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"Prepaid Water Meters' Effect on Decreasing the Water Debt of the Service Providers to Achieve Strategic Goals of PWA "

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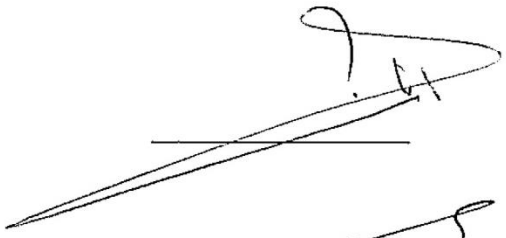
1. Dr. Eyad Yaqoub, Supervisor	
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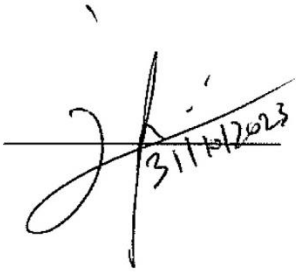
3. Dr. Jawad A.H Shoqeir , external examiner	

Declaration

I declare that all the work in this thesis titled "**Prepaid Water Meters' Effect on Decreasing the Water Debt of the Service Providers to Achieve Strategic Goals of PWA** " has been done to fulfill the requirements for the degree of Master's in Strategic Planning and Fundraising and submitted to Arab American University Palestine. All work is original and it has been written by me and I have duly acknowledged all the sources of information have been used in this thesis.

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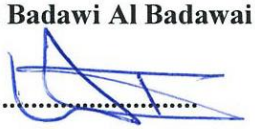
Signature: ..... 

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List of Abbreviation

Abbreviation	***Name***
C o M	Council of Ministries
Excel	A spreadsheet Developed by Microsoft for Windows, Mac OS, Android and iOS. It Features Calculation or Computation Capabilities
MDLF	Municipal Development & Lending Fund
MOLG	Ministry of Local Governance
MOSD	Ministry of Social Development
PNA	Palestinian National Authority
PWA	Palestinian Water Authority
PWM	Prepaid Water Meters
WBWD	West Bank Water Department
WSRC	Water Sector Regulatory Council

List of Contents

Thesis Approval I
Decliration II
Acknowledgment III
List Of Abbreviation IV
List Of Contents V
List Of Figures VII
Abstract VIII
Chapter One: Introduction 1
1.1 Background 1
1.2 The Study Significance 2
1.3 Problem Statement 3
1.4 The Objectives of the Study 4
1.5 The Research Questions and Hypotheses 5
1.6 Scope and Limitation of the Study 6
1.7 The Study's Community 6
Chapter Two: Literature Review 7
2.1 Introduction 7
2.2. Water Law 2014 9
2.3 Palestinian Water Sector's Situation 10
2.4 Pre-paid Water Meter Definitions 12
2.5 Benefits of Pre-paid Water Meter (PWM) 14
2.6 Dis-Advantages of Pre-Paid Water Meter (PWM) 15
2.7 Attitudes Towards PWMs 16
Chapter Three: Theoretical Framework 18
3.1 Introduction 18
3.1.1 Pre-pad in Palestine 18
3.1.1.2 CoM's Decrees About Pre-Paid Water Meter 19
3.1.2-The Effect of Pre-Paid Meters in Palestine 21
Chapter Four: Methodology 23
4.1 Data Analysis and Research Findings 24
4.1.1 Introduction 24
4.1.2 Data Analysis Overview 25
4.1.3 PWA Procedures to Encourage the Local Utilities to Install Prepaid Meters 27
4.1.4 Sequence of the Process of Installing Pre-Paid Meters Through PWA 28
4.1.5 Response the Local Utilities to PWA's Encouragement of Installing Prepaid Meters 30
4.1.6 The Water Debt of the Utilities with Regard to the Prepaid Meters 33
4.1.7 Pre-Paid Impact on The Social Side 36
Chapter Five: Conclusions And Recommendations 38

5.1 Introduction 38
5.2 Conclusions 38
5.3. Recommendations 41
Chapter Six: Future Research 45
References 46
ملخص 53

List of Figures

Figure (1): The Increasing In The Number Of Meters Through The Years 2017-2020 31
Figure (2): The Percentage Of Prepaid Meters Funded By Pwa Compared To The Meters Funded By Other Institutions 32
Figure (3): Growth Of Total Debt 34
Figure (4): The Increasing Number Of Prepaid Meters Vs Debt Growing Debt 35
Figure (5): Debt of utilities installed prepaid meters between 2017-2020 35

Abstract

Palestine is one of the most water-stressed regions in the world, with limited access to water resources due to several factors, including population growth, urbanization, and climate change. The Palestinian Water Authority (PWA) is responsible for managing water resources and providing clean and safe water to households and businesses across Palestine. However, the PWA is facing a significant water debt crisis, with estimates suggesting that it owes over $450 million (Muneeb, 2021)To address this issue, the PWA has introduced a prepaid water meter system in several cities in Palestine, including Ramallah, Hebron, and Nablus. The prepaid water meter system allows customers to pay for their water supply in advance using prepaid cards. The PWA argues that the system will help to reduce water waste and increase revenue, which will ultimately benefit all customers.

The introduction of prepaid water meters has been met with mixed reactions from the public, with some expressing concerns about the cost of the meters and the potential impact on low-income households. In Ramallah, for example, a protest was organized against the installation of prepaid water meters, with protestors arguing that the meters would lead to higher water bills and further financial burdens on low-income families (Aljazeera, 2020). However, the PWA has stated that the prepaid water meter system will help to improve the accuracy of water billing and reduce water theft, which are common issues in Palestine (Muneeb, 2021)

The water debt crisis facing the PWA is a significant challenge that must be addressed to ensure the sustainability of Palestine's water supply. Innovative approaches such as the prepaid water meter system will be necessary to reduce water waste and

increase revenue, but it is crucial to ensure that the system is implemented fairly and does not disproportionately affect low-income households.

In conclusion, the water debt crisis facing the PWA highlights the ongoing challenges facing Palestine in terms of water access and management. The introduction of prepaid water meters is an innovative approach to address the water debt crisis, but it is crucial to ensure that the system is implemented fairly and transparently to avoid further financial burdens on low-income households.

Chapter One:

Introduction

1.1 Background

Since its establishment in 1995, the Palestinian Water Authority (PWA) has faced numerous challenges in managing the water sector. These challenges are rooted in factors such as water scarcity in the region and the Israeli-Palestinian conflict over water resources. Complicating matters further, Israel has control over most of the water resources in Palestine. Given these circumstances, the primary strategic goals of the PWA and the water sector in Palestine are twofold: (a) ensuring a fair distribution of water, where every individual has access to an adequate quantity and quality of water without discrimination, and (b) achieving financial sustainability for the PWA through various activities and methods. One crucial approach to achieving financial sustainability is by addressing the accumulated water debt of the utilities.

The Palestinian government has encountered significant problems resulting from the accumulation of water debt over the years. This impedes the PWA's ability to fulfill its strategic objectives of providing improved water services to Palestinians. Various factors contribute to service providers not paying their water bills to the PWA, with one significant factor being individuals not settling their bills with the service providers. Consequently, the service providers are unable to pay their wholesale water bills to the bulk provider (WBWD/PWA).

In response, the Council of Ministers (CoM) has issued ten declarations since 2010, aiming to address the issue of accumulated water debt.

The PWA has been entrusted with the task of encouraging service providers to install prepaid water meters for their customers instead of postpaid meters.

The government will fully finance the cost of these prepaid meters by deducting the corresponding amount from the water debt of utilities with outstanding debts and allocating it to utilities without any water debt.

This economic approach aims to assist local utilities and service providers in collecting water bill payments from their customers, enabling the service providers to settle their wholesale water bills. Ultimately, this helps the PWA deliver improved water services to the Palestinian community and meet the growing demand for adequate water quantity and quality, despite challenging political, economic, and natural circumstances.

Upon examining the situation in the water sector, it becomes evident that the primary problem lies in the weak management practices of the service providers and their vulnerable financial positions due to accumulated water debt. The introduction of prepaid meters allows service providers to collect water payments in advance and gradually recover previous debts by deducting small amounts each time a customer recharges their meter. This approach promotes better financial management and contributes to the overall sustainability of the water sector.

1.2 The Study Significance

This study aims to investigate the effectiveness of prepaid meters (PWMs) as a managerial instrument in water administration and their impact on achieving the strategic goals of the Palestinian Water Authority (PWA), specifically financial sustainability through the reduction of water debt. The study aims to assess the extent to which PWMs, as a managerial tool, affect the issue of water debt and determine if they are a suitable solution for addressing the problem of accumulated water debt.

Additionally, the study will examine the procedures implemented by the PWA and other institutions in the water sector in relation to PWMs.

Considering that PWMs are a relatively new technology in our region, there is limited literature available on this subject. Therefore, this study will contribute to filling a gap in the existing literature by providing insights into the effectiveness of PWMs as a tool for managing water debt. The findings of this study will provide valuable information to decision-makers, enabling them to better plan and make informed decisions regarding the implementation of PWMs in the future.

1.3 Problem Statement

The background information provided states that on July 6, 2010, the Palestinian government issued a cabinet decision to encourage service providers to install pre-paid water meters. This decision aimed to address the issue of accumulating water debt, which had reached one and a half billion shekels. The purpose of implementing pre-paid water meters was to allow service providers to collect water prices in advance from citizens, enabling them to pay their bills wholesale through the West Bank Water Department/Palestinian Water Authority (WBWD/PWA).

This study focuses on examining the financial impact of using pre-paid water meters (PWM) to decrease the water debt and achieve financial sustainability for the PWA.

Additionally, the research aims to assess the suitability of this managerial tool in the Palestinian context from different perspectives. One particular focus is ensuring fair distribution of water, which emphasizes every Palestinian's right to access water in sufficient quantities and of good quality.

The problem of the study can be defined in the following statement:

The installation of prepaid water meters for citizens by service providers in Palestine has experienced a noteworthy increase. However, it is worth noting that during the same period, the water debt of these service providers to the Palestinian Water Authority (PWA) has also increased.

1.4 The Objectives of the Study

The Palestinian Water Authority (PWA) aims to provide equitable and high-quality water services to ensure that all people have access to an adequate quantity and quality of water, regardless of any other factors. To achieve this, PWA needs to establish financial sustainability, which includes reducing the accumulated water debt that has built up over the years due to many service providers not paying their water bills. These service providers often cited non-payment by their end customers as the main reason for their own non-payment.

To address this issue, PWA has started encouraging service providers to switch from post-paid water meters to prepaid water meters in their respective regions. The objective of this study is to examine the impact of installing prepaid water meters for citizens in the West Bank/Palestine on the water debt of service providers under WBWD/PWA. The study aims to achieve the following objectives:

1. Investigate the financial impact of prepaid water meters on the water debt of service providers for the Palestinian Water Authority.
2. Analyze the measures implemented by PWA to promote the adoption of prepaid meters in Palestine.

3. Evaluate the steps taken by service providers to ensure that families with low income can install prepaid meters, thereby ensuring their ability to access sufficient quantity and quality of water.

By examining these aspects, the study aims to shed light on the effectiveness of prepaid water meters in reducing water debt and ensuring fair water distribution in Palestine.

1.5 The Research Questions and Hypotheses

Research Questions:

1. How does the installation of prepaid water meters impact the water debt of service providers for the water authority?
2. Are the procedures implemented to encourage the installation of prepaid meters considered adequate and convenient?
3. What is the effect of prepaid water meters on families with low income in terms of recharging the cards?

Hypotheses:

1. The installation of prepaid water meters has a positive impact on reducing the water debt of service providers for the water authority.
2. The procedures implemented to encourage the installation of prepaid meters are considered adequate and convenient.
3. Prepaid water meters have a negative effect on families with low income in terms of recharging the cards.

These hypotheses will be investigated in the study to assess the impact of prepaid water meters on the water debt of service providers and the undertaken procedures towards families with low income in managing the recharge process.

1.6 Scope and Limitation of the Study

The focus of this study is to analyze the 2014-2016 Strategic Plan of the Palestinian Water Authority (PWA), specifically in relation to achieving financial sustainability objectives. The research aims to examine the impact of installing prepaid meters (PWMs) on the water debt of service providers who are customers of PWA.

The scope of the study is limited to evaluating the economic, managerial, and financial responses of PWA regarding the implementation of PWMs. The objective is to provide guidance and recommendations that elucidate the effects of PWM technology, benefiting not only the water authority but also other institutions operating in the water sector, to aid in future planning.

It is important to clarify that this study does not delve into the technical aspects of PWMs. Instead, the focus is solely on the financial and administrative aspects related to their implementation.

1.7 The Study's Community

The research community for this study will consist of the customers (service providers) of the West Bank Water Department/the Water Authority who have installed prepaid meters up until the year 2020. These customers will be the primary participants in the study, providing insights and data regarding the impact of prepaid meters on the water debt of service providers..

Chapter Two:

Literature Review

2.1 Introduction

The Palestinian Water Authority (PWA) faces significant challenges in achieving financial sustainability while ensuring equitable water service delivery in Palestine. One key challenge is the accumulation of water debt of service providers, which can be attributed, in part, to the non-payment of water bills by end customers. To address this issue, PWA has been promoting the installation of prepaid water meters (PWMs) as a potential solution to alleviate the water debt burden and enhance financial sustainability.

Several studies have examined the effectiveness of prepaid water meters in reducing non-revenue water and improving water service delivery in Palestine. Abu-Madi et al. (Abu-Madi M. A., Evaluating the efficiency of prepaid water meters in reducing non-revenue water in Palestine, 2017)found that prepaid water meters could potentially reduce non-revenue water by up to 50% in the West Bank and 60% in Gaza. The study also noted that prepaid water meters could improve the accuracy of billing and reduce customer complaints about high water bills.

Prepaid water meters have been shown to be effective in promoting water conservation and reducing water demand in Palestine. Abu-Madi et al. (Abu-Madi M. A.-H., 2019) found that prepaid water meters could lead to a 30% reduction in water consumption in households. (Hamdan, 2019), also found that prepaid water meters could encourage water conservation behaviors such as fixing leaks and reducing water waste.

Prepaid water meters have the potential to improve the financial sustainability of water service providers in Palestine. (Abu-Madi M. A., Evaluating the efficiency of prepaid water meters in reducing non-revenue water in Palestine, 2017).

Found that prepaid water meters could lead to a significant reduction in operational costs and an increase in revenue collection. (Abu-Madi M. A., The impact of prepaid water meters on the financial sustainability of water service providers in Palestine, 2018)) also noted that prepaid water meters could help water service providers to recover the costs of service provision and improve their financial viability.

The implementation of prepaid water meters in Palestine has raised concerns about their potential impact on social equity, particularly for vulnerable populations. (Abu-Madi M. A.-H., 2019)found that prepaid water meters could lead to an increase in the financial burden on low-income households, as they may need to purchase water in smaller increments and more frequently. (Fattah, 2020)also noted that prepaid water meters could potentially exacerbate existing inequalities in access to water services.

The implementation of prepaid water meters in Palestine has also faced several challenges. (Khammash, 2019) Khammash and Hammoudeh (2019) highlighted the need for adequate infrastructure and technical expertise to support the implementation and operation of prepaid water meters. Abu-Madi and Fattah (Abu-Madi M. A.-H., 2019)also noted the importance of stakeholder engagement and community participation to ensure that the implementation of prepaid water meters is socially and culturally appropriate.

Overall, the literature suggests that prepaid water meters have the potential to improve water service delivery, reduce non-revenue water, promote water conservation, and improve the financial sustainability of water service providers in Palestine.

However, the implementation of prepaid water meters must be accompanied by efforts to address the potential social and equity impacts, as well as technical and operational challenges.

More research is needed to better understand the long-term impacts of prepaid water meters in Palestine and to identify strategies to maximize their potential benefits while minimizing their potential drawbacks.

2.2. Water Law 2014

The Water Law 2014 in Palestine represents a significant milestone in the institutional and legislative restructuring of the water sector. This law was formulated to enhance the efficiency and effectiveness of water institutions and promote sustainable water management practices in Palestine.

The Palestinian Council of Ministers endorsed an action plan for institutional and legislative restructuring in the water sector in 2009, with the aim of segregating the policy function from the regulatory function (Orgut, 2013). The Water Law 2014 was the outcome of this reform, providing a comprehensive framework for the water sector in Palestine.

The law designates the Palestinian Water Authority (PWA) as the major player in the water sector (PWA, Water Law, 2014) The PWA's mission is to handle strategic planning, policy development, sectoral development, water resources management, water pricing approval, and water service quality assurance for customers in Palestine. The law empowers the PWA to license and regulate water service providers, including municipalities, regional utilities, joint water councils, and the national water company (PWA, water law, 2014).

One of the key provisions of the Water Law 2014 is the establishment of regional water utilities. These utilities, coordinated and cooperated with relevant stakeholders, are responsible for providing water and wastewater services to end customers. This restructuring involves transforming the ownership and structure of water providers from municipalities, service councils, and water associations to financially and legally independent utilities, aimed at improving service delivery, enhancing efficiency, and increasing debt collection (PWA, Water Law, 2014).

The Water Law 2014 plays a crucial role in enhancing the governance and management of the water sector in Palestine. It provides a legal framework for effective water resource management, sustainable service delivery, and equitable access to water. The law promotes transparency, accountability, and coordination among various water sector entities, facilitating better planning and development of water resources (PWA, water law, 2014)

In conclusion, the Water Law 2014 in Palestine represents a significant step towards achieving sustainable water management. It establishes the institutional framework, roles, and responsibilities within the water sector, empowering the Palestinian Water Authority and promoting efficient service delivery through the establishment of regional water utilities.

2.3 Palestinian Water Sector’s Situation

The Palestinian water sector faces numerous challenges due to the complex political and geographical realities in the region. The Israeli occupation has had a significant impact on the availability, accessibility, and management of water resources in the Palestinian territories. The following points highlight key aspects of the Palestinian water sector's situation:

Palestinians face restrictions on accessing water resources, leading to inadequate water supply in many areas. Israel controls the majority of shared water sources, and Palestinians are allocated a smaller share, limiting their access to water for domestic, agricultural, and industrial purposes (World Bank, 2009)

The Palestinian Water Authority (PWA) has faced formidable challenges in managing the water sector effectively. Inadequate infrastructure, limited funding, and a scarcity of technical expertise have hindered their efforts to ensure sustainable water resource management. The prevalence of outdated water distribution systems has exacerbated the situation, leading to significant rates of non-revenue water and inefficient water usage (Saleh, 2019)

Pollution and contamination of water sources pose a significant health risk to Palestinian communities. Sewage and wastewater treatment facilities are insufficient, leading to untreated sewage discharge into rivers and groundwater, exacerbating the contamination issue (Authority, 2017)

The Palestinian territories suffer from water scarcity, exacerbated by population growth, climate change, and limited access to water resources. The per capita water availability falls well below the international standards set by the World Health Organization (WHO) (United Nations, 2017)

The absence of a unified legal framework and institutional fragmentation hinders effective water resource management. The lack of coordination between different governing bodies and limited enforcement capacity further exacerbate the challenges faced by the water sector (World Bank, 2009)

The Oslo Accords of the 1990s established joint management mechanisms for shared water resources between Israel and Palestine. However, the implementation of

these agreements has faced numerous challenges and has not fully addressed the water needs of the Palestinian population (Lustick, 2011)

International organizations and donor countries have provided assistance and support to improve the Palestinian water sector. This aid focuses on infrastructure development, capacity building, and promoting sustainable water management practices (Nations, 2017)

Palestinian communities have initiated local water projects, including rainwater harvesting, wastewater treatment, and water conservation initiatives. These grassroots efforts aim to address water scarcity and promote self-sufficiency (Gleick et al., 2012).

Civil society organizations and human rights activists advocate for equitable access to water resources and challenge discriminatory water policies. Their efforts raise awareness about the water crisis faced by Palestinians and call for the recognition of water as a basic human right (Alatout, 2008) .

The Palestinian water sector's sustainable development depends on political stability, strengthened governance, and increased investments in infrastructure, technology, and capacity building. International cooperation and adherence to international water law principles are crucial for addressing the challenges faced by the sector (Bank, 2009) .

2.4 Pre-paid Water Meter Definitions

Pre-paid water metering has emerged as a promising approach to address issues related to water affordability, consumption management, and revenue collection in water supply systems. The following literature review explores different definitions and concepts associated with pre-paid water meters, shedding light on their potential impact and implications.

Breen and Nortje (Breen, 2018)define pre-paid water meters as "a water management system where users pay in advance for their water consumption, typically through the purchase of water credits or tokens." These meters allow consumers to monitor and control their water usage while enabling utilities to efficiently manage revenue collection.

Gumbo and Mohamed (Gumbo, 2015)emphasize the role of pre-paid water meters as a policy option to improve water services in Zimbabwe. They define these meters as "devices that require users to purchase water in advance, with a corresponding amount of water allocated according to the value of the credits purchased." The authors highlight the potential benefits of pre-paid meters, including reduced non-revenue water and increased revenue collection.

Healy and Craig (Healy, 2012) explore the social implications of pre-paid water meters in Cape Town, South Africa. They describe pre-paid water meters as "a means of flow sharing, enabling residents to determine their water consumption based on affordability." The authors highlight how pre-paid meters have shaped the dynamics of working-class communities and the challenges associated with affordability and water access.

Kebede, Travi, and Ayele (Kebede, 2021) conducted a systematic review to examine the impact of pre-paid water meters on water use efficiency and equity. They define pre-paid water meters as "systems that require users to pay for water services in advance, typically through the purchase of water credits or tokens, thereby promoting a more cost-reflective approach to water consumption." The authors analyze the existing literature and discuss the potential trade-offs between efficiency and equity in pre-paid metering systems.

Makoni (Makoni, 2020)provides a comprehensive review of global experiences, challenges, and opportunities related to pre-paid water meters. The author defines these meters as "devices that allow users to pay for water services in advance, ensuring accountability, reduced water wastage, and improved revenue collection." The review highlights the importance of effective implementation strategies, addressing concerns related to affordability, and promoting consumer engagement.

2.5 Benefits of Pre-paid Water Meter (PWM)

Pre-paid water meters (PWM) have emerged as a potential solution to address water management challenges. This literature review aims to explore the benefits of pre-paid water meters in terms of water conservation, revenue management, affordability, consumer empowerment, and improved service delivery.

Pre-paid water meters incentivize consumers to adopt more sustainable water consumption practices, leading to improved water conservation outcomes (Ayeb-Karlsson, Prepaid water meters in Nigeria: A way forward for water conservation, 2018) PWM systems facilitate efficient revenue collection by ensuring that consumers pay for water services in advance, reducing outstanding bills and improving cash flow for water utilities (Foster, Prepaid smart meters for urban water services: A viable option for Africa, 2017) .

Pre-paid water meters offer consumers greater control over their water expenditure, allowing them to manage their usage according to their financial capacity, potentially enhancing affordability for low-income households (Foster, Prepaid smart meters for urban water services: A viable option for Africa, 2017)By providing real-time information on water consumption and expenditure, PWM systems empower consumers to make informed decisions about their water usage, leading to a sense of

control and empowerment (Cronje D. &., An assessment of the effectiveness of prepayment water meters in reducing water consumption in South Africa, 2014)

Pre-paid water meters enable utilities to monitor consumption patterns, detect leaks, and plan infrastructure maintenance, resulting in more efficient and reliable service delivery (Kamara A. B., 2018)

By implementing PWM systems, water utilities can reduce non-revenue water losses caused by leaks, unauthorized connections, and meter tampering, leading to improved financial sustainability (Foster, Prepaid smart meters for urban water services: A viable option for Africa, 2017).

PWM systems automate the billing process, eliminating the need for manual meter reading and reducing administrative costs for utilities, thereby improving operational efficiency (Cronje D. &., An assessment of the effectiveness of prepayment water meters in reducing water consumption in South Africa, 2014)

2.6 Dis-Advantages of Pre-Paid Water Meter (PWM)

While pre-paid water meters (PWM) have shown promise in addressing water management challenges, it is important to critically assess their potential disadvantages. This literature review aims to explore the drawbacks of pre-paid water meters from some aspects.

Affordability Concerns:

Pre-paid water meters may pose affordability challenges for low-income households, as upfront payment requirements can strain their limited financial resources (Sørensen, Water supply affordability in developed economies: Assessing the influence of metering and alternative price structures, 2013).

Social Equity Considerations:

PWM systems may disproportionately affect vulnerable and marginalized communities, exacerbating existing social inequalities in accessing water services (Budds, 2012).

Technical Challenges:

The implementation of pre-paid water metering systems may encounter technical issues such as meter tampering, inaccurate readings, and system failures, leading to unreliable service provision (Kamara A. B., 2018)

Water Quality Implications:

There are concerns that pre-paid water meters may lead to a decline in water quality due to reduced monitoring and maintenance activities by utilities (Cronje D. &., 2014)

Privacy Concerns:

Pre-paid water metering systems involve the collection of detailed consumption data, raising concerns about privacy and potential misuse of personal information (Bakker, Good governance and good practice: The role of transparency in ensuring sustainable urban water supply, 2010).

2.7 Attitudes Towards PWMs

Pre-paid water meters (PWMs) have gained traction as a tool for water management. This literature review investigates the attitudes and perceptions towards PWMs through different aspects

Attitudes of Consumers:

Research suggests that consumer attitudes towards PWMs are influenced by factors such as affordability, perceived fairness, ease of use, and reliability (Sørensen, Water supply affordability in developed economies: Assessing the influence of metering and alternative price structures, 2013) .

Stakeholder Engagement:

Effective stakeholder engagement, including consultations and information sharing, plays a crucial role in shaping positive attitudes towards PWMs and fostering acceptance among communities (Hope, 2015)

Social Equity Concerns:

Attitudes towards PWMs vary depending on social equity considerations, with some perceiving these systems as exacerbating existing inequalities in water access and affordability (Bakker, Good governance and good practice: The role of transparency in ensuring sustainable urban water supply, 2010)

Technical Challenges and Reliability:

Concerns about technical challenges, such as meter accuracy, maintenance, and potential system failures, can influence stakeholders' attitudes towards PWMs (Joshi, 2016)

Consumer Acceptance:

Factors such as consumer awareness, education, and perceived benefits of PWMs can influence acceptance levels, with greater acceptance observed when consumers understand the advantages and feel empowered by the system (Ayeb-Karlsson, Prepaid water meters in Nigeria: A way forward for water conservation, 2018)

Impacts on Water Access:

Attitudes towards PWMs can be shaped by the potential impacts on water access for vulnerable populations, including concerns about disconnections and reduced water availability (Budds, 2012).

Chapter Three:

Theoretical Framework

3.1 Introduction

3.1.1 Pre-pad in Palestine

he implementation of Pre-paid Water Meters (PWMs) in Palestine requires a solid theoretical framework to understand and analyze the various factors influencing their adoption and effectiveness. This section provides an introduction to the theoretical framework that can be applied to the study of PWMs in Palestine, drawing on relevant theories and concepts. The following theoretical perspectives are considered:

Technology Acceptance Model (TAM): The TAM, developed by Davis (1989), is widely used to assess users' acceptance and adoption of new technologies. It explores the factors influencing individuals' perceptions, attitudes, and intentions towards a specific technology. Applying the TAM to PWMs in Palestine can help identify the key determinants of acceptance and adoption among different user groups.

Diffusion of Innovation Theory: The Diffusion of Innovation theory, proposed by Rogers (2003), examines the process by which new technologies are adopted and spread among a population. This theory provides insights into the factors that facilitate or hinder the diffusion of PWMs in Palestine, including the role of early adopters, communication channels, and social networks.

Social Equity Theory: Social equity theory focuses on the distribution of resources and fairness within society. Applying this theory to PWMs in Palestine helps assess the potential impact on marginalized groups, such as low-income households, and understand how the introduction of PWMs may affect the equitable provision of water services.

Institutional Theory: The institutional theory emphasizes the role of institutions in shaping organizational behavior and practices. In the context of PWMs in Palestine, this theory can help examine the influence of regulatory frameworks, policies, and institutional arrangements on the adoption and implementation of PWM systems by water utilities.

Political Economy Perspective: The political economy perspective considers the interplay between political, economic, and social factors in shaping policies and practices. Applying this perspective to PWMs in Palestine can provide insights into the power dynamics, economic considerations, and social implications associated with the adoption and use of PWMs in the water sector.

These theoretical frameworks offer valuable insights for understanding the adoption, acceptance, and impact of PWMs in Palestine. By incorporating these theories, researchers and policymakers can gain a deeper understanding of the factors influencing the successful implementation and utilization of PWM systems.

3.1.1.2 CoM's Decrees About Pre-Paid Water Meter

The Palestinian Council of Ministers has issued several declarations regarding prepaid water meters, demonstrating their commitment to promoting and implementing this technology in Palestine. These declarations aim to address various aspects related to the installation, support, and regulation of prepaid water meters. The following is a summary of some key declarations:

1. Decree No (03/51/13/م.و/س.ف): This decree, issued on 7/6/20210, assigns the Palestinian Water Authority (PWA) with the responsibility of encouraging local utilities to install prepaid meters for their customers. The government pledges to support utilities by deducting 50% of the meter cost from their water debt. The

decree also outlines the financial transformation strategy of the Ministry of Social Affairs in providing support to families installing prepaid meters (Palestinian Council of Ministers, 2021).

2. Decree No (06/82/13/م.و/س.ف): Issued on 8/2/2011, this decree approves the recommendations of the ministerial committee on water and energy. It emphasizes the technical qualifications of prepaid meters and instructs the Water Authority to include provisions supporting their implementation in their budget. The focus is on areas facing challenges in collecting water costs (Palestinian Council of Ministers, 2011).
3. Decree No (/08/55/ 14 م.و/س.ف): This decree, issued on 23/5/2013, approves the technical qualifications of the second edition of prepaid meters, ensuring their compliance with relevant standards and specifications (Palestinian Council of Ministers, 2013).
4. Decree No (90/186/17/م.و/ر.ح): This decree, issued on 7/9/2017, approves the technical qualifications of the third edition of prepaid meters, reflecting advancements and improvements in the technology (Palestinian Council of Ministers, 2017).
5. Decree No (17/2015/17/م.و/ر.ح): Issued on 7/8/2018, this decree urges the Water Authority to encourage utilities to install the third edition of prepaid meters. It also stipulates that the installation costs should be deducted from the utilities' existing debts (Palestinian Council of Ministers, 2018).

These declarations highlight the commitment of the Palestinian Council of Ministers to promote the installation of prepaid water meters in Palestine. They provide guidelines for technical qualifications, financial support, and debt management,

emphasizing the importance of this technology in enhancing the efficiency and sustainability of the water sector.

3.1.2-The Effect of Pre-Paid Meters in Palestine

The implementation of prepaid water meters in Palestine has had several effects on the water sector. This section will discuss the key impacts of prepaid meters in Palestine, focusing on different aspects such as financial sustainability, water conservation, billing accuracy, consumer behavior, and service quality.

1. Financial Sustainability: Prepaid meters have contributed to enhancing the financial sustainability of water utilities in Palestine. By promoting upfront payment for water services, prepaid meters improve revenue collection and reduce outstanding debts, enabling utilities to cover operational costs and invest in infrastructure development (Abu-Madi et al., 2019).
2. Water Conservation: The use of prepaid meters has been effective in promoting water conservation practices. With a prepaid system, consumers have a direct financial incentive to monitor and manage their water consumption, leading to more responsible water usage and reduced wastage (Abu-Madi et al., 2019).
3. Billing Accuracy: Prepaid meters provide accurate and transparent billing information to consumers. The real-time monitoring of water consumption enables customers to track their usage and understand the associated costs, promoting greater awareness and control over water expenses (Abu-Madi et al., 2019).
4. Consumer Behavior: The introduction of prepaid meters has influenced consumer behavior regarding water usage. The pay-as-you-go nature of prepaid meters encourages consumers to be more mindful of their water consumption patterns,

leading to more efficient use and a reduction in water-related disputes (Abu-Madi et al., 2019).

5. Service Quality: Prepaid meters have contributed to improving the overall service quality in the water sector. The accurate measurement of water usage and timely payment through prepaid systems enable utilities to allocate resources effectively, enhance maintenance activities, and provide reliable and continuous water supply to consumers (Abu-Madi et al., 2019).

These effects highlight the positive outcomes of prepaid meters in Palestine, ranging from financial sustainability to water conservation and improved service delivery. By implementing prepaid metering systems, the Palestinian water sector has taken significant steps toward ensuring efficient and sustainable water management.

Chapter Four:

Methodology

This study has employed a mixed-methods approach, incorporating both qualitative and quantitative methods. Primarily, a qualitative approach was adopted, which involved an extensive analysis of published articles and books that address prepaid meters as a managerial tool. Additionally, interviews were conducted with experts from the West Bank Water Department (WBWD), Palestinian Water Authority (PWA), and Water Sector Regulatory Council (WSRC). Furthermore, phone interviews were conducted with 20 service providers who have implemented prepaid meters. These qualitative methods were utilized to gain insights and perspectives from experts and service providers regarding the issue of prepaid meters.

The study conducted interviews with six respondents who were carefully selected based on their current positions and expertise in the issue of prepaid water meters. The interviewed individuals include:

1. Mr. Mohamad Said Hmaidi - CEO of Water Sector Regulatory Council (WSRC)
2. Adv. Anan Slahat - Legal Advisor in the Palestinian Water Authority (PWA)
3. Mr. Sayeed Samaane - Financial Manager at the West Bank Water Department (WBWD)
4. Mr. Imad Abdo - Head of Customer Services Department at WBWD
5. Eng. Hala Barhomi - Head of Specifications and Standards Department at PWA
6. Dr. Moath Abu Saada - Minister's Advisor for Technical Affairs

These individuals were chosen due to their positions, involvement in committees related to prepaid water meters, and their experience and expertise in the field.

The study employed both structured and unstructured interviews with the six selected respondents who are experts in the issue of prepaid water meters. The interview notes were manually taken. The interviews tended to be flexible and focused on the interviewee's professional experience and opinions. In addition, 20 phone interviews were conducted, all of which were structured and manually recorded with the approval of the interviewees.

Furthermore, the study utilized existing data from various sources such as reports and records from the West Bank Water Department, Water Authority, and Water Regulatory Council regarding the debt of service providers, yearly collection rates, and the number of installed prepaid meters. Other sources of data include press releases, scientific papers, World Bank reports, and other publications.

The data analysis method used in the study was thematic analysis, which involved organizing the data into preliminary themes that addressed the research questions and then reviewing and defining the themes to identify certain patterns across the dataset.

4.1 Data Analysis and Research Findings

4.1.1 Introduction

In recent years, many service providers in Palestine have adopted prepaid meters as a replacement for traditional postpaid meters. These prepaid meters have garnered positive feedback and are believed to offer financial and managerial benefits, as indicated by studies conducted by the Water Sector Regulatory Council (WSRC) and other sources.

Despite the perceived advantages, the water debt of the service providers for the Palestinian Water Authority (PWA) has continued to rise. PWA data shows that the

water debt has reached a significant amount of one and a half billion shekels by 2022. This study aims to examine the impact of installing prepaid meters on the water debt of PWA's service providers. The primary research question being addressed is: "What effect does the installation of prepaid water meters have on the water debt of the service providers for the Palestinian Water Authority?".

4.1.2 Data Analysis Overview

This chapter presents the results of the data analysis conducted in this study. The data were collected by reviewing and checking records from the Palestinian Water Authority (PWA), West Bank Water Department (WBWD), and Water Sector Regulatory Council (WRSC). Open interviews were also conducted to gather additional information. The collected data were analysed using Microsoft Excel Program.

In this chapter, descriptive statistics derived from interviews were utilized to examine the impact of service providers' installation of prepaid water meters for their end customers on the water debt of these service providers for the Palestinian Water Authority (PWA). The gathered data from the interviews were analysed to generate valuable insights and draw conclusions regarding the relationship between prepaid water meter installation and the resulting water debt of the service providers. The descriptive statistics provide a quantitative overview of the observed patterns and trends, shedding light on the potential effects of prepaid water meters on the financial situation of the service providers.

This chapter is divided into four sections, each addressing different aspects related to the installation of prepaid meters by service providers and its impact. The sections are as follows:

1. PWA Procedures to Encourage Service Providers to Install Prepaid Meters: This section explores the procedures and strategies implemented by the Palestinian Water Authority (PWA) to incentivize and encourage service providers to adopt prepaid metering systems. It examines the initiatives, policies, and support mechanisms put in place by the PWA to promote the installation of prepaid meters.
2. Sequence of the Process of Installing Prepaid Meters through PWA: Here, the chapter discusses the step-by-step process involved in the installation of prepaid meters by service providers through the Palestinian Water Authority (PWA). It outlines the sequential procedures, from obtaining approval to the actual implementation of prepaid meters, highlighting the key stages and requirements.
3. The Water Debt of Service Providers with Prepaid Meters and the Response of Local Utilities: This section focuses on the water debt accumulated by service providers who have installed prepaid meters. It analyzes the financial implications and challenges associated with prepaid metering systems, as well as the response of local utilities to the encouragement to install prepaid meters. The chapter examines the experiences, actions, and strategies employed by service providers to address their water debt.
4. The Social Influence of Prepaid Meters: The final section explores the social impact of prepaid meters. It examines the influence of prepaid metering systems on the social dynamics, behaviors, and perceptions of both service providers and end customers. It investigates how the adoption of prepaid meters has affected interactions, customer satisfaction, and overall social aspects related to water consumption.

By addressing these areas, the chapter aims to provide insights into the procedures, processes, financial implications, and social influences associated with the installation of prepaid meters by service providers in Palestine.

4.1.3 PWA Procedures to Encourage the Local Utilities to Install Prepaid Meters

The first decision (No. 03/51/13/م.و/س.ف) dated 2010, confirmed the role of the Palestinian Water Authority (PWA) in promoting and encouraging service providers to install prepaid water meters for their end customers. This decision aimed to inform service providers about the financial benefits provided by the government. According to this decision, PWA would deduct 50% of the cost of prepaid meters from the total debt of the service providers for the West Bank Water Department (WBWD)/PWA.

In a subsequent decision (No. 12/240/17/م.ر ح) on 12/2/2019, the government coverage percentage was increased to 100% of the total cost of the prepaid meters. This decision further emphasized the government's commitment to supporting the installation of prepaid meters by service providers.

To actively encourage the installation of prepaid meters, PWA initiated several steps, including:

1. Raising awareness: PWA conducted awareness campaigns and provided information to service providers about the advantages and benefits of prepaid meters. This aimed to increase their understanding and appreciation of the financial and operational advantages associated with prepaid metering systems.
2. Financial incentives: PWA introduced financial incentives, such as the aforementioned deduction of the prepaid meter cost from the service providers' total debt. This financial support helped alleviate the financial burden on service providers and encouraged them to adopt prepaid metering systems.

3. Streamlining the installation process: PWA implemented streamlined procedures and guidelines for the installation of prepaid meters. This aimed to facilitate the process for service providers and ensure efficient and timely implementation.
4. Technical support: PWA provided technical assistance and guidance to service providers throughout the installation process. This assistance included advice on meter selection, installation techniques, and ongoing maintenance.

By taking these steps, PWA aimed to actively promote and encourage service providers to install prepaid meters for their end customers. These initiatives were designed to maximize the financial and operational benefits of prepaid metering systems and contribute to the overall efficiency and sustainability of the water sector.

4.1.4 Sequence of the Process of Installing Pre-Paid Meters Through PWA

The process of installing prepaid meters through the Palestinian Water Authority (PWA) follows a specific sequence. The steps involved are as follows:

1. Proactive Communication: PWA initiates the process by sending letters to local service providers, encouraging them to apply for the installation of prepaid meters. These letters highlight the various benefits of prepaid meters, emphasizing economic advantages, improved management, and water consumption efficiency.
2. Formal Request: Interested service providers must submit a formal request to the central committee responsible for prepaid meters, either through PWA or the West Bank Water Department (WBWD), indicating their intention to install prepaid meters.

3. Review and Evaluation: The prepaid committee convenes to review and discuss the service provider's request. Factors considered include the technical condition of the service provider's water network, the percentage of water loss, the financial situation of the service provider, and the amount of water debt.
4. Debt Repayment Schedule: If the prepaid committee approves the request, the service provider is required to establish a schedule for repaying its previous debt to WBWD, the wholesaler, through specific payments and checks. Additionally, the service provider must commit to paying the monthly bills on time as a precondition for proceeding with the installation process.
5. Legal Agreement: Once the debt repayment schedule is in place, a legal agreement is signed between PWA (or WBWD) and the service provider. This agreement outlines the rights and obligations of each party involved in the prepaid meter installation process.
6. Tendering and Bidding: The Water Authority oversees the tendering and bidding process, which is the responsibility of the service provider. PWA ensures that the technical conditions are met and that the specified version of water meters, as determined by the technical committee, is installed before proceeding with the installation.
7. Installation Completion: After the prepaid meters have been installed and the handover committee has confirmed the final completion of the work, the Water Department/ PWA submits a request to the Ministry of Finance to deduct the service provider's water debt.

8. Ongoing Obligations: The service providers are obligated to pay their monthly bills and adhere to the terms of the signed schedule agreement. Failure to comply may result in the Water Department/PWA contacting the Ministry of Finance to revert the debt to its original amount, cancel the deduction, and demand full repayment of the debt by the service provider.

4.1.5 Response the Local Utilities to PWA's Encouragement of Installing Prepaid Meters

The response from local utilities to PWA's encouragement of installing prepaid meters has been positive, as indicated by the collected and analyzed data and interviews. The findings reveal a high demand among service providers to install prepaid meters for new users and replace existing postpaid meters with prepaid meters. Here are the key findings:

1. Increasing Number of Service Providers: By 2020, a total of 117 service providers had installed prepaid water meters for their customers, including some who were not customers of WBWD/PWA.
2. Adoption by WBWD/PWA Customers: Out of the 280 service providers who are WBWD/PWA customers, 110 of them had installed prepaid meters by 2020, showcasing a significant uptake within this group.
3. Growth in Prepaid Meter Installations: The total number of prepaid meters across all service providers has seen a substantial increase, rising from 19,827.0 in 2017 to 96,724.0 in 2020.

These findings highlight the positive response and growing acceptance of prepaid meters among service providers in Palestine. The increasing number of service providers opting for prepaid meters demonstrates their recognition of the benefits associated with this metering system.

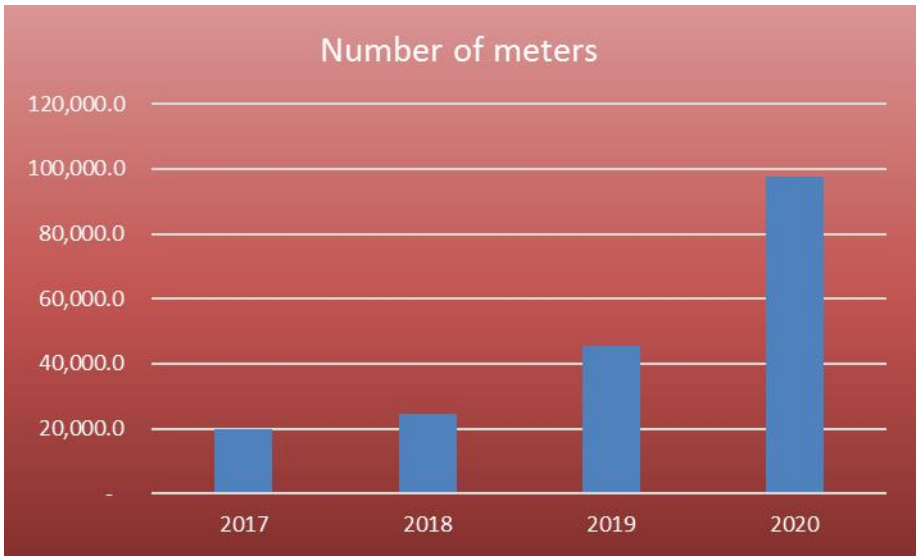

Figure (1): The Increasing in the Number of Meters through the Years 2017-2020

- According to the data, it was found that among the 110 service providers that are customers of WBWD/PWA, 33.32% of them have responded to PWA's encouragement and installed their prepaid meters through PWA. This indicates that a significant portion of these service providers have chosen to avail themselves of PWA's support and resources for installing prepaid meters.

However, it was also observed that a larger proportion, specifically 67% of these service providers, have opted to install their prepaid meters through other sources. These alternative sources include the Municipal Development & Lending Fund (MDLF) and other donors who have provided support for the installation of prepaid meters. This data highlights that while PWA's encouragement has influenced a portion of the utilities to install prepaid meters through PWA, a considerable number of utilities have sought alternative

avenues to implement this metering system. It indicates a diversified approach among the utilities in accessing resources and support for installing prepaid meters.

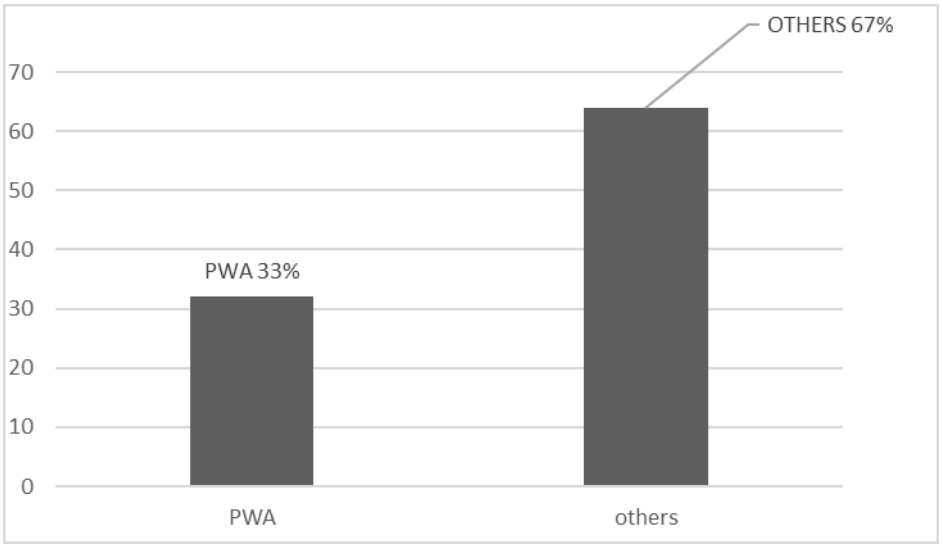

Figure (2): The Percentage of Prepaid Meters Funded by PWA Compared to The Meters Funded by Other Institutions

- The lack of coordination and communication among institutions in the Palestinian water sector has created challenges for the implementation of prepaid meters. The Water Authority (PWA) has the primary responsibility for managing the sector and promoting prepaid meters. However, there have been instances where institutions provided funding to local service providers without involving or informing the PWA.

The study found that 67% of local service providers received funding from other water sector institutions without the knowledge or involvement of the PWA. Consequently, these service providers were not obligated to pay their monthly water bills or address their existing debts. This approach to financing prepaid meters without active PWA involvement undermines the government's original intent of improving water debt collection.

To gather data on prepaid meters, the PWA relies on various sources such as meetings with local service providers and reports from the Water Sector Regulatory

Council (WSRC). Nevertheless, these findings highlight the crucial need for enhanced coordination and communication among institutions to ensure the effective implementation of prepaid meters and overall improvements in the Palestinian water sector.

4.1.6 The Water Debt of the Utilities with Regard to the Prepaid Meters

According to the data provided by WBWD/PWA, the water debt of service providers in Palestine has experienced a significant increase, amounting to one and a half billion shekels by 2022. This rise in debt can be attributed to various factors that contribute to the financial challenges faced by the local service providers.

One key factor is the unstable political situation in Palestine, which has created an unfavorable economic environment for Palestinian citizens. Due to these circumstances, paying water bills often takes a lower priority among their financial obligations, resulting in financial difficulties for the service providers. Consequently, their ability to settle their water bills with WBWD/PWA becomes compromised.

Another contributing factor to the mounting water debt is the accumulated debt from Palestinian camps, which has remained uncollected by the service providers due to the ongoing political situation since 1988. The inability to collect these debts further adds to the financial burden for the service providers.

In addition, the poor performance of many service providers in debt collection exacerbates the debt problem. Some service providers struggle to effectively collect payments from customers, which negatively impacts their ability to meet their financial obligations to WBWD/PWA.

Furthermore, it has been observed that certain service providers divert funds generated from water prices for other expenses instead of remitting them to

WBWD/PWA. This misallocation of funds further contributes to the accumulation of debt.

It is important to note that these factors are not exhaustive, and there may be additional reasons for non-payment of WBWD/PWA bills, which could be explored in future studies.

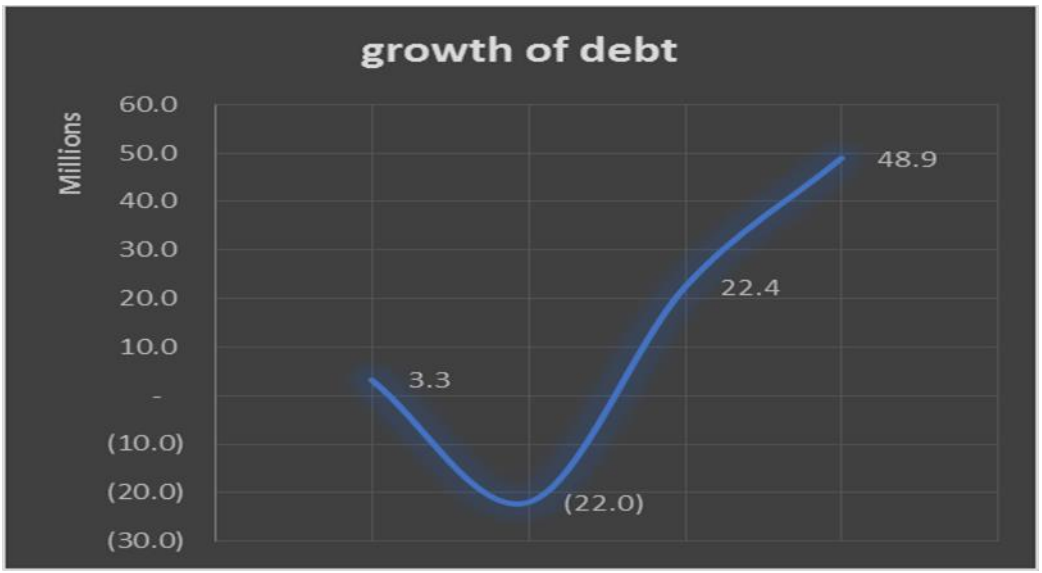

Figure (3): Growth of Total Debt

- According to the data, there has been a significant increase in the number of prepaid meters installed by service providers, from 19,827 in 2017 to 97,424 in 2020. Alongside this growth, the amount of debt among service providers who adopted prepaid meters also showed a notable rise, from 3,296,148 in 2017 to 48,940,626 in 2020. However, it's crucial to highlight that the installation of prepaid meters has resulted in a higher collection rate of water bills for these service providers, as reported by the WSRC. This suggests that the affordability of paying bills for the Palestinian Water Authority (PWA) has improved among these providers.

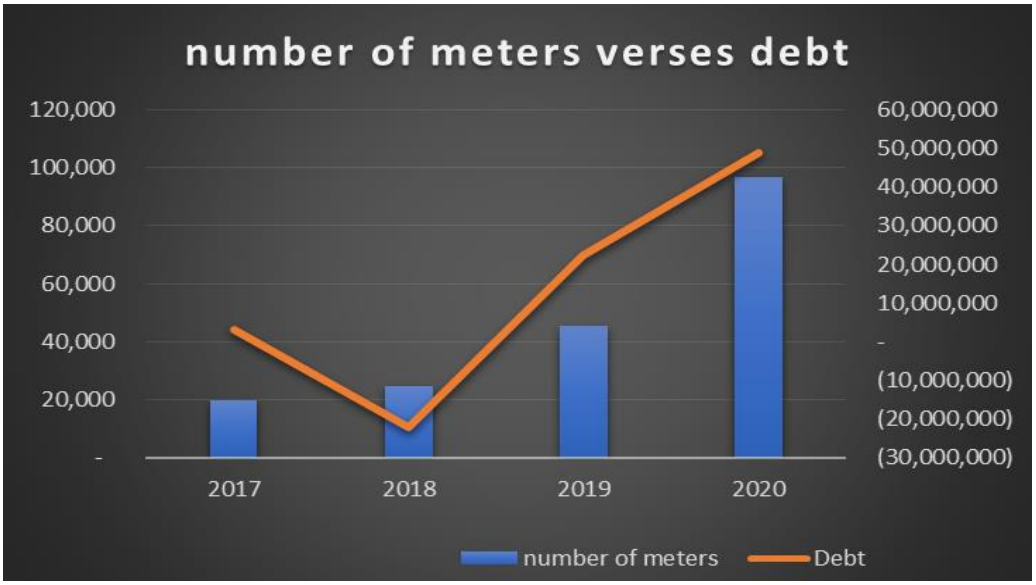

Figure (4): number of prepaid meters VSdebt

-by studying the case of the thirteen service providers who started installing prepaid meters for their customers in 2017, the starting amount of prepaid meters was 19,827 meters in 2017. Over time, the number of meters increased to 26,731 by 2020. Regarding the debt of these service providers for the Palestinian Water Authority (PWA), it was 3,532,165 Nis in 2017. However, by 2020, the debt had risen to 5,500,257 Nis.

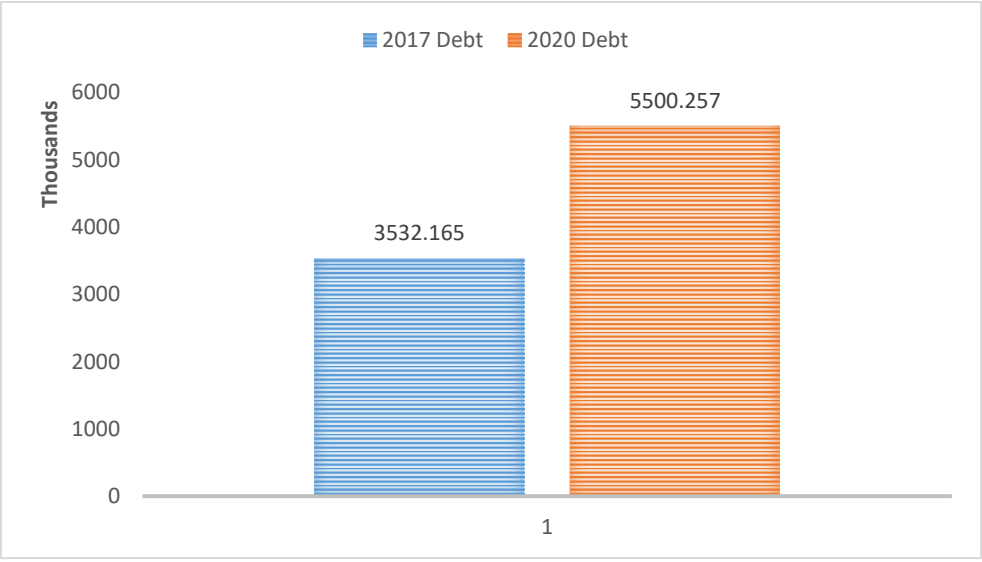

Figure (5): Debt of utilities installed prepaid meters between 2017-2020

4.1.7 Pre-Paid Impact on The Social Side

The installation of prepaid meters, as outlined in Cabinet Declaration No. 30/51/13/م.و/س.ف for the year 2010, and Declaration No. 05/60/17/م.و/ر.ح for the year 2014, along with the Memorandum of Understanding on water prepaid meters in Palestine, has had implications for the social aspect of water access. These declarations emphasized that utilities intending to install prepaid meters must ensure that families with low incomes are adequately provided with sufficient quality and quantity of water.

However, the study revealed that different utilities implementing prepaid meters have adopted various procedures to address the needs of low-income families who may struggle to recharge their water meters. Unfortunately, the data indicates that there is no standardized approach among utilities in dealing with this issue. Consequently, these procedural variations may have an impact on people's lives. It would be beneficial to establish unified procedures overseen by a key institution in the water sector, such as the Water Authority (responsible for policies) or the Water Regulatory Council (responsible for monitoring utilities' performance). This would ensure fair distribution of water to low-income families, regardless of their location, and guarantee adherence to a consistent methodology. The Ministry of Social Affairs should also be involved in addressing this matter.

Regarding water laws and regulations in Palestine, the study found that the Palestinian legislature has taken necessary measures to ensure legal protection for the continuity of water services. All water resources in Palestine are considered public property, guaranteeing every citizen the right to access water services of appropriate quality and quantity (Palestinian Water Law No. 3, 2002).

According to Palestinian law, both public institutions and private water service providers are obligated to take appropriate action to safeguard this right and develop water services. If water service is disconnected for any reason, any citizen has the right to file a complaint before the court, specifically the urgent relief judge (Civil Procedure and the Palestinian Trade Law No. 2, 2001).

Based on Palestinian legislation, the study concludes that prepaid meters are legally permitted, while water disconnection due to non-payment is deemed illegal.

Chapter Five:

Conclusions and Recommendations

5.1 Introduction

The installation of prepaid meters in Palestine has been a controversial issue, with concerns raised about its impact on cost recovery, debt recovery, and the social implications for water users' rights. This research aimed to provide an initial evaluation of the implementation of prepaid meters in Palestine, focusing on these key areas. The study analyzed the various procedures and approaches adopted by different water service providers in dealing with low-income families, as well as the existing laws and regulations in Palestine that govern the provision of water services. By doing so, the research sought to provide insights into the effectiveness and fairness of the prepaid meter system in Palestine, and highlight areas for improvement and further study.

5.2 Conclusions

After analyzing and investigating the outcomes of implementing prepaid meters to decrease water debt, this study concludes that prepaid meters have significantly enhanced the collection rate for the service providers and consequently decreased citizens' water debt. Furthermore, the implementation of prepaid meters could also enhance the collection rate for WBWD/PWA. However, it was found that the water debt of service providers for the bulk provider WBWD/PWA was not distinctively affected decrease for several reasons:

1 - The study found that out of the 298 service providers, 112 had installed prepaid meters as of 2020. Of these, 100 were customers of the West Bank Water Department/PWA, indicating that roughly one third of WBWD/PWA's customers had

prepaid meters by 2020. Additionally, 33% of these customers (33) financed their meters through PWA, but according to PWA, only seven of them comply with the scheduled payment agreement and pay their monthly bills. Therefore, this number of service providers is insufficient to reduce the accumulated water debt.

2- According to the study, in 2017, thirteen service providers began installing prepaid meters for their customers, resulting in the installation of 19,827 meters. Over time, the number of meters increased to 26,731 by 2020.

Regarding the debt of these service providers with the Palestinian Water Authority (PWA), it was recorded as 3,532,165 Nis in 2017. However, by 2020, the debt had risen to 5,500,257 Nis. This signifies a notable growth in the debt accumulated by these service providers with the PWA over the mentioned period

3- The study highlights that without the involvement of the Water Authority, there is a risk of the prepaid meters not meeting the technical qualifications agreed upon in the cabinet declarations. The council of ministries has assigned PWA to ensure the technical qualifications of the meters and their versions. Therefore, the study suggests that coordination with PWA is necessary during the installation of prepaid meters to ensure that the agreed technical qualifications are met.

4- The study identifies several factors contributing to the accumulation of water debt, including the unstable political situation in Palestine, financial difficulties for citizens in paying their water bills, non-payment by some utilities, and the use of water prices for other expenses. Although prepaid meters can assist local utilities in collecting bills from customers, the aforementioned factors indicate that they may not be effective in reducing the overall water debt for PWA.

5- The study found that information regarding the installed prepaid meters, including the number of meters, their versions, installation locations, and the percentage of prepaid to postpaid in each service provider, is scattered across several institutions. These institutions have not provided PWA with this information, despite the water authority being the main player and responsible institution for prepaid meters in the water sector as stated in the water law. This information is crucial in determining the appropriate approach to addressing the debt issue with each service provider. Regular access to this information is therefore a significant factor in finding the best solutions for WBWD/PWA

6- The study revealed that many service providers find the process of installing prepaid meters through PWA confusing, despite PWA's efforts to inform them through various means. This highlights the need for continuous efforts by PWA, the Ministry of Local Governance, and the Water Regulatory Council to educate service providers about the installation process and its sequence of steps.

7- One reason why the implementation of prepaid meters did not effectively reduce water debt is that 67% of the service providers who installed them obtained financing from sources other than PWA. As a result, these providers were not required to schedule their previous debts or commit to paying their monthly bills to WBWD/PWA, preventing PWA from collecting outstanding debt and ensuring regular monthly payments. To rectify this issue, financing institutions should have collaborated with PWA and made obtaining PWA's approval a prerequisite for receiving funding, which would have allowed PWA to achieve its goal of installing prepaid meters.

5.3. Recommendations

It is recommended that PWA collaborate with other institutions involved in the water sector to encourage service providers to install prepaid water meters in their respective regions. This effort would help the water authority achieve its goal of reducing the debt of service providers, ultimately enabling PWA to improve water services for Palestinians and achieve financial sustainability. In order to achieve that, the study recommends several suggestions:

1- The study recommends that the Palestinian Water Authority (PWA) should capitalize on the interest of many service providers in prepaid meters and encourage them to install new prepaid meters for new customers and replace existing postpaid meters with prepaid ones for existing customers. PWA can achieve this by increasing awareness about the benefits of prepaid meters at all levels using different social media tools, workshops, and meetings with service providers. The awareness campaign should highlight the financial, managerial, and technical advantages of installing prepaid meters, as well as the positive impact of prepaid meters on water consumption rationalization. Additionally, PWA should explain the financial benefits of prepaid meters, such as deducting the cost of prepaid meters from the accumulated debt of service providers that have debt or debiting the cost of meters for the benefit of service providers with no previous debt.

2-The study suggests that all institutions involved in prepaid meters, such as the Ministry of Local Government, Municipal Development & Lending Fund, Water Sector Regulatory Council, and other bodies involved in funding or installing prepaid meters, should coordinate with the Water Authority. This ensures the involvement and cooperation of the Water Authority in any grant related to the installation of prepaid

water meters for service providers. The study proposes that each service provider should obtain PWA's approval as a pre-condition for obtaining the grant for installing prepaid meters. Therefore, scheduling debts and commitment to pay the monthly bill should be contingent on the approval of the grant for installing the meters. Moreover, the Water Authority should also be involved in the approval of the technical specifications of the meters.

3. The study recommends that the Water Authority should monitor the compliance of service providers that installed prepaid meters and had their debts deducted. The Water Authority should ensure that service providers comply with the payment of monthly bills and adhere to the agreed-upon schedule. If any service provider violates the conditions of the legal agreement, the Water Authority should take legal action against them and re-add the deducted amount of debt to the total amount before the agreement. The Water Authority should also follow the procedures outlined in declaration no(17/215/17/م.و/ر.ح).

4. The study recommends that institutions, such as the Ministry of Local Governance, Water Sector Regulatory Council, Municipal Development & Lending Fund, or any other organization that intends to finance prepaid meters for any service provider, should coordinate with PWA to ensure that the technical terms of the prepaid meters, as approved in the cabinet declarations, are fulfilled. The Water Authority should be a main partner in supervising the tender conditions and the final handover of the meters.

5. The study suggests that a centralized database containing comprehensive information about prepaid meters in Palestine should be established in the Water Authority. All relevant bodies in the water sector, such as the Water Sector Regulatory Council (WSRC), Municipal Development & Lending Fund (MDLF), Ministry of Local

Governance (MoLG), Ministry of Finance (MoF), and service providers, should collaborate to ensure the regular update of the database with accurate information. This will help PWA to have a clear understanding of the prepaid situation in Palestine and enable accurate distribution of prepaid meters. In addition, it will assist in comprehending the financial and managerial status of each service provider regarding the collection of water prices, and therefore facilitate finding suitable solutions to address any water debt issues and monthly bill payments. Moreover, this will enable all institutions in the water sector to exchange information easily and efficiently.

6. he study recommends that the Water Authority should utilize the cabinet declaration number (17/215/17/م.و/ر.ح)) for the year 2018 regarding the debts of all water service providers who are customers of WBWD. This declaration requires service providers to schedule their previous debt and commit to paying the monthly bills. In case of disobedience, the Ministry of Finance is authorized to deduct the debts from the payable expenses for the service providers, which include road transport fees and crafts licensing fees, as well as freezing of project allocations. The Water Authority should coordinate with the Ministry of Finance to enforce this declaration and ensure that service providers comply with their obligations. As this declaration can be used for the utilities that installed prepaid or postpaid meters, then it is a strong method to gain the water dept.

It should be noted that the Water Authority has collaborated with the Ministry of Finance to implement this declaration in some instances. However, the study suggests that this procedure should be utilized more frequently in dealing with service providers who have outstanding water debts.

7. The study recommends that PWA, as the primary institution responsible for prepaid meters, in cooperation with the Water Regulatory Council, responsible for monitoring the performance of service providers, and the Ministries of Social Affairs and Local Governance, responsible for all service providers, should develop a clear and detailed procedure for dealing with low-income families. This procedure should be implemented by service providers that have installed prepaid meters for their customers, and it should be fair and transparent for both the citizens and the service provider when recharging prepaid meters.

Furthermore, the study suggests that these procedures should be formalized as a bylaw and approved by the Council of Ministers to ensure their proper implementation and enforcement.

Chapter Six:

Future Research

The following topics are recommended to be studied in the future:

-The reasons for service providers not paying the water bills and debts for WBWD/PWA.

-The procedures implemented by service providers for low-income families in recharging their prepaid meters.

-The feasibility of recharging the water card through mobile and internet platforms in Palestine.

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ملخص

تقدم هذه الرسالة تحليلا لامكانية تحقيق حل الديون المتراكمة على مزودي خدمة المياه لصالح سلطة المياه الفلسطينية من خلال استخدام عدادات المياه المسبقة الدفع ،حيث يتجسد الهدف الرئيسي لهذه الدراسة في تقييم تأثير تركيب عدادات مسبقة الدفع على الدين العام لمزودي الخدمة لدى سلطة المياه.

فمن خلال اتباع منهجية الوصف التحليلي ،تم بحث ودراسة المؤثرات المختلفة المتعلقة بتركيب عدادات مسبقة الدفع من خلال دراسة دور مجلس الوزراء الفلسطيني وسلطة المياه الفلسطينية ومجلس تنظيم قطاع المياه وكذلك موقف مزودي الخدمة ،وتم تحليل النتائج المترتبة على تركيب عدادات مسبقة الدفع على مزودي الخدمة وانعكاس ذلك على التعامل مع ديون المياه لدى سلطة المياه وذلك من خلال تحليل مصادر معلوماتية اساسية تتمثل ببيانات مالية متعلقة بالدين العام للمياه خاصة بسلطة المياه وكذلك مجلس تنظيم قطاع المياه ، وبالاعتماد على مصادر اخرى تمثلت بالاوصول الى نتائج من خلال ادراءات مقابلات خاصة لهدف هذه الدراسة مع عدد من الخبراء المختصين بموضوع عدادانت مسقبقة الدفع بالاضافة الى مقابلات مع مزودي خدمات مياه ممن قاموا بتركيب عدادات مسبقة الدفع ،بالاضافة الى مصادر اخرى تمثلت بالبيانات الصحفية والدراسات المتعلقة بموضوع عدادات مسبقة الدفع.

وبتحليل النتائج نتوصل الى ان نقاط القوة المرتبطة بتركيب عدادات الدفع المسبق كالية لحل مشكلة الدين العام هي انها كاداة جيد ة اذا تم التغلب على مجموعة من المعيقات الداخلية والخارجية التي تمنع تحقيق هذا الهدف، ومنها معيقات خارجية مرتبطة بتأثير الاحتلال وسيطرته على مصادر المياه وانعكاس ذلك على عمل سلطة المياه وتسعيرة المياه وغيرها بالاضافة الى معيقات داخلية قانونية مرتبطة بعدم قيام مزودي الخدمة بتسديد الديون المترتبة عليهم لسلطة المياه ،وذلك من خلال تعاون جميع الشركاء في قطاع المياه بحيث يتم فهم ضرورة اشراك سلطة المياه كطرف اساسي في اي منحة لتركيب العدادات المسبقة الدفع وكذلك التعاون من قبل وزارة المالية كطرف اساسي لتحصيل هذه الديون ،بالاضافة الى ر فع الوعي العام بالاهمية والفوائد المترتبة على تركيب العدادات لصالح مزودي الخدمة والمواطنين وغيرها من العوامل الواردة في الرسالة .

وخلصت الرسالة ايضا الى ان الدين العام للمياه قد ارتفع حتى وصل الى مليار ونصف المليار شيكل بحلول عام 2022 بالرغم من الزيادة الملحوظة في تركيب عدادات مسبقة الدفع حيث

تبين ان تركيب العدادات المسبقة الدفع قد ادى الى حل مشكلة الديون الخاصة بالمواطنين لصالح مزودي الخدمة الا ان انعكاسه على ديون مزودي الخدمة لدى سلطة المياه لم يكن بنفس التاثير وذلك بسبب العديد من الاسباب الواردة في الرسالة .

وخلصت الدراسة الى انه وفي حال توفير مجموعة من العوامل والدعم على كافة المستويات الكافي فانه يمكن تحقيق الهدف الذي من اجله قامت سلطة المياه بتحديد هذه الاداة كحل لتقليص الدين العام