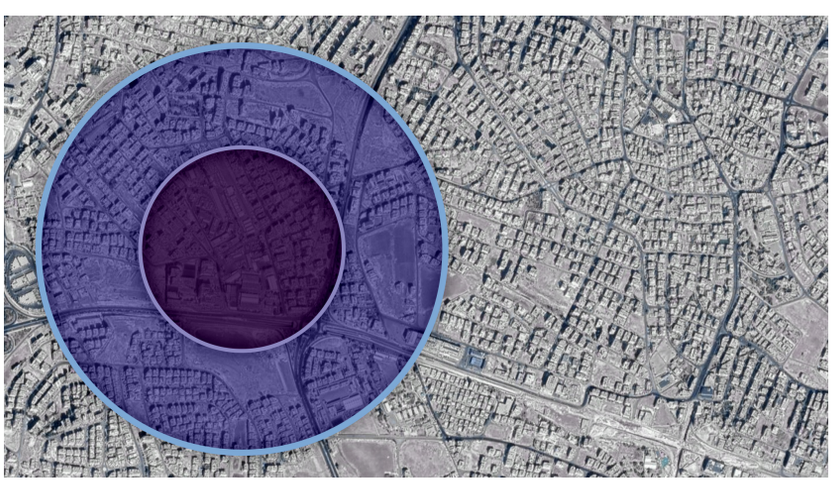
- Highly congested area
- Lack of parking areas
- Waste management and loading/unloading issues

Study Area 5

The fifth study area is located between Al Mashagel Circle and the North Terminal. The aim is to investigate the relationship between the BRT and existing urban services, and propose new developments for the study area that will have a positive economic impact and enhance the public space.

Goals and Objectives:

- Propose a comprehensive urban transportation development policy
- Enhance urban safety and gender justice
- Promote social entrepreneurship hubs



Challenges:

- Lack of investments
- Various major city connections (Zarqa,North Terminal, Urdon Ring Road)
- Air pollution due to construction

7.3 Why Do We Need to Integrate 'Her' Into Mobility?

This publication is built on the synergy between urban evidence and gender-based urban research. This research is based in a context where some areas of the city suffer from a lack of urban services and reachability, which affects all citizens of the city, not just women. Nevertheless, these effects discriminate against certain groups more than others. Though the project name denotes the focus on women, other marginalized groups residing in the city also are included (e.g. refugees, people with a disability, the youth, and senior citizens). Sustainable mobility cannot be sustainable if it is not accessible and fair for all. Having public transportation that is unsafe, inaccessible, and unaffordable will not lead to social justice, nor reduce GHG emissions, nor enhance air quality.

In case you would like to read more about the mobility transition, please find the following regional overview "Mobility Transition in the MENA Region" (Attari et al., 2020). In general, the mobility transition aims to shift the focus from private motorized vehicles and reduce the need of motorized transportation by changing land-use and increasing active mobility, such as walking, cycling and escooters. In doing so, the focus will instead shift to public transportation and improved vehicle technologies (e.g. using electric and alternative fuels for the remaining transportation needs). Furthermore, there is an inherent connection between the lack of public transport infrastructure and a lack of gender justice for women attempting to navigate public spaces. In Sub-Saharan African cities, for example, inadequate planning, rapid urbanization, and deteriorated transport infrastructure and services have negatively impacted urban mobility (Sietchiping, Permezel, & Ngomsi, 2012). Moreover, findings show that women in particular suffer more from inadequate planning and transportation availability. Similarly, in Karachi, Pakistan, for example, the lack of systemized public transportation and the poor quality of the existing system increased the social exclusion of women, and thus is considered a burden on local women's freedom (Iqbal, 2019). Furthermore, Iqbal (2019) stresses that while men may benefit from exclusive alternative modes of transportation, such as bicycles and motorcycles, women's exclusion from them increases their dependency on men. This supports the idea that women are uniquely deprived of their agency due to societal gender disparity, which has a substantial impact on their opportunities (Ibid.). Thus, the lack of proper transportation and urban planning, including an intersectional understanding, sustains and worsens gender stereotypes and women's dependency on men.

Safe active transportation for other groups of marginalized users, such as the elderly, has also been explored in the literature in general, as well as from a gender perspective in particular (O'Hern & Oxley, 2015; Pelclová, Frömel, & Cuberek, 2013). This was done through understanding travel patterns and transportation requirements, such as travel needs, destinations and time of travel for these specific groups. Attempts were then made to provide alternatives that meet these requirements and increase safe active mobility as part of enhanced urban environments. According to the studies, gender differences for meeting walkability requirements in an active transportation approach indicate that there are gender-specific associations between transportation-related walking and the constructed environment that could effectively promote active transportation. Moreover, studies have used technologically advanced methods, such as virtual street audits, to understanding walkability between different gender and age groups. In this regard, the research indicated that routes selected by women, for example, tend to be shorter and scored high on pavement width and obstructions, pavement surface quality, personal security, and environmental quality (Brookfield & Tilley, 2016). Thus, infrastructure must become more inclusive and be prepared to serve all parts of society. Creating accessible sidewalks, transportation systems, and public spaces in general is crucial to create a higher network of users for public transportation.

Lastly, on a philosophical note, transportation has also been explored as a manifestation of one's right to the city and urban citizenship. However, according to various studies, gender and diversity in transportation, which is a key factor in urban development, remains largely overlooked, and the emphasis often prioritizes economic and environmental aspects (Levy, 2013). Moreover, the ongoing feminist critique on gender-blind transportation and the resulting "women in transportation"

literature (or, more particularly, "gender in daily mobility" literature) over the past few decades has also suggested incorporating these topics within a larger theoretical project that looks at the social and cultural geographies of mobility. In doing so, future literature on the topic must be based on a more systematic treatment of gender as a theoretical concept (Law, 1999).

Shifting the focus to Jordan, gender differences in travel behavior has hardly been explored. Yet, findings highlight that there are significant differences between travel patterns. Men tend to drive cars more, spend more time traveling, and participate more in the workforce than women do, while women have to take more complex routes during their daily travels (Aloul, Naffa & Mansour, 2018). Interestingly enough, as one study notes, although demographics and socioeconomic factors have an effect on the diversity of daily activity patterns, these variables are insufficient for explaining the resulting gender disparities (Elias & Shiftan, 2014). The study by FES and SADAQA on gender and public transportation is a crucial baseline study for the purposes of this paper (Aloul, Naffa & Mansour, 2018). The interconnection between gender injustice and lack of access to public transportation must be addressed to include Jordanian women in the workforce and increase their freedom of mobility.

In 2014, transportation was responsible for approximately 20.5% of CO_2 emissions globally and 29.2% in Jordan. The growth rate for private vehicle ownership from 2009 to 2016 was 6.54%, the second highest globally, followed only by Turkey (Jordan Strategy Forum, 2018). By increasing Amman's walkability, and later, that of all of Jordan, as well as improving bus stops and the "last mile," this pilot project hopes to encourage Jordanians to use private vehicles less, use accessible and affordable public transportation more, decrease CO_2 emissions, improve spatial stress, and become more inclusive.

8.1 Theme One: Urban Mobility Through Politics

According to an article entitled "Why Amman's public space stops at 4th Circle" (Hiari, 2012), the 4th Circle at the heart of the political district is fenced off, which came as a result of an open sit-in protest. This sort of construction marks an anti-urban approach by which the city of Amman silences its population through urban design.

Hiari also notes that the Prime Ministry overlooks the roundabout and keeps a watchful eye over the space. This ambiance ruins the hospitality of this once public space, reduces civic engagement, and, by extension, reduces citizens' chances to voice their concerns, thereby leading to selective misrepresentation.

The scarcity of public spaces where people can meet, greet, or simply acknowledge the presence of one another in this politically charged area minimalizes the opportunity for social interaction and restricts access to the area's public space.

The current conditions of this area are physically and aesthetically pleasing, yet the freedom to express political views was hampered by limiting access to the 4th Circle. What once was an area for assembly is now just a congested roundabout.

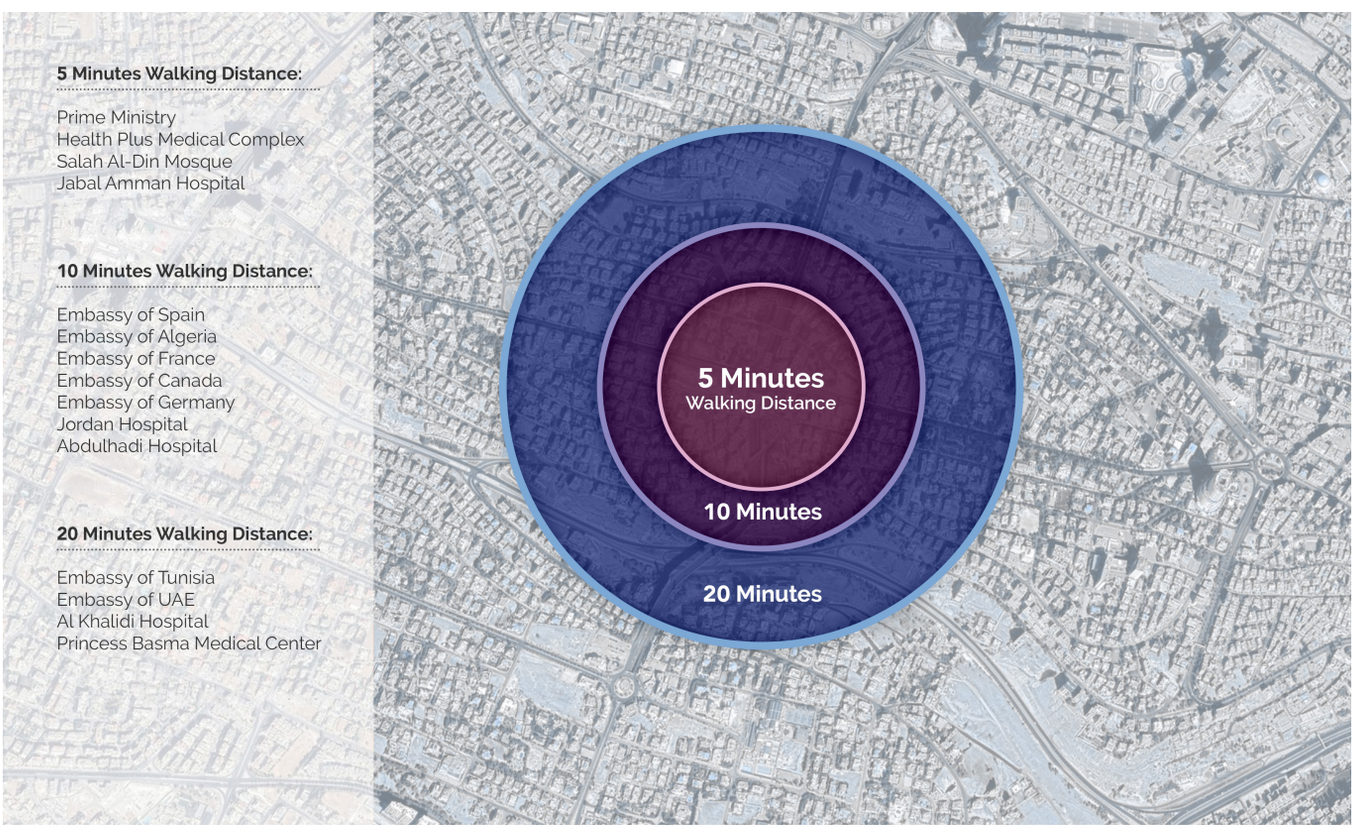


Figure 9: In-depth analysis of Study Area 1

In most cases of political protest, protesters and policing units often confront one another in the streets. These confrontations either escalate to violence and property damage, or the tension is deflated (Schwedler, 2012). When considering the events of the Arab Spring, which had a significant impact on the political landscape in Arab countries like Jordan, Schwedler argues that we need to consider the

longer history of protest to help us understand what is happening at the present moment and provide insight into what may happen in the future.

With regards to physical space in the study area and how its modifications throughout history affect protest, one interviewee in Schwedler's report stated, "You know, we can't even protest here anymore." He added, "There are all of these high-speed underpasses and overpasses, and the cars go flying by, and we can't stop traffic anymore here. So, we have to protest somewhere else." Other central areas across the city are carefully policed or undesirable due to heavy traffic, high building density, or land-use type. Thus, pushing protests from the political city center towards the outskirts of the city became a spatial question. This relocation had the definitive impact of making protests less seen, less disruptive, and thus, less effective.

The concept of "civitas," where the city acts as a "space of active democratic citizenship" and "full-human realization" according to Knudsen and Clark (2013), is predicated on there being an open and free space to encounter and exchange differences. In their research, they examine how many local urban contexts uphold and sustain Social Movement Organizations (SMOs) by considering four main parameters: density, connectivity, housing age diversity, and walking.

They argue that one's unique experience in cities, as well as how individuals interact with and make use of urban neighborhoods, environments, and spaces, relates to the urban phenomenon of SMOs. Moreover, they emphasize that the physical accessibility characteristics of dense, diverse, and walkable cities enable social accessibility to a variety of ideas, actions, and events. Kundsen and Clark claim that an encounter with difference is fundamental to the orientation of many modern-day SMOs.

8.2 Theme Two: Urban Poverty and Mobility

Since the 1980s and 1990s, poverty is increasingly concentrated in urban settlements. As such, economic crises and structural adjustment policies continue to have a considerable impact on the urban poor, whether due to rising prices, declining wages, redundancy in the labor market, or reduced public expenditure on basic services and infrastructure. Moreover, as a result of rapid urbanization, the number of urbanites in poverty will most likely grow at a faster rate (Wratten, 1995).

According to Wratten, in today's undisputed global demographic shift to urban areas, predictions about the urbanization of poverty are based on assumptions on the definition of urban areas, the nature of poverty, and our capacity to measure it. Interestingly, her research arrives at two principal ways for defining urban poverty: conventional definitions using income or other social indicators as an approximation for welfare; and participatory definitions allowing for flexibility in local perceptions of urban poverty. The latter approach views poverty in non-materialistic as well as physical terms, which is closer to the views of this study on the matter. The advantage of these kinds of anthropological approaches to poverty measurement is that they recognize diverse perceptions of poverty and formulate an understanding of its many dimensions particularly disadvantaged groups. As such, this approach aligns most closely with this study's goals with regards to gender.

This type of analysis is extremely important for designing "enabling" strategies that, as Wratten argues, help to overcome the structural constraints to the economic, social and political participation of the urban poor (1995). In order to "help the poor to help themselves," she states that we need to understand the nature of entitlements and vulnerability.

As also demonstrated by our research study case, the burden of reduced mobility is borne disproportionately by women in poor households, such as those in Nairobi, Kenya. Salon and Gulyani (2010) show that women in poor populations face distinct barriers to access. Their research concludes

that a policy aimed at improving mobility and transportation access for the poor must grapple not only with the crucial issue of affordability, but also with specific constraints faced by women.

They highlight that mobility-constraints faced by poor women are not only related to affordability. Rather childcare and household responsibilities also impinge on mobility. Moreover, and as shown in this study, they conclude that enhancing mobility among the urban poor deserves special attention on a multi-level policy. In this regard, mobility issues should also be presented in ways that consider the unique needs and specific challenges each user group faces, rather than looking at the urban poor as a monolithic group.

In their study addressing the gender gap and mobility, Gauvin et al (2020) found that women visit fewer unique locations than men and distribute their time less equally among such locations. Mapping this mobility gap over administrative divisions, they observed that a wider gap is associated with lower income and lack of transportation options. Their results uncovered a complex interplay between gendered mobility patterns, socio-economic factors, and urban affordances. As with almost all literature discussed in this study, they call for further research to provide insight for policy-makers and urban planners.

They also argue that cities are not designed as gender-neutral. Considering daily mobility for example: the typical travel experience between a man and a woman differs greatly. Factors such as insecurity and fear of physical/sexual violence in public spaces and while using transportation are key factors that limit women's everyday movement. The poor location of bus stops and inadequate lighting therein may also lead to similar results. This highlights the fact that women and girls engage in more multi-purpose, multistop trip patterns ("trip changing") to do household chores, as well as perform other various tasks. Moreover, they add, women-headed households are often more prominent in urban settings. The women in said households tend to work more in low-paid or informal jobs than men and have limited access to transportation subsidies.

Moreover, they emphasize that, although urbanization offers many possibilities to reduce gender gaps, it can also increase inequality. This could happen, for example, through increasing geographic segregation, especially in developing countries like Jordan. As mobility is a critical factor in reducing such segregation, investigating the role of gender in urban mobility is crucial to better understand whether women and girls can fully benefit from opportunities offered by cities and realize their human rights in the process.

8.3 Theme Three: A Tactical Approach to Upgrading Urban Mobility

Today, urban transportation is attracting increasing interest, and numerous innovative and advanced solutions are constantly proposed. However, the implementation of such solutions remains mired in many uncertainties, such as future supply and demand, consequences of urbanization on transportation, and each stakeholder group's responses to transportation decision-making. According to Marchau, Walker, and Duin (2008), in order to deal with such uncertainties, a flexible policy allowing for adaptations over time is necessary, as knowledge about urban transportation will accumulate over time, and critical events during the implementation of suggested solutions will likely occur.

In the urban mobility system, we can distinguish three different levels of planning and control with different organizational requirements and functional roles: the strategic level, where the political objectives of the system are defined as an answer to the stakeholders; the tactical level, where the previous objectives are translated into operational specifications; and the operational level, where transportation and contact with the consumer effectively take place. Macário (2000) argues that upgrading urban mobility quality can occur at any of these levels.

Small-scale interventions have been utilized in longer-term strategies and have large-scale impacts on transportation projects. The Sustainable Urban Mobility Plan (SUMP) of Aberdeen, UK, for example, encouraged more walking and cycling in the city center by suggesting minor changes, such as improving signage, reducing speed limits, and granting possible exemptions to cyclists from oneway streets and from other access restrictions where possible, while also maintaining safety.

In line with what this study promotes, the SUMP was implemented by the local authority and partners to enable and encourage residents and visitors to travel around the area on foot, bike, public transportation, and other low-emission forms of transportation instead of less clean alternatives (Aberdeen City Council, 2019).

Small-scale interventions within a mobility and transportation context have also had positive impacts on the environment, economy, society, and sustainability goals in general (Barmpas, Kopsacheilis, & Politis, 2017).

In more recent work, tactical urban mobility has been considered a crisis management tool, especially in light of the Covid-19 pandemic. According to the Transformative Urban Mobility Initiative (TUMI), tactical urbanism is identified as an approach to community building using short-term, low-cost, and scalable projects for inciting long-term change (Lydon & StreetPlans, 2020).

Similarly, Barata and Fontes (2017) look at the potential of tactical urbanism in promoting active transportation, which they argue coincides with the idea of sustainable urban mobility. Through this method, cities can promote human-powered means of transportation, such as walking and cycling. In doing so, other opportunities for transforming the urban space of contemporary cities may emerge through initiatives that promote, protect, and incentivize pedestrians and cyclists, thereby ultimately reducing the importance and reliance on motorized vehicles.

Recent tactical urban mobility initiatives and the ways in which they were developed through public policies demonstrate the role of small-scale actions in promoting and incentivizing a more active, healthy, sustainable, and responsive urban way of life.

8.4 Theme Four: Urban Mobility for Improved Livability and Livelihood

Connections between mobility and key urban indicators such as infrastructure, facilities, population distribution, jobs, and services have been proven time and time again. Cities with strong hierarchical mobility structures witness an extensive use of public transportation, higher levels of walkability, lower pollutant emissions per capita, and better health indicators, all of which further contributes to improved health, livability, and sustainability (Bassolas et al., 2019). A new, cooperative public infrastructure relationship between transportation and cities requires balancing economic productivity and community place-making through improving neighborhood quality and land value, a task that has long been overdue (Cervero, 2009).

Ravazzoli (2017), for example, argues that, although long ignored in the urban planning discourse, the relationship between public space and urban mobility has the potential to create livable cities. In her research, she stresses that the use of public space for pedestrians and cyclists greatly contributes to economic, environmental, and social sustainability. Hence, together with economic, ecological and social indicators, public space and urban mobility also constitute relevant urban elements when measuring a city's sustainability performance. Her research suggests a set of public space and soft mobility measures that can be integrated into an already existing set of indicators commonly used to measure urban sustainability. Moreover, her research contributes to the debate on the need for more investment in public spaces, while at the same time suggesting that planners and policy-makers

must develop international measures for evaluating urban mobility and public space sustainability, a conclusion which this research has also reached.

The connection between urban mobility and improved livelihood has also been attested in numerous contexts, some of which closely resemble that of our own study (Bryceson et al., 2003; Katherine V. Gough et al., 2015). Owusu, Agyei-Mensah, and Lund (2008), for example, emphasize that livelihood strategies related to mobility in particular have not been extensively examined within lower-income areas in urban contexts. Even when mobility and livelihood issues have been explored, the emphasis has been on the position of the poor relative to higher income groups. They argue that this situation largely stems from the view that the poor lack the resources to engage in livelihood strategies related to mobility. In this model, they stress that poorer areas and population groups become further marginalized in the new global economy and are thus negatively affected in terms of livelihood development and mobility. These results are similar to what this research noticed, but for more marginalized groups such as women, children, the elderly, and people with disabilities.

Similar to this study, Mandel (2004) examines the importance of mobility in creating profitable livelihood strategies for women. He also focused on the type of activities in which women are engaged to consider the ways in which socio-economic settings differentially shape women's mobility. Similar to what this research aims to achieve, her research contributes to feminist scholarship by examining the spatialities of socioeconomic processes in creating women's livelihood strategies.

The mobility of residents is either aided or hindered by a country's transportation system, and this in turn influences their livelihood strategies and income-generating activities. Accordingly, new alternative mobility paradigms that consider and build upon insights from the specific contexts must always be explored. In doing so, Esson et al. (2016) suggest a holistic approach that considers the intersections of urban transportation, mobility, and livelihood. This should be done through a process-oriented lens that enables one to examine the "interrelationships of movement of people, objects, capital and ideas in and through the overlapping scales of the local, the body, the national and the global." Thus, the approach will allow the city to be imagined as "a mobile network whole—messy, moving and morphing—rather than as compartmentalized sections."

8.5 Theme Five: The Future of Urban Mobility

As part of the research conducted in collaboration with the International Association of Public Transport (UITP from the French: L'Union Internationale des Transports Publics), urban mobility is one of the toughest challenges that cities face today, as existing mobility systems are close to breaking down. The world's population is increasingly becoming urban, and the majority of travel is done within urban environments. Thus, realizing urban mobility to cope with this increasing demand will require massive investment in the very near future. In addition to the increasing demand for urban mobility, mobility needs are also evolving. Changing travel habits, demand for more convenient, faster, and more predictable services, as well as evolving customer expectations toward individualization and sustainability will require an expanded mobility services portfolio. It will also require a business model transformation, as specialized players from other sectors assess opportunities to play a role in the expanded mobility ecosystem. Moreover, to meet said demands, public transportation stakeholders are working hard to improve the attractiveness, capacity, and efficiency of mobility systems, despite the growing limitations in public financing, which highlights the need for system-level innovation (Van Audenhove, Koriichuk, Dauby, & Pourbarx, 2014).

Similarly, Gakenheimer also argues that mobility and accessibility are rapidly declining in most of the developing world, whether due to the rapid pace of motorization, local demand that far exceeds the capacity of facilities, incompatibility of the urban structure with increased motorization, need for a

stronger relationship between transportation and land-use, lack of adequate road maintenance, or limited consensus among responsible officials as to appropriate approaches to the problem.

In his research, he demonstrates that developing countries have shown significant leadership in vehicle use restrictions, new technologies, privatization, transit management, transit service innovation, transportation pricing, and other actions. He also emphasized that continued progress in solving the mobility problem in developing cities should focus on: (a) highway building, which will hopefully be used as an opportunity to rationalize access, (b) public transport management improvements, (c) pricing improvements, (d) traffic management, and (e) possibly rapid rail transit based on new revenue techniques.

In thinking about the future of urban mobility, more collaborative and participatory approaches must be considered in ways that ensure the involvement of local communities in the decision-making process. In the case of Loukopoulos and Shcolz (2004), citizen preferences on sustainable future urban mobility were assessed through a negotiation method. Their results demonstrated that all stakeholder groups were aware of the importance of environmental factors and gave these factors greater weight than economic factors. Moreover, their discussions focused more upon issues related to policy analysis and process, as well as strategic planning that included stakeholders (e.g. how the method can support and meaningfully engage citizens in strategic planning).

According to Wegener (2013), one of the many challenges facing the future of mobility in cities is the dependency on abundant and cheap energy that allows people to travel more but pay less. However, this trend will soon disappear due to finite fossil fuel reserves and high costs of alternative vehicles and fuels. As a result, and despite technological innovation, this will lead to increased transportation costs.

Improved future urban mobility will have a significant impact on environmental sustainability and limiting the effects of global warming. This is especially the case since greenhouse gas emissions have continued to grow and transportation is a major contributor thereto (Wegener, 2013). Additionally, the harmful effects of traffic noise on sound environment must also be considered (Can et al., 2020).

The study shows that we need to dive into mobility and urban studies from an academic and institutional perspective to improve mobility planning, urban land use, and city access. By incorporating an intersectional lens and considering the privileges and discrimination within the city (e.g. gender, walkability, and the "first and last mile"), these issues are examined in a new light, in which the focus shifts from simply providing public transportation to crafting an inclusive and comprehensive mobility plan. This includes improving infrastructure leading to public transportation, such as walkways, lighting, bus stations, as well as improving public transportation itself. The analysis has focused on the main aspects of accessibility, availability, affordability, reliability, and safety. By highlighting mobility through the different case studies, Amman's mobility is seen through different "eyes:" through the eyes of poverty, politics, development, adaptation, and urban complexity. Participatory processes including researchers, civil society, students, and the GAM as an institution prove to be valuable for such analysis.

Before presenting the conclusions, it is crucial to state again that this was a multi-stakeholder process based on an internal report by Dr. Deyala Tarawneh and Ronja Schiffer presented at the "Women and Transport in Africa" Conference in Addis Adaba in December 2019. The report, entitled "Mobility for Her," included the initial analysis for this study that identified the main areas of attention and approach. It was created in collaboration with urban design students through their in-class work and experiments to highlight how the lack of walking infrastructure hinders women and people with disabilities from using public transportation. After sourcing and utilizing the data, this present study applied the results for mobility planning and analyzed the effects of limited mobility on other societal aspects, such as political participation, access to resources, sustainable development, and adaptation to urban complexity.

The recommendations mentioned here speak first and foremost to multi-stakeholder approaches and cooperation between governmental institutions (such as the GAM), private entities (such as the BRT operators), international agencies (such as FES, the AFD, and EBRD), academic institutions (such as the UoJ), and civil society.

Using active mobility and public transportation should not only be the choice of transportation due to minimal resources, but rather because they are simple, accessible, safe, sustainable and affordable. Instead of relying on captive users, these forms of transportation should also become more common for higher classes of society. Sustainable mobility cannot be sustainable if it is not inclusive. As such, inclusive, sustainable mobility can further increase social justice by reducing class differences, and creating a welcoming and safe public space for all. This will also reduce emissions and air pollution and make cities more livable.

9.1 The Amman Green City Action Plan: A Vision for Intersectional and Sustainable Mobility?

The Amman Green City Action Plan (GCAP) is a policy vision for Amman's emissions to become net-zero by 2050. This is an ambitious and necessary strategy to increase the city's resilience, decrease emissions, and improve livelihoods. The GCAP was published in 2018 in cooperation with the World Bank Group and GAM. It aims to "transform the city of Amman to become a sustainable, green, and livable city that works efficiently to preserve its resources for future generations." As this study strives to practically improve the lives of Amman's residents, we analyze the current recommendations and give explicit modifications to make these recommendations and plans intersectional and inclusive. This builds directly on the five interconnected themes: mobility through politics; poverty; tactical planning; livelihoods; and future development.

In Figure 10 you can see the recommendations given by the GCAP. To give them a thorough review and modification, we focus on three recommendations from the GCAP and two other necessary recommendations that are currently missing from the GCAP.

Actions for Improving Sustainable Transportation

Activity	Timeframe	Volume of Emissions Reduced	Sustainability Benefits
Plan and construct a Bus Rapid Transit system	• Medium/ 2 Lines Completed	High	Reduced commute times, improved productivity and better air quality
Implement a public transportation awareness plan to change perceptions and behaviour	• Short	Unknown	Awareness raising
Install electric vehicle charging stations around the city	• Short	Unknown	Improved infrastructure
Give preferred treatment for zero/ low emission vehicles, including fast lanes, parking discounts and reduced fees	• Medium/ 2 Lines Completed	Unknown	Reduced costs
Replace GAM-owned fleet vehicles with electric vehicles	• Short	Low	Reduced operating costs for city
Replace 75 percent of taxis with electric taxis	• Short	Medium	Reduced local air pollution
Install bike paths and other bike safety measures	• Short	Unknown	Improved land use, and preserved open space
Promote walkability through installation of new sidewalks and maintenance; improve existing sidewalks; increase green space; and introduce pedestrian safety measures to enhance use	• Short	Unknown	Improved public health, and enhanced livability of the city
Enhance the efficiency of the city bus network using improved fuel specifications	• Short	Low	Reduced local air pollution, and improved public health

Figure 10

9.2 Recommendations for Inclusive and Sustainable Mobility in Amman

The three recommendations to be modified for the sake of inclusivity are as follows:

- **Plan and Construct a Bus Rapid Transit System**
- **Implement a public transportation awareness plan to change perceptions and behavior**
- **Promote walkability through installation of new sidewalks and maintenance; improve existing sidewalks; increase green space; and introduce pedestrian safety measures to enhance use**

Plan and Construct a Bus Rapid Transit System: This recommendation is related to the ongoing BRT System construction in Central Amman that will link to the neighboring city of Zarqa. The BRT System will improve public transportation by providing fast, reliable transportation. However, there is no comprehensive strategy to make it accessible, affordable, secure, and inclusive. As such, certain groups will have more access to this new system than others. Thus, the system will preserve current systems of privilege, power, and poverty instead of improving livelihoods and creating inclusive, sustainable, and intersectional mobility. Without level platforms, people with disabilities and people carrying items like strollers will struggle to access the buses. **Without a "first and last mile" plan** ensuring that the bus can be accessed safely and easily, the buses will reinforce current dynamics of who can access the system and thus participate in politics, the struggle against poverty, and opportunities to improve their livelihood. This plan should also include proper walkway infrastructure, lighting, green spaces and benches. Accordingly, the revised recommendation needs to be amended as follows: **Plan and construct an inclusive and accessible Bus Rapid Transit System with connected infrastructure, accessible stations, safe "first and last mile" connectivity, and affordable plans.** City planners should also take note of other systems in the region, such as that of Marrakech, and learn from their experience to build an inclusive system. Electric transmission, station design, payment plans, and digital solutions, such as real-time traffic planning, need to be integrated from the beginning. This includes **"Creating a sustainable and inclusive strategy for the BRT System's Last Mile and Bus Stop Design and Network."** By integrating accessibility, gender justice, and sustainability principles in the building process, expensive remodeling can be avoided. International examples, such as those from India, are already available and can be applied in feasibility studies of the BRT and its feeder system.

Implement a public transportation awareness plan to change perceptions and behavior: This recommendation is directly related to the high increase in car ownership in Jordan (more than 10% per year). The hope is to counter this trend by providing both high-quality public transportation and conducting awareness-raising plans to enhance the perception of public transportation within the broader public. By improving the perceptions of public transportation, it will shed the stigma surrounding it and become the preferred mode of transportation for everyone, not just "captive riders." For the recommendation to become sustainable and inclusive, it needs to be amended as follows: **Create a public transportation implementation and awareness plan to change perceptions and behavior, as well as prioritize and reward modes of transportation that use public transportation and active/micro-mobility.** This approach would reward public transportation users with easily accessible and affordable walking/bike paths, public transportation routes, etc. Cars would also become less convenient through priority lanes for buses and reduced parking spaces. Nevertheless, the crucial part of this plan is that public transportation be accessible, affordable, reliable, secure, and comfortable. Without a functioning network, poverty and poor access to public space would otherwise be further aggravated. This includes **"Working on awareness programs to change behavior within the society."** An example would be posters with inappropriate behavior and the fines associated with such behavior. Another possibility would be to expand the experiment on a larger scale in schools and universities to create direct awareness in the younger generation.

Promote walkability through the installation of new sidewalks and maintenance; improve existing sidewalks; increase green space; and introduce pedestrian safety measures to enhance use: This recommendation is critical to improving "first and last mile" access to public transportation, as well as neighborhood connectivity for accessing services and moving in non-motorized ways. In Amman, sidewalk infrastructure, cycling paths, and green spaces are insufficient, inaccessible, and unsafe, which negatively impact on access to public spaces and an individual's ability to improve his/her livelihood. The recommendation is missing one crucial aspect, and should be amended as follows: **Enable walkability through the installation of new accessible and level sidewalks; enforce maintenance; remodel existing sidewalks according to building standards; increase green space and play areas in every neighborhood; introduce and enforce pedestrian safety measures; and update Zoning and Building Codes to enforce sidewalk accessibility.** This approach includes taking public ownership of sidewalks. Similarly, a National Code designed by experts that represents all parts of society can result in inclusive planning strategies, improve overall citizen satisfaction, as well as enforcing the standards based on new laws and regulations.

These three recommendations from the GCAP can be adjusted and improved according to our suggestions and thus become intersectional in their implementation. Nevertheless, the actions also lack several other key tools to improve mobility in Amman and other cities. Thus, based on our analysis, the following actions need to be included in any revision of the GCAP.

Establish a Comprehensive and Detailed Digital Database on Mobility, including Data on Walkability and Land Use: This recommendation is related to the need for real-time traffic data and planning. With this reliable data for studying phenomena, we can improve mobility planning and make accurate analyses on current trends among different demographic groups. Understanding the patterns of mobility, needs, and demands of different demographic groups is key to just and sustainable mobility planning, and thereby reduce inequalities instead of worsening them. This includes current accelerated efforts by the GAM to have reliable data on walking needs. By incorporating the universities in the surveying process, the students get hands-on training, and the additional human resources help accomplish the task quicker. Furthermore, it is crucial to **review and update our Street Manual to provide guidance for practitioners** involved in the planning, design, and approval of new streets, including modifications to existing ones. Finally, the database and digital data inflow need to be used to create and **install an Intelligent Transport Systems (ITS)** to improve traffic flows. All of this should **encourage sustainable zoning**, leaving less space for cars and more for public transportation, walking, and cycling. Reducing spatial stress from cars can improve quality of life, as well as reduce CO_2 emissions.

In addition to the data, we must **create and provide a walkability map** that identifies possible walkable routes within the city and neighborhoods. This can also be used to expand walkability through changing and expanding these routes. This recommendation is connected to the lived experience of the complete lockdown in Jordan in 2020, during which people were only allowed to walk for several hours a day to provide for their survival needs. The study on Neighborhoods of Amman (Suboh et al., 2020) includes such a possible analysis and can be extended to include other neighborhoods and allow for better access to public transportation. This includes **developing a map of existing transportation routes and how they link to existing walking paths.** Furthermore, any new transportation and mobility development, including new streets and public transportation projects and routes, **must include enclosed pedestrian walkways for public transportation riders, wider access points through smartly designed sidewalks, as well as "mobihubs" (neighborhood-level transport hubs) at critical junctions that connect with the new BRT system.**

A crucial aspect of including these recommendations concerns the process for how policies are designed, decided and implemented. Thus, **policy-making must be a multi-stakeholder approach that includes all different parts of society as stakeholders in the process.** As such, women, people with disabilities, and refugees must be included in working groups during the policy process, and their

recommendations should be heeded to ensure that policies are informed by all those to be affected. This results in **designing policies in a just, gender-conscious, sustainable, and intersectional way**. Incorporating the experiences of all parts of society helps make public spaces hospitable to everyone, which will also improve labor participation, quality of life, and overall happiness. All of this can be accomplished through open discussions on new policies and and practicing an innovative approach for gathering feedback from society.

Amman certainly needs to implement **a Gender Action Plan (GAP) for sustainable urban mobility**. The GAP will provide intersectional perspectives into urban planning by providing the recommended tools, policies, and actions that complement current strategies, which will help to **reframe public spaces**. Public spaces need to become safe, welcoming, and comfortable for all parts of society, not just able-bodied men, and thus encourage economic and political participation and improve livelihoods. One important step in this regard is **enhancing street lighting**. By studying and planning better lighting, citizens will be encouraged to walk at night and in winter. Data collection is crucial, as well as accurate zoning and land use plans. Furthermore, another important feature is **raising public awareness on how to spot and correct "negative" behavior and create an inclusive public space.** Posters highlighting "negative" and "positive" behaviors, routine checks on bus stops, buses and sidewalks, as well as setting up a hotline to report negative experiences could help encourage this recommendation. **Creating friendly, secure, and accessible public spaces and modes of transportation** will benefit everyone in society and lead to improved economic participation, as well as higher satisfaction rates and happiness.

In conclusion, the next steps forward are clear. The drafting of a GAP for sustainable mobility in Amman and Jordan must take priority in this process. The plan should be crafted through a multi-stakeholder process including all relevant groups to work on future solutions. Current efforts by the GAM are heading in the right direction, but better results can be achieved by incorporating certain changes and adjustments to actions and policies. In the end, this will lead to both more sustainability and social justice. Considering the intersections of mobility/walkability with politics, poverty, livelihoods, and future development, it is crucial to include more in-depth studies and research on these processes. The project team is more than happy to share its detailed methodology, data, and analysis with those interested, as well as help to set up a GAP task force.

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11.1 Integration of Gender Concepts within Societies

To extend the idea of Mobility for Her far beyond the project period, as well as further emphasize that gender must always be considered when thinking about cities, the research team aimed to align the project with a national and international agenda. Conveniently, since the project started in early February, the International Women's Day (IWD) seemed like a timely opportunity to launch the idea of our research to the public.

The Poster Idea

The general guidelines included using the same color scheme as the IWD, with an emphasis on the color purple. According to the International Women's Development Agency (IWDA), the color purple historically denoted justice and dignity. Today, it is used to represent women, and as such, purple is the color of the IWD (IWDA, 2020). The poster needed to have a carefully crafted symbolic slogan that also relates to mobility from a gender perspective.

A group workshop was held at the beginning of the campaign. Participants were divided into five groups, and each group was asked to hand in two sheets: a concept sheet and a final poster sheet. During the exercise, the researchers gave constant feedback to each group individually, and towards the end of the exercise, the final designs were presented and discussed by each group to all participants. Two of the posters will be shown below, and the rest can be viewed in Appendix (B).

The students in the project were invited to a workshop to design two posters to raise awareness on women's mobility through using the IWD and its purple color scheme. The researcher's expertise and feedback helped produce impressive works of art to be used on social media. The inclusion of women here is considered a starting point. In further studies, of course, such posters need to include more motives and personal backgrounds, such as people with disabilities. Using social media posters and designing them in cooperation with students puts awareness-raising on a community level, as well as

incorporates local knowledge for finding solutions. Thus, an intersectional approach was employed in the project's early stages to yield more suitable and appropriate policy recommendations.

First Poster

#We_all_steer

The slogan reads "طالعة صبية؟" which in English translates to "Women, are you riding?". This refers to the fact that, in Jordan, driving a private car for individual use or as a taxi is usually done by males. Another subliminal message this poster tries to show is the connection between "driving" and "steering," a reference to women representation in "steering" (leading) positions, where they may have more influence if given the chance.

Second Poster

#درب_السلامة

Translated to English, #Safe_Road. It's often said in prayer for a safe trip or to always find 'safe roads' through their travels. Inspired by the strike an #EachForEqual pose idea originally located in the IWD2020 official website, the logo for the second poster symbolises the two arms of the society with the 'upper hand' belonging to the female users of the road and the lower and equal hand belonging to the male user of the road. Indicating the need for more females in positions of power.

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About FES Regional Climate & Energy Project MENA

The Regional Climate and Energy Project MENA advocates for an energy transition into renewable energy and energy efficiency. It continues to search for solutions for a just transition in the energy sector ensuring both, the protection of the planet and the people.

As the MENA region is one of the most affected areas by climate change, we contribute to policy advising, research, and advocacy in the areas of climate change policy, energy transition, and urban sustainability, with the support of research institutions, civil society organizations, and other partners in the region and in Europe.

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