

**Integrating sustainability assessment into public
works development in Jordan**

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Submitted in accordance with the requirements for the degree of
Doctor of Philosophy

The University of Leeds
School of Civil Engineering

August, 2020

Declaration

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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Acknowledgment

Many thanks are due to God for giving me the ability to complete this thesis.

Further thanks and appreciation are due to my supervisors Professor Nigel Smith and Mr Krisen Moodley for their great support, guidance, inspiration, encouragement and their valuable comments which significantly impacted my PhD studies.

Thanks also due to my sponsorship “Isra University in Jordan” for giving me this chance to undertake my studies at the University of Leeds.

I owe a massive debt of gratitude to my parents for their support throughout my life. I am lucky to have their support throughout my studies and they will always be a source of motivation and inspiration.

Many thanks go to my brothers Othman and Abdel Kareem and sisters Areej, Ghadeer, Tamara and Yasmin for their support and encouragement, which have provided great motivation.

I would also like to thank my friends in the United Kingdom, who encouraged me during my studies.

Finally, I would like to dedicate this work to my beloved country “The Hashemite Kingdom of Jordan”.

Abstract

Most developing countries are suffering from random unplanned economic growth and excessive resource consumption that limit creating a more Public Works (PWs) infrastructure projects which are essential for suitable human life. Jordan as one of the developing countries is suffering from limited natural resources and problems in achieving a high level of socioeconomic growth. Indeed, the increased number of people in Jordan imposes the government to plan for creating more PWs infrastructure projects development. In this regard, PWs development should be designed, built, maintained, and adopted in ways that meet the changing needs of society and provides environments in which people live and work enjoyably and efficiently and improves the quality of life and service provision.

In line with the need to create PWs development that can reduce environmental damage, achieve social welfare, improve community wellbeing and enhance economic growth, sustainability becomes increasingly popular worldwide. However, sustainability is not well recognised into PWs development in developing countries including Jordan. The evidence that PWs development still has long-lasting environmental, social and economic negative impacts upon communities. This is clear that in order to reduce long negative lasting impacts of PWs development, its development from creating policies and plans, to select individual projects should be assessed to what extent they contribute to sustainable development in Jordan.

Sustainability assessment (SA), however, is currently not factored into the existing practices of PWs development that leads to unsustainable development being promoted in Jordan. This research, therefore, seeks to show how to integrate SA into PWs development in Jordan. In order to achieve this, Modified Grounded Theory (MGT) was used. The incorporation of recommendations and findings resulting from the MGT have helped to propose a novel integrated approach. The findings indicated that there is a need to change the existing PWs development practices by identifying the SA process, goals and targets, linking the development levels, creating an enabling environment, and, lastly, restructuring the policymaking process to select individual projects. Then, the integrated approach was validated with Jordanian and Non-Jordanian experts. The validation's findings recommended several suggestions that need to be carried out for the improvement of the integrated approach. This indicated that it is favourably recommended for its usability, usefulness, and appropriateness and its application to assess the extent to which emerging policies, plans, and projects of PWs achieve sustainable development.

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Abbreviations

Symbols	Definition
BREEAM	Building Research Establishment Environmental Assessment Method
CEEQUAL	Civil Engineering Environment Quality
GBD	General Budget Department
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GNA	Qatar National Agency
UNDP	United Nation Development Programme
GSAS	Global Sustainability Assessment System
JGBG	Jordan Green Building Guide
JOD	Jordan Dinar
LCC	Life Cycle Cost
LEED	Leadership in Energy and Environmental Design
MCM	Million Cubic Meter
MDGs	Millennium Development Goals
MoE	Ministry of Education
MEMR	Ministry of Energy and Mineral Resources
ME	Ministry of Environment
MGT	Modified Grounded Theory
MH	Ministry of Health
MPIC	Ministry of Planning and International Cooperation
MPWH	Ministry of Public Works and Housing
MT	Ministry of Transportation
MWI	Ministry of Water and Irrigation
NIC	National Infrastructure Commission
OGC	Office Government of Commerce
PWs	Public Works
SDGs	Sustainable Development Goals
SPWs	Sustainable Public Works
UNEP	United Nation Environmental Programme

Chapter 1 Introduction

1.1 Introduction

The purpose of this chapter is to present the introduction to the current research. It presents the research background, the research problem, the aim and objectives of the research, besides specifying the scope of the research and contribution to knowledge, it outlines the methodology adopted for the research. Eventually, it describes the structure of the thesis, which is divided into nine chapters.

1.2 Background

It is widely recognised that the development of a community means to expand or realise the potential of gradually creating a greater or better state (Daly, 1990). As a result, a specific term for development is being used, known as 'sustainable development' since 1987 (Brundtland, 1987) that combines in a balanced way environmental, social, and economic issues (Kivilä et al., 2017) which has become a growing concern worldwide. As a concept, it has been evolved to manage emerging issues such as global warming, natural resource depletion, and decreasing socioeconomic controversy (Alam et al., 2017). Sustainable development, therefore, is commonly accepted as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1987). It has gained momentum since the declaration of the sustainable development goals (SDGs) 2030 Agenda by the United Nations (UN) (UN, 2015a; UN, 2019).

Four years ago, world leaders came together at the UN in order to adopt the 2030 Agenda for sustainable development (UN, 2019a). Therefore, making progress towards sustainable development is more important now than ever. This is evident from the societies that are obligating themselves to sustainable development by attempting to improve environmental quality, social equity, and economic welfare (EU Parliament, 2019; Shaker and Sirodoev, 2016; UN, 2019a). However, the urgent change in Earth's systems and human activity and interactions in human nature are increasing. Humanity is enduring a period of unparalleled change driven largely by exponential population growth and a demand for improved material well-being (Shaker and Sirodoev, 2016). The human population has grown exponentially since the industrial revolution of the late 1700s (Wu, 2008). Therefore, human activities

have continued to hinder Earth's life-supporting ecosystems, and these activities will likely intensify as population growth and consumption patterns increase (Weinzettel et al., 2013). As a result, the UN charter for sustainable development envisioned institutional changes to deal with the increase of human activities that create sustainable development issues in order to manage them effectively (UN, 2015a). Therefore, it is essential for understanding these issues which are associated with each country (UN, 2015a). In fact, countries' specific interests, challenges, and sustainable development issues which require to be addressed may differ due to the overall delivery environment, development priorities, the capacity of government and local industry that influencing moves towards sustainable development (Pope et al., 2017; Yigitcanlar et al., 2015). Thus, achieving sustainable development in the context of developed countries and developing countries is differ (Stiftung, 2019).

Jordan is one of the developing countries that is concerned about achieving sustainable development. It suffers from water scarcity, overreliance on external resources as such energy, inequalities across the country, deep poverty, and the high unemployment rate (MPIC, 2016c; MPIC, 2017a). Therefore, several practices have been adopted by the government in promoting sustainable development (GoJ, 2015; ME, 2016). Some of these practices are having policies, strategies in regards to the environment, society and economy, guidelines as such environmental impact assessment (EIA) while others as a code of practices as such Jordan Green Building Guide (JGBG), etc., as a mean of achieving Jordan's sustainable development (GoJ, 2015; ME, 2016). However, despite all these efforts, their positive impacts still weak in providing a balanced society, creating a friendly environment and influencing the value of economy where opportunities are available and the gap between governorates is closed (MPIC, 2017a). The evidence can be seen in Jordan from the intensified and unsustainable demand of the available resources, resulting from the rapid population growth that leads to increased degradation of its natural ecosystems and erodes the life-supporting systems that uphold human civilization.

In fact, due to human pressure on urban spaces, there will increasingly need for infrastructures that are sustainable (Marcelo, 2015; Serebrisky et al., 2018), particularly in developing countries including Jordan. They should provide the intended living conditions for human life and underpin the livability of communities through the delivery of effective public services (Bhattacharya et al., 2016; Wang, 2014; Zhang et al., 2014). Therefore, due to the unique nature of the country under investigation, meeting the service requirements of citizens needs a huge effort from the government to cope with the growing population. In fact, there is an increased

demand for economic PWs development in Jordan such as energy (oil and gas, power generation and supply), telecommunications, transportation (roads, bridges, tunnels, and airports), water (sewerage, supply and waste treatment), and social PWs development (buildings, hospitals, and education institutes) which need significant efforts with the goal to meet people's service requirements (MPWH, 2017a).

However, investments in PWs development are often the sources of negative sustainable development issues which have long-lasting, impacts on its environmental, social, and economic dimensions (Alam et al., 2017; Bhattacharya et al., 2016; Shaker and Sirodoev, 2016; Shen et al., 2010; Wang, 2014; Zhang et al., 2014), that causes rapid resource depletion and harmful discharges into the environment (Shaker and Sirodoev, 2016). PWs development increases the demand for energy consumption which, in turn, results in the consequence of approximately 70% of global greenhouse gas (GHG) emissions (World Bank, 2018). Moreover, if it lacks on achieving socioeconomic growth, it will not help private enterprises, markets, and competition and will decrease the level of social welfare (IFC, 2016).

In line with the promotion of sustainable development, PWs development should be delivered to bring benefits across environmental, social, and economic dimensions and able to meet the needs and express the greatest potential in the present and in a long term (Shen et al., 2010). This means that PWs development should promote a pattern of development that is compatible with a safe environment and biodiversity, ensure ecological balance, and intergenerational equity. Therefore, assessing the impacts of PWs development according to these dimensions can make significant contribution to the development of society and enhance economy, and therefore have a special societal responsibility, in particular with regard to the protection of environment and the use of resources (Alam et al., 2017; Bryce et al., 2017; Kostevšek et al., 2015; Shortall et al., 2015; Singh et al., 2012).

In fact, sustainability assessment (SA) of PWs infrastructure development has been increasing since 1990, and its expansion to building came later (Bond et al., 2012; Bryce et al., 2017; Pope et al., 2017). Therefore, in many countries, SA has become popular since the beginning of the 21st century, particularly in the developed world (Bryce et al., 2017). Sharifi and Murayama (2013), argued that SA is a tool to measure how sustainability is achieved in PWs infrastructure development. Consequently, PWs infrastructure development should be assessed at the early stages of development in order to direct the decision-making process for whether it contributes to sustainable development or not (Bond et al., 2012; Pope et al., 2017).

However, some voices consider that SA as a tool to achieve sustainable development, can delay their works and affect the decision-making process (Bond et al., 2013). One of the controversial arguments is that SA can make trade-offs between socio-economic and environmental dimensions. It should ensure a balance between the three dimensions of SA and the interactions between them (Pope et al., 2017; UN, 2015b). Others argued that due to the lack of institutional and technical capacity and even the political will, developing an approach for achieving sustainable development becomes a challenge (Alkhasawneh, 2015; Awad, 2016; UN, 2016b). Moreover, adopt sustainable practices into PWs development is costly in developing countries (William Dobson, 2013). This might bring such challenges in achieving sustainable development rather nor overcome these challenges, however. Bhanot et al. (2017) and Peenstra and Silvius (2018), have other views that challenges affecting the achievements of sustainable development become the main enablers once they are being overcome. Therefore, there is a need for a systematic approach to assess the negative impacts of PWs infrastructure development in need of promoting a sustainable state. In fact, worldwide, achieving sustainable development is now more complex and interconnected by its very nature requires an integrated and systematic approach to decision-making and investments (Pope et al., 2017). Unfortunately, this approach is currently lacking in most developing countries including Jordan, and hence achievement of sustainable development becomes difficult.

In this regard, several recent studies have underlined this way of conceiving sustainable development could be misleading, calling for an integrated approach. The UN General Assembly in 2015 proposed the 2030 Agenda to gear up governments worldwide which has widespread recognition to achieve sustainable development (Nilsson and Persson, 2017). It is thus important to move forward and acquire more sustainable behaviour that ensures sustainable PWs (SPWs) development is translated into on-the-ground reality. As a result, the need for an integrated approach in need to achieve sustainable development has become a central concern worldwide including Jordan. However, existing PWs development practices in Jordan are practiced conventionally without considering SA as a fundamental part of the overall process. Consequently, the outcomes from these practices still face a lack in meeting the service requirements of citizens and achieving the intended situation of sustainable development. Therefore, much work still needs to be done in order to enable SPWs development in Jordan.

Indeed, the current research is not about studying sustainability and its SDGs, while this research is about developing an integrated approach to assess the extent

of which PWs development can achieve sustainable development. It shades on the reduction of the negative impacts of PWs development in Jordan on the environment, society, and economy. Therefore, it is hoped that the current research can contribute to a better understanding of showing how to integrate SA into PWs development in Jordan, which to date has received little attention in the research literature.

1.3 Research Problem

The government of Jordan works hard to meet people's requirements, improve their living standards, and enhance economic growth with significant infrastructure investments (Aljadeed, 2017; Alqatawneh, 2013). These investments in PWs development relate to transportation, roads, drinking water and wastewater networks, and electricity, etc. should be increasingly targeted to reduce the negative impacts on achieving sustainable development in the country.

Qureshi (2016b) and Sourani (2013) pointed out that it is important to establish strategic direction in order to formulate public policies toward sustainable development. As a result, many policies and plans have been issued in Jordan with respect to the environment, water, climate change, social and economic growth at each level of development from the national level – taking into consideration the national strategy– to the local level, such as local development plans. However, while Jordan has achieved some successes, important gaps and shortcomings in policy and action remain, due to a mix of, regulatory, institutional, political, and economic factors (Combaz, 2019). This has led to unsustainable development being promoted which, in turn, results in several challenges for the country. These challenges include water scarcity, overreliance on external resources, inequalities across the country, deep poverty, and the high unemployment rate (MPIC, 2016c; MPIC, 2017a). In fact, the ongoing efforts are conducted sectorially to develop conventional policies, plans, and PWs development projects, which results in the national policy not being linked with on-the-ground realities. In addition, most efforts in Jordan are conducted individually at both strategic and project levels that their contributions to achieve sustainable development become difficult.

In fact, the policy is the source of projects (Qureshi, 2015; Tadege Shiferaw and Jonny Klakegg, 2012). In this regard, Mansourianfar and Haghshenas (2018) pointed out that realising the positive impacts of PWs projects can only happen if the assessments are conducted from the early stages of the emerging policies and plans to ensure compliance with sustainable development. However, in Jordan, assessing

emerging policies, plans, and projects of PWs development is lacking, particularly their long-term impacts. In addition, there is no clear evidence from literature and documentary data on SA approaches that directs the decisions in relation to delivering SPWs development. Although many western developed countries have realised that it is necessary to assess their policies, plans, and PWs projects; Jordan has not.

Unlike researchers, therefore, this research will encompass simultaneously all practices which have strong influences on the integration of SA into PWs development in Jordan. However, there are a great many SA practices at the international level while in Jordan are not. Therefore, leveraging the international SA practices in PWs development in Jordan is needed. Thus, a combination, interactions, and interrelations between those practices within a single approach become necessary. As a result, the potential approach can ensure the strategic alignment of PWs development remains consistent with the national policy of the country; to improve people's community and their social life, enhance economic growth and reduce the negative impacts on the environment. The current research, therefore, is carried out in order to solve the research problem and answer the research question: *'How can SA be integrated into PWs development in Jordan?'*

1.4 Research Aim and Objectives

The aim of the current research is to show how to integrate SA into PWs development in Jordan.

In order to fulfil this aim, the following objectives should be achieved:

1. To review the current situation of Jordan and analyse the influences of PWs development in Jordan on achieving sustainable development.
2. To review international SA practices and understand their application in PWs development from the policymaking process to select individual projects.
3. To review and evaluate the existing practices of PWs development in Jordan compared to the international level from the policymaking process to select individual projects.
4. To identify practices, enablers, and processes which have strong influences on the integration of SA into PWs development in Jordan.
5. To develop an approach for integrating SA into PWs development in Jordan from the policymaking process to select individual projects.

1.5 Research Scope

The research focuses on studying the integration of SA in the context of Jordan and in specific of PWs development. PWs development refers to economic and social PWs infrastructure projects in Jordan (MPWH, 2004). In fact, the policy is the source of PWs projects. Therefore, the early consideration of SA throughout the delivery process of PWs development is needed and from the policymaking to select individual projects. It is very important, therefore, to discover the existing practices of PWs development in Jordan. However, it has been indicated that their contributions to achieving sustainable development are lacking, which, in turn, resulted in the need to leverage the international practices of SA into PWs development in Jordan.

The current research is not about studying the sustainability practices in technical terms which refer to energy, water, and environment, etc. while this research is about leveraging the international SA practices, enablers and processes in developing an integrated approach. This refers to the extent to which the emerging policies, plans, and projects of PWs development achieve social needs and ensure high levels of economic growth with less damage to the environment. Additionally, the research focuses theoretically on the PWs development industry of Jordan due to its importance and problems while practically development have been fed also from fieldwork sources due to the shortage of literature in this area.

Moreover, the research concentrates on PWs development projects which are fully funded by the government of Jordan as they can be implemented by the Ministry of Public Works and Housing and within its normal delivery. Furthermore, the research fieldwork was conducted with Jordanian experts and non-Jordanian experts (which involves organisations, ministries, associations, consultancy firms, NGOs, and universities) that are found to be the best choice to be targeted since they are structured and combined with the public and non-public sectors. Insights were utilised from not only policymaking organisations but also those implementation organizations, intranational institutions, and large firms that deal with sustainability in the PWs development sector.

1.6 Summary of Original Contribution to Knowledge

The current research makes original contributions in the following means:

In theory, it is the first time that a novel integrated approach has been developed that shifts the conventional way of PWs development in Jordan into

sustainable behaviour. Second, it is the first in its kind that the current research extends the theoretical knowledge of understanding and clarification of international SA practices and their critical analysis including their linkages with PWs development as there is confusion in the literature. Third, it is one of the few scholarly efforts in Jordan that have been done to specifically explore the strategic level.

In practice, the empirical findings and validity of the integrated approach have indicated that it is favourably recommended for its application in improving the outcomes from the policies, plans, and projects of PWs development to achieve sustainable development. Second, it is the first methodological process that can assist policymakers, planners and developers to make the right decisions in order to be aware of PWs impacts in Jordan. Finally, the integrated approach allows the country to be updated regularly due to uncertainties that may occur. Full details of the original contribution to knowledge are given in Chapter 9 (Conclusion).

1.7 Outline of Research Methodology

The current research investigates both the existing practices of PWs development in Jordan and international SA practices, starting from the policymaking process to select individual projects. Literature and documentary data have been substantially reviewed regarding existing practices of PWs development and international SA practices, and a gap analysis (GA) was conducted. As a result, the outcome implications of GA were considered as the departure point for designing Modified Grounded Theory interview questions. Finally, the proposed integrated approach was validated with Jordanian experts using Delphi validation method and with non-Jordanian experts using validation interviews.

1.8 Structure of the Thesis

The thesis is divided into the following chapters:

Chapter 2 International Sustainability Practices in PWs Infrastructure Projects

This chapter provides a critical review of sustainability concepts, sustainability vision in developed and developing countries, sustainability in projects and project management, infrastructure needs and its enablers.

Chapter 3 International Sustainability Assessment Practices

This chapter provides a critical review of SA concepts, forms and dimensions, and the integration of SA into policymaking process to select individual projects from different international practices worldwide.

Chapter 4 Jordan's Public Sector Work

This chapter provides a critical review of the existing practices of PWs development in Jordan, sustainability practices in Jordan and its limitations. Finally, the gaps issues in Jordan compared to the international practices are discussed.

Chapter 5 Research Methodology

This chapter discusses the research design and methodology, the gap analysis and the justification of why the chosen research strategy is the most appropriate for this research using MGT. Finally, it provides how the proposed approach has been developed and validated.

Chapter 6 Findings

This chapter provides the research findings by conducting Modified Grounded theory (MGT). The findings gained from the qualitative approach will be clarified by conducting MGT interview questions and documentary data.

Chapter 7 Approach Development and Validation

This chapter presents the development process of the integrated approach throughout a rational sequence of development stages from policymaking process to selecting SPWs development projects. It discusses the validation process using Delphi method and validation interviews with Jordanian and non-Jordanian experts.

Chapter 8 Discussion

This chapter discusses the findings of integrating SA into PWs development in Jordan. Critical reflection from the international practices on SPWs practices is provided. How the aim and objectives and research question are addressed, limitations, recommendations and future research are provided.

Chapter 9 Conclusions

This chapter provides the main conclusions of the current research study and the main research contributions.

Chapter 2 International Sustainability Practices in Public Works Infrastructure Projects

2.1 Introduction

In the previous chapter, the decision has been made in need of an integrated approach of SA into PWs development in Jordan. This chapter as part of literature review discuss the international sustainability practices in PWs development projects. It gives a clear vision and understanding of concepts; the context of sustainability in developed and developing countries, sustainable project management, sustainable PWs development, its need, and PWs development enablers. This chapter also discusses the PWs development planning process and related works which include different international practices. It identifies the knowledge gap that needs to be filled in the current research study.

2.2 Sustainability Concepts

Historically, the concept 'sustainability' has been defined through various researchers. Du Plessis (2007), defined the term 'sustainability' as something has the ability to continue achieving the current and the future needs, without negatively affecting the current generation needs.

Moles et al. (2008), define 'sustainability' as 'an inspirational future situation' and sustainable development is the process 'by which we move from the present status towards the future situation'. Muench et al. (2009), state that sustainability is a system characteristic reflect that system's capacity to support natural laws and human values. While Sage (1998) and Asad and Khalfan (2007), have another point view where 'sustainability' is meant to fulfilling human needs, ensuring a better quality of life and obtaining a healthy built environment, improving living standards, reducing impacts on nature and protecting the environment, optimizing the usage of natural resources and finally, maintaining high and stable levels of economic growth. Thus, Bell and Morse (2008), seem to support the previous meaning that 'sustainability' is 'a dynamic balance among three mutually interdependent elements; (1) protection and enhancement of natural ecosystems and resources; (2) economic productivity; and (3) provision of social infrastructure such as jobs, housing, education, medical care and cultural opportunities.

Bui et al. (2017), pointed out that the previous definitions provide explanation for 'sustainability' in which is placed in economic development for better living standards of people as important for human well-being, and ensure that those development activities are not harmful to social and environmental conditions. In the current research, in need to identify a comprehensive view of sustainability, the previous perspective of Bui et al. (2017) covers all elements of sustainability concept which is accepted at the current research.

All the previous definitions of sustainability drive the need to define sustainable development. According to the World Commission on Environment and Development WCED 1987 (Brundtland, 1987), sustainable development is determined as 'the development that meets the needs of the present generations without compromising the ability of the future generations to meet their own needs'. As a result, the goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations (OECD, 2016b). Therefore, there is a common agreement that sustainable development is understood through its three dimensions, often referred to triple bottom line TBL (environmental, social and economic) (Aarseth et al., 2017; Banihashemi et al., 2017; Carvalho and Rabechini, 2017; Kivilä et al., 2017; Othman and Ahmed, 2013; Zabihi et al., 2012). From this perspective, it can be noted that despite the high number of different definitions, sustainable development can be achieved once its dimensions are met.

2.3 Sustainability Vision in Developed and Developing Countries

The history of realising sustainable development refers to the WCED in 1987 (Brundtland, 1987). According to Agenda 21 of sustainable development, 140 indicators were proposed which cover various issues of sustainability (Singh et al., 2012). In 2000, the UN introduced eight goals referred to as the Millennium Development Goals (MDGs). These were a set of important focus on social priorities for developing countries with 62 indicators for monitoring progress in achieving the proposed eight goals (Sachs, 2012; Sachs and McArthur, 2005; UN, 2015a). These goals were developed by experts worldwide to be achieved by 2015. Later, in 2015, 17 sustainable development goals (SDGs) were proposed with 169 targets to be achieved by 2030 all over the globe (UN, 2015a).

The SDGs were created with the help of the largest consultation as such; citizens, civil society, academia, the private sector, and local and regional governments (UN, 2015a). The SDGs as shown in Figure 2.1, are known as the Global Goals that call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity (UN, 2015a).



Figure 2.1 Sustainable development goals (SDGs Agenda 2030)

Collaborating in developing and implementing these goals, they examine a plan for action for all countries in the world (UN, 2015a; UN, 2019a). The differentiation and the variety of these goals are to establish a comprehensive sustainable development at each level and different sectors (UN, 2015a). However, in achieving the 17 SDGs it can be seen that the world's strong economies are in the top ranking, while some of the world's poorest countries are near the bottom of the ranking (Stiftung, 2019; Willige, 2017). Out of 162 countries surveyed and across all 17 goals, Sweden topped the list of countries in achieving these goals in 2016, (Stiftung, 2016) while in 2019 is ranked 2, and Denmark is the top of the ranking (Stiftung, 2019). On average, Denmark accomplished 85.2% of the way to achieving the targets predicted for 2030 (Stiftung, 2019). Meanwhile, out of 162 countries, the Central African Republic has the lowest rank with an average of 39.1% (Stiftung, 2019). The UK is ranked 13 by a score of 79.4%, and Jordan is ranked 81 by a score of 68.1% (Stiftung, 2019). The Stiftung report stresses that many high-income countries perform well in areas such as economic development, but still fall short of achieving a good all-around SDGs performance (Stiftung, 2019). This is due to significant challenges they counter in specific areas such as; climate-change, income inequality, gender equality and education (Willige, 2017).

Since the launch of SDGs, there have been many positive developments. Countries have started to integrate the SDGs into national plans, and many have set up coordinating structures for coherent implementation (UN, 2019b).

Denmark tops the Index 2019 tracking countries' performance on the 17 SDGs (Stiftung, 2019). Denmark shares the vision of our world and planet in 2030 as expressed by the 2030 agenda. The Danish government is committed to an ambitious follow-up in the national as well as international setting (UN, 2019c). It acknowledges the interdependent and holistic nature of the 2030 Agenda to emphasize the need for all actors across society to contribute to achieving the SDGs (UN, 2019c). Denmark is a frontrunner in securing sustainable cities and communities, clean energy and water, reducing inequalities with a universal health care and educational system, gender equality, a generous social safety net, cooperation among social partners, responsible business, and more (UN, 2019c).

In fact, Sweden's ambition is to implement the 2030 Agenda both at home and through contributing nationally, and as part of the global system (Stiftung, 2016; Sweden Government, 2017). Sweden's implementation of the 2030 Agenda is achieved as it continues its daily operations, decisions, and measures and the existing steering processes (Sweden Government, 2017). The 2030 Agenda involves a process of on-going transition and further development of the Swedish social model as a modern and sustainable welfare state (UN, 2017a). The government Authority of Statistics has drawn up a report providing the preliminary assessment of how Sweden is living up to the various goals in order to well achieve the international standards (UN, 2017a). As a result, the key lesson that can be learned from Sweden is that everyone should be involved in the process of achieving SDGs and no one should be left behind (UN, 2017a). Therefore, it is essential to conduct broad partnerships among all actors in society, building on knowledge and insight from local to the national level, strengthen institutional capacity for those who are a willingness to change (UN, 2017a). This reinforces the core values and cohesion of Swedish society and creates the necessary foundation (UN, 2017a).

Canada is committed to implementing the 2030 Agenda and its SDGs at home and abroad (Government of Canada, 2018). In a country as large and northern as Canada, it is not surprising that the SDG7 'energy' is required to heat homes and businesses in winter or to travel across the vast expanses of the country. Indeed, Canada is one of the world's largest per-capita consumers of energy (Government of Canada, 2018). Through its foreign policy, Switzerland committed to sustainable development around the world (Swiss Confederation, 2016). All of the SDGs are

important in Switzerland. When developing federal policy, an equal account of the three complementary dimensions of the economy; social development and environment must be taken into confederation (Swiss Confederation, 2016).

With respect to many challenges, the Australian Government (AG) responds to the SDGs as a whole (Australia Government, 2018). The response report indicates that the AG focusing only on considering the achievements at home. While the impacts of its activities on the global level can be gained indirectly throughout its contribution to reducing the carbon emissions and using the non-renewable energy i.e. (Australia Government, 2018). In contrast, in the UK, all 17 SDGs are important (DID, 2017). As a part of the globe, it will contribute to achieving the SDGs 2030 agenda at home and around the world (DID, 2017). In Italy, following the 2030 Agenda, the “National Sustainable Development Strategy 2017/2030” (NSDS) shapes a new vision towards a circular, low-emission economy, resilient to climate impacts and to other global changes endangering local communities, prioritizing the fight against biodiversity loss, alteration of the fundamental biogeochemical cycles (carbon, nitrogen, phosphorus) and land-use change (IMELS, 2017).

In the Jordanian context, the need for more attention towards energy, water and environment are very important due to the current conditions of water scarcity, environmental degradation and high energy consumption (GoJ, 2015; MEMR, 2015; ME, 2016; Edama, 2016; MWI, 2016; MPIC, 2017a). In addition, the financial situation, poverty, ‘high unemployment rates, low private sector competitiveness’ and high public debt, are considered critical challenges facing Jordan’s economy (World Bank, 2016a, p1). This contrasts with other Arab countries in the region, such as Saudi Arabia, UAE, and Qatar which are rich countries with significant amounts of natural resources. For instance, according to the World Bank (2017), Qatar is one of the richest countries in the region of GDP while Jordan the GDP figure was the lowest in the region in 2016. As a result, addressing sustainable development goals may not be the same, even for countries in the same region.

According to sustainable development report of Jordan (MPIC, 2017a), the most important goals are SDG1 (No Poverty), SDG2 (No Hunger), SDG3 (Good Health and Well-being), Education (SDG4), SDG5 (Gender Equality), SDG6 (Water), SDG7 (Energy), SDG8 (Prosperity and Decent Work), and SDG9 (Industry, Innovation and Infrastructure). Also, other priorities for Jordan include a focus on SDG13 (Environment and climate change) and SDG16 (Justice, human rights, and participation). However, having reviewed Jordan’s responses to the SDGs, by preparing cross-sectoral strategies for these goals, a comprehensive policy for SPWs

development is not in place. The focus in the response report is the quality of water, for example, energy accessibility and environmental protection. This is due to the unique position of Jordan among the countries, its challenges and priorities in addressing sustainability issues. In contrast to the UK, according to the SDGs booklet (DID, 2017), SDG9 suggests infrastructure to create jobs and become more energy efficient. In addition, SDG11 suggests making cities and human settlements inclusive, safe, resilient and sustainable through investing in public infrastructure, create green spaces and attract a broader range of people involved in urban planning decisions. This is supported by Costanza et al. (2016), in that achieving sustainable development in the country requires the integration of the three dimensions of sustainable development in a synergistic way. Indeed, sustainability should be shaped into their particular context and not taken in isolation. For example, improved access to drinking water SDG6 can endorse health SDG3 and food security SDG2, while the increased use of land for agriculture can help to end hunger and undermine efforts to curb loss of biodiversity SDG15 (OECD 2016c). However, the SDGs in their triple bottom line are not developed in the context of PWs infrastructure in Jordan (GoJ, 2015; MEMR, 2015; ME, 2016; Edama 2016; MWI, 2016; MPIC, 2017a), which needs more attention from Jordan's government to address this issue seriously.

It can be concluded that progress is being made and some favourable trends with regard to the implementation of the SDGs is evident (UN, 2019a). However, particular countries interest regarding sustainable development may also differ due to the overall delivery environment and development priorities, the capacity of government and local industry and influencing moves towards the implementation of the SDGs. On one hand, Willige (2017) stressed that the top three countries, for example, Denmark, Sweden, and Finland (Stiftung, 2019) will need to focus particularly on evolving their energy systems from high-carbon to low-carbon sources, to fulfil the environmental sustainability goals. On the other hand, the SDGs demands of the developing countries include a call to end the extreme poverty and hunger, universal access to healthcare, education, safe water and sanitation, modern energy services, and decent work (Stiftung, 2016; Willige, 2017). In fact, UN Agenda 2030 seeks to ensure the balance between the three dimensions of sustainable development (UN, 2015a). However, the advanced economies concern with the reduction of the negative impacts on the environment and low-carbon infrastructure, due to their development and the economic development of manufacturing. While the developing countries concern more with the social goals of sustainable development to achieve their basic needs. Therefore, formulating the SDGs is essential for understanding the needs associated with each country.

2.4 Sustainability in PWs Infrastructure Projects and Project Management

Project management and sustainability are both currently considered hot topics. Projects are recognized to play a crucial role in the sustainable development (Silvius and De Graaf, 2019). In fact, there is an increasing interest for project management (PM), and principles of sustainability worldwide (Armenia et al., 2019; Silvius and De Graaf, 2019). In advanced economies, there is an increase interest in considering sustainability practices in project development (Banihashemi et al., 2017). In developing economies, the interests of sustainability practices into project development have been of inferior priority and mostly concern with socioeconomic development (Banihashemi et al., 2017; Stiftung, 2019; Willige, 2017).

The UK Association for Project Management (APM), defines a project as "unique, transient endeavours undertaken to achieve the desired outcome" APM (2006, p.2). The Project management Institute (PMI) defines a project as 'a mean implemented to achieve an organization's strategic plan' (PMI, 2000, p.4). It is a temporary endeavour undertaken to create a unique product or services (PMI, 2000). The British Standards Institute BSI (2010), suggests that a project as a unique set of coordinated activities, with definite starting and finishing points, undertaken by individuals or organizations to meet specific objectives with defined schedule, cost and performance parameters. Silvius (2012), defined a 'project' as the main deliverable outputs from the organization that is linked to the organization's policy goals, which can deliver benefits to people as products/ services.

From all these definitions it can be seen that a 'project' is a deliverable output of the organization's policies that interprets its direction on reality. However, sustainability into projects and project management are still lagging in developing countries (Banihashemi et al., 2017; Daneshpour, 2015). Although the literature regarding the sustainability has grown steadily, little clear guidance exists on this subject in project management literature and it is still an emerging field of study (Aarseth et al., 2017; Banihashemi et al., 2017; Carvalho and Rabechini, 2017; Schipper and Silvius, 2017; Silvius and De Graaf, 2019).

In this regard, Kivilä et al. (2017, p.1167), stated that 'sustainable project management is particularly relevant for infrastructure projects that cause enduring changes in the community and to involve multiple stakeholders with varying expectations'. In this domain, Silvius and Schipper (2014, p.79), defined sustainable

project management as ‘the planning, monitoring and controlling of project delivery and support processes, with consideration of the environmental, economic and social dimensions of the life-cycle of the project’s resources, processes, deliverables and effects, aimed at realizing benefits for stakeholders, and performed in a transparent, fair and ethical way that includes proactive stakeholder participation’. It can be noted that the preceding definition focuses on managing the overall process of a project management process, taking into account the three dimensions of sustainable development related to environmental, social and economic (Kivilä et al., 2017). It releases the benefits of the overall stakeholders who can participate proactively for its development (Kivilä et al., 2017).

Moreover, from the emerging literature on the integration of sustainability and project management, two types of relationship between sustainability and project management appeared (Kivilä et al., 2017; Silvius and Schipper, 2015). Sustainability of the deliverable outputs that the project realizes (product) and the sustainability of the project's process of delivering and managing the project (Kivilä et al., 2017; Silvius and Schipper, 2015). However, Silvius and Schipper (2010), argued that sustainability only makes sense in the product. This argument highlights that considering sustainability in the product/deliverable of the project makes sense, but considering sustainability in the process/delivery has little impact (Silvius, 2017). Therefore, the integration of sustainability in project management becomes a difficult task. According to Banihashemi et al. (2017, p.3), the integration of sustainability in project development refers to ‘the comprehensive and harmonized combination of (TBL) into effective project delivery systems’. However, Carvalho and Rabechini (2017), argued that fewer studies have been carried out concerning the importance of a comprehensive holistic approach in the context of TBL. Daneshpour (2015), pointed out that to fulfil the integration of sustainability into project development, some studies have developed a structure of integration which is still a conceptual framework. Daneshpour (2015), added that one of the most significant barriers hindering the integration of sustainability into project development is the difficulties of developing a comprehensive holistic approach considering all dimensions of sustainability into programmes and projects. Zeemering (2017), supported previous point that there is a lack of clear frameworks in local governmental organization outlines proposing how sustainability should be integrated into the management field.

It can be seen that the optimal conventional project is concerned with achieving cost, time and quality (APM, 2006) while sustainable project is concerned with people, profit and plant (UN, 2015a). Consequently, it can be concluded that

several studies have been undertaken the understanding of the relationships between sustainability and project management. Most of these studies focusing on the products (projects) such as; (Carvalho and Rabechini, 2017; Gareis et al., 2009; Gareis et al., 2013; Labuschagne and Brent, 2008; Silvius and Schipper, 2010), which came from series of decision-making and defining a process of sustainable project management (Silvius, 2017). While slight works have been done concerning the strategic level of PWs infrastructure project development. In fact, the policy is the source of projects, thus, it may contain the intended situation that the organization eager to reach, and interpreting its objectives into projects (Qureshi, 2015; Tadege Shiferaw and Jonny Klakegg, 2012). As a result, sustainability objectives should be an integral part of the organization policy objectives (Kivilä et al., 2017). This can guarantee that with no separation of sustainability objectives and the organization's policy, the project delivery product is influenced by sustainability (Kivilä et al., 2017). Therefore, the current research focuses on studying the strategic level of SPWs infrastructure project development.

2.5 The Need for Sustainable PWs Infrastructure Projects

In order to cope with an increasing of population, pressure on land and public services, and economic activities, PWs projects become an essential demand and activities that are growing increasingly (Marcelo, 2015; Serebrisky et al., 2018), particularly in developing countries (Zhang et al., 2014). PWs development provides the intended living conditions for human life and improves their living standards (Bhattacharya et al., 2016; Wang, 2014; Zhang et al., 2014). In fact, bad PWs development can lead to severe injuries and even deaths, have negative impacts on the environment in terms of air pollution and put pressure on land and national resources (Bhattacharya et al., 2016).

In the current research, PWs projects refers to the development that provide public facilities and services. They include both economic PWs (e.g., highways, roads, transport, water and sewer systems, and public electric) and social PWs e.g., public schools and hospitals (El-Sawalhi and Sarhan, 2018; Mor, 2017; Palei, 2015; World Bank, 1994). Serebrisky et al. (2018), argued that the investments of the various PWs bring development in a crucial way or in a bad way. They can cause a great danger by high percentages of carbon emission and pollution, which in turn requires the building of a new PWs in which it can significantly reduce carbon emissions and the fossil fuel and meeting the future demand of energy (Bhattacharya et al., 2016; Granoff et al., 2015; Qureshi, 2015). However, more than 80 percent of

the world's primary energy supply and more than two-thirds of its electricity are derived from fossil fuels (Qureshi, 2016b). This means that investing more PWs and better to moving beyond 'do no harm' to meeting the future needs and supporting SDGs is vital (Cumming et al., 2017; Serebrisky et al., 2018). Moreover, it can ensure the services provided by sustainable PWs, which meet the people needs, the continuity and flow of these public goods and services without harming the environment, but rather support climate change (Cumming et al., 2017).

PWs development can be entitled 'sustainable' when it is able to provide economic development, and meet service requirements in a manner consistent with the natural resources and human rights (Bhattacharya et al., 2016; Mansourianfar and Haghshenas, 2018). Bielenberg et al. (2016, p.2) have different point of view that 'PWs' can be defined 'sustainable' when it 'is socially inclusive, low carbon and climate resilient'. It also includes PWs projects that supports the conservation and sustainable use of natural resources and contributes to enhancing livelihoods and social wellbeing (Bhattacharya et al., 2016; Corfee-Morlot et al., 2016; NCE, 2016). Bhattacharya et al. (2016) added that it can be divided in which its contribution to sustainable development and its impacts upon socioeconomic growth and environment under environmental, social and economic infrastructure.

Thus, it can be concluded that PWs sustainability is "the performance of the infrastructure in contributing to the coordinated development of environmental, social and economic dimensions" (She et al., 2018, p.66). It will become tangible to sustainability if their impacts on service requirements of people will contribute significantly to achieving sustainable development dimensions relates to its TBL (Bhattacharya et al., 2016; Cumming et al., 2017; Serebrisky et al., 2018).

2.6 Enabling Sustainable PWs Infrastructure Projects

Bhanot et al. (2017) and Peenstra and Silviu (2018), pointed out that the main barriers affecting the development of PWs infrastructure projects become the main enablers once they are overcome. In this regards, OECD (2016b, p.61), defines the enabling environment (enablers) 'as the set of interrelated conditions in the political, legal, economic, and social domains that influence policy outcomes positively, such as good governance, strong institutions, research and development, health and education, social and legal protection, and gender equality'. In addition, the interactions between these enablers are essential for enabling sustainability (Du Plessis, 2007; Qureshi, 2015; Sourani, 2013). Qureshi (2015) stressed that

governments can create a supportive enabling environment for climate-smart infrastructure. As result, the OECD (2016b), added that the enabling environment is supportive of the transformation processes towards sustainable development.

The Swedish Report for implementing SDGs Agenda supports the previous arguments in which creating an enabling environment is crucial for implementing sustainable development (Swiss Confederation, 2016). Therefore, creating an enabling environment that contributes to inclusive and informed decision-making is a top priority. Moreover, Sweden indicated that institutional aspects and governance, coherent policies, legal frameworks, and adequate financing are fundamental to achieving the SDGs Agenda 2030 (Sweden Government, 2018). And it will be possible through coherent policies, legal frameworks, dedicated financing, strong institutions and partnership with and involvement of all the relevant stakeholders in society as such transparency and accountability will be crucial in achieving openness and eliminates corruption (Sweden Government, 2018). The overall enabling environment (enablers) are discussed in the following sections.

2.6.1 Institutional Enabler

The effective policy implementation for achieving the SDGs requires appropriate governance structures as well as the overall implementation of governance principles (UN, 2016d). For that, it is important to create a clear governance system to ensure that each public sector is consistent within the government development strategy (Luyet et al., 2012). Thus, the governance system from different sectors is essential to more effectively project objectives achieving in line with the government trends (OGC, 2007a). This is resulted in an effective governance system for successful achieving sustainable development (Qureshi, 2016a). Effective governance requires accountability and effective monitoring, plus evaluation of tracking progress and ensuring efficient use of resources across all levels of government (UN, 2016d). Therefore, it is important to understand that the SDGs require the creation of institutional and policy changes in order to meet desired needs (MoEnv. of Egypt, 2014; Qureshi, 2016a).

In Sweden, good governance is a key factor to tackle the most challenges in the country and to the successful implementation of the 2030 Agenda (Sweden Government, 2018). This includes creating effective, accountable and transparent institutions that ensure responsiveness and inclusiveness, participatory and representative decision-making at all levels. Therefore, a partnership between national, regional and local actors is needed (UNDP, 2017). In March 2016, the

Sweden Government appointed a committee tasked to supporting work on the implementation of the 2030 Agenda nationally and internationally (UN, 2017a). In June 2017, the committee presented a proposal for an action plan for the 2030 Agenda (UN, 2017a). Adopted by the government in 2017, the proposal will serve as a basis for establishing a national action plan for the Agenda (UN, 2017a). Thus, two ministers have shoulder this mission namely; the Minister for Public Administration as responsible for coordinating and promoting the implementation of the Agenda nationally in Sweden, and the Minister of International Development Cooperation and Climate, who leads the Sweden's contributions to international implementation of the policy for global development and Swedish development cooperation (UNDP, 2017). At the local level, conducting a broad dialogue on sustainable development with the government agencies, the county councils and municipalities, the social partners, the business sector and the civil society is needed. As a result, a decentralized societal structure was developed, which it is governed by democratically elected decision-making assemblies (UNDP, 2017).

In Australia, Infrastructure Australia (IA) is an independent body meant to assess and propose the need for infrastructure investments (IA, 2016). Similarly, in the UK, the NIC's National Infrastructure Assessment is the first-ever multi-sector strategic infrastructure planning exercise (NIC, 2016). The National Infrastructure Commission (NIC) was founded in 2015. It provides the Government with independent advice and analysis on the infrastructure requirements and future strategy for infrastructure in the UK (NIC, 2017). NIC uses both bottom-up and top-down approaches to identifying the need for investment across the sectors. It is defined as transport, energy, water and sewerage, flood risk management, digital and communications, and waste (NIC, 2016). Moreover, the National Infrastructure Delivery Authority (NIDA) in the UK is responsible for addressing the delivery plan of the approved infrastructure that can ensure the coordination between different bodies in the country (NIA, 2016). While, in Germany, all ministries are involved in shaping and implementing the Strategy (FGoG, 2017). The coherence of the political measures is strengthened by appointing a Co-ordinators for Sustainable Development in all ministries as central contact (FGoG, 2017).

In the UAE, the National Committee of SDGs was formed in 2017 by the UAE Cabinet (NCSDGs, 2017). The Minister of State for International Cooperation, Chairwoman of the Federal Competitiveness, Statistics Authority (FCSA) and Chair the National Committee. FCSA serves as vice-chair and secretariat for the Committee (NCSDGs, 2017). The Ministry of Cabinet Affairs and the Ministry of Foreign Affairs

and International Cooperation and 12 other Federal-level government organizations are also members. They are responsible for the national implementation for SDGs, monitoring, and reporting of progress towards targets and stakeholder engagement which they have developed an active engagement strategy to involve the UAE's and international stakeholders in the implementation of the SDGs (NCSDGs, 2017).

It can be seen from previously international practices that the institutional arrangements at each level are required in which to ensure the SDGs are achieved. In the other hand, Qureshi (2016a), stressed that the way for infrastructure investments to be developed and financed, and delivering sustainable infrastructure will require strong leadership of public policy and active private-sector engagement and including important transformations. As a result, specific actions must be tailored to reflect each country circumstances (Qureshi, 2016a). Therefore, various stakeholders' engagement might be useful to achieve SDGs, ensure the consistency between theory and practice and link the policy with on-ground realities (BREEAM, 2016; Du Plessis, 2007; Mita Patela, 2007; Mont et al., 2014; UNEP, 2015). According to IFC, Sequeira and Warner (2007, p.10) defined stakeholders as 'directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively'.

Indeed, stakeholders' engagement is strongly recommended by international practices (EU Parliament 2019; UN, 2019a). The Government of Canada for instance strongly supports the principles of the 2030 agenda to "leave no one behind." It means that everyone can participate in, contribute to and benefit from the achievement of the SDGs (Government of Canada, 2018). This putting person at centre of decision-making and ensuring policies and programs respond to the distinct challenges faced by under-represented and marginalized groups (Government of Canada, 2018). In Sweden, the SDGs implementation should embrace everyone and no one is to be left behind (Sweden Government, 2017). Therefore, a number of stakeholder platforms and partnerships with a bearing on the Agenda have been launched, primarily with and between the private sector, civil society, the research community and municipalities (Sweden Government, 2017).

Williams and Dair (2007) pointed out that in infrastructure development there is relatively uncommon for infrastructure plans to be developed using both bottom-up and top-down approaches. Indeed, Australia i.e. is responding partially to a perception that there was insufficient involvement in infrastructure planning at the national level. Since 2008, the Commonwealth Government has taken a more top-down planning approach with the establishment of the Infrastructure Priority List by

Infrastructure Australia (IA) (IA, 2016). IA's aims to provide structured guidance to decision makers, which was actually created using both top-down and bottom-up approaches (IA, 2016). However, it is required to integrate the government and the industry into action (Alkilani, 2012). Similarly, in England, delivering a sustainable built environment, there is pressure towards both top-down and bottom-up approaches (Williams and Dair, 2007). Thus, the most infrastructure planning process is driven by a bottom-up approach to assess the need for specific sectors or locations (Department of Transport, 2015).

Alkilani (2012), argued that a clear encouragement of best practices and improvement behaviour measures of industry, and the supportive actions of the government, are all essential for successful adopting sustainability into PWs development. This point view can be supported in the UK, where there is a number of innovative projects, particularly at the local level, successful in using bottom-up planning approach as set by local government approach than the top-down policies, as set by national government approach (Alwan et al., 2017). Therefore, the application of strategic planning should be based on the broad participation of all relevant users and the local community to achieve the desired outcomes for all (MoEnv. of Egypt, 2014).

Alsubeh (2013), has another that that there is another technique that enables sustainable infrastructure development referred to decentralized planning. As a result, it is necessary to strengthen the decentralized decision-making where the responsibilities of top management level are transferred from the central level to regional and local ones (Alsubeh, 2013). Decentralization can occur in the following forms; establishment of subnational bodies, representation of the local level and the formation of local government decentralized structures (Alsubeh, 2013). The level of decentralization will depend on the size of the country, its population and its federal system (Alsubeh, 2013; UNDP, 2017) which can mandate the role from the national level to the local level. Alnsour (2016) supported the former point that, decentralization can manage the requirements of the urban development at the local level, and that the decision-making process becomes transparent and accountable. As a result, the engagement of local communities into the preparation of plans may offer chances to make locally appropriate decisions towards sustainable development (Alnsour, 2016). Certainly, using a participatory approach bottom-up planning is broadly recognized and applied, in which it should be a key principle for decision-making at each level in the country locally and nationally (UN, 2016b).

It can be concluded that each country has its own structure for institutional governance, due to the context of that country. And so, the establishment of the sustainable development committee and sub-committees concerned with the implementation of SDGs is required (MoEnv. of Egypt, 2014; OECD, 2016b). It is important to include national, sub-national and local governmental levels to ensure that the monitoring system and these levels are governed by different institutional frameworks with a wide range of stakeholders in implementing SDGs without leaving anyone behind (UNDP, 2017; UN, 2019a).

2.6.2 Regulatory Enabler

William Dobson (2013), pointed out that government regulations have a large effect on sustainability practices adoption within the PWs infrastructure projects. Which necessities the adoption of sustainability practices by the government, and enabling all parties to follow the rules of sustainability and building codes (Sourani, 2013; Srour et al., 2010; William Dobson, 2013). Rydige et al. (2015), supported the preceding point that organizations such as the United Nations Development Programme (UNDP) are actively working with governments to strengthen legislation, i.e. on building codes for energy efficiency and disaster risk resilience. In this regard, the international practices indicated that a clear legal framework has been established by some OECD countries such as Germany, Japan, and the USA, allowing them to direct activities to achieve the SDGs (OECD, 2015).

According to the Homes and Communities Agency in the UK, the regulatory framework can include the regulatory standards, requirements, guidance and code of practices (Home and Community Agency, 2015). Kivilä et al. (2017), added that regulations can be divided at each level of project development, which might include national and regional regulations, municipalities' regulations and project master plans. In France for example, an Energy efficiency Law was established to reduce CO₂ emissions, reduce in total final energy consumption, reduce in fossil fuel consumption, use renewable energy in total final energy consumption and finally, use nuclear energy in electricity production (OECD, 2017).

From the earlier analysis, It can be seen that, at both national and sub-national levels, there are important challenges to promote the regulatory capacity to track the performance of infrastructure service delivery, and these challenges govern policy-making while achieving its objectives (OECD, 2015). This needs more attention at each level and the project implementation level to avoid failing the downstream of the policy cycle in achieving the desired needs (OECD, 2015).

2.6.3 Technical Enabler

Technical support is one of the main enablers to mainstreaming sustainability practices in PWs infrastructure projects at each development level and time horizon (Du Plessis, 2007; Edama, 2016; ME, 2016; Sourani, 2013). However, Matar et al. (2008), claimed that a lack of technical support results in a reduced level of professional skills, training and education about sustainable practices, and knowledge leading to ineffective frameworks for adopting sustainability into project development. For that, awareness should be developed among public client organizations, decision-makers, funders, contractors and users (Sourani and Sohail, 2011). Accordingly, moving forward in science and research, educational and training priorities to support the transition to a green economy is essential (OECD, 2016b).

The UNDP (2003), has recognised the capacity building as a long-term continuing process, to create an enabling environment with appropriate policy and legal framework, and institutional development including community participation and human resources, besides strengthening managerial systems. Capacity building is essential for stakeholders and the supply chain to ensure that they are fully qualified in practicing and understanding sustainability properly, and decide the most appropriate options to be delivered (Al-Zu'bi, 2009; Jihan Haddad, 2013; OECD, 2015; UNEP, 2009; Wei et al., 2016). This can be achieved through dialogue-oriented approaches combines theoretical and action-oriented knowledge to examine the sustainability of environmental, social and economic aspects at each national, sub-national and local governmental levels (Mathur et al., 2008; Mont et al., 2014; UNDP, 2017). Du Plessis (2007), suggests that there are certain cultural differences between all levels of governments' organizations and the industry, towards increasing awareness and changing attitudes in order to affect overall behaviour. These differences can create radically different views for developing sustainability objectives, which can affect the understanding and implementation of sustainability (Du Plessis, 2002). Consequently, in 2015, Sweden's Ministry of Foreign Affairs conducted a comprehensive consultation process towards the 2030 Agenda (OECD, 2016b). The purpose of the consultation was to obtain expert knowledge to initiate broad support in Sweden for the 2030 Agenda (OECD, 2016b).

Moreover, technology can support the progress of sustainability in PWs infrastructure projects (Du Plessis, 2007; NCSDGs, 2017; UN, 2016a). From the environmental dimension, technology can offer new and enhanced opportunities for cleaner and more climate-friendly infrastructure with less pollution. Socially dimension wise, technology can improve the affordability and safety of infrastructure and

enhance accessibility for the elderly and disabled. And from the economic dimension, it can drive efficient infrastructure technology to cut down wastes, ensure savings and reduce the number of bills that have the potential for economic growth (UN, 2016a).

2.6.4 Funding Enabler

Lately, funding has become one of the main enablers to ensure that sustainability is being adopted in PWs infrastructure project development (policy implementation) (Edama, 2016; Robichaud and Anantatmula, 2010; Sourani, 2013; Sourani and Sohail, 2011). Therefore, the lack of funding affects policy implementation in meeting its objectives (Martin and Walker, 2015; Robichaud and Anantatmula, 2010; Sourani and Sohail, 2011). However, funding problems can force policy-makers not consider sustainability as a fundamental part of policy-making (Robichaud and Anantatmula, 2010). This needs more attention from the public sector through finding innovative mechanisms for finance and engaging private partnerships (OECD, 2017; Qureshi, 2015; UNDP, 2017). In the UK, public funding for infrastructure is estimated based on statistical analysis and historical data and predicting future needs (NIA, 2016). In Germany however, infrastructure policy faces a fundamental problem in financing infrastructure development and at the same time this funding, which is available, is unequally distributed (Anheier et al., 2016). Accordingly, there is a need to explore new funding models and enhance the coordination of different actors (Anheier et al., 2016). Thus, Martin and Walker (2015), argued that in order to ensure equality in allocating funding, there is a need to consider the impacts of each sector and its contribution to the overall SDGs.

Funding allocation process, therefore, should weight all sectors and the poverty rate, the development of each sector and parameters in term of health, education, and other aspects (Martin and Walker, 2015). As a result, it is essential for shifting government expenditures away from these activities that waste, overuse or degrades environmental assets (Bhattacharya et al., 2016). Therefore, several green funds were established to support the Climate change through green financing investments to low-carbon infrastructure such as in Europe (European Clean Energy Fund, Global Energy Efficiency and Renewable Energy Fund,), UK (London Green Fund, Green Investment Bank, International Climate Fund), UAE (DB Masdar Clean Tech Fund), Australia (Clean Energy Finance Cooperation) and the USA (New York City Energy Efficiency Corporation, Keystone Home Energy Loan Program and Warehouse for Energy Efficiency Loans, Connecticut Clean Energy Fund, Green Energy Market Securitization Program) (ME, 2017b). For that, it is useful to ensure

that all of these funds can create an enabling environment and financing green investments towards a green economy (ME, 2017b).

Moreover, in order to secure public funding, actions that can make severe negative impacts on the community can be charged (UN, 2016a). In Sweden, reducing GHG emissions and noise and air pollution, the funds raised were redirected to finance the expansion of public transportation services (UN, 2016a). Moreover, Sweden was the first country that created (Carbon Tax Scheme) to charge these activities that increase the GHG (UN, 2016a). This is essential and a need to considering the development of low carbon infrastructure, which can derive a more green economy and cuts the negative activities that have negative impacts on the environment, and will lead to enhance only sustainable infrastructure to be implemented (UN, 2016a).

2.7 Planning of Sustainable PWs Infrastructure Projects

The value of the investment in infrastructure can only be gained if the investment is well planned and implemented (Shen et al., 2010; Singh et al., 2012). Indeed, population and economic growth rates derive the need for sustainable infrastructure investment (OECD, 2017). Investment in sustainable infrastructure can generate employment, economic growth and reduce inequalities among countries (Bhattacharya et al., 2016). Nevertheless, inadequate infrastructure investment is a primary barrier to achieving sustainable development (Singh et al., 2012). However, public policy should reflect the following levels to ensure the infrastructure investment aligns with the government's strategic objectives (Australian Government, 2010). Strategies and aligning development priorities are needed (Australian Government, 2010; Mell et al., 2017). It can ensure the rational link of the development to the infrastructure planning (Mell et al., 2017). Theoretically, national objectives of sustainable development are derived from the global SDGs, which are proposed by the UN, while regional objectives derived from them, and regional and local planning objectives should all be derived from (OECD, 2016b). This guarantees that these objectives are broken down from being abstract and general to be more detailed and fit to each level of development, from the national to project implementation levels.

The integration of sustainability practices in PWs infrastructure projects planning can begin at national, sub-national, and local levels (OECD 2015; Nation 2017; OECD 2001; Mell et al. 2017; OECD 2016b). Although national, sub-national and municipal governments face different challenges and opportunities in promoting

green growth, their policies and actions need to be coherent and strive towards the same overall objectives (OECD, 2016b). Consequently, some of the challenges need to be addressed at different levels of development as such the global level (e.g. climate change); at the national level (e.g. legislative changes or changes in economic, fiscal and trade policy); and at the local level (e.g. specific details on land use; human settlement patterns, or transportation planning) (OECD, 2016b). Therefore, the changing of infrastructure planning structure between countries to another can be realised as shown in Figure 2.2 (Mell et al., 2017, p11).

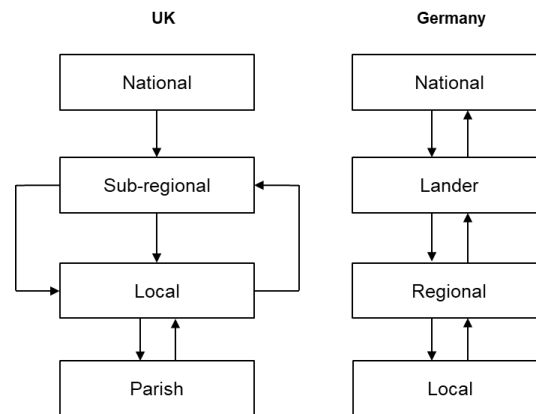


Figure 2.2 Green infrastructure planning in UK and Germany

In Figure 2.2, the UK i.e. shows that there are four levels of infrastructure planning starting from the national to the parish level. It shows the development of policy for infrastructure goes into the following levels that the regional sub-regional and local levels have left an effect relationship to manage planning and control. On the other hand, in Germany, the planning of infrastructure goes into national throughout regional and local levels. This differs from country to another and from the levels of development can be realised due to the organization structure at each country and the challenges of sustainable development that the country needs to be addressed.

Sustainable development challenges, as well as the SDGs issues, should be addressed at different levels. Certainly, an integrated agenda requires coherent policymaking to ensure a balanced approach to the environmental, social and economic dimensions of sustainable development (horizontal coherence) (Curran et al., 2018), while transformative agenda involves aggregated and coherent actions at the local, national, regional and global levels (vertical coherence) (Curran et al., 2018; OECD, 2016b). Therefore, coherence for equitable and sustainable development – horizontally between policy areas and vertically from the global to the local levels, and from goal formulation to implementation – shall be strengthened in all dimensions (Curran et al., 2018; OECD, 2016b). As a result, the impacts of decisions taken at

different governance levels need to be considered in an integrated and coherent manner, to manage policy tensions or inconsistencies and to enhance complementarity for achieving sustainable development (OECD, 2016b).

2.7.1 International Practices of Planning Sustainable PWs Infrastructure Projects

In 2015, the UK road strategy was established for assessing the need for infrastructure investment, which is predominantly driven by population and economic growth rates as such many scenarios are used to consider different possible outcomes (Department of Transport, 2015). This is similar to Switzerland case, where status analysis of the extent to which the 2030 Agenda in sectoral policies (gap analysis), and identification of future action areas with regard to the SDGs is already implemented (OECD, 2016b).

In 2016, Infrastructure Australia (IA) released the first-ever 15-year Australian Infrastructure Plan (IA, 2016). The Australian Government works in partnership with states, territories and local governments towards the continual improvement of the nation's infrastructure (Australia Government, 2018). However, Infrastructure Australia was created to address an inconsistent approach for planning infrastructure investment, which focused on the level of individual projects, without an adequate assessment of the needs or defining the problem at hand from a national perspective (OECD, 2017). As a result, the assessment for the economic, environmental and social impacts of infrastructure projects investment has not been addressed yet (OECD, 2017). In France, Agenda 21 (Mobilité 21) that guides transport infrastructure investment is similar to the Australian, driven by multiple priorities such as optimise existing transport systems to limit greenfield infrastructure projects, improve system performance and territorial connectivity, improve environmental performance of transport systems, and minimise the environmental impact of transportation systems and infrastructure (MEST, 2017).

In the England case, Mell et al. (2017), argued that in spite of the creation of the central government policy, it appears that the application of it at the local scale still lacking. Although there is a transition between these levels of green infrastructure policy planning as a predetermined, it needs a reflectivity in the formulation of the policy and insurance of the occurrence of the investments (OECD, 2017). One reason for underinvestment in infrastructure in the UK appears to be an insufficiently stable investment environment (OECD, 2017). Therefore, the ultimate aim of an independent planning body in the assessment of sustainability for the country is not

to remove the decision-making capacity from politicians, as that would also remove the necessary leadership and commitment (OECD, 2017), but to provide politicians and other stakeholders with the full range of information on which to improve decision-making (Gibson et al., 2013; OECD, 2017).

In the European Union (EU), investment in energy infrastructure is driven by the overarching objective of achieving the EU's long-term GHG reductions targets by 2050 (EC, 2018). Investment in the energy sector in each member country is driven by EU-wide targets and policy objectives to meet its long-term 2050 GHG reductions target, which is the target of 2030 objective (EC, 2018). The UK share of international emissions is included in the European target to reduce emissions by at least 80% by 2050 (CCC, 2016). So, long-term GHG emissions reduction targets as an overall constraint are also reflected in the strategic investment assessment (CCC, 2016).

A discussion of the selected examples reveals that setting objectives for long-term PWs infrastructure planning strategies for each country has its own perspectives and a long-term view. A clear understating in the proposed examples shows that all these countries have long term targets for sustainable PWs infrastructure development. They seek a comprehensive and sectorial planning approach. France has also driven integrated regional planning and electricity transmission; and cross-border electricity network integration at the European scale (OECD, 2017). Australia in contrast has a tradition of project-based planning without sectorial master plans (IA, 2016), while the UK lies between these approaches. It uses medium-term sectorial plans for strategic road investment strategy (Department of Transport, 2015), but without the long-term focus, which was characteristic of master plans in France. Both Australia and the UK have developed a more comprehensive, long-term strategic approach towards infrastructure development (Atkins et al., 2017; IA, 2016; NIC, 2017). In Germany, the most dominant trend is the sectorial planning, which has been increased by the official one, such as strategic master plans which are used for formulation planning frameworks (Mell et al., 2017). In fact, explore the potential for infrastructure plans is needed. Such a plan has to be based on a detailed analysis of the current condition of German infrastructure and potential future needs (Anheier et al., 2016). Therefore, strategic master plans for the development of infrastructure by sector, provide a valuable framework for the extension of networks (OECD, 2017).

It can be concluded that according to Bond et al. (2013) there are two types of sustainability planning approach. They can be divided into; comprehensive planning for sustainability and sectorial planning. The comprehensive plans can take all dimensions of sustainability and considered and weighted, while the sectorial

planning can take only one or two dimensions of sustainability referred to the environment, society and economy (Bond et al., 2013). In the current research study, comprehensive planning for SPWs development is needed that ensures the policy development will cover environmental, social and economic dimensions.

2.7.2 Assessment of PWs Infrastructure Projects' Sustainability

PWs infrastructure projects have long-lasting environmental, social and economic impacts upon communities (Bhattacharya et al., 2016; Shaker and Sirodoev, 2016; Shen et al., 2010; Ugwu et al., 2006b; Wang, 2014; Zhang et al., 2014). Therefore, understanding the impacts of infrastructure according to these dimensions drives efforts for assessing the effect of infrastructure on the environment, society and economy (Alam et al., 2017; Bryce et al., 2017; Kostevšek et al., 2015; Shortall et al., 2015; Singh et al., 2012). In fact, Sustainability assessment (SA) of infrastructure has been grown since 1990, and its appearance in building expanded to cover infrastructure came later (Bond et al., 2012; Bryce et al., 2017; Pope et al., 2017). As a result, PWs infrastructures development should be assessed in which they contribute to sustainable development or not at the early stages of development.

SA and PWs infrastructure projects planning is a young field (Bond et al., 2012; Pope et al., 2017). It refers to the direct effect on the decision-making process towards sustainable development (Bond et al., 2012; Pope et al., 2017). This definition covers many potential forms of decision-making from choices of individuals in everyday life through to public policies, plans or infrastructure projects (Pope et al., 2017). This is supported by Bryce et al. (2017) and Mell et al. (2017) that SA should be a process that needs to be integrated into PWs infrastructure projects planning.

Therivel et al. (2009), argued that in some cases sustainability is need to be more focused in regards to the environment for example than to focus on the social or economic. Stoeglehner et al. (2009), derived that the concept of SA integration into planning might create ownerships by planners, stakeholders and the public. This can improve the overall planning process affected by the decision-making in line with accepting decisions for more sustainable solutions (Bond et al., 2013; Stoeglehner et al., 2009). Bond et al. (2013), stated that SA should be integrated within the planning process of PWs infrastructure development, which becomes one process affecting decision-making and before the decisions are being made for policy, plans, and project selection. These processes should take sustainability in a comprehensive view. As a result, the integration of SA and PWs infrastructure projects planning become one process that does not separate (Bond et al., 2012; Bryce et al., 2017;

Mell et al., 2017; Pope et al., 2017). Earlier efforts have discussed SA from different points view. Most of the literature has discussed the SA methodologies for assessing PWs infrastructure sustainability at both strategic and project level. The debate about the integration of SA in the planning process is controversial. Few voices revealed that SA and the planning process can be in separate terms.

Ugwu et al. (2006a), developed a sustainability appraisal model for infrastructure projects. It includes a set of sustainability appraisal indicators for infrastructure projects in Hong Kong. It focuses on the project level for the design and construction phases. Similarly, Shen et al. (2010), developed key assessment indicators for assessing the effective performance of infrastructure projects sustainability. Zhang et al. (2015), on the other hand, developed a more recent approach to quantify the effect of sustainable urban infrastructure projects, by focusing on two main attributes which are efficiency and equity. Also, Yigitcanlar et al. (2015), introduced a multi-scalar approach for sustainable urban infrastructure in Gold Coast, Australia, by linking the two levels the mezzo and micro level SA to evaluate sustainability performance. This approach helps the policymakers to decide what decisions should be made through the level of mezzo- to micro.

Kostevšek et al. (2015), considered on developing suitable metrics for assessing the sustainability of the locally integrated energy sector of a Slovenian municipality. The study revealed that there is a need for four main groups of assessment which are energy, environment, social and economic. They are used to assessing the performance of the local level of the Integrated Energy Sector IES for the Ormoze municipality in Slovenian. Later, in their research, De la Fuente et al. (2016), focused on developing multi-criteria decision-making in SA of sewerage pipe systems in Spain. Their study focused on the sustainability analysis of different constituent materials for sewerage pipes by using specific criteria of assessment. The developed model was employed to assess eight alternatives of materials used in the sewerage pipe system, which concluded that the most proper sewerage pipe system materials are the concrete with respect to other materials.

Bryce et al. (2017), reviewed the available rating tools for design, construction, and management of the road pavement sustainability at the project level. This research revealed that the existing rating tools do not consider the pavement as a system, while most of these tools seek to optimize individual aspects of pavement in efforts towards sustainability. As a result, this research developed a systematic approach to assessing the system outcomes for road pavement development projects. Alam et al. (2017), proposed a new index termed 'road sustainability index'

(RSI) to deliver sustainable roadworks by integrating key indicators of the three sustainability dimensions. The new index can ensure the least GHG emissions, the best economic value and optimised social proper outcomes from life cycle viewpoint, which will result in an effective application improved the sustainability of road networks in the future.

Sierra et al. (2018), recommended a method to optimize road infrastructure projects in El Salvador by assessing their social contribution. This proposal considers the infrastructure's interactions with the local environment, in terms of its potential contribution in the short and long term. The results showed that the method can distinguish socially efficient alternatives from short and long-term contributions. The method can be employed in the infrastructure formulation and prioritization phases and complemented with economic and environmental SA dimensions.

Mansourianfar and Haghshenas (2018), developed an assessment practical method for Micro-scale SA of transport infrastructure in the Azadi district, Iran. This study is conducted to assess the sustainability of infrastructure projects and evaluate their compliance with sustainable development. The results of this study indicated that public transportation development projects are the most compliance with sustainable development. The proposed method can help policymakers and traffic engineers in Iran to assess urban transportation infrastructure projects.

Most recently, Krajangsri and Pongpeng (2019) argued that existing sustainable infrastructure assessment models play an important role in sustainable development. However, the current infrastructure assessment models for road projects have several limitations that all models do not consider the risk arising from uncertainty in the assessment, do not support the involvement of various stakeholders, and are not flexible regarding changes needed. Accordingly, their study aims to develop a model for sustainable infrastructure assessment that overcomes these limitations, which is the main contribution of the study. The model was verified and validated with four actual road projects, and acceptable results were obtained. Thus, the proposed model, which reflects reality more accurately than other available models of sustainable infrastructure assessment, can assist stakeholders in assessing the sustainability of road projects.

It can be concluded that previous efforts have discussed the SA methodologies and developing indicators at both strategic and project levels. Although it is undoubtedly important to investigate the factors that constrain the improvement of infrastructure sustainability, such studies were rarely conducted in

the context of PWs development in Jordan. In addition, studies on the strategic links between policies at the project levels have not been considered yet, thus leaving the aforementioned gap still under-investigated. In fact, there is a great potential for encouraging a stronger connection between strategic and project level (Bond et al., 2012; Gibson, 2006). Therefore, studying the integration of SA in PWs infrastructure projects through the emergent policies at the strategic level, to select individual projects at the project level needs further investigation.

Analysing previous efforts indicate that the SA is most likely become a guide to design and to set mitigation measures, rather direct the decision-making process from the policymaking process to select individual projects. Thus, it appears that assessing the emerging policies of the government and linking them with on-ground has received little attention in research. This constitutes an important gap in literature that needs to be filled. As a result, there is a potential opportunity to investigate the integration of SA into PWs development in Jordan. So, it is essential to consider the assessment throughout the planning process and from the policymaking process to select individual projects, in order to ensure that the delivered PWs infrastructure is sustainable and fit with the national vision of the country.

2.8 Summary

The chapter critically discusses international sustainability practices in PWs infrastructure projects. Interestingly, reviewing extensive literature has indicated that there are a lot of international practices worldwide practicing sustainable PWs infrastructure where the need is to ensure their long-lasting negative impacts upon the environment, society and economy are less. Therefore, the SA tool becomes the current trend in need of the systematic approach which assesses the emerging policies of PWs to select individual projects. There are some researchers proposing assessment methodologies for assessing PWs infrastructure sustainability. However, it appears that assessing the emerging policies, plans, and projects and linking them with on-ground has received little attention in research. This has created a significant gap which this research is going to fill. Last if not the most important finding, reviewing the literature has shown that the assessment is most likely to be a guide to design and to set mitigation measures, rather than directing the decision-making process from the policymaking to select individual projects, especially in Jordan. Thus, detailed discussions of previous studies have been done in the chapter with clear justifications of why SA is fully required in the current research. Hence, the following chapter provides an analysis of international SA practices.

Chapter 3 International Sustainability Assessment Practices

3.1 Introduction

This chapter follows previous chapter of reviewing literature in regard to international SA practices, its concepts, its forms, its process, and its integration into the policymaking process to select individual projects. A practice is referred to as a method, procedure and process, or rule that is used in a particular field. It seems to be acting something in which produces results in which to be achieved as a standard way of doing things (Business Dictionary, 2019). International practices then are these actions that are generally accepted worldwide to achieve a particular objective. In the current research, the international SA practices are referred to as those actions that the countries worldwide practicing in achieving sustainable development.

3.2 Sustainability Assessment: The State of the Art

In terms of environmental, social and economic concerns in each community, the multidimensional factors push policy-makers to find new approaches to change the trend for a new concept referred to 'sustainability' (Bryce et al., 2017; Mansourianfar and Haghshenas, 2018; Shen et al., 2010; Sierra et al., 2018; Ugwu and Haupt, 2007; Ugwu et al., 2006b). Sustainability is a solution-oriented discipline that studies a complex relationship between the nature and the human activities, conciliating the scientific and social reference paradigms, which are influenced and covered temporal scales (Sala et al., 2015), that leads to the emerging field of sustainable development (Brundtland, 1987; Sala et al., 2015), which becomes important for decision-making (Singh et al., 2012).

The significant and urgent problems challenging each system of humankind are increasing (Sala et al., 2015). However, in order for the human to live, there is a need to develop their service requirements which in turn achieve their living standards (Shaker and Sirodoev, 2016). In fact, human activities usually make a big pressure on nature. A concern in this regard has risen whether these development activities are in a reliable manner or not (Sala et al., 2015), they should meet the needs for current and future generations without compromising the current generations' needs (Brundtland, 1987). These development activities are in process of providing the infrastructure that makes the lifestyle of people easy (Shaker and Sirodoev, 2016),

and providing access to water and energy, transportation and linking areas together, ensure public health and provide sewerage system, enhance economic growth, and create job opportunities etc. (El-Sawalhi and Sarhan, 2018; Mor, 2017; MPWH, 2004; Palei, 2015; World Bank, 1994).

Mansourianfar and Haghshenas (2018), pointed out that in order to ensure the compliance of implementing PWs infrastructure with respect to sustainable development, the assessment in which infrastructure development and its compliance and contribution to sustainable development become important. SA is a fundamental step to support decisions towards sustainable development, and several procedures to assess the sustainability of production system (Agostinho, et al., 2019). In this particular and in practice, the traditional assessment for the on-going infrastructure project is considered according to Cost-Benefit Analysis (Sierra et al., 2018). Consequently, increasing the negative impacts arising from infrastructure activities drives the importance of the assessment for the sustainability of infrastructure (Bryce et al., 2017; Shen et al., 2010; Ugwu and Haupt, 2007; Ugwu et al., 2006b).

Sierra et al. (2018), supported the preceding point that the assessment of PWs infrastructures sustainability is important, and then becomes essential to support decision-making. This is clear that in order to reduce long negative lasting impacts of PWs infrastructures, their development from creating policies, throughout plans, to select individual projects should be assessed to which extent they contribute to sustainable development. As a result, the assessment of infrastructures sustainability can guarantee the development of them will have positive impacts on the country while infrastructures that are harmful to the environment and cannot enhance socioeconomic growth will not be developed (UN, 2016a). Obviously, a slight change in PWs infrastructure projects development process would have a significant effect on their performance to deliver sustainable and intended services.

3.3 Assessment Tools for the Achievement of Sustainable Development in PWs Infrastructure Projects

The achievement of SDGs in both developed and developing countries in the world should respond to the need for economic and societal development in a way that has the least negative impacts on the planet (UN, 2015a). Therefore, there is a need to assess their achievement from the perspectives of environmental, social, and economic concerns. Sharifi and Murayama (2013), argued that SA is a tool to measure how SDGs are achieved. Therefore, Nilsson and Persson (2017), pointed

out that the need for an integrated approach to public policymaking has become a central concern as governments gear up to implement the 2030 Agenda (SDGs). In this regard, there is widespread recognition that the 2030 Agenda require shifts in how policy is developed and implemented (Nilsson and Persson, 2017). Policy tools are part of the policymaking that integrates different dimensions into policy decision-making processes for decades (DESA, 2016). For instance, one of the tools for policy assessment is environmental impact assessment that have received wide attention from policymakers and academia since its first use in the late 1960s (DESA, 2016) while SA is a much more recent tool. An important characteristic that these tools share is the emphasis on assessing the impact of policies on environmental or social dimensions before policy choices are made (DESA, 2016; Nilsson and Persson, 2017). As a result, this tool refers to SA should be integrated into the process of strategic decision-making and support decision-makers to decide which actions are needed towards sustainable development (Bond et al., 2012; Sala et al., 2015).

3.3.1 Sustainability Assessment Background and Forms

In many countries, SA has become popular since the beginning of the 21st century, particularly in the developed world (Bryce et al., 2017). SA has emerged in Europe, OECD countries and worldwide in different forms towards an 'ex ante' policy process for directing decision-making (Bond et al., 2012; OECD, 2016b; Pope et al., 2017), and for evaluating the potential effects of such activities before their implementation (Bond et al., 2012; Pope et al., 2017). The objective of SA can vary from a macro to a micro scale (Cinelli et al., 2014), meaning that the presence of various processes and mechanisms cannot always be taken into account at each action (Cinelli et al., 2013; Zamagni et al., 2009). This leads to the necessity to clearly define what the scope of the assessment is, and what questions need to be answered and implying that different instruments that should be used depending on each action (Sala et al., 2013).

SA is defined as a mechanism to assess the extent of emerging policies, plans and projects that can achieve sustainable development (Mansourianfar and Haghshenas, 2018; Pope et al., 2004; Sala et al., 2015; SCC, 2011; Shen et al., 2010; Sierra et al., 2018). Therefore, Mathur et al. (2008) argued that recognizing SA is not an aim, but rather should be a process integrated into decision-making and further support by (Bond et al., 2012; Sala et al., 2015) that it supports decision-makers to decide which actions are needed. Sharifi and Murayama (2013), added that it is a tool to measure how the SDGs are achieved. Its design goes beyond economic cost-

benefit analysis. It is hence well suited to meet the demands of the 2030 Agenda, as the three-dimensional perspective of sustainable development.

There are variety forms referred to 'ex ante' of SA process such as 'integrated sustainability assessment, 'sustainability impact assessment and 'sustainability appraisal which is another form of assessment particularly in England (Bond et al., 2012; Bond et al., 2013; Hinterberger and Jäger, 2008; Historic England, 2016; OECD, 2010; Pope et al., 2004; Pope et al., 2017; Rotmans, 2006; Weaver and Jordan, 2008). However, the point that has not reached consensus in the universe, is which of these forms is the most proper and commonly understood for conducting the assessment process, which in turn results in confusion for researchers (Pope et al., 2017). Accordingly, understanding the overall forms of SA becomes essential to decide which of these forms is suitable for the context of the current research study. These forms are presented in Table 3.1.

Table 3.1 Assessment forms

Assessment forms	Area of concern	County	Level	Used
Environmental Impact Assessment (EIA) (Bond et al., 2012; DESA, 2016; Mathur et al., 2008; Zhukova, 2012)	Environmental	Global	Project level	No
Strategic Environmental Assessment (SEA) (Morrison-Saunders and Therivel, 2006; Noble, 2009; SEPA, 2010; White and Noble, 2013)	Environmental	Global	Strategic level	No
Life cycle assessment (LCA) (De Camillis et al., 2013; Ortiz et al., 2009)	The potential impacts of (goods and services) along their supply chains, resources consumed and emissions	Global	Project level	No
Integrated Sustainability Assessment (ISA) (Hinterberger and Jäger, 2008; Rodríguez-Serrano et al., 2017; Sala et al., 2013)	Environmental, social and economic	Europe	Strategic level	No
Sustainability Impact Assessment (SIA) (Kivilä et al., 2017; OECD, 2010; Rotmans, 2006) and (NCSDGs, 2017)	Environmental, social and economic	European Union, Canada and UAE	Strategic level and project level	No
Sustainability Appraisal (SA) (Bond et al., 2012; Bond et al., 2013; Historic England, 2016)	Environmental, social and economic	England	Policy and local levels	No
Sustainability Assessment (SA) (Mansourianfar and Haghshenas, 2018; Pope et al., 2004; Sala et al., 2015; SCC, 2011; Shen et al., 2010; Sierra et al., 2018)	Environmental, social and economic	Global	Strategic level and project level	Yes

It can be seen that SA is the third generation of impact assessment following environmental impact assessment (EIA) and strategic environmental assessment (SEA) (Bond et al., 2012). The first generation of EIA tools was launched in 1950

(DESA, 2016), and the United States of America in 1970 become the first country around the world in applying EIA on the main construction projects (Al-Rashdan, 1999). EIA started spreading around the world beginning with the developed countries after the American example: Canada in 1973, Australia 1974, and West Germany in 1975 (Zhukova, 2012). The EIA is not an effective tool, however, it is used to assess infrastructure proposals that can achieve environmental sustainability (Mathur et al., 2008). In addition, it fails to take into account the environmental dimension from the early stages of developing policies and programmes, and considering other dimensions of sustainability (Mathur et al., 2008). Moreover, Arce and Gullón (2000), stated that EIA can be conducted with detailed information to set out mitigation measures associated with a project rather in directing the decision-making process. Therefore, this tool of assessment is excluded from the current research study.

The second generation of impact assessment referred to SEA was launched to assess whether on-going policies, plans and programmes are developed in an environmentally appropriate manner (Morrison-Saunders and Therivel, 2006; Noble, 2009; White and Noble, 2013). This tool takes into account the environmental sustainability in the decision-making process as early at strategic level while the project level needs another tool such as the EIA (Arce and Gullón, 2000; SEPA, 2010). In fact, there is an important difference, where the concept of 'environment' as used in SEA is more precisely formulated and can be understood more widely than in EIA, there is an important advantage of conducting SEA at a strategic level as opposed to the production of the environmental impacts at the project level (SEPA, 2010). Therefore, much earlier consideration of environmental assessment is essential to be integrated into policies, plans, programmes to provide a holistic approach for promoting sustainable development (Arce and Gullón, 2000; EU, 2017; Monteiro and Partidário, 2017; SEPA, 2010). However, SEA is a narrower process, in that it only considers environmental impacts with regardless of the project level (EU, 2017; SEPA, 2010), which is not used from the current research study.

Another form of assessment is the so-called life cycle assessment (LCA). It is a methodology to assess the potential impacts of (goods and services) along their supply chains, resources consumed and emissions which are tabulated, during the use and end-of-life waste management processes (De Camillis et al., 2013; Ortiz et al., 2009). LCA provides the mean to know how to extract raw materials and how to dispose of these materials (Al-Rashdan, 1999; Hollerud et al., 2017; Ortiz et al., 2009). LCA can be applied in decision making in order to improve sustainability in the construction industry and to overcome the concern about the depletion and the high

level of consumption of the environmental resources (Hollerud et al., 2017; Ortiz et al., 2009). However, it is considered an appropriate method for assessing the whole process in the project life cycle, taking into consideration materials manufacturing, construction process, operation and maintenance and finally the end life of a project, but it does not assess the policy level (Hollerud et al., 2017; Ortiz et al., 2009). As a result, the limitations of this form are this form is not comprehensive for each level of infrastructure development, but rather concerns with only the impacts of the LC.

Hinterberger and Jäger (2008) referred to another form of SA, the so-called 'integrated sustainability assessment' (ISA). It is a cyclical, participatory process of scoping, envisioning, experimenting and learning through a shared interpretation of sustainability for a specific context is developed and applied in an integrated manner (Hinterberger and Jäger, 2008). It is used to explore solutions to persistent problems of unsustainable development. In order to integrate the social with the environmental and economic pillars, ISA is the way to ensure the impacts of each dimension of sustainability on its other part to make it all more balanced (Rodríguez-Serrano et al., 2017; Sala et al., 2013). ISA cycle models can play an important role in assessment to deal with the strategic level only (Hinterberger and Jäger, 2008), however. Definitely, sustainable development is even higher, much more than the strategic level as what ISA covers. Therefore, this form of assessment deems not tangible to assess the emerging plans and projects while it only assesses the impacts of the policies at the strategic level of the PWs infrastructure projects development.

To ensure that sectorial policies can be evaluated in relation to their wider sustainability impacts, new policy tools such as Sustainability Impact Assessment (SIA) has been adopted by the European Union and Canada (OECD, 2010). It helps to reinforce the existing debates and the quality and coherence of policy proposals; to set the agenda for sustainable development (OECD, 2010). In fact, ISA is closely related to SIA, while SIA is focused on the short-term and very practical, ISA is broader, explorative, forward-looking and long-term oriented (Rotmans, 2006). Kivilä et al. (2017), claimed that SIA, however, can be considered as a mitigation measure tool rather than one to achieve sustainability targets. Hence, this form of assessment is not directing the decision-making process towards sustainable development, but it is only about proposing mitigation measures which is not used in the current research.

Sustainability appraisal is the term used in the context of (England) and referred to the SA context of local plans, which have been used since 1999 (Bond et al., 2012; Bond et al., 2013). However, the existing structure of sustainability appraisal

in England indicated that it can derive weak sustainability rather than strong sustainability that comprises the TBL (Bond et al., 2013). It also indicated that whether the plan is doing something about sustainability targets, or actually improving the targets and achieving the desired situation, still vague (Bond et al., 2013). Therefore, this form of assessment is excluded from the current research.

In fact, sustainability assessment (SA) can be carried out in similar fashion to other forms of assessment and in different contexts (Sala et al., 2015). It can assess the impact of achieving sustainable development of proposed policies, plans, and projects. But also it can be used to assess which public institution can contribute to a sustainable or unsustainable situation, and whether the production or consumption of a product/services are sustainable or not (Sala et al., 2015). On the other hand, Pope et al. (2017), pointed out that, the International Association for Impact Assessment (IAIA), referred to SA as a recent frame for an impact assessment that places emphasis on delivering sustainable development for the future. While the impact assessment (IA) is the process of identifying the future consequences of the current or proposed actions. It can distinguish from SA and IA in that, SA attempts to direct and determine whether or not a particular proposal is or sustainable, while IA is only to identify the potential impacts of this proposal (Sala et al., 2015).

It can be concluded that SA form is ideal to consider the integration of assessing the emerging policies, plans and projects against sustainability (Mansourianfar and Haghshenas, 2018; Pope et al., 2004; Sala et al., 2015; SCC, 2011; Shen et al., 2010; Sierra et al., 2018). Not all SA forms need to be done at the same level and detail. In the current research, it is quite clear that SA is the most comprehensive approach to be employed for assessing the emerging policies, plans and to select individual projects in Jordan. Additionally, the dimensions of sustainability can vary, which means that some forms consider only environmental dimensions and other environmental, economic and social all together (Sala et al., 2013). The current research seeks to integrating the three dimensions of SA into PWs development in Jordan. Where, SA has become not only a tool to set mitigation measures to identify and reduce the impacts of emerging policies, plans, and projects, but also it has become a comprehensive process to direct the decision-making towards sustainable development in the country.

3.3.2 International Practices of Sustainability Assessment Forms

In 2016, Historic England Published an Advice Note to provide advice on historic environment considerations, as part of the sustainability appraisal/strategic

environmental assessment process parties (Historic England, 2016). This document is aimed at all relevant local planning authorities, neighbourhood groups, developers, consultants, landowners and other interested parties (Historic England, 2016). This inference is partly reflected in the definition of sustainability appraisal used in England planning system (Historic England, 2016). The plan is evaluated against sustainable development objectives, but it is unclear how these plans own objectives relate. In addition, decision-makers consider sustainability appraisal as a tool that can delay their works and affect the decision-making process (Bond et al., 2013) which can be conducted later throughout the process. However, this can make the sustainability appraisal not with less impact on policies nor to projects, that can mitigate the impacts, but rather it may direct the decision-making process towards sustainable development (Bond et al., 2012; Bond et al., 2013).

In 1998, Sweden adopted the Environmental Code (EC) that entered into force in 1999 (Zhukova, 2012). Sweden implemented the requirement for EIA in 1987 based on the EC Directive, but then it only regarded the Roads Act which is always needed when a project presupposes applying some kind of permit (Zhukova, 2012). The Directive only concerns with the significant impacts on the environment, meaning that when the impacts are found to be insignificant, no EIA is needed, but Sweden went further. That's why the Swedish EIA system has been shaped under the influence of the European Directive. It includes the stages of screening, scoping, preparation and presentation, review and decision-making and follow up (Zhukova, 2012). In Australia, the west region has a traditional project based on a long term environmental impact assessment EIA (Bond et al., 2012; Bond et al., 2013). It developed case by case reflecting on the evolving expertise and based on EIA and SIA practices (Bond et al., 2013). The development proposals for plans are improved and involved in the development of proposals. Yet, the community engagement should be part of responding to the assessment, with the absence of regulatory frameworks of EIA seem to be voluntary (Bond et al., 2013).

In Canada, responsibilities for sustainability issues are divided into federal, provincial, territorial, aboriginal and municipal authorities (Bond et al., 2012; Bond et al., 2013), and the stakeholder's engagement is well practiced in the process (Bond et al., 2013). SA is based on basic producers, which set a higher positive contribution on sustainability rather than a mitigation tool, and that resulted in rejection such projects which are not contributing to sustainability (Bond et al., 2013). However, still, there is a weakness in SA laws that include the application of SA by authorities (Bond et al., 2012; Bond et al., 2013) and the various practices are developed in SA, where

specifying them in the context of Canada is rare and most of them are tools at the project level, rather on strategic level (Bond et al., 2012; Bond et al., 2013).

In Germany, the federal committee for sustainable development conducts the SIA to assess the impact of emerging policies and set out mitigation plan measures towards the reduction of negative impacts upon community (FGoG, 2017). SIA's laws and decrees are prerequisites for their consideration by the cabinet (FGoG, 2017). The benchmarks for the impact assessment are the targets, indicators and the so-called management rules of the Sustainable Development Strategy (OECD, 2016b). In the UAE, the development of policy and their alignment with the 2030 Agenda are assessed using SIA form (NCSDGs, 2017). SIA is carried out to provide mitigation measures. However, the impacts of the development of the country are assessed without directing the decisions whether their impacts contribute to sustainable development or not (NCSDGs, 2017).

In Jordan, the EIA was first introduced in 1995 as stipulated under the 1995 Environment Law (Al Ouran, 2015). However, only these projects which are not fully funded by the government are assessed for their environmental and social impacts by (ESIA) studies, as the Term Of References (TOR) refers to donors (CC, 2012; RSS, 2012). Moreover, SEA was conducted for the two Development Zones, while is not implemented into the overall context of Jordan. This approach was only conducted at the local level to examine environmental problems in specific areas such as the Dead Sea (Al-Zu'bi, 2009).

Although it is undoubtedly important to investigate the factors that constrain the improvement of PWs infrastructure projects' sustainability, all the provided international practices of SA has different forms to be conducted, where the EIA is dominant to use at the project level. SA is required by law in some countries, strongly recommended in others. Some are kinds of mitigation measures, while others are kinds of directing decisions-making process, and others are conducted at the project level or at the strategic level.

3.3.3 International Infrastructure Assessment Rating Schemes

The use of assessment tools focused on major infrastructures has not been very common so far. Several score ratings have been developed by various public and private institutions to assess highways and roads, but only three of them such as (CEEQUAL) are in the UK (BRE, 2019), the Infrastructure Sustainability (IS) Rating scheme in Australia (ISCA, 2018) and (Envision) in the USA (ISI, 2018) are able to

assess all types and sizes of civil infrastructures including ports, airports, highways, dams, bridges, wastewater facilities, tunnels and (Diaz-Sarachaga et al., 2016). A summary of these rating schemes is provided in Table 3.2.

Table 3.2 International infrastructure assessment rating schemes

Characteristics	Civil Engineering Environment Quality (CEEQUAL) (UK) V6 BRE (2019)	Infrastructure Sustainability (IS) (Australia) ISCA (2018)	Envision (USA) ISI (2018)
Supporting Institution	Building Research Establishment and Institute of Civil Engineers	Infrastructure Sustainability Council of Australia (ISCA)	Institute for Sustainable Infrastructure (ISI)
Geographical Context	UK & Ireland International	Australia & New Zealand	USA & Canada
Year of launching	2003	2012	2012
Manuals	CEEQUAL for international Projects V6 / CEEQUAL for Term Contracts V5.2	Infrastructure Sustainability (IS)	Envision
Categories	8	6	5
Sub-categories	30	15	64
Levels of Achievement	(6 Levels) Unclassified < 30% Pass >= 30% Good >= 45% Very Good >= 60% Excellent >= 75% Outstanding >=90%	(5 Levels) 20-39 - Bronze 40-59 - Silver 60-79 - Gold 80- 94 – Platinum 95+ - Diamond	(5 Levels) Verified 10 Bronze 20 Silver 30 Gold 40 Platinum 50
Awards	(CEEQUAL for Projects) and 2 (CEEQUAL for Term Contracts)	(Design, As Built, Operation)	(Planning and Design), construction, operations and deconstruction
Verification Agents	Independent CEEQUAL-trained Verifiers	Independent ISCA-trained Verifiers	ISI independent third-party Verifiers

CEEQUAL is to create a single, science-based best practice standard and certification tool for civil engineering and other infrastructure projects in the UK and around the world (BRE, 2019). It encourages and promotes the attainment of high environmental, social and economic performance in all forms of civil engineering, through identifying and applying the best practices. It aims at assisting clients, designers and contractors to deliver improved sustainability performance and strategy in a project or contract, during strategy, design, and construction (BRE, 2019). When CEEQUAL was launched, it was the first sustainability rating scheme for infrastructure in the world of all types of civil engineering, infrastructure, landscaping and public realm projects and contracts (BRE, 2019). Unlike decision-support tools, it uniquely uses rigorous evidence-based assessment criteria, and external verification, to provide a result that can be used in publicity (BRE, 2019).

CEEQUAL scheme, rewards project and contract teams who go beyond the legal, environmental and social minima to achieve distinctive environmental and social performance at work (BRE, 2019), and, to use it as a rating system to assess

performance. The rigour and flexibility of the Scheme can significantly influence project or contract team decisions as they develop, design and construct their work (BRE, 2019). It encourages them to consider the sustainability issues they face at the most appropriate time and enables them to secure the CEEQUAL score and their work deserves. BREEAM Infrastructure (Pilot) and CEEQUAL Version 5.2 are being updated and merged into a single assessment scheme, that resulted in CEEQUAL (2019), which brought together the best of both schemes to create a world-class infrastructure assessment scheme (BRE, 2019).

The IS Rating Scheme (IS) is used in Australia and New Zealand only as a comprehensive rating system for evaluating sustainability across the planning, design, construction and operational phases of infrastructure programs, projects, networks and assets (ISCA, 2018). IS evaluates the sustainability performance of the quadruple bottom line (Governance, Economic, Environmental and Social) of infrastructure development (ISCA, 2018). The IS International rating tool is a credit-based, flexible rating framework applicable to both developed and developing economies (ISCA, 2018). The tool is built upon the credible, respected and well-adopted foundation of the IS rating tool (v1.2), and currently deployed across Australia and New Zealand (ISCA, 2018). It has been developed to align with the UN Sustainable Development Goals (SDGs) and was officially launched for implementation in September 2017 (ISCA, 2018).

Envision is a framework that assessing infrastructure sustainability and rating the community, environmental, and economic benefits of all types and sizes of infrastructure projects (ISI, 2018). It includes 64 indicators of sustainability in five main groups namely; quality of life, leadership, resource allocation, the natural world and climate and resilience (ISI, 2018). These groups together address areas of human wellbeing, mobility, community development, collaboration, planning, economy, materials, energy, water, sitting, conservation, ecology, emissions and resilience (ISI, 2018). All these indicators become a substance of what constitutes sustainability in infrastructure. In order to ensure quality for awarding, infrastructure project must achieve a minimum of the total applicable Envision points (ISI, 2018). It helps to make better decisions at each step of a project development's life cycle to achieve more sustainable behaviour (ISI, 2018).

It can be seen from these provided international assessment schemes that they assess infrastructure sustainability, which is in the line of research topic. However, these assessment schemes assess the achievement of sustainability to

better directing the decision-making towards sustainability at the project LC. In addition, these schemes are considered only at the project level, while this research is focusing on the strategic one. The main difference between SA and infrastructure rating scheme is that the former focuses on directing the decision-making and identifying the need for such improvements in the current situation of the country towards sustainability, which results in the need for sustainable infrastructure. On the other hand, the infrastructure rating schemes focus on these already identified infrastructures, to measure its sustainability achievements and directing the decision-making. Therefore, SA works before the identification of the need and derived infrastructure development, while the infrastructure rating schemes work once the need is identified that derived sustainable infrastructure developments. Accordingly, they are not considered in current research.

3.3.4 International Green Building Assessment Rating Tools

Building performance is considered as the major concern for professionals in the construction industry (Banani et al., 2013). The construction industry is considered harmful and may destroy the environment whereby the construction actions are happening (Wang et al., 2014). The construction action by itself consumes vast amounts of resources such as energy and water (Wang et al., 2014). The environmental building performance assessment tools have been emerged to be one of the most important ones in assessing sustainable construction, as the building designers and occupants have long term concerns about construction performance (Ding, 2008).

Environmental building assessment tools are the most useful during the design stage when any impairment for the pre-design criteria can be assessed and incorporated at the design development stage (Ding, 2008). This work has developed the systems of building environmental performance over its life cycle from inception to reuse. The development system of building performance has been evaluated to take successful development into account with regard to environmental issues (Banani et al., 2013; Ding, 2008). There are lots of rating systems for building which are specific for each country at the international level such as; BREEAM in UK (BRE, 2018), LEED in USA (USGBC, 2018), Green Star in Australia (GBCA, 2018), Estidama in Abu-Dhabi/UAE (ADUPC, 2010), Al-Sa'fat in Dubai/UAE (Dubai Municipality, 2017), GSAS in Qatar (GORD, 2017) and JGBG in Jordan (MPWH, 2013a) as provided in Table 3.3.

Table 3.3 International green building assessment rating tools

Rating tool	Country /Year	Phases
BREEAM BRE (2018)	UK, 1990	Design, Construction and Operation
LEED USGBC (2018)	USA 2009	Design, Construction and Operation
Green Star GBCA (2018)	Australia, 2003	Design, Construction and Operation
Estidama ADUPC (2010)	Abu-Dhabi, 2010	Design, Construction and Operation
Al Sa'fat Dubai Municipality (2017)	Dubai, UAE, 2016	Planning, design, construction and operation
GSAS GORD (2017)	Qatar, 2017	Urban planning, design, construction, operations
JGBG MPWH (2013a)	Jordan, 2013	Design, construction and operation

The purpose of these rating tools is to evaluate the environmental criteria of building performance from the initial stages of project development. The results of building assessment are carried out to investigate the changes of design, performance and methods of construction through project development stages, in order to significantly contribute and understand the relationship between buildings and the environment (Al-Rashdan, 1999; Banani et al., 2013).

It can be seen that each rating system has its features and depends on the specific country and its interests. Undeniably, the environmental dimension of sustainability dominates other dimensions that are not fully covered. In addition, the weights which are provided for water efficiency, energy efficiency in BREEAM are not at the same of JGBG due to the country interests. Moreover, most of these rating tools are assessing the existing and new buildings which are linked with the policy and regulations of the countries such as JGBG while GSAS and Estidama, which are linked with international standards. In fact, GSAS is developed based on the international standards and from overall assessment tools of the buildings which covers more about environmental, social and economic dimensions of sustainability (GORD, 2017). However, it can be seen that not all of them cover the overall building such as GSAS, while others such as JGBG does not fit with other kinds of PWs development (GORD, 2017). These assessment tools can provide different rating certificates and different themes of assessments. However, in the current research, the assessment will be required from policymaking at the strategic level to select individual projects while these rating tools are not suitable to assess the policymaking process. Therefore, these assessment tools are not considered in the current study.

3.3.5 Sustainability Assessment Process

Despite the variety of SA forms, there is no single universally applicable methodology for SA. So far, lots of forms referred to SA and sustainability appraisal particularly in England, have been developed. Understanding of all of them is essential to clarify their process. Table 3.4 illustrates these processes and stages from different sources.

Table 3.4 Sustainability assessment process

SA process	George (2001)	Gibson et al. (2013)	Bond et al. (2013)	Sala et al. (2015)	Historic England (2016)
Stages	<ul style="list-style-type: none"> - Definition of sustainable development objectives - Expansion into targets and indicators - Baseline studies - Scoping the appraisal - Appraisal of spatial strategy options and comparison of alternatives - Appraisal of policy statements - Reporting - Monitoring 	<ul style="list-style-type: none"> - Identifying appropriate purposes and options - Assessing purposes, options - Choosing option - Monitoring, - Learning from the results 	<ul style="list-style-type: none"> - Screening - Scoping - Baseline studies - Analysis - International and national commitment objectives concerned with sustainability - Description of the choice of alternatives - Description of comparison measures and monitoring - Description and appraisal of the environmental, social and economic effect of the final draft - Decision-making - Implementation - Monitoring and evaluation 	<ul style="list-style-type: none"> - Sustainability principles - Sustainability targets - Decision-making context - Choices and assessment 	<ul style="list-style-type: none"> - Screening - Scoping - Developing plan options, refining alternatives and assessing likely effects - Undertaking the assessment stage - Publication, consultation and adoption - Monitoring

George (2001), argued that the efficiency of sustainability appraisal, particularly in England, depends on the established sustainability objectives. It is clear that during the appraisal process, the objectives of sustainable development used in the planning process make them independent, which in turn can then assess the current planning process against other objectives of sustainability than the ones that identified to be achieved (George, 2001). Therefore, defining the objectives of sustainability becomes the first start of sustainability appraisal. His proposed process indicated that there is a rational sequence of them that starts from the baseline of sustainability objectives to monitor the progress of this process.

Bond et al. (2012), indicated that in England, sustainability appraisal is carried out at the policy level, and most likely for the local development plans, according to

the last published documents of Historic England 2016 (Historic England, 2016). However, sustainability appraisal seems to be a more mitigation measure tool to reduce the negative impacts on policies, plans and projects rather than contributing to sustainable development (Bond et al., 2012; Pope et al., 2017). On another hand, Taisch et al. (2013), disagreed with the previous point that, sustainability appraisal should be distinguished from being an impact assessment and mitigation measure tool to be an aim that should be integrated into policies, plans, and projects in order to contribute for sustainable development. There are arguments that sustainability appraisal is a time-consuming that each policy, plan, and project should be assessed against sustainability appraisal baseline indicators (Bond et al., 2013). Public participants, monitoring and strengthening the decision-making process from policy level to project level is required. Therefore, it is essential to adopt policies properly to achieve the intended requirements more efficiently (Pope et al., 2017).

Consequently, there is no common agreement that the process of SA is efficient, while many researchers agree that there are such principles that make the process of sustainability assessment effective (Bond et al., 2013; Gibson et al., 2013). Thus, ensuring process efficiency is a major challenge for SA (Gibson et al., 2013). The effective SA process is these design processes that have an impact in contributing to sustainable development (George, 2001; Gibson et al., 2013; Sala et al., 2015). In addition, an effective SA process is these process that contributes to sustainable development outcomes rather than its stages and how to deal with them (Bond et al., 2013). Therefore, the regulations in such cases can enable the assessment of sustainability to be undertaken as well as the outcomes in such, and then will be covered by the regulatory frameworks. So, SA is not likely to be achieved if appropriate procedural steps are generally not followed (Bond et al., 2013; Gibson et al., 2013). It can be demonstrated that the problem occurs in the procedurals that are inadequate by themselves, while the outcomes from these processes can be assessed if they are positive and efficient to achieve sustainable development or not.

According to Gibson et al. (2013), while sustainability requirements can be applied in many different ways, assessment processes that apply explicit evaluation criteria in the preparation, evaluation, approval, and implementation of policies, plans, programmes and projects are particularly well suited as vehicles for sustainability. Therefore, Gibson et al. (2013), pointed out that in order to design an effective SA process, it should cover all potentially significant initiatives, at the strategic level as well as at the project level, in a way that connects work at the two levels. Furthermore, effective SA must have decision criteria based on a comprehensive and well-

integrated understanding of the key requirements for sustainability (Gibson et al., 2013). Then, identify the strengths and weaknesses in the proposed process in order to learn from the fault and strengthen the efficient practices (Gibson et al., 2013).

According to Sala et al. (2015), SA can be carried out in different contexts. It can assess the impact of achieving sustainable development of proposed policies, but also it can be used to assess in which public institution can contribute to a sustainable or unsustainable situation, and whether the production or consumption of a product/services are sustainable or not (Sala et al., 2015). They proposed just a few stages in which the decision-making should only be made for these actions that contribute to sustainable development.

It can be concluded that, from all previous efforts of proposing SA procedurals, there is not an effective procedural of SA processes while the outcomes are not effective from their use. All these processes can share some of the same stages. Undeniably, the most common stages are identifying the baseline of SA objectives and targets, developing such alternatives, assess these alternatives and compare between them, selecting the most proper alternative by decision-making, implementing, monitoring and evaluating. Slightly difference between them while in-depth critically review it can be indicated that the difference between them occurs in the number of these stages or splitting one stage into many stages. However, SA can be seen in some cases as only administrative and legal requirements to be followed while its impacts are not adequate. It is evidenced from Jordan as the ESIA for example at the project level used to be conducted as the requirements of the donor of PWs projects which are not funded by the government (CC, 2012; RSS, 2012). This research is not to propose an advanced SA process, rather it is to leverage from these procedurals in the context of PWs development in Jordan.

3.3.6 Assessment Techniques of Achieving Sustainable Development in PWs infrastructure Projects

According to UN Agenda 2030 (UN, 2015a; UN, 2019a), 17 goals were proposed for developed and developing countries. All these goals are classified into three main dimensions; environmental, social and economic. One of the major challenges facing assessment, however, is the relationships between these dimensions and the interactions between them. Therefore, these dimensions need to be applied in a balanced way in order to achieve sustainable development (Cumming et al., 2017; Hák et al., 2016; Nilsson and Persson, 2017).

Theoretically, the national SDGs for any country are derived from the global goals (EU Parliament, 2019; George, 2001; Hák et al., 2016; UN, 2019a). Therefore, in order to assess the achievements of the SDGs, a list of 230 indicators are provided by the UN Agenda (IAEG, 2016) which can be used to assess each SDGs for the country. Thus, the results of this assessment technique can indicate where the country whether in developed and developing economic living up to these goals (Government of Canada, 2018; IAEG, 2016; Sweden Government, 2017). SA dimensions are divided into goals, targets and indicators that need to be identified as the main contributors to improving infrastructure development (Hák et al., 2016).

Hák et al. (2016, p.570), proposed a methodology clarifying how to break the SDGs down into a set of indicators to be fit at each level of the development. It shows that these objectives are broken down from being abstract and general to be in more detail fit with each level of development from the strategic level to project implementation level (Hák et al., 2016). The process of translating national strategic sustainability objectives into actual actions at micro project levels is a difficult task (Kaivo-oja et al., 2014; Ugwu and Haupt, 2007; Ugwu et al., 2006b). Therefore, inadequate understanding of the interactions and the impacts of the various levels of sustainability indicators can create difficulty in realizing the achievements of sustainability on project development at both macro and micro levels (Ugwu and Haupt, 2007; Ugwu et al., 2006b).

SA can have different objectives (Alam et al., 2017; Bryce et al., 2017; Bui et al., 2017; De la Fuente et al., 2016; Kostevšek et al., 2015; Mansourianfar and Haghshenas, 2018; Shortall et al., 2015; Sierra et al., 2018; Yigitcanlar et al., 2015). Sala et al. (2015) stressed that, SA can be used to assess the impacts of the macro policy level on sustainable development achievement, assess to what extent public institutions are contributing to sustainable or unsustainable development and the creation of a product or service which is sustainable or not. Sala et al. (2015) added that in all of these cases, SA can be carried out using a similar approach. For instance, there is a need for a set of indicators to assess different policies and projects at macro and micro levels (Alam et al., 2017; Bryce et al., 2017; Bui et al., 2017; De la Fuente et al., 2016; Kostevšek et al., 2015; Mansourianfar and Haghshenas, 2018; Shortall et al., 2015; Sierra et al., 2018; Yigitcanlar et al., 2015).

Yigitcanlar and Dur (2010), argued that sustainability indicators are the main fragments of assessment, which help in drawing a picture of the current development situation in which sustainability goals are met. A sustainability indicator is: 'a

measurable aspect of environmental, economic, or social systems that is useful for monitoring changes in the system characteristics relevant to the continuation of human and environmental wellbeing' (Yigitcanlar et al., 2015, p.37).

There are many large studies on measuring infrastructure project sustainability achievements. Most of them address the micro level of infrastructure development (Alam et al., 2017; Bryce et al., 2017; Bui et al., 2017; De la Fuente et al., 2016; Kostevšek et al., 2015; Mansourianfar and Haghshenas, 2018; Shortall et al., 2015; Sierra et al., 2018; Yigitcanlar et al., 2015), while few studies, however, develop a holistic approach from macro to micro levels and for comprehensive public infrastructure projects. The sustainability concept varies from region to region, and indicators to measure it should be specific (Pope et al., 2017; Yigitcanlar et al., 2015). In addition, it can be formulated based on location, country of interest, institutional and regulatory frameworks, resources available, the national policy, programmes and plans that need to be assessed (Pope et al., 2017; Yigitcanlar et al., 2015). As a result, the dimensions of SA can be developed through several actions. In order to develop appropriate sustainability indicators and consider them as a baseline to assess which emerging plans are appropriate for achieving sustainable development, many approaches have been developed.

Singh et al. (2012), argued that a 'top-down' approach can enable experts to define a baseline for achieving sustainability. The 'bottom-up' approach requires the systematic participation of various stakeholders to understand the framework as well as the key sustainable development indicators (Singh et al., 2012). However, Shortall et al. (2015), have another point view, where the 'bottom-up' approach is intended to avoid stakeholders biases; therefore, it could be better to consult various stakeholders in the county. They propose a methodology for proposing SDGs indicators using the Delphi technique by conducting a World Café workshop by the consultations with various stakeholders in the country under investigation. The consultation is essential to determine sustainability dimensions and the most suitable indicators for different project levels from macro to micro.

Developing sustainability indicators can be carried out using both qualitative and quantitative analysis (Alam et al., 2017; Bryce et al., 2017; Bui et al., 2017; De la Fuente et al., 2016; Kostevšek et al., 2015; Mansourianfar and Haghshenas, 2018; Shortall et al., 2015; Sierra et al., 2018; Yigitcanlar et al., 2015). As a result, it can allow trial calculations, issues such as lack of data, the suitability of reference values or responsiveness of the indicator (Shortall et al., 2015).

It can be concluded that in contributing to sustainable development, many frameworks were developed and assessed at the regional, national and international levels (Hák et al., 2016), such as a list of 230 indicators proposed by IAEG (2016). And further evidence from each country that responses to achieve each goal based on its interests. However, developing a set of indicators requires huge efforts need to participate with a wide range of stakeholders at different levels in the country (UN, 2017b). The UN Conference of European Statisticians (CES) proposed a Road Map as a resource to guide the work for the SDGs (UN, 2017b). Hence, this task is excluded from the current research due to the wide range of participants that should work in developing the national list of SDGs indicators for PWs infrastructure projects development in Jordan, which requires further research.

3.4 Integrating SA into the Policymaking Process of PWs Infrastructure Projects

Public policy has a fundamental role to play in the agenda to promote sustainable development, and manage the climate change through delivering better infrastructure (Böhringer and Jochem, 2007; Qureshi, 2015; Stern et al., 2017; UNEP, 2009). This has resulted from the role of the public sector, which is the major investor in infrastructure project development (Qureshi, 2015).

Weaver and Jordan (2008), argued that traditional policy assessment procedures, which are designed and used to screen policy proposals are unable to ensure sustainability considerations into proposals proactively. Therefore, assessing economic, social and environmental progress should be conducted through measuring on-going policies beyond the traditional approach (OECD, 2016a). Consequently, orienting public policies and articulating strategies should be towards sustainable infrastructure (Qureshi, 2016b).

Devuyst et al. (2001, p.9), defined policy-oriented sustainability as an approach ‘that can help decision-makers and policy-makers decide what actions they should take and should not take in an attempt to make society more sustainable’. This means that in the assessment of climate change i.e., there is a need to consider the social and economic factors that drive emissions and their interactions in order to evaluate possible actions (Hacking and Guthrie, 2008).

According to the Office of Government Commerce (OGC) gateway, policy-making is defined as ‘the process by which governments translate their political vision

into programmes and actions to deliver ‘outcomes’ – desired changes in the real world’ (OGC, 2007a, p.7). The United National Environmental Programme (UNEP) on other hand, proposed a definition for the Integrated Policymaking for Sustainable Development that ‘Mainstreaming Sustainability into Policymaking and builds on these assessment efforts and reinforces the response to the need for a proactive approach to integrating sustainable development goals into policy-making’ (UNEP, 2009, p.10). It can be seen from these definitions that the policy is a proactive measure that is listed to assess any potential effects upon the community. It can translate the trend and vision of the government into actions.

The need for an integrated approach to mainstreaming sustainability into policy-making has been expressed in international processes such as; the Millennium Development Goals (MDGs), Multilateral Environmental Agreements (MEAs), Article Six of the Convention on Biological Diversity (CBD), and Article Three of the United Nations Framework Convention on Climate Change (UNFCCC) (UNEP, 2009). As a result, the integrated policy of sustainable development should be able to make optimal contributions to ‘meet the needs of the present without compromising the ability of future generations to meet their own needs’ (Brundtland, 1987; Verheem, 2002).

The integration of SA into policymaking can begin at the national, sub-national, and local levels (Mell et al., 2017; OECD, 2001; OECD, 2015; OECD, 2016b; UNDP, 2017). Certainly, SA is becoming a common practice in policy-making and infrastructure project development appraisal (Sala et al., 2015). Rydger et al. (2015), agreed with the previous point that, assessing infrastructure for consistency with adopted climate policies against likely future policy is needed to meet long-term targets. Accordingly, a successful policy is one in which it has been assessed where the policy can be translated into on-ground reality (Du Plessis, 2007). Tadege Shiferaw and Jonny Klakegg (2012, p.15), pointed out that Billions of dollars are being financed for infrastructure projects while there is still a lack in meeting the requirements of people and achieving the intended requirements. This is due to the inappropriate policy that is formulated based on politicians’ pressure and their agenda rather than the actual need of people. Alkilani (2012), supported this point of view that whilst many policies and strategies are in place, the application of them, however, can often have little impact on communities.

Sala et al. (2015) however, argued that there are no guarantees that sustainable development can make positive contributions. Therefore, the essential

task of sustainable higher-level policymakers is to coordinate the sectorial policies, plans, and programmes while taking into account sustainable development goals into sectorial policies in the country (MoEnv. of Egypt, 2014; UN, 2016b). This can create a strategic link between the policy and the project development (OGC, 2007a; Tadege Shiferaw and Jonny Klakegg, 2012).

In its different dimensions, sustainable development should ensure the capability of addressing the environmental, economic and social impacts and their interactions with robust relationships to purposeful actions (Böhringer and Jochem, 2007). As a result, there is a need to ensure the integration between all of these dimensions while policymaking is being achieved (Sourani, 2013; Sourani and Sohail, 2005). While considering interactions of these dimensions, considering the relationship between them is essential in order not to repeat what is known about sustainable development dimensions (IA, 2016; UNEP, 2009). Consequently, having an effective and comprehensive policy-making, an integrated one is needed in order to ensure that the alignment is met across different infrastructure sectors and with other actions of development (IA, 2016). Thus, there is a great potential for encouraging stronger connection between strategic and project levels which in turn, can derive efficient results (Bond et al., 2012; Gibson, 2006). However, realizing the need for linking these two levels has been studied to a lesser degree which derived the efforts to be studied in the current research.

3.4.1 Policymaking Process

The United Nations Environmental Programme (UNEP) provides guidance on integrated policymaking for sustainable development within its dimensions (environmental, social, and economic) (UNEP, 2009). This is further supported by Hák et al. (2016), who proposed the same structure with slight differences in the policy cycle. The UNEP places solutions within a policy cycle that typically includes agenda-setting, policy formulation, decision-making, implementation, and evaluation, as shown in Figure 3.2 (UNEP, 2009, p.6) and (DESA, 2016, p.3).

The UNEP proposed a generic public policy-making approach that considers significant sustainable dimensions implications and their interactions associated with public policy issues, plus their potential solutions (DESA, 2016; UNEP, 2009). It ensures that policy issues are appropriately defined, potential solutions compared, solutions increase collaborations, and that the adopted solution is implemented, monitored and evaluated (DESA, 2016; UNEP, 2009). As a result, one of the key tools

for achieving sustainable development in a more balanced way is the employing of SA (DESA, 2016). Therefore, SA has become the primary tool for integrating environmental, social and economic dimensions into policy decisions and for maximising the synergies across these dimensions of sustainability (DESA, 2016).

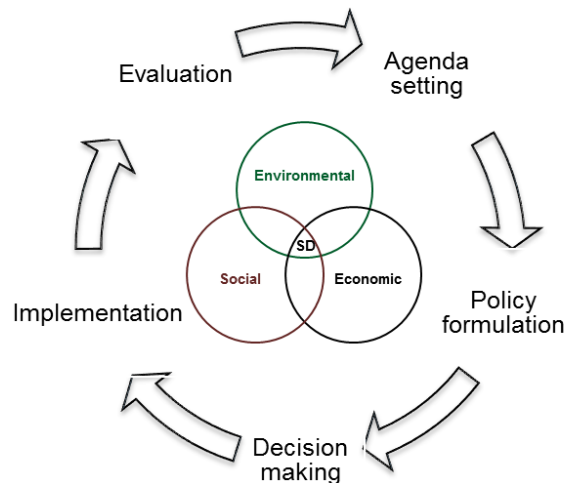


Figure 3.1 Policy cycle

3.4.2 Policy Development

3.4.2.1 Agenda Setting

In this stage, the UNEP (2009), proposed that setting an agenda, is important for identifying a list of issues such as weakness and opportunities in the current situation of a country. Tadege Shiferaw and Jonny Klakegg (2012), stressed the importance of conducting need assessments to compare the current situation in a country with respect to the infrastructure and the desired situation. However, at the early stages of policy-making, conducting a SWOT analysis is essential for identifying internal and external factors that can affect policymaking and understanding the impact of public infrastructure (Azapagic, 2003; Wheelen and Hunger, 2012). This broader approach can be used to assess the extent to which the domestic policies are aligned with the national sustainable development objectives and contribute to the achievement of the SDGs (OECD, 2016b). This can ensure that these objectives are broken down from being abstract and general to be more detailed and fit to each level of development from the strategic level to the project implementation level.

Based on statistics and the existing data, Statistics Sweden, as a leader in sustainability, in cooperation with a number of other Swedish authorities has prepared a comprehensive report on the first preliminary and systematic assessment per goal and target of how Sweden is currently living up to the 2030 Agenda (Sweden

Government, 2017). On the other hand, in Finland, the preparation of the National Agenda 2030 Implementation Plan is guided by conducting a gap-analysis to look into Finland's willingness to implement the (global) 2030 Agenda (OECD, 2016b). The objective of the report is to draw a baseline for Finland's implementation measures and, in particular, to point out those goals and targets where Finland needs to be (OECD, 2016b).

Agenda-setting allows policymakers to understand which issues are worthy of government attention (UNEP, 2009). The assessment of the need for infrastructure investment is predominantly driven by population and economic growth rates (OECD, 2017). Consequently, a comprehensive analysis of those challenges, their interconnections, and implications of the problem and what causes the problem, should be clarified well in order to realize the weaknesses of diverse actors at different levels (OECD, 2017). This can identify the baseline information to establish the current situation; such framing would determine issues at the national and sub-national levels and the sectors that need to be achieved (Historic England, 2016; UNEP, 2009). Policymakers would then be able to better grasp where the problem is in terms of with respect to the SDGs (Mansourianfar and Haghshenas, 2018; Sala et al., 2015; SCC, 2011; Shen et al., 2010; Sierra et al., 2018).

3.4.2.2 Policy Formulation

Policy formulation is a process of generating policy options in response to a problem defined on the agenda (UNEP, 2009). Then, the policy formulators in both inside and outside of the government identify policy options to prepare for the decision-making stage (Mont et al., 2014; Sequeira and Warner, 2007; UNEP, 2009; UNEP, 2015). However, such assessments and comparisons typically require investing a large number of resources, which need to conduct an initial screening of the potential options assessing their political, financial and administrative feasibility (UNEP, 2009). Once the assessment is carried out to identify the problem, the next step is to formulate strategic objectives for the policy (Historic England, 2016; Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009). Therefore, these objectives should be formulated for policy solutions (Historic England, 2016; Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009).

The objectives can be developed in both bottom-up or top-down approaches, but typically this involves a number of iterations until the different levels of objectives are consistent and respond to the policy problem to be addressed (UNEP, 2009). As a result, there is a need to ensure that the national sustainable development

objectives for the country are considered into the sustainable strategic objectives of infrastructure, which become the overall objectives of the country (OGC, 2007b; Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009). At this stage, there is a need to assess the local level in rural areas in line with the sustainable development indicators which should be formulated at this level (Ugwu and Haupt, 2007; UNEP, 2009).

3.4.2.2.1 Formulate Policy Options

Alternative solution options for a problem should associate with the sustainable development goals formulated for the country and at the macro level (UNEP, 2009). Developing alternative solutions to a defined issue should be generated to be adoptable for any circumstance because each policy option needs to be formed in line with the future expansion and its effect on the community, environment, and economy (UNEP, 2009). As a result, a key challenge that policymakers face is to ensure an integrated approach in implementing the SDGs and analysis to know what their real options are (OECD, 2016b). At this step, the generated options should then be reported in terms of how they solve identified problems and must be linked with the sustainable strategic objectives (UNEP, 2009). This stage can ensure compliance with the policy or issues of sustainability in certain areas (Bill, 2011; OGC, 2007b; Sinclair et al., 2013).

3.4.2.3 Decision-Making

Decision-making is considered as a stage where decision-making bodies select an action or non-action among a set of policy options identified at the policy formulation stage, in order to be implemented in the following stage (UNEP, 2009). The decision-making process is described as a set of different characteristics that are important for improving effectiveness such as rational comprehensive and political aspects, or as sequence activities involved in information gathering, developing alternatives and choosing among them (Shepherd and Rudd, 2014).

According to OECD (2017), all infrastructure investment decisions are ultimately political, and no socio-economic assessment tools will ever replace political decision-making. However, assessment tools and planning institutions can be used to help improve the quality of political decisions and increase the role of deliberation in decision-making (OECD, 2017). In this regard, Tadege Shiferaw and Jonny Klakegg (2012) and the UNEP (2009), seem to have a similar point of view that, decision-making involves the highly political interests of policymakers. As a result, the engagement of local communities into the preparation of policy-making may offer

chances for them to make locally appropriate decisions towards sustainable development (Alnsour, 2016).

3.4.2.3.1 Choose Criteria for Decision-Making

The integration of SA into the decision-making approach can provide the basis for choosing the most appropriate option to achieve sustainable development goals (Ashley et al., 2003). Therefore, defining a baseline for decision-making is essential to consider the right decisions (UNEP, 2009). A 'baseline' is established to assess each generated option against sustainability indicators in order to change the governmental decisions or to continue (Historic England, 2016; OECD, 2016b; UNEP, 2009). As a result, reviewing the strategic sustainable objectives of the country and the national and international policies are important for prioritizing the most appropriate option to achieve sustainable development (Historic England, 2016; OECD, 2016b; UNEP, 2009).

3.4.2.3.2 Assess and Compare Policy Options

At this stage, there is a need to assess the provided options from each option and estimate the benefits from each alternative according to the baseline assessment of sustainability (UNEP, 2009). So, in order to prioritize an appropriate option, the baseline of decision-making should take place (UNEP, 2009). To support decision-making, a matrix can be created and then link each option with the appropriate indicators to assess each provided option and then take the final decision (Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009). However, public communication, as well as transparency and accountability requirements for decision-makers are needed (OECD, 2015).

3.4.2.4 Policy Implementation

Policy implementation is probably the most demanding and critical stage in the policy process (UNEP, 2009). However, policy managers, initiators, formulators, decision-makers, and others involved in the policy process often fail to translate the policy into on-ground reality (UNEP, 2009). This is because those participants at the policy formulation stage left out from the earlier stages that can affect policy implementation in an appropriate manner (UNEP, 2009).

Du Plessis (2007) and Tadege Shiferaw and Jonny Klakegg (2012), argued that despite many sustainable development policies being developed, their impacts are often rather low. Therefore, most public organizations may resist coordination due to a supposed risk to self-government or differences over the nature of the tasks being

followed (UNEP, 2009). As a result, UNEP (2009), proposed a set of measures to implement policy in an appropriate manner that considers the challenges as early as possible. Therefore, the set of indicators can be used to assess the implementation of the policy and its impacts on achieving sustainable development (Hák et al., 2016).

Implementing public policy means translating policy options into actions for an organization (OECD, 2016b; OGC, 2007a; UNEP, 2009). Thus, once public organizations identify the need and select the policy option, the implementation of these options becomes the priority. Therefore, in order to implement the policy, public procurement is needed. According to Svanen (2016, p.3) public procurement in the EU is worth EUR 2,000 billion per year (2013), almost 20% of the EU's total GDP. In Sweden, the figure is around SEK 600 billion, equating to just under 20% of GDP (2011), spread across approximately 20,000 calls for tender from 1,200 authorities (Svanen, 2016, p.3). In Sweden also, the award criteria "lowest price" dominates in public procurement (Svanen, 2016). Therefore, there is a need to move forward to sustainable public procurement to implement the policy into actions. As a result, an appropriate procurement strategy should be selected in order to ensure that the sustainability objectives and targets are fully integrated into sustainable procurement (HM Government, 2006; Fussey, 2012; Government of Canada, 2018; OGC, 2007b; Swiss Confederation, 2016). Consequently, sustainable infrastructure projects can be delivered as a new project, or sustain the existing with no need for a new project (OGC, 2007b).

According to the Sustainable Procurement Task Force (HM Government, 2006), Sustainable Public Procurement (SPP) is a process whereby organisations meet their needs for goods, services, works, and utilities. They are made in a way that achieves value for money on a whole life basis, in terms of generating benefits not only to the organisation but also to society and the economy, while minimising damage to the environment. OGC (2007b) seemed to describe sustainable procurement process the same as the previous, that a process which identifies where and when the key decisions are being made and determine the critical outputs that should be delivered at each stage of a project while considering sustainability into all processes of procurement development. Fussey (2012), argued that in some cases and within these development processes of sustainable procurement, some other conditions need to be satisfied which are part of the SA during the entire project life cycle. These processes start from pre-procurement, tender specifications, pre-qualification, award and contract stages (Fussey, 2012).

It can be noted that the implementation of the policy can derive sustainable infrastructure project development. This means that the procurement process should be carried out to design each infrastructure project development. As a result, such assessment tools and schemes would then be appropriate for directing the decision-making in the design stage, using green building assessment tools and/or infrastructure assessment schemes. In the current research, however, the implementation of the policy under SPP is out of the research scope. This research is focussing on the pre-procurement stage, while further research is needed in this particular to address the need for studying the delivery of SPWs development in Jordan under SPP.

3.4.2.5 Monitoring and Evaluation

With respect to sustainability, the UNEP refers to the integrated evaluation as the monitoring and determining how a policy is managed during implementation (UNEP, 2009). It examines the effectiveness of the policy both sides directly and indirectly in terms of its objectives (UNEP, 2009). The monitoring and evaluation can lead to learning from weaknesses that could be caused by many factors along with the implementation of the policy (UNEP, 2009). Evaluation should also take place in terms of to what extent the policy results are achieved in order to give early notice. The results of the policy are then monitored and evaluated against the strategic objectives, which can allow for such adjustments to the policy, if needed (UNEP, 2009). Alkilani (2012), added that, in order to support the implementation of sustainable policy, the collaboration systems top-down and bottom-up approaches are essential for delivering supported action by the government and monitoring systems for industry. As a result, there is a need to explain the implications of new information derived through evaluation to all policy participants by using local, sub-national, and field-level resources, including embassies and development co-operation agencies, which may call for re-planning at the operational level (OECD, 2016b). This will determine the actual effects of an implemented policy, not only on the established objectives for that policy (OECD, 2016b).

In Sweden, the committee proposal for a comprehensive action plan for 2030 Agenda implementation will also contain proposals for effective forms of monitoring of the implementation at the local, regional and national level (Sweden Government, 2017). In Switzerland, to weigh up interests and to make political decisions, there is a need to know where it stands with regard to key success and deficit parameters related to sustainable development (Swiss Confederation, 2016). In Germany, a

regular monitoring system is important to track the success and failures in the policy of SDGs (FGoG, 2017). This is necessary to understand the weaknesses in the policy and the way to re-align the policy with SDGs (FGoG, 2017). In Qatar, in line with international practices, a central monitoring function was developed as a performance measurement follow-up indicators (MDPS, 2017). The selection process is supported and enhanced by defining the main procedures required by the government to achieve the KPIs. These KPIs will be monitored on a monthly basis, where possible, and on a quarterly basis at all rates (MDPS, 2017). The evaluation should be carried out based on specific indicators that need to be evaluated to understand compliance with the selected alternative option, linked with appropriate strategic sustainable objectives. Consequently, there is a need to identify specific criteria of evaluation, collect data about the policy implementation and conduct participatory monitoring and evaluation (Brugmann, 1996; UNEP, 2009). As a result, the evaluation means that policy outcomes are intended changes in society, where governments seek to generate an effect on economic, social, and environmental impacts resulting from the implementation of policies (OECD, 2016b).

3.5 Critical Review of the International SA Practices

It can be seen from the review of international SA practices worldwide that there are a variety of assessment tools for use to assess sustainability. There exist rating schemes to assess the achievements of sustainability in PWs infrastructure. These schemes cover most PWs infrastructure while at the same time are able to assess the infrastructure at the predesign, design, and construction phases. However, this research is not about these phases as it focuses on the policymaking process to select individual projects. Thus, the rating schemes of assessment were not considered for the current research. The green building tool is another tool which only considers the environmental sustainability at the predesign, design, and construction phases for the building itself without taking other PWs infrastructure into account. Therefore, this form of assessment was excluded from the current research. The last assessment tool is the SA tool and from the critical discussion, it is clear that it is the most appropriate tool for the current research due to its comprehensive view.

International SA practices have indicated that, despite the variety of SA forms, there is no single universally applicable methodology to integrate SA into PWs development. Consequently, there is no common agreement that the process of SA is efficient although many researchers agree that there are some principles that make

the process of SA effective (Bond et al., 2013; Gibson et al., 2013). Thus, ensuring process efficiency is a major challenge for SA (Gibson et al., 2013). The effective SA process is that whose design processes contribute to sustainable development (George, 2001; Gibson et al., 2013; Sala et al., 2015). In addition, an effective SA process is that which contributes to sustainable development outcomes rather than its stages and how to deal with them (Bond et al., 2013). Therefore, each country has its specific tools, processes, and techniques on how to follow SA requirements.

In fact, there has been an increased interest in advanced economies to further consider sustainability practices when delivering projects (Banihashemi et al. 2017). In developing economies, the interests of sustainability practices have been of lower priority and mostly concern economic development (Banihashemi et al. 2017), while the integration of sustainability into project development and management is still lagging in developing countries (Banihashemi et al. 2017; Daneshpour 2015). The integration of sustainability into PWs infrastructure development process can begin at any of the levels; national, sub-national, and local levels (OECD 2015; Nation 2017; OECD 2001; Mell et al. 2017; OECD 2016b). This study provides significant information regarding SA practices for these levels. Currently, and according to these practices, there is a need to change behaviour related to projects and organisational strategies (Daneshpour 2015). Therefore, the need to move away from the current and traditional approach of PWs infrastructure project development to SA practices is necessary in order to move into sustainable action (Daneshpour 2015). The clear message is that in the absence of support by policymakers, the integration of SA into project development will not happen (Banihashemi et al. 2017). Therefore, there is a need to consider what are the international practices that better integrate SA into PWs infrastructure development.

In summary of all international SA practices, it can be concluded that internationally there is a great deal of SA practices at both strategic and project levels. These practices have been critically reviewed and then grouped into sets of thematic categories. The overall international SA practices that were emerged from the critical analysis are provided in **Appendix A**. It can be seen from these practices that there is a need to:

1. Define sustainability in the context of the country under investigation.
2. Identify SA processes, goals, and targets that need to be integrated into PWs infrastructure projects development.
3. Link the development levels of PWs infrastructure projects development.

4. Create an enabling environment at each level of PWs infrastructure projects development.
5. Structure a comprehensive PWs infrastructure projects development process from policymaking process to select individual projects.
6. Draw all the elements together in order to show how to integrate SA into PWs infrastructure projects development.

3.6 Summary

This chapter discusses critically, the international SA practices from different Western developed countries and some developing countries. It revealed that many forms of SA and international practices are used, as there is no common agreement that special forms of SA and practices are the most appropriate fit all. The critical analysis of related works provides a solid foundation for the need in the integration of SA into PWs development in Jordan. However, unlike researchers whose arguments have been discussed in detail, this research will push the boundary in need of SPWs development further by encompassing simultaneously all practices which have strong influences on the integration of SA into PWs development.

This research argues that, focusing on one, two or more of the practices like previous studies did, are ineffective and no longer relevant to achieve successful outcomes. Thus, the combination, interactions, and interrelations between those practices within a single approach become apparent and necessary. Therefore, there are a set of practices that have been grouped into categories have been confirmed significant in integrating SA into public infrastructure development. These practices are coded under (SP_{1...55}) which have been identified from reviewing literature and scientific documents provided in Appendix A. It is believed that PWs infrastructure participants will better understand, recognise, and assess PWs sustainability if SA is clearly embedded into PWs development and therefore can achieve more successful outcomes with respect to sustainable development.

The following chapter provides an analysis of the existing practices of PWs development in Jordan at each level of development. Moreover, it provides the limitations of the existing practices of PWs development in Jordan compared with the international level. As a result, it provides significant implications for the presentation of potential connections between different elements of the proposed integrated approach in need to leverage international SA practices into PWs development in Jordan.

Chapter 4 Jordan's Public Sector Work

4.1 Introduction

Following the same sequence as the previous Chapters (2 and 3), this chapter reviewing the context (Why Jordan?) and provides a clear understanding of public works (PWs) development, its need, its classifications and the role of the government of Jordan in PWs development. It discusses the existing enabling environment and the existing PWs development levels which comprise four levels – national, sub-national, local and project implementation. Moreover, it discusses the existing sustainability practices in Jordan, as well as providing a critical review of these practices and their limitations. Finally, a gap analysis is provided leveraging from the international SA practices into PWs development in Jordan.

4.2 The Context: Why Jordan? The Unique Nature of Jordan Towards SPWs Development

Jordan is officially called the 'Hashemite Kingdom of Jordan'. The name 'Jordan' is related to the Jordan River which passes its border from the north to the Dead Sea in the south, and Amman is the capital. The system in Jordan is monarchical and King Abdullah II is the current king. Jordan includes 12 governorates distributed throughout three main regional divisions: the north, the middle, and the south. It is located northwest of Saudi Arabia, to the south of Syria, to the west of Iraq and to the east of the West Bank. Jordan covers an area of 89,342 km² (World Bank, 2017). The Gulf of Aqaba in the south is the only coastline in the country and is only 26 kilometres in length (Encyclopaedia, 2014). Jordan is considered a modern civil nation and has a strategic location with an open market for business (Najmi, 2011; UK Government, 2014).

Jordan is, however, one of the small Arab countries located in the heart of conflicts in the Middle East that is concerned about achieving sustainable development (Sharp, 2019). The progression in size of the population that is projected over the coming years in Jordan (MFA NL, 2018, p. 3), is a result of regional conflicts, particularly the ongoing Syrian conflict, affects Jordan's ability to achieve sustainable development (Jordan Times, 2017; Sharp, 2019). Receiving Syrian refugees has

forced Jordan to bear a huge share of the global responsibility for hosting more than 1.3 million Syrians, with 630,000 being registered refugees (Jordan Times, 2017), which places significant pressure on Jordan's economy, communities and public services (Awad, 2016). Indeed, the Syrian refugee community constitutes the second largest population group in Jordan compared to its population in the world, 89 refugees per 1,000 inhabitants (UNHCR, 2018). Therefore, population growth has become the most significant concern for the government of Jordan (MPIC, 2017a).

In fact, Jordan remains highly dependent on regional and global exchanges, especially for water, food, and energy (Combaz, 2019). It suffers from a severe water scarcity problem; which is considered as one of the world's most water-stressed countries (MWI, 2016; Sharp, 2019). The fluctuation of annual rainfall is considered as an issue, with approximately 92% of its area is covered by the Arabian Desert (MWI, 2016; World Bank, 2017). As a result, there is an increasing decline in the quality and quantity of water resources and a decrease in the amount of groundwater and surface water due to the decline in water flows, mainly due to Jordan's location, which is exacerbated by increasing the demand for water services (MWI, 2016). Moreover, Jordan is facing increases in temperature, the expansion of areas affected by drought, loss of some natural ecosystems, relocation and habitat degradation, deforestation, a rise in the occurrence of forest fires and recurrent heat waves, (MPIC, 2017a).

Jordan also faces severe land degradation as a result of inadequate land-use planning, urban infringement, soil corrosion, and poor waste management methods (Alnsour, 2016; Awad, 2016). Indeed, land and soil degradation destabilise the security and development of all countries (UN, 2015a). Thus, sustainable land management is very important for reducing the effect of land degradation and desertification, which improves the livelihoods of people who are under threat (UN, 2015a). One other issue that can be seen in Jordan is an increase in GHG emissions. Jordan's GHG emissions are approximately 28.7 million tons per year (MPIC, 2017a). The annual amount of CO₂ emissions per capita amounted to approximately 4.41 tons at the end of 2016, and this is expected to rise to 5.59 tons by 2030 (MPIC, 2017a). In addition, waste generation is still on the increase as human development activity continues; i.e., Jordan produces a large number of hazardous waste materials (in 2014 the country produced 4,000 tons of medical waste) (Edama, 2016).

The energy sector is another sustainability issue which is considered one of the main pillars of the Jordanian economy (Alshboul and Ghazaleh, 2014). However, Jordan has extremely limited primary energy resources and is forced to depend to a

large extent on importing 97% of its oil needs from petroleum and natural gas from neighbouring Arab countries (Edama, 2016; GoJ, 2015; MEMR, 2015; MPIC, 2017a; Sharp, 2019). In fact, while the provision of reliable energy supply at a reasonable cost is a crucial element of economic reform and sustainable development, the energy price will continue to increase due to the economic growth and the increase of energy usage in its different forms (Goussous et al., 2015). Regarding the regional development that occurred in 2003, energy bills have been pushed up to JOD 800 million per year, comprising 13% of GDP and reaching 45% of imported goods (Goussous et al., 2015). Therefore, the dependency on conventional oil sources should decrease as a result of investments in renewable energy (MEMR, 2015). This, in turn, results in a decreased reliance on external energy and drive efforts towards a green economy (EPC, 2018)

In addition, although Jordan is classified as an upper-middle income country (MPIC, 2017a), it faces serious challenges related to poverty and unemployment (Combaz, 2019). In fact, Jordan's government has a target to decrease the unemployment rate from 12.03% in 2015 to 9.17% by 2025 (GoJ, 2015). In addition, poverty reduction continues to receive primary attention not only as a basic human right and one of the most important SDGs but also as a peace and security issue, particularly in the light of the instability and conflicts surrounding the country. Although the poverty rate remained at approximately 14% during the period 2002–2010, Jordan aims to reduce it to 8% by 2025 and to 7% by 2030 (GoJ, 2015).

Moreover, the developments in the region, particularly in Syria and Iraq, and the influx of refugees remain the largest shock affecting Jordan and have had a strong impact on the country's economy and society (Sharp, 2019). The GDP rate fell from 2.3% in 2015 to 2.0% in 2016, affected by the political conditions in the region (GBD, 2017). As a result of the government's budget deficits which makes it difficult for the government to find a secure financing mechanism (Trading Economics, 2018). Jordan also faces serious challenges relevant to financing PWs development projects. As a result, Jordan's funding depends on different foreign sources in order to deliver PWs development and to meet the service requirements of the citizens (Trading Economics, 2018; Sharp, 2019).

In the light of this situation in Jordan, governmental policies were created focusing on sustainable development that provides a balanced society where opportunities are available to all and the gap between governorates is closed (GoJ, 2015; ME, 2016). Despite all these efforts, Jordan still faces several challenges

including water scarcity and overreliance on external resources, while on the other hand, neither poverty nor unemployment have been significantly reduced. In addition, despite help from the international community, it is still difficult for public services to match these requirements (Awad, 2016), and achieve sustainable development. This is evident from the continuing pressure on services, inadequate PWs services, the increase of poverty and unemployment rates, and the inequalities across the country (Ajarmeh, 2016; GoJ, 2015; ME, 2016; MPIC, 2016c; MPIC, 2017a; Combaz, 2019). Therefore, due to the serious challenges that face Jordan, understanding sustainable development issues is crucial to driving efforts to address the particular interests associated with the country.

In fact, there is an increased demand for PWs infrastructure projects development in terms of electricity, water and wastewater networks, schools, transportation, and hospitals, which require significant effort to sustain these public services (MPWH, 2017a). Recently, in need to reduce environmental damage, achieve social welfare, improve community wellbeing and enhance economic growth, achieving sustainable development has become increasingly popular in all sectors including PWs development worldwide (El-Sawalhi and Sarhan, 2018; Mor, 2017). However, sustainable development is not well recognised in PWs development in Jordan. Therefore, it implies necessarily providing PWs services for current and future generations and maintaining these services for future generations without compromising the current generation's needs (Mansourianfar and Haghshenas, 2018; She et al., 2018). Thus, delivering sustainable public works (SPWs) development is essential in countries that suffer from limited resources and socioeconomic issues (Bhattacharya et al., 2016; Combaz, 2019; Paul Starkey, 2014; White and Noble, 2013), including Jordan. Consequently, Jordan is in a unique nature among developed and developing countries in need to delivering SPWs development.

4.3 Public Works Development in Jordan

Public works (PWs) development in Jordan is the main contributor to improving people's living standards, public facilities and social services (Sweis, 2008). It is a foundation for socioeconomic growth; thus, investment in PWs development in Jordan is crucial (Aljadeed, 2017; Alqatawneh, 2013). It is a kind of public goods that the government has an important role of influencing economic growth and social welfare (Alqatawneh, 2013). The Ministry of Public Works and Housing (MPWH) in Jordan is in charge of managing the delivery of PWs

development (Jordan Times, 2017). In 1923, the first nucleus of the MPWH was specifically founded from the establishment of the Emirate of East Jordan and was called the Department of Beneficial (MPWH, 2017b). Its name was taken from the function of this department, including its useful work for the society. Later, the department's name was changed to the MPWH. According to the system of PWs development No.71 in Jordan, the most common definition of PWs development in Jordan is: creating and establishing buildings, roads, facilities and engineering projects of various kinds and then maintaining them, also, to what these works do which are needed to be studied for implementation (MPWH, 2004). The current research study will look at PWs development in Jordan from this perspective, but it will also examine PWs development starts from policymaking process to select individual projects.

According to Ross (1995), public infrastructure projects cover a range of public services including power, telecommunications, water supply, sanitation and sewerage, solid waste collection and disposal, and pipe gas, roads, dam and canal works, railways, urban transport, and airports. This definition is supported by a number of authors (El-Sawalhi and Sarhan, 2018; Mor, 2017; MPWH, 2004; Palei, 2015; World Bank, 1994): that public infrastructure is the physical assets created by public investment. These assets include both economic infrastructure (e.g., highways, airports, roads, railways, water and sewer systems, public electric and pipelines, telecommunications) and social infrastructure (e.g., schools, hospitals, and prisons) (El-Sawalhi and Sarhan, 2018; Mor, 2017; Palei, 2015; World Bank, 1994).

In the context of Jordan, a project can be defined as a product that comes from a series of strategic decisions to deliver public services for the society in line with organisation's strategic objectives and its service requirements (MPSD, 2014a; MPWH, 2004). They are classified into water and sanitation, transportation, energy, environment, health, telecommunication, education and governmental buildings (MPWH, 2004; MPWH, 2017b).

4.3.1 The Need for Public Works Development in Jordan

The demand for PWs development is increasing due to population growth and the need to cope with modernisation and service requirements (Awad, 2016; Edama, 2016; Jordan Times, 2017; Sweis, 2008). It is considered the main driver for major investments that contribute to the development of society and provide a healthy and safe environment for people (Aljadeed, 2017; Tweesi, 2009). PWs development in Jordan is delivered at two main levels: national and local (MPWH, 2017b). The former

level considers large-scale projects which are usually delivered by privately financed companies (Mistarihi, 2012). At the local level, PWs development is needed for a specific local community which is typically fully funded by the government (MPWH, 2017b), or either by foreign grants (MPIC, 2017a).

4.3.1.1 Construction Industry

The construction industry in Jordan is the backbone of Jordan's economy that provides significant employment and wealth (Hadadin et al., 2010). Thus, Jordanian banks offer a good environment for investment in infrastructure projects and public facilities (Hyari and Kandil, 2009; QNA, 2014). More than 60% of investment projects in the region are in the construction sector, which creates around 33% of the GDP and employs approximately 30% of the labour force (Jordan Times, 2015). The GDP from construction in Jordan increased to 147 JOD million in the fourth quarter of 2016, up from 144.2 JOD million in the same quarter of 2015 (OECD, 2017).

The construction sector has been developed steadily because the growth is influenced by many factors interrelated to the general political climate and a safe investment environment (JCI, 2014). The geopolitical conditions in the region in recent years, for example, in Iraq, Palestine and Syria, have increased immigration (Department of Statistics, 2016), resulting, in turn, in huge numbers of people who have increased the demand on economic PWs such as roads, water networks and electricity and social PWs such as schools, hospitals and public buildings, which requires significant efforts from the public sector with cooperation from the private sector (MPWH, 2017b).

4.4 The Role of the Government in Public Works Development in Jordan

The government of Jordan plays a key role in the development plan of the country's construction industry. It is also the main contributor to improving people's living standards (Ismail, 2012). The government of Jordan has responded to the increased demand for essential needs to improve the economy including at both the local and international levels (Ismail, 2012). Mistarihi (2012) stated that the government's involvement in each operating system of the construction industry is different based on the manner of investment. Several firms' processes involve local or international levels to deliver government requirements (Mistarihi, 2012). To do this, the Jordanian government signs agreements with the private sector to improve

PWs development in the country and at the international level fully supports the international companies and encourages international investments (Ismail, 2012).

The role of government involvement in the construction industry is widely developed (Mistarihi, 2012). It is clear that the government is mainly responsible for meeting the needs of the people, and the degree of its involvement in the construction industry is on-going (Mistarihi, 2012). However, although the government of Jordan plays a key role in PWs development, the lack of a systematic approach towards improving people’s living standards and bridging the gap between the governorates is still clear (MPIC, 2017a). This can be seen from the development services which are provided across the country, that cause a problem in considering the service requirements for people in a more sustainable manner.

4.5 Public Works Development Levels in Jordan

In Jordan, PWs development is conducted from five main development levels, as shown in Figure 4.1. It shows the existing levels of PWs development in Jordan adapted from a number of sources (GBD, 2015; GoJ, 2015; Goussous et al., 2015; Jordan Times, 2017; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MPWH, 2017c; MT, 2018; MWI, 2013).

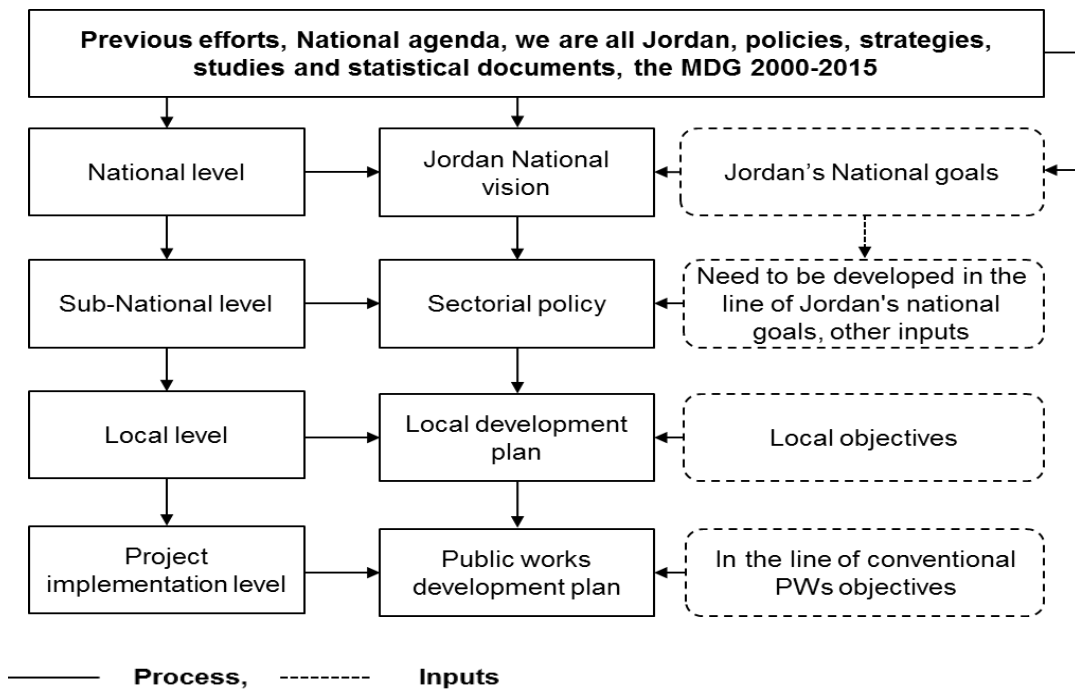


Figure 4.1 Public works development levels

These levels of development start from the inputs which come from various efforts, public documents, and international targets. This is followed by four levels, which are namely: national level (the country level), sub-national level (ministries level), local level (governorates level) and the last one is the project implementation level where projects are delivered by the MPWH. At the national level, the national vision of Jordan 2025 was developed in 2015 and became one of the main inputs for each ministry to develop its policy. At the sub-national level, each sector then develops its policy sectorially, in line with the national vision's objectives. The provided objectives at the national level are abstract and provide implications for PWs development to meet people's service requirements. The Millennium Development Goals (MDGs) were included to develop the national vision of Jordan 2025. However, these goals are out of date now (Sachs, 2012; Sachs and McArthur, 2005; UN, 2015b), and only considered social aspects of development.

In addition, it can be seen in Figure 4.1 that there are, however, no indicators being developed from the sub-national level to assess the current situation at the local level to prioritise PWs development in Jordan. Each local community is assessed in terms of its strengths, weaknesses, opportunities and threats (MPIC, 2016c), based on local indicators which are provided in Table 4.1 (GBD, 2015; GoJ, 2015; Goussous et al., 2015; Jordan Times, 2017; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MPWH, 2017c; MT, 2018; MWI, 2013). However, these indicators are conventional and their implications for reality on the ground are not linked to the national level.

Table 4.1 The overall PWs goals, targets, and indicators

Level	National	PWs	Sub-national	Local
sector				
Public works projects (sectorial planning)	<ul style="list-style-type: none"> Jordan should have efficient and high-quality infrastructure and facilities Improving the quality and preservation of the environment Jordanians should have equal opportunities 	Roads and public buildings	<ul style="list-style-type: none"> Develop, rehabilitate, maintain and sustain the road networks in the kingdom of Jordan. Developing and implementing a comprehensive plan for traffic safety that would improve the degree of safety and the provision of sophisticated components for traffic safety on the roads. Develop the plans in order to sustain public building and road networks. Develop the healthcare infrastructure. 	<ul style="list-style-type: none"> # Of schools # Of medical centres # Of hospitals Roads (km long) The service requirements Level of education and the level of health
		Transport	<ul style="list-style-type: none"> Reduce the negative environmental impacts of the transport sector Transition to sustainable transport patterns. Completion of infrastructure Development of the public transport system. 	<ul style="list-style-type: none"> # Of buses/person # Of accidents and fatalities

		Water	<ul style="list-style-type: none"> • Sustain the water resources. • Improve the level of water quality and wastewater services. 	<ul style="list-style-type: none"> • Accessibility of water and sanitation % • Recycled water for agriculture % • Water supply per capita L/d • Water losses
		Energy	<ul style="list-style-type: none"> • Reduce energy consumption and improve efficiency. • To create opportunities for the private sector and encourage investment in infrastructure and energy sector projects. • Diversify the sources and energy forms. The development and exploitation of conventional and renewable local energy sources. 	<ul style="list-style-type: none"> • Accessibility of electricity % • Using Hybrid cars
		Environmental	<ul style="list-style-type: none"> • Reduce adverse impacts on the environment and prevent pollution. • Improve levels and quality of ecosystems. • Develop a safe learning environment. 	<ul style="list-style-type: none"> • Landfills and recycling plants'

However, there is no systematic approach for linking each level of PWs development in Jordan, as seen in Figure 4.1. Hence, and due to the variety of inputs at the national level, each ministry at the sub-national level would not be able to formulate an effective policy that is linked with a set of objectives at both local and project implementation levels and then translated into on-the-ground realities.

4.6 The Enabling Environment for Public Works Development in Jordan

In Jordan the main barriers affecting PWs development are, namely: lack of institutional governance, regulations not being effective, lack of experienced people and skills, and the lack of availability of public funding (Goussous et al., 2015; ME, 2017a; MEMR, 2016; MH, 2017; MPIC, 2017a; MPIC, 2017b; MPWH, 2017c; MT, 2018). Barriers are the factors that hinder the implementation of projects while enablers are the factors that help such implementation (Bhanot et al., 2017; Peenstra and Silvius, 2018). According to Bhanot et al. (2017) and Peenstra and Silvius (2018), these barriers affecting the development of public infrastructure become the main enablers once they are being overcome.

Figure 4.2, adopted from (Goussous et al., 2015; ME, 2017a; MEMR, 2016; MH, 2017; MPIC, 2017a; MPIC, 2017b; MPWH, 2017c; MT, 2018) shows all enablers that are linked with PWs development in Jordan. However, there is a weakness of interactions between these enablers or there is a lack of interactions between them. This means that institutional governance body should work within the regulations in

the country that are less enforced by them. The available technical support that needs to be provided, usually is not assessed in which it is appropriate for PWs development or not. Lastly, the developers of PWs are not identifying the need for PWs development based on the available public funding or not, which can make problems due to the lack of availability of public funding constantly.

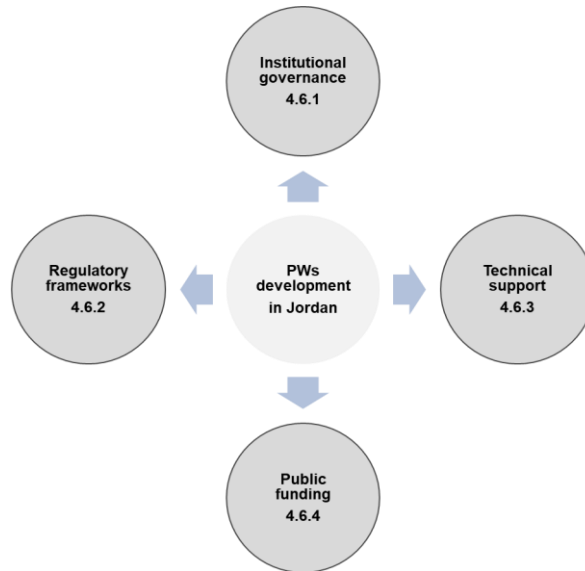


Figure 4.2 The enabling environment of PWs development in Jordan

However, the enabling environment in Jordan covers only specific development levels while other levels are not included. This means that the enablers are not consistent at each level or linked to each other. The following sections discuss the enabling environment of PWs development in Jordan.

4.6.1 Institutional Governance

In the context of Jordan’s public sector work, ‘Governance’ is defined as a set of legislation, policies, organisational structures and controls that influence the manner in which government departments are directed and managed professionally and morally, with transparency, in accordance with mechanisms for monitoring, evaluation and a rigorous accountability system to ensure efficiency (MPSD, 2014a). Institutional Governance is defined as the organisational structure which bears direct responsibility for all aspects of executive management in the government department and is accountable to the senior management for effective performance and compliance with the implementation of policies (MPSD, 2014a). It plays a key role to ensure compliance with regulations and requirements at PWs development (MPSD, 2014a). However, the concern regarding PWs development in Jordan is most likely

to be on a project level, and absent at other levels of development. Indeed, the institutional governance is different at each level of PW development in Jordan. It starts at the national level (the prime minister), at the sub-national level (the ministry), at the local level (local house), and finally at project implementation level (the general tendering department at the MPWH), as shown in Figure 4.3, adopted from (GBD, 2015; Jordan Times, 2017; ME, 2017a; ME, 2017c; MEMR, 2017; MPIC, 2017b; MPWH, 2013c; MT, 2018; MWI, 2013).

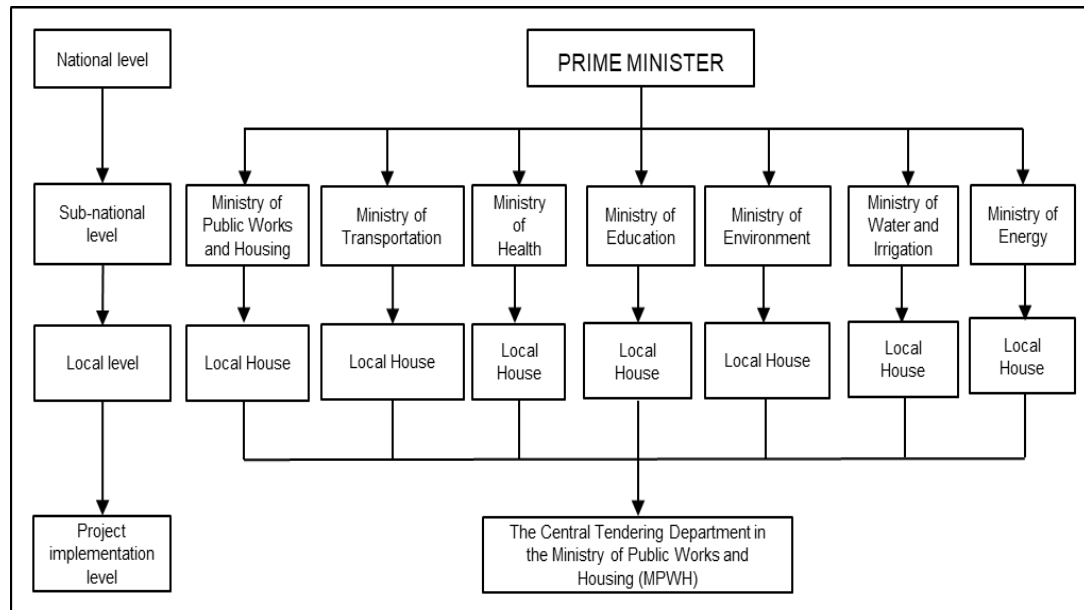


Figure 4.3 The institutional governance of PWs development in Jordan

Figure 4.3 shows that each ministry is linked with the prime minister (PM) of Jordan. The PM of Jordan is appointed by the king of Jordan while the ministers for each ministry are selected by the PM that is headed by the minister at the top management level (Jordan Times, 2017; ME, 2017c; MPWH, 2013c; MT, 2018; MWI, 2013). Each minister communicates with the PM directly in order to ensure consistency between the higher and lower management levels (Jordan Times, 2017). Then, the general secretary is linked with several directorates at the ministry and each directorate has its own work to ensure consistency between all of them (Jordan Times, 2017; ME, 2017c; MPWH, 2013c; MT, 2018; MWI, 2013). Each ministry includes several local houses (branches) at each of the country's 12 governorates, which represent them across Jordan (Jordan Times, 2017). The MPWH is responsible for the delivery of all PWs development by the central tendering department, from preparing the contract documents and managing the implementation for all PWs development and, finally, transferring the role for operating these PWs development to the ministries (Jordan Times, 2017).

4.6.2 Regulatory Frameworks

PWs development in Jordan is governed by different regulatory frameworks. The regulatory frameworks can be defined as those sets of regulations, laws, systems, and measures that govern the overall process of development and which should be compulsory in practice (MPSD, 2014a). The regulatory frameworks in Jordan are divided into five main levels: country (such as the constitution), national (international agreements and national regulations), sub-national (ministries' regulations), to manage and govern the process of each ministry (MPSD, 2014a), local (permits, land uses and local authorities' regulations), to manage the development of each municipality area, and project implementation (codes and PWs System No. 71 1986 (MPWH, 2004), association of engineers' permits, codes, and civil defence permits for safety) levels, to ensure the design of PWs projects is in line with Jordanian standards and codes (Jihan Haddad, 2013).

One of the most challenging aspects of investment and the development plan is the instability of the government's trends, plans, and legal and regulatory frameworks that govern organisations in Jordan, however (Nilsson and Persson, 2017). In fact, each ministry has its own regulations and laws which govern its specific work. For example, at the sub-national level there is no clear regulatory framework to govern overall policy formulation for most PWs influenced by other ministries' regulations (ME, 2017c), and, at the local level, each local authority has its own regulations. As a result, these regulations become not considered in other sectors. In contrast, the regulatory framework at the project implementation level is effective for delivering PWs development in Jordan that the national building council issues all the required codes (JordanTimes, 2017).

In addition, PWs System No.71 is the only system that can govern the overall process of PWs development in Jordan at the project implementation level. In 1986, the PWs system was launched, and it was updated in April 2004 (MPWH, 2004). Moreover, the civil defence should also review public building development's drawings to ensure that they are consistent within Jordanian safety standards. Once these drawings are approved, the municipalities will ensure they are designed based on the municipalities' laws (Jihan Haddad, 2013). Finally, the Jordan Engineers Association reviews all engineering drawings to ensure the compliance with Jordanian codes, specifications, and standards (Jihan Haddad, 2013).

4.6.3 Technical Support

One of the most important enablers for PWs development in Jordan is providing appropriate technical support. The technical support can be defined as the technical skills, capability, and knowledge that are needed from those who work in the field and who provide the intended technical support that meets the organisation's objectives (MPSD, 2014a). The number of participants in the construction industry in Jordan included more than 2,935 contractors at the end of 2016; the Engineers Association included more than 137,000 engineers in the summer of 2016; and there were about 1,600 investors in the housing sector and approximately 2,845 consultancy officers at the end of 2016, who are consultant partners with the MPWH (Hák et al., 2016; Kats, 2003). The Engineers Association, however, conducts training in the Engineers' Centre, partnering with the MPWH for capacity development at the project implementation level (MPWH, 2017c). Many training opportunities are designed to improve the ability of engineers to cope with the development of the industry and prepare them to work more efficiently. Also, in such cases for special invitations, the pre-qualification can be provided for consultants, designers, and contractors (MPWH, 2004), while at the sub-national and local levels the technical support is not considered.

4.6.4 Public Funding

The government of Jordan is well aware of the need to fund all investments for PWs developments in Jordan. Public funding can be defined as the amount of money that is provided by the government and its institutions to deliver its national vision on reality (GBD, 2015). In some situations, the government borrows money from different sources to deliver PWs development (OECD, 2017), and, in general, the government provides public funding for such development from the general budget department (GBD). The GBD allocates public funding for all sectors in the country and each sector is responsible for creating its policy based on allocated funding (GBD, 2015). It allocates public funding based on previous spending reports and the current policy proposal from each ministry (GBD, 2015). The policy for each ministry should be reviewed by the GBD and it should be agreed on whether to proceed with PWs development or not (GBD, 2015).

In order to manage the delivery of PWs development, it is important to examine whether public funding is available or not (MPWH, 2004). This process is carried out by the GBD, which reviews the policies of each ministry to ensure that they are in line with the government's and policies (GBD, 2015). The feedback then

goes to the ministry to modify, adjust and finalise the policy (GBD, 2015). However, the non-equality in allocating public funding for each sector creates gaps in development among the sectors in the governorates across the country (MPIC, 2017a). There still remains a particular problem for funding PWs development in Jordan with respect to ensuring that public funding for PWs development is allocated consistently (MPWH, 2017c). Therefore, public funding should be allocated for PWs development in such a way as to ensure the gaps in governorates are closed (MPIC, 2017a).

4.7 Existing Practices of PWs Development in Jordan

A generic framework which is commonly carried out for PWs development in Jordan from the national level to project implementation level is shown in Figure 4.4; this has been adopted from a number of sources (GBD, 2015; Goussous et al., 2015; Jordan Times, 2017; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MPWH, 2017c; MT, 2018; MWI, 2013).

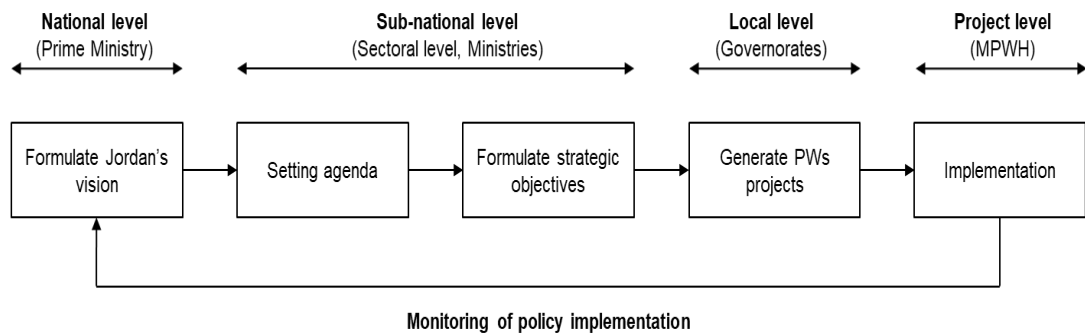


Figure 4.4 The PWs development process from policymaking process to select individual PWs projects

In the current research study, there are four levels of PWs development, which are the national (the PM level), sub-national (ministerial level), local (governorates level) and project implementation (the central tendering department at the MPWH level); these levels are discussed in the following sections.

4.7.1 National Level

4.7.1.1 The Development of National Vision

In 2015, the country's government launched the national vision of Jordan in order to achieve overall development in the country (MPIC, 2017a). This document is

officially titled 'Jordan Vision 2025'; it is a roadmap for the future to close the gap between the current and targeted situations for the country (GoJ, 2015). The government formulated a steering committee headed by the PM and comprising a number of ministers (GoJ, 2015; MPIC, 2017b). The Ministry of Planning and International Cooperation (MPIC) communicated, coordinated and managed the overall process of carrying out workshops with all parties including the local community (GoJ, 2015; MPIC, 2017b). The process of creating the national vision of Jordan started by studying the current situation of the country in terms of water and energy, social life, living standards, infrastructure and the economy (GoJ, 2015). These processes are essential for detecting any external and international factors (i.e. strengths, weaknesses, opportunities, and threats) in the community (MPIC, 2017c), which are as follows (GoJ, 2015):

1. External factors

- Difficulties in importing Egyptian gas
- Population growth (refugees)
- Climatic change and environmental degradation
- Politics and external conditions and their effects
- World development and technology
- World economic crisis

2. Internal factors

- Water consumption
- Energy consumption
- Population growth and development of social living standards
- Poverty and unemployment
- Indebtedness and Jordan's economy

Following this, the analysis of collected information clarifies and identifies opportunities and strengths and links them together to identify the required development sectors within a specific timeframe (GoJ, 2015). As a result, the national vision of Jordan becomes a guideline for all sectors in the country to formulate their own policies based on national objectives (GoJ, 2015). These national objectives cover the following main areas: infrastructure, transportation, education, employment, energy, environment, water, healthcare, financial services, fiscal discipline, higher education, investment development, justice, legislation, political development and inclusion, postal services, poverty, scientific research, social welfare and vocational training (GoJ, 2015). Moreover, the vision identifies a set of targets to be achieved through specific actions adopted at the sub-national level (ministerial level) (GoJ, 2015). Each of these targets must be followed at the sub-national level (ministerial level). Therefore, success and failure are measured by the progress achieved at each

level (GoJ, 2015). It provides two scenarios depending on progress made and the degree of commitment to implement agreed policies (GoJ, 2015). The baseline scenario assumes that some improvement measures are predicted in the vision, while the targeted scenario assumes that further measures are needed to achieve high growth rates.

However, the most important goal for the vision to be achieved is improving the welfare of citizens and the basic services provided to them, creating a balanced society where opportunities are available for all and closing the gap between governorates (GoJ, 2015). Therefore, the vision places Jordanian citizens at the centre of the development process. Indeed, Jordan Vision 2025 represents a long-term national vision rather than a detailed government action plan (GoJ, 2015). It contains more than 400 policies and actions that need to be implemented through a participatory approach between government, business and civil society (GoJ, 2015). According to a flexible schedule that takes into account global and regional developments, the uncertainties and unpredictable circumstances which would occur in the future mean that the content of the national vision should not be static and it must be updated over time (GoJ, 2015).

4.7.2 Sub-National Level

In the current research, the organisation is a public entity that is a ministry (MPSD, 2014b). At the sub-national level (sectorial level), each of Jordan's ministries formulates its policy to translate the national vision for each sector into actions based on targeted scenario line. Each ministry starts its work by clarifying its vision, mission and core values to establish its short-term policy for delivering its primary services and objectives (GBD, 2015; Goussous et al., 2015; Jordan Times, 2017; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MT, 2018; MWI, 2013). Therefore, strategic planning is a logical and inclusive framework at all levels of the organisation, analysing the overall environment of the organisation, assessing its capability, formulating its strategic objectives, selecting the preferred ones, identifying programmes and forming budgets in line with the organisation's vision (MPSD, 2014b).

Investment in an organisation for PWs development is important. Thus, the strategic alignment of PWs development needs to be consistent with the ministries' primary services and delivery objectives (MPIC, 2017b). As a result, the outputs from PWs development policy can be divided into programmes, projects and initiatives.

Programmes are sets of related projects, projects can be defined as the delivered physical assets, which are divided into three main classifications, regional projects between neighbouring countries, national privately financed ones, and local ones which are fully funded by the government. The initiatives are these practices that are carried out on the existing assets to improve their service delivery requirements of PWs development (GBD, 2015; Goussous et al., 2015; Jordan Times, 2017; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MT, 2018; MWI, 2013). The following section discusses the process of policymaking for the investment in PWs development in Jordan.

4.7.2.1 Policymaking for Public Works Development in Jordan

PWs development policy is formulated sectorially at the sub-national level through a top-down strategic decision-making approach (MPWH, 2017c). In this case, the top management level with the participation of different organisational levels (public stakeholders) formulates the policy for each PWs development sector while non-public stakeholders do not participate in this process (MPWH, 2017c).

In the current research study, public stakeholders are those who work in ministries and public authorities while non-public stakeholders are all the others. Stakeholders can be defined in the context of Jordan as those individuals or groups affecting or affected by strategic decisions of the ministry and its policies and objectives (MPSD, 2014b). They can be classified into internal stakeholders (who work in public organisations) and external stakeholders (end users, citizens, NGOs, financiers, private sector) (MPSD, 2014b). In the strategic decision-making process, their feedback is considered effective for participating in policymaking and such participation can be divided into full participation, advisory, consultation and information providing (MPSD, 2014b).

The PWs development sector includes infrastructure with respect to roads, water, transportation, health, schools and governmental buildings, environmental and energy. PWs development policies are (sectorial) which are formulated based on previous efforts such as the national vision of Jordan, any development plans and previous efforts and documents related to their work (GBD, 2015; Goussous et al., 2015; Jordan Times, 2017; Lafargeholcim, 2015; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MT, 2018; MWI, 2013). All of these inputs then become the basis for each sector of PWs development to

formulate its policy to meet the service requirements of people in line with the ministries' objectives (MPWH, 2017c), which are as follows:

- Jordan Vision 2025 (national vision)
- Government orientation
- Previous efforts and related documents

The PWs development policy in Jordan is formulated based on the availability of funding allocated by GBD in regard to previous plans and activities of each ministry (GBD, 2015). Once funding is allocated, each ministry then identifies the main inputs to develop its policy. The national vision of Jordan is the main input for each ministry, which includes targets that need to be achieved by each sector in the country (MPWH, 2017c). In some cases, the government of Jordan provides additional requirements which are not included in the national vision to be embedded into the development of PWs development policy (GoJ, 2015). In addition, previous efforts which have not been delivered can be considered in the new PWs development policy to ensure that they are delivered (GoJ, 2015; MPIC, 2017b; MPWH, 2017c).

It is important to conduct environmental scanning using a SWOT analysis. The process of environmental scanning, however, is not carried out to study the country's current situation. Such environment scanning analysis is conducted at the organisational level of the ministry to assess the internal and external environment, however (GBD, 2015; Goussous et al., 2015; Jordan Times, 2017; Lafargeholcim, 2015; ME, 2017a; ME, 2017c; MEMR, 2017; MH, 2005; MH, 2007; MH, 2017; MPIC, 2016b; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c; MPWH, 2004; MPWH, 2013c; MPWH, 2017b; MT, 2018; MWI, 2013). The outcomes from analysis are evaluated in order to then update the ministry's existing vision. Once the ministry's vision is updated, sets of strategic objectives are formulated and linked with related national goals (MPWH, 2017c). In addition, each strategic objective is linked with specific KPIs to measure the performance for achieving these objectives (MPWH, 2017c).

4.7.3 Local Level

At the local level, the MPIC prepared the local development plan for each governorate in Jordan for 2017–2019 (MPIC, 2016c). This document was developed in participation with local authorities and municipalities, governors, and representatives from ministries in order to determine the required development areas and include these areas in each sector's policy (GoJ, 2015; GoJ, 2006; MPIC, 2016c; MPIC, 2017b; MPIC, 2017c). Therefore, starting-up and prioritising PWs development projects then became the main priority.

4.7.3.1 Start-Up and Prioritising Public Works in Jordan

PWs development start-up is an essential process for translating the ministry's strategic objectives into realities. To understand the need for public infrastructure development, it is therefore important to study the current situation of public infrastructure development in order to identify the problems and propose the intended solution (Tadege Shiferaw and Jonny Klakegg, 2012). However, this is not the case in Jordan because existing PWs development practices are not identified based on the current situation nor on finding where the problem is to determine the best solution (Jordan Times, 2017; ME, 2017c; MPWH, 2013c; MT, 2018; MWI, 2013). The existing practices of assessing the current situation of the governorate at the local level is only to understand the level of development at the local level by conducting a SWOT analysis (MPIC, 2016c). Therefore, the traditional behaviour of prioritising PWs development in Jordan is dominant, which creates inequalities in opportunities (Alkhetan, 2017). PWs development in Jordan starts by identifying the need for a project by several criteria, without specific standards to be adopted for prioritising a project. The most commonly used criteria based on (Goussous et al., 2015; Lafargeholcim, 2015; MH, 2005; MH, 2007) are grouped as follows:

- Initiatives (politicians)
- Human interventions (parliament)
- Social pressure
- Problems (reactive)

There are various ways of starting up PWs development in Jordan, such as involving politicians who have certain attitudes and can bring initiatives to such communities (World Bank, 2016). In addition, in other cases the need for PWs development can be identified through social pressure, human interventions (people's claims) and/or whether a problem exists (reactive actions) (MPWH, 2017a; MPWH, 2017c). In fact, it is essential to meet the citizens' requirements and ensure that consistency between an organisation's objectives and the delivery requirements is achieved (Jordan Times, 2017; ME, 2017c; MPWH, 2013c; MT, 2018; MWI, 2013). However, identifying and prioritising PWs development is carried out conventionally, without public engagement. In other cases, the current situation may push the public sector to adopt new solutions for a problem, which is typically observed in the health, education and road sectors. The ministry would then start developing a plan and conduct studies to identify whether there is a need for a new project or not (MPWH, 2017a). In addition, PWs development can be identified based on the feedback obtained from the local house (branches) of a ministry (MPWH, 2017a; MPWH,

2017c). Any problems with existing PWs can reactively encourage the public sector to conduct such required studies to improve the current situation and enhance its performance (MPWH, 2017a).

The variety of inputs for each ministry to create its policy can lead to problems in that each ministry has many documents and requirements from different parties, however. This means that the ministry cannot identify which development plans are the most appropriate and even which proposal should be prioritised and carried out within the timeframe and available budget (Alkhetan, 2017; World Bank, 2016). Once the idea of the need is developed, each ministry then links identified and prioritised projects with its strategic objectives (MT, 2018), and identifies the key actions in terms of timeframe and budget for a project before transferring project requirements to the MPWH to manage the delivery (MPWH, 2017a).

4.7.4 Project Implementation Level

At the project implementation level, all the identified PWs development projects are included in the local development plans and then delivered by the central tendering department at the MPWH under public procurement (Alkilani, 2012; MPWH, 2004; Odeh and Battaineh, 2002).

4.7.4.1 Public Works Procurement

According to Smith (2003, p.146) ‘procurement’ in the context of construction is “the term used to describe the overarching process of the identification, selection, and acquisition of civil engineering services and materials; their transport, their execution or implementation; and subsequent project performance. It includes the ‘internal’ aspects of administration, management, financing of and repayment for these activities”.

In Jordan, PWs development is delivered under the traditional public procurement process, as shown in Figure 4.5 (MPWH, 2004).

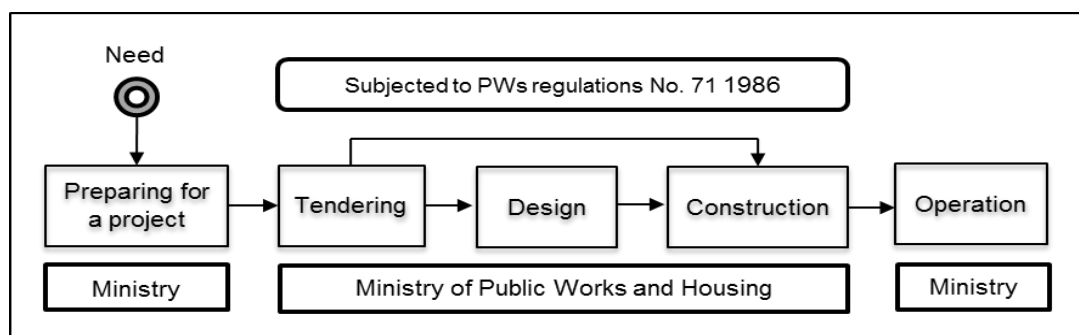


Figure 4.5 Public procurement in Jordan

It is a process that delivers the ministry's goods and services, from preparing, tendering, designing, construction and, finally, operating (MPWH, 2004). Odeh and Battaineh (2002) and Khalaf (2003) argued that there are some disadvantages for using this type of procurement when clients award bids at the lowest tendering price. Such procurement focuses on the lowest price and financial guarantees for the contractor/consultant rather than the technical support, skills, and expertise required for addressing adequate delivery of PWs or services (Sage, 1998). Therefore, most construction contracts for PWs development projects in Jordan are awarded to the lowest-priced contractors, whether they are fully qualified or not, using a competitive sealed bidding process (Alkilani, 2012; Odeh and Battaineh, 2002). The central tendering department in the MPWH prepares the tendering documents for consultation and calls for procurement tender by making an announcement in the newspapers (MPWH, 2004). The preferred bidder is selected to begin the process of conducting the design of a project (MPWH, 2004). The consultant then begins preparing the tender documents with help from the MPWH in order to select a contractor to deliver PWs (MPWH, 2004). The only contractors/consultants who can carry out such works and technical services are Jordanian firms (MPWH, 2004). In some cases, there are exceptions in inviting foreign firms to perform such work (MPWH, 2004), such as when the tender is fully funded by international sponsors taking into consideration the regulations and rules of the Jordanian Contractors Association (JCF, 2007; Jordan Times, 2017).

4.7.5 Monitoring of Policy Implementation

The monitoring of policy implementation can be performed both internally and externally. The former is usually carried out by the interior auditing committee at each ministry to ensure that its policy is being followed and potential outcomes are being gained or not in order to update the existing policy as part of changes in the internal or external environment (Jordan Times, 2017; ME, 2017c; MPWH, 2013c; MT, 2018; MWI, 2013). The external monitoring system is carried out by the MPIC to ensure that the ministries' policies are implemented in accordance with the national vision of Jordan (MPIC, 2017b; MPIC, 2017c). However, its monitoring can be considered external and cannot affect the decision for each ministry's works' role. It just provides where are the weaknesses (MPWH, 2017a). Feedback from the external monitoring is reported each year and all of these reports are submitted to the PM of Jordan (MPIC, 2017b; MPIC, 2017c). Thus, the MPIC works on reporting only the delivered PWs development at the project implementation level (policy implementation level) (MPIC, 2017b; MPIC, 2017c). Moreover, monitoring of spending public funding on

policy implementation is the responsibility of the Audit Bureau and the GBD (GBD, 2015). Thus, the Audit Bureau ensures that identification of PWs development is implemented (Audit Buearu, 2016). In addition, the Audit Bureau monitors the organisation's overall behaviour in different perspectives, namely compliance with regulations, administrative measures, and financial and technical requirements (Audit Buearu, 2016).

4.8 Critical Review of PWs development in Jordan

PWs infrastructure projects development are essential for achieving successes, as they are no longer only a measure of the success of countries, but have become a key factor in attracting foreign investments through the establishment of many operational projects which, in turn, support industrial and individual production (Aljadeed, 2017; Alqatawneh, 2013). Through the investment in these PWs infrastructure projects, they contribute to the elimination of unemployment through the provision of employment opportunities for young people, and provide the environment for them to evaluate their projects and help them to establish roads that facilitate access to transportation and the establishment of railways, linking cities together to save more time, effort and money by shortening distances and saving transportation expenses (Aljadeed, 2017; Alqatawneh, 2013). This creates an environment that is conducive to socio-economic growth. Therefore, Jordan needs to develop a structure of PWs infrastructure projects and their expansion, which requires more work, that will result in an increase in investing in PWs development in Jordan.

Shen et al. (2010) argued that the value of investments in PWs infrastructure projects can be realised if the investments are well planned and implemented. In addition, they reported that, if these investments in PWs infrastructure projects are inefficient, they will be ineffective and even wasted infrastructure development. As a result, Jordan has invested significant resources in PWs infrastructure projects facilities serving its citizens, made remarkable human development achievements, maintained stability, and attracted foreign and domestic investment (ME, 2016). These achievements were accompanied by some challenges that are still unresolved, mainly the development gap between governorates, high unemployment rates, particularly among young people, and the relative decline in certain competitiveness indicators (ME, 2016; MPIC, 2017a).

Existing PWs development practices in Jordan focus on continuing to provide adequate public services (MPWH, 2017c). However, the quality of public services is

not being assessed in relation to whether they achieve the intended outcomes or not. Wang et al. (2014) argued that public infrastructure has long-term impacts on the economy, society, and environment of a nation. Existing practices of PWs development have, however, indicated that SA is not part of PWs development in Jordan. Therefore, the impacts of these services upon the community, economy, and environment are not considered. Moreover, due to the lack of coordination between each sector in the country, conflicts between PWs developments have appeared, resulting in inequality in opportunities (Ajarmeh, 2016; GoJ, 2015; MPIC, 2017a). This is clear from the continuing pressure on services (GoJ, 2015; ME, 2016; MPIC, 2016c). Table 4.2 provides some examples of the outcomes among four governorates in Jordan based on the existing practices of PWs development in the country (GoJ, 2015; MPIC, 2016b; MPIC, 2016c), where 'Km²' is kilometres squared, '#' is number, 'Km' is kilometres, 'L' is litres and 'd' is day.

Table 4.2 Comparison between governorates for some indicators (2016-2019)

Indicators	Governorates			
	Amman	Al-Balqa	Irbid	Tafila
Area Km ²	7579.1	1120.4	1571.8	2209.5
Population million	4007526	491709	1770158	96291
Unemployment %	10.3 %	10.2 %	11.4 %	13.34 %
Poverty %	11.2 %	20.3%	15%	16.2 %
Hospitals # of beds/person	26.8/10000	17.3/10000	16.24/10000	11.3/10000
Roads Km (long)	920	572	981	236
Transportation # of taxis and buses	N/A	288	1129	82
Water L/per capita/d	N/A	178	120	130

Indeed, the Ministry of Water and Irrigation (MWI, 2016) reported that, in 2018, the expected water supply is 1034 MCM and the demand is 1442 MCM. There remains a critical imbalance between supply and demand, particularly in the context of regional insecurity and the social, economic and environmental impacts of climate change (MWI, 2016). Thus, there was a significant water deficit of 408 MCM (MWI, 2016), which indicates that the existing practices of water sector development are lacking in meeting people's service requirements.

Paul Starkey (2014) argued that many countries around the world confirm that PWs infrastructure development can reduce overall poverty and provide economic opportunities. However, the existing practices of PWs development are not effective to eradicate poverty and create job opportunities or to improve economic growth. The desired unemployment rate in 2017, as mentioned in the Jordan Vision was 11.56%

(GoJ, 2015); however, the rate reached 18.7% in the 2nd quarter of 2018 (Department of Statistics, 2018). The evidence is that, despite all efforts, the unemployment rate is still increasing, with no ideas of how to reduce this proportion in an appropriate way. Moreover, the existing practices of public funding indicate that the impacts of these investments in PWs infrastructure are not assessed regarding whether they contribute to sustainable development or not. As a result, the public funding process does not take into account the negative impacts of these PWs development or even their positive impacts. Therefore, the operational expenditures on PWs development are considered a significant concern to the public sector in trying to provide adequate public services (MPWH, 2017c). As a result, high operational costs are required in continuing to deliver PWs development using the same practices (MPIC, 2017a).

It can be concluded that the difficulties in understanding the 'Jordan vision' clearly result in inadequate PWs development being promoted, due to there being no link between the government policy and on-the-ground realities. As a result, the existing practices of PWs development in Jordan are not delivering SPWs development that provides sustainable public services for people. Consequently, the level of investing in SPWs development could help Jordan to leap ahead and start addressing and overcoming such challenges in respect to Jordan's sustainability issues (ME, 2016). Therefore, moving forward with SPWs development in Jordan can provide more efficient PWs services environmentally, socially and economically.

4.9 The Context of Sustainability in Jordan

The context of sustainability in Jordan can be understood as referring to the ability to continue providing public services to people (MPWH, 2017c; MWI, 2016). This definition generally considers the social dimension more than other dimensions. However, in Jordan, green building is most commonly understood from the environmental dimension of sustainability more than other dimensions refer to social and economic (MPWH, 2013b). On the one hand, in the sustainable water sector, several efforts are being developed in order to ensure the sustainability of this important natural resource (MWI, 2016). In contrast, solar systems are the main concern of Jordan when it comes to generating energy from renewable power plants (Edama, 2016; HU, 2016; MEMR, 2015). From each of these perspectives, sustainability focuses on providing services from the development of the sector itself and continuing to provide these services to people while the consideration of a comprehensive vision of all sectors is absent.

4.9.1 Barriers of Implementing Sustainability into Public Works Development in Jordan

Indeed, Jordan has invested significant resources in PWs development of infrastructure facilities serving its citizens, and has made remarkable human development achievements, maintained stability, and attracted foreign and domestic investment (ME, 2016). In fact, if investments are well planned and implemented, the value of the investment in PWs infrastructure development can be realised (Shen et al., 2010; Singh et al., 2012). However, Alkilani (2012) pointed out that in Jordan when general frameworks for sustainability are implemented the key performance indicators are sometimes missing. Alkhasawneh (2015) added that, to date, it is still clear that an integrated and comprehensive approach for sustainable development policies is lacking. In addition, no ministry has been assigned to take charge of this process, indicating both a lack of institutional capacity and political will (Alkhasawneh, 2015; Awad, 2016; UN, 2016b).

Moreover, such challenges –which affect the adoption of sustainability – relate to cultural issues of those not willing to change, availability of funding, enforcement of governmental regulations, lack of technical skills and private sector support (Goussous et al., 2015; ME, 2017a; MEMR, 2016; MH, 2017; MPIC, 2017a; MPIC, 2017b; MPWH, 2017c; MT, 2018). As a result, the market of sustainability in Jordan is still weak and needs more work. It requires finding a holistic approach to adopt sustainability into PWs development, strengthen the decision-making process and improve social responsibility to achieve sustainable development in the country (Alkhasawneh, 2015; Awad, 2016; UN, 2016b).

4.9.2 Existing Sustainability Practices in Jordan

There are many sustainability practices at both strategic and project levels in Jordan. Efforts to review these practices are driven by the need to study the strategic level. Indeed, public policy has a fundamental role to play in the agenda of promoting sustainable development by delivering better infrastructure (Böhringer and Jochem, 2007; Qureshi, 2015; UNEP, 2009). This has resulted from the role of the public sector as the major investor in infrastructure development (Qureshi, 2015).

In Jordan, the government developed Jordan's national policies to ensure the conservation of natural resources, enhance the country's development and improve quality of life (GoJ, 2015; MPIC, 2017a). As a result, the first national millennium development goals (MDGs) for Jordan were articulated in 2004, forcing policymakers

to adopt these goals and impacting the overall development process, ensuring alignment of national plans and priorities (Awad, 2016). Two more documents were launched in 2006, the “National Agenda” and “We Are All Jordan”, which articulated national plans towards development (Awad, 2016).

The executive plans were developed in a three-year period aligning with MDG indicators on healthcare, poverty and education, outlining policies, social welfare and the government’s programmes and projects (Awad, 2016). Moreover, in 2006, the National Agenda 2006–2015 identified the need for integrated solid waste management (GoJ, 2006). However, it was drafted by the Ministry of Municipalities to manage overall municipal solid waste, while waste generated from PWs development wastes in Jordan was not considered in the policy (GmbH, 2014).

In 2009, the Jordanian Green Building Council (Jordan GBC) was established to enhance the importance of environmental considerations, (Alkilani, 2012). In 2013, the long-term goal of the Climate Change Policy: A Strategic Guidance Framework of Jordan was issued by the Ministry of Environment (ME) (ME, 2013). This policy was issued to continue with a low carbon but growing economy, with healthy, sustainable, resilient communities, sustainable water and agricultural resources, and successful and productive ecosystems towards sustainable development. In the same year, 2013, the Jordan Green Building Guide (JGBG) was issued by the Royal Scientific Society and approved by the Jordan National Building Council (established in accordance with the Jordanian National Building Law) in the MPWH (MPWH, 2013b). The guide was developed through the engagement of several stakeholders, from the National Building Council at the MPWH, the Building Research Centre at the Royal Scientific Society and the Jordan Engineers Association (Edama, 2016; MPWH, 2013b).

In 2015, ‘Jordan 2025: A National Vision and Strategy’ was launched as a 10-year socioeconomic blueprint to achieve national development goals designed by reviewing previous efforts of policies, strategies, and recommendations, taking into account the current situation in Jordan (Fakhori, 2015). However, much still needs to be done in order for this document to enable Jordan’s development and for this development to be sustainable (Awad, 2016). Moreover, the decentralisation law (GoJ, 2015b) was issued to be adopted at the local level in order to ensure that the local community participates in decision-making. This can enhance the prioritisation of development needs, based upon citizens’ needs (GoJ, 2015b).

In late 2016, the Ministry of Environment in Jordan launched the National Green Growth Plan to outline the country's strategy for sustainable growth (ME, 2016). The plan includes opportunities, targets, and policies that Jordan anticipates to follow in order to endorse its green economy (ME, 2017b). It focuses on the development of sectors identified as high-potential growth areas (Edama, 2016; ME, 2017b). There is the potential that the NGGP will improve the living standards of Jordanians and optimise the use of natural resources, attract investments and provide new employment, investment and innovation opportunities (Environment, 2017; GGGI, 2016). Continuing the process, the country has launched several strategies for achieving sustainable development (Awad, 2016; MPIC, 2016a). These strategies concern the environment, eradicating poverty and reducing unemployment, and improving education and health, biodiversity and agriculture, water and energy efficiency (MPIC, 2017a). However, all of these policies focus on their own sectors while the impact of these sectors on other sectors is not included.

In July 2017, Jordan's Way to Sustainable Development document was issued by the MPIC. The report is considered a roadmap for adopting the 2030 Agenda in Jordan (MPIC, 2017a). Moreover, the report includes important goals for Jordan to focus on, in terms of water, energy, environment, poverty, equality between genders and unemployment. Although this report can also be considered as a first step for the country at the national level to translate sustainable development goals in the context of Jordan, sustainability dimensions in the context of PWs are absent. In addition, although the report responded to PWs development for continuing to provide public services, integrating sustainability into the development was not considered. There is still a lack in considering these objectives and indicators in PWs development to be in a sustainable manner.

4.9.3 Limitations of Sustainability Practices in Jordan

Jordan faces a complex set of challenges resulting from a continued increase in population, deep poverty and unemployment rate, water scarcity, climate change conditions, geographical location and the region's political environment, each of which on their own create a significant challenge for the country to achieve sustainable development (Edama, 2016; Goussous et al., 2015; ME, 2013; MPIC, 2017a; MPWH, 2017c; MWI, 2016; World Bank, 2017; Zawaydeh, 2017). In fact, the most effective policies are those that result in a more sustainable situation in the country and have less negative impacts upon the community (Böhringer and Jochem, 2007; Qureshi, 2015; UNEP, 2009).

Mansourianfar and Haghshenas (2018) noted that realising the positive impacts of the emerging policies, plans, and public infrastructure projects with respect to the environment, society, and economy can only happen if assessments are conducted to ensure compliance with sustainable development. Thus, SA has become one of the most recognised scientific concepts by the public (Mahida, 2011) and many countries have therefore been reported to be applying SA into the planning process which is strongly recommended in international practice.

In Canada, responsibilities for sustainability-related issues are divided into federal, provincial, territorial, aboriginal and municipal authorities (Bond et al., 2012; Bond et al., 2013). The assessment of sustainability is based on basic producers, which set higher positive contribution upon sustainability rather than mitigation, and resulted in rejection of such projects which were not contributing to sustainability (Bond et al., 2013).

In Sweden, a comprehensive report on the first preliminary and systematic assessment per goal and target of how well Sweden is currently living up to the 2030 Agenda has been prepared (Sweden Government, 2017). In the meantime in Finland, the preparation of the National Agenda 2030 Implementation Plan is guided by conducting a gap analysis (GA) to look into Finland's willingness to implement the (global) 2030 Agenda (OECD, 2016b). The objective of the report is to draw a baseline for Finland's implementation measures and, in particular, point out those goals and targets where Finland needs to be (OECD, 2016b).

In 2016, Historic England published the Sustainability Appraisal and Strategic Environmental Assessment (Historic England, 2016). This document is aimed at all relevant local planning authorities, neighbourhood groups, developers, consultants, landowners and other interested parties (Historic England, 2016). However, the definition of sustainability appraisal used in England's planning system to evaluate investment planning against sustainable development objectives does not cover the overall aspects and, as such, has limitations (Historic England, 2016).

In Germany, the federal committee for sustainable development conducts a sustainability impact assessment (SIA) to assess the impact of emerging policies and sets out mitigation plan measures towards the reduction of negative impacts upon the community (FGoG, 2017). SIA's laws and decrees are prerequisites for their consideration by the cabinet (FGoG, 2017). The benchmarks for the impact assessment are the targets, indicators and the so-called management rules of the Sustainable Development Strategy (OECD, 2016b).

In fact, there is a great deal of SA practised at an international level across the world. However, Jordan is still lagging behind these countries in assessing the emerging policies, plans, and projects of PWs development, particularly their long-term impacts on the environment, society, and economy. The evidence for this can be seen by how the assessment of sustainability throughout the policymaking process is carried out in international practice while in Jordan it is not. Moreover, to date, the literature and documentary data in Jordan indicate that there is no clear evidence of SA methods or approaches into PWs development.

Indeed, Al-Rashdan (1999), developed a reliable methodology for environmental projects in Jordan using the environmental impact assessment (EIA) methodology. The study focused on wastewater projects to assess the environmental impacts of implementation at the project level. However, the policy level that is supposed to be the source of projects is not considered in this study.

Further, Ali and Al Nsairat (2009), proposed an assessment tool for green building residential units in Jordan, in terms of environmental dimensions through which sustainable development tools are suitable in accordance with the local context. Their research studied international green building assessment tools such as LEED, CASBEE, BREEAM, GBTool, and others, but the study defined new assessment items respecting the local conditions of the country. The outcome of the research was a suggested green building assessment tool (SABA Green Building Rating System) – computer-based program – that suits the Jordanian context.

Recently, Matarneh (2017) developed a sustainability assessment method using four international rating systems (BREEAM, UK), (LEED, USA), (GREEN GLOBES, Canada), and (GREEN STARS, Australia) for existing and traditional buildings to assist both public and private construction sectors in Jordan to achieve more sustainable buildings. However, this method focuses only on buildings while other types of PWs are not considered. In addition, it focuses on assessing the buildings for design and construction while the assessment at policy level is not considered by this method.

From the above three examples of methods of assessment in Jordan, it can be seen that Jordan is still lagging behind other countries. To date, a comprehensive approach for assessment in which the emerging policies, plans, and projects of PWs achieve sustainable development is still missing. This is, in fact, a big concern for Jordan as one of the developing countries hoping to meet the same level of the international practices towards sustainable development.

According to du Plessis (2007), the biggest challenge in developing countries in relation to sustainability is how to link the policy with on-the-ground reality. Emerging policies create a lot of wish lists as previously reviewed and, based on political interests, powerful policymakers and their cultural interests deviate from people's actual needs in order to meet the intended situation towards developing a sustainable community (Du Plessis, 2007). Therefore, within the policymaking process, decisions should be made based on an assessment of sustainability, so that these policies can achieve a more sustainable community.

Alkhasawneh (2015), noted that it is clear there is not an integrated and comprehensive approach in Jordan that assesses which of the emerging policies, plans, and projects of PWs are best suited to achieve sustainable development. Despite all the efforts in Jordan its existing policies are not achievable, and their impacts are not appropriate towards sustainable development. One of the reasons that these policies and plans confuse the development and achievement of sustainability is that there are too few existing models to guide their formulation (Alkhasawneh, 2015). As a result, much still needs to be done in order to enable Jordan's development and ensure that it is sustainable (Awad, 2016). The government of Jordan should find an integrated approach that ensures the relationships between the SDGs and determines the interactions between human need, society and the environment, and enhances the economic level of the country. From this understanding, a meaningful policy for SPWs in Jordan cannot emerge from the existing practices of both conventional and sustainability practices in the country itself. Thus, the current practices of sustainability are not efficient, which justifies the need to leverage them in the context of PWs development in Jordan.

It can be seen that, despite Jordan's practices of sustainability, the services provided for people are not efficient and resources such as the water issues are still not solved, and further, poverty and unemployment rates have increased while economic growth is still decreasing. Therefore, the originality of this research is that it focuses on Jordan's public sector work only by leveraging the international practices into the context of Jordan. As a result, this research is applicable to the context of Jordan due to its interests, context, regulations, and the organisational structure. This study is the first in this context in research work that focuses on integrating SA into PWs development in Jordan. The following section discusses the gap analysis between Jordan and the international level.

4.10 Gap Analysis (GA)

In the current research, the basic concept of designing the integrated approach and its structure was established based on the implications of the gap analysis (GA). GA is a strategic tool used to compare the current situation with the desired situation that needs to be achieved (Business Dictionary, 2017), and then find solutions to the real problems (Orendorff, 2017). The GA studies the existing PWs development practices (the current situation) compared to the international SA practices (the desired situation). As a result, the GA identified such issues which need to be addressed by improving the current situation of PWs development Jordan in order to match the international level. In this regard, the findings from conducting the GA created the first version of the existing PWs development practices in Jordan. They were identified and then assembled from literature and documentary data which comprise three main elements. As a result, bringing the main three elements of PWs development in Jordan resulted in Figure 4.6 which were discussed as follows:

1. PWs development levels in Jordan (section 4.5).
2. The enabling environment for PWs development in Jordan (section 4.6).
3. The policymaking process to select individual PWs development in Jordan (section 4.7).

Figure 4.6 shows the conceptual structure of the existing PWs development practices in Jordan comprises four levels from national to project implementation levels. Each level includes the stages and outputs that are usually contained and finally the enabling environment is linked with each level as appropriate. It also illustrates the international SA practices which are coded by (SP_{1...55}) and marked up (in red) compared to the existing practices (in black) of PWs development in Jordan.

It can be seen from the critical analysis of comparing the existing practices of PWs development and the intranational level that the integration of SA into policymaking can begin at national, sub-national and local levels to project implementation level (Mell et al., 2017; OECD, 2015; OECD, 2016b; UNDP, 2017). The current research provides significant information regarding international SA practices for these development levels as such there is a need to change behaviour related to projects and organisational strategies. Therefore, the need to move forward from the current and traditional approach of PWs development into SPWs development throughout SA process is necessary. The clear message is that, in the absence of policymakers' support, the delivery of SPWs development will not occur (Banihashemi et al., 2017; OECD, 2016b).

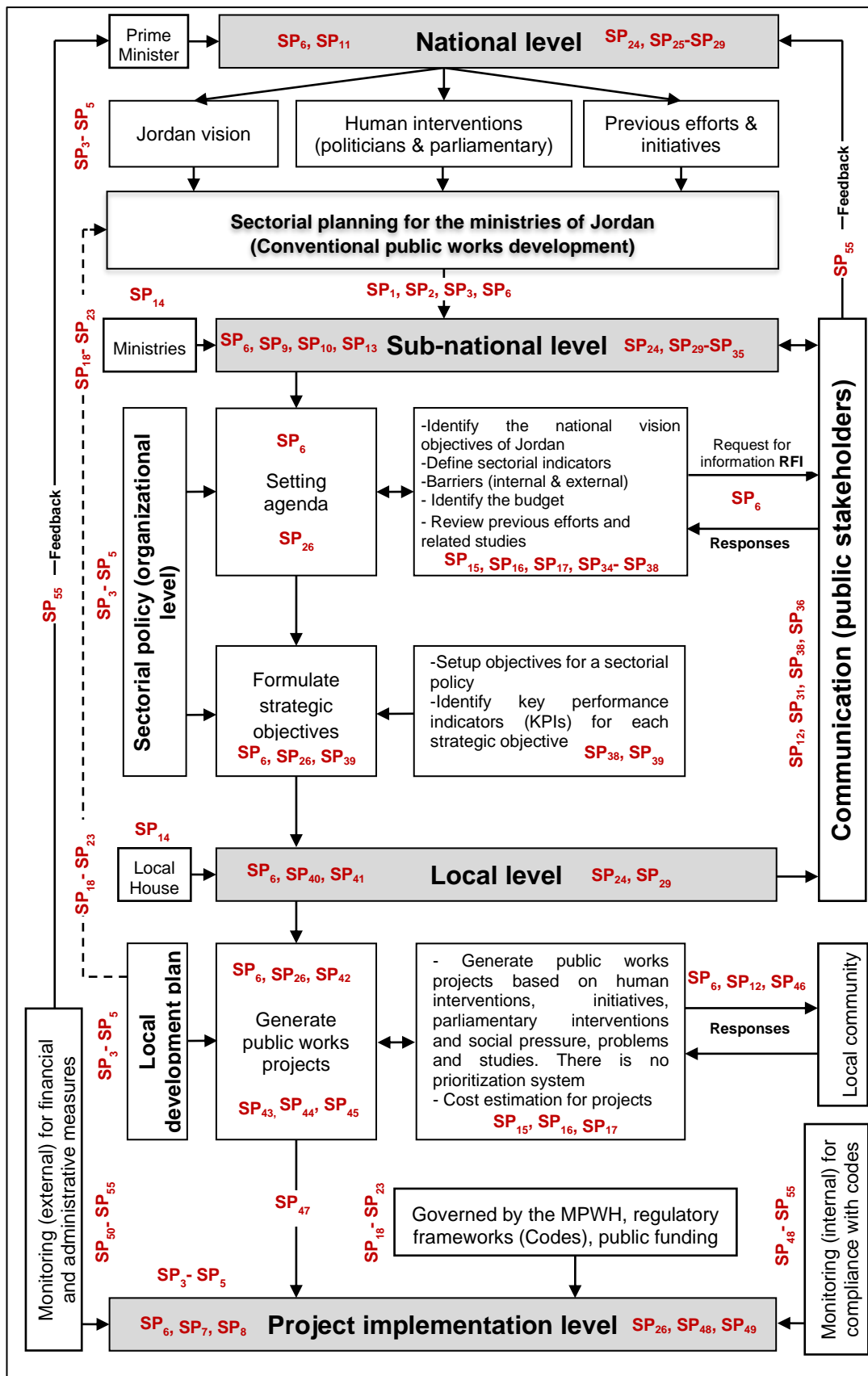


Figure 4.6 Conceptual PWs development practices VS international SA practices (Adopted by the researcher)

In fact, the international SA practices are coded into sets of categories and sub-categories that share the same meaning and perspectives to define theories that frequently appear in the analysis. These practices which were given the code (SP_{1...55}) are provided in Appendix A. They were compared with the existing PWs development practices in Figure 4.6 and the implications from the GA are given in Appendix B. The GA process compares the emerging practices from the international level and Jordan in the following categories:

1. SA definition, its processes, goals, and targets that need to be integrated into PWs development.
2. The development levels of PWs development.
3. The enabling environment at each level of PWs development.
4. The structure of PWs development process from policymaking to select individual projects.

The key findings from the GA outlined the need to make improvements not only to the existing PWs development in Jordan but also to the outcomes from these practices to achieve sustainable development.

4.10.1 Gap Analysis Findings

The overall findings from the GA are listed in **Appendix B** which includes the implications from the overall analysis by comparing the existing practices of PWs development in Jordan with the international SA practices.

The GA outlines that SA can direct the decision-making throughout the policymaking process in one process without separation between them. The international SA practices indicated that there is a need to identify the current situation for the country regarding sustainability and compare it with the target situation that needs to be achieved. This means that a baseline assessment for sustainability at each level of development needs to be created (Ashley et al., 2003; UNEP, 2009). However, this type of assessment is not conducted at each level of PWs development in Jordan; the assessment is performed using only the conventional indicators identified in Table 4.1. In addition, there is no systematic process for how to assess emerging policies and plans to select individual PWs projects in Jordan. In this regard, the existing practices of PWs development in Jordan indicate that, to date, SA indicators have not been identified at each level of PWs development.

The GA indicated that there are no robust links between PWs development levels. This is evidenced by two main areas. First, targets at the national level are not

well defined in terms of considering integrating SA into PWs development, which is still developed conventionally (sectorial planning) rather than via comprehensive planning. Second is that the indicators proposed at each level do not reveal a link between national targets and on-the-ground reality in Jordan.

The GA indicated that the enabling environment of PWs development in Jordan includes four enablers that are not interacting with each other. In addition, the existing enablers are not considered at all levels of PWs development. However, the enabling environment, as discussed in Chapter 2, indicates that each of these enablers should be linked and interact with each other (Du Plessis, 2007; Qureshi, 2015; Sourani, 2013). These enablers are divided into institutional governance, regulatory frameworks, technical support, and public funding. All these enablers should enable SA to be integrated into PWs development in Jordan. However, the limitations in these enablers are: there is still no robust institutional governance at each level enabling SPWs development; there is a lack of coordinated regulatory frameworks; a lack of technical support at different levels and scales considering the capacity development for the supply chain; and finally, public funding is allocated based on historical data regardless of whether previous developments have achieved sustainable development or not. There is a need, therefore, to ensure that public funding is only allocated to those PWs development projects that have positive impacts on the environment, society, and economy.

The GA indicated that in Jordan, although a lot of policies have been issued, the compliance with them is still inadequate. Another reason is that policymaking on the issue is not unified, with fragmented plans and institutions that lack consistency, comprehensiveness, links, and common purpose (Combaz, 2019). Therefore, there is no advised about which policies have been issued thus far and which have been reviewed for future use. The sub-national level includes the national vision and several documents that are not consistent with each ministry's policies. Zeemering (2017) argued that the lack of clear frameworks in government organisations makes it difficult to propose how sustainability should be integrated into practice.

Moreover, the GA indicated that throughout the policymaking process to select individual projects there are missing stages. The existing practices for delivering PWs policy seem to be created based on social pressure, human interventions, and reactive actions. The policymakers in Jordan are not assessing the current situation – whether there is a need for a project or not. All the provided projects are assessed in a traditional way (Goussous et al., 2015; Lafargeholcim, 2015; MH, 2005; MH,

2007), with no consideration for their implications on the environment, energy, water, eradicating poverty, or creating job opportunities. The GA indicated that these missing stages need to be considered in Jordan.

In addition, the GA showed that the system for prioritising PWs still uses a traditional approach without local community engagement. Alnsour (2016) argued that the engagement of local communities in the preparation of plans may offer chances for them to make locally appropriate decisions relating to development. Awad (2016) added that there are very few consultations that enable civil society organisations, political parties, and business associations to contribute to the process. Moreover, public participation is essential to manage the requirements of urban development at the local level, which ensures that the decision-making process is transparent and accountable (Alnsour, 2016).

On the other hand, the GA indicated that prioritising the need for PWs development in Jordan is not considering the end users' satisfaction (Ajarmeh, 2016). The reason why most projects fail is that they are identified at the top level, without input from the local community and, due to an unstable decision-making process, the decisions taken result in conflicts across the country, with consistency not being promoted (Kiali, 2018). Therefore, identifying alternatives, and evaluating and selecting the most appropriate options for these PWs development projects which are fully funded by the government, are not considered.

The GA indicated that there is no systematic process to ensure that a monitoring system is in place that will require strategic alignment between government objectives and on-the-ground reality to achieve the desired outcomes. Therefore, an improved monitoring system is needed for PWs development to ensure that the government's policies in terms of sustainability are followed (Brugmann, 1996; UNEP, 2009). The GA indicated that public procurement for PWs development is dominant without considering sustainability to be integrated into practice. Current PWs procurement calls for the lowest bidding prices, while sustainability requirements are usually absent (Alkilani, 2012; Odeh and Battaineh, 2002). In sustainable procurement, all project development stages are integrated, which is very important for achieving value for money and reducing life cycle costs (Saunders et al., 2003), so that only sustainable projects which have positive impacts upon the environment, society, and economy are only delivered.

Clearly, there are many issues in delivering SPWs development in Jordan with regard to the findings obtained from conducting the GA. Figure 4.7 clarifies the process of GA and how the implications are gained from conducting the GA between Jordan and the international level.

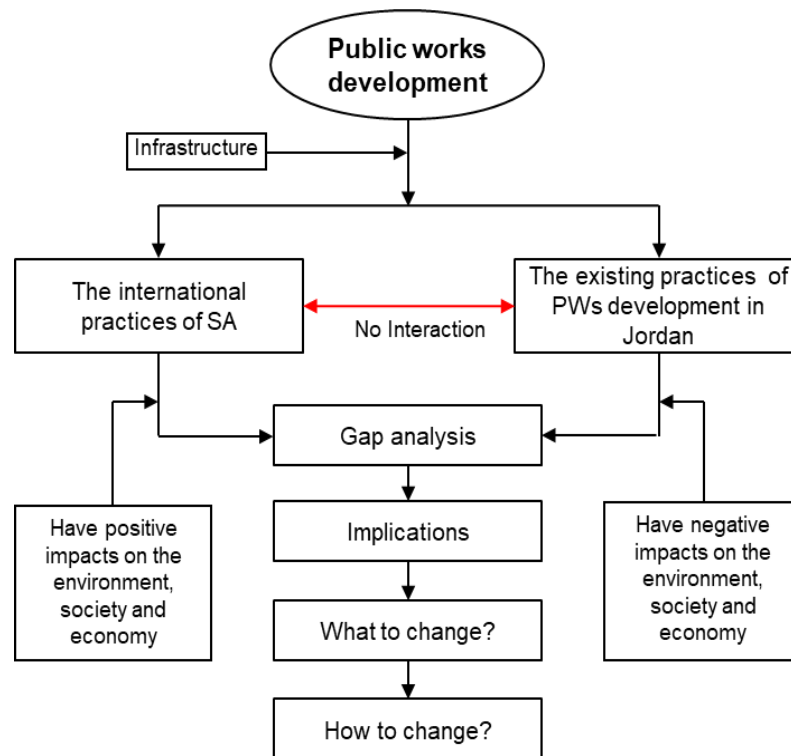


Figure 4.7 The implications from the gap analysis process

It can be concluded that to date, there has been no interaction between the existing practices of PWs development in Jordan and international SA practices. The current research thus, seeks to investigate this in order to leverage the international SA practices into PWs development in Jordan. As a result, two main questions have been raised – what to change and how to change – in existing PWs development practices in Jordan.

To answer the question, ‘What to change?’, the GA indicated that there is a need to:

1. Identify SA processes, goals, and targets that need to be integrated into PWs development in Jordan.
2. Link the development levels of PWs development in Jordan.
3. Create an enabling environment at each level of PWs development in Jordan.
4. Structure a comprehensive SPWs development process from policymaking to select individual projects in Jordan.

To answer the question, 'How to change?' the research methodology was designed in order to conduct the fieldwork study in Jordan. However, a clear understanding of how to achieve the integration of SA into PWs development in Jordan can directly guide the process from policies through plans to select individual SPWs projects, which is currently not clear in Jordan. As a result, the knowledge of gap will be filled. In fact, the GA provides a set of issues that need to be investigated as a departure point to conduct the fieldwork study in Jordan. This is essential in order to achieve the aim and objectives, solve the research problem and answer the research question.

4.11 Summary

This chapter discusses PWs development in Jordan. It critically discussed the need for sustainability to be factored into PWs development due to challenges currently being faced in Jordan. It has been argued that it is necessary to develop an integrated approach to achieve sustainable development in Jordan. Therefore, it has been vital to intensively review the existing practices of PWs development in Jordan and leverage from the international SA practices. The key findings from the GA are discussed and grouped into four categories. These categories are considered the departure point to conduct the fieldwork study in Jordan as follows:

1. Identify SA processes, goals, and targets that need to be integrated into PWs development in Jordan.
2. Link the development levels of PWs development in Jordan.
3. Create an enabling environment at each level of PWs development in Jordan.
4. Structure a comprehensive SPWs development process from policymaking to select individual projects in Jordan.

The chapter indicated that taking the international SA practices as they are impossible, taking into account the delivery environment of Jordan, the institutional and regulatory considerations. Therefore, there is a need to investigate the gap practices in the context of Jordan compared to the international level by conducting the fieldwork study in Jordan. The following chapter, which is the research methodology chapter, discusses the overall research methodology process used in order to show how to integrate SA into PWs development in Jordan.

Chapter 5 Research Methodology

5.1 Introduction

This chapter provides the research methodology of this thesis. It explains the adopted research methodology and a justification of why the chosen methodology is the most appropriate one to achieve the aim and objectives and answer the research question. This is followed by explaining the GA process, the research instruments used in this study, the process of conducting the fieldwork study in Jordan, analysis, sampling procedures, documentary data, an integrated approach development and validation, and, finally, the research ethics are discussed.

5.2 Research Design and Methodology

Research is defined as “the systematic investigation into and study of materials, sources, etc. in order to establish facts to reach new conclusions” (Oxford Dictionary, 1995) cited in (Fellows and Liu, 2008, p.4). From this definition, it is clear that there is an emphasis on determining facts to create new knowledge and conclusions (Fellows and Liu, 2008). Fellows and Liu (2008, p.3) added that research includes “a careful search, investigation and systematic investigation towards increasing the sum of knowledge”. Generally, it can be concluded that the main feature for the research of a doctoral degree (PhD) study is about creating new knowledge and making an original contribution that does not yet exist (Fellows and Liu, 2008).

Remenyi et al. (1998) defined a research methodology as the overall approach to a problem that could be put into practice in a research process from the theoretical underpinning to the collection and analysis of data. From this definition, it can be observed that the research methodology concerns the entire research process, including method selection, data collection, and analysis. This definition focuses on the research problem to be investigated in the study. Fellows and Liu (2003) have another way of describing the research methodology: it is the principles and procedures of the logical thought process which are applied to a specific investigation. Therefore, the selection of a research methodology is significant in supporting the identification of all relevant variables, their mechanisms and the amount of impact (Fellows and Liu, 2003).

Yin (2003, p.21) defined research design as “the plan that guides the investigator in the process of collecting, analysing, and interpreting observations. It is a logical model of proof to allow the researcher to draw inferences concerning causal relations among the variables under investigation”. Yin (2013) added that research design is “a logical plan for getting from here to there, where there may be defined as the initial set of questions to be answered, and there is some set of conclusions (answer)”.

Royer (2001) argued that there is no one specific research design that is always correct to use; it is possible to utilise one of several designs, and the choice is essential for affecting the quality of the research problem that needs to be solved. Gill and Johnson (2002) supported the previous point that there is no single research design that is the most suitable to solve a research problem and answer a research question. In this regard, Fellows and Liu (2008, p.83) pointed out that the research design is about finding a way to answer the research questions and solve the research problem. Denscombe (2014) supported this idea that the chosen research design should be suitable for a specific part of an investigation and for a certain type of research problem. Therefore, it is important to clarify the research problem and define the research question, which gives a clear idea about the adopted research methodology. Charmaz (2008) argued that the research problem shapes the chosen methods. As a result, once a statement of the research concern was studied to identify the research problem, which is exploratory in nature, the next step was to select the most proper research design and methodology.

Consequently, a statement of the research concern was studied to identify the research problem. Such an approach is used when knowledge about the specific topic is limited (Naoum, 1998). Therefore, the current research study has been carried out in order to develop an integrated approach on how to integrate SA into PWs development in Jordan which the knowledge about this topic is limited.

The current research is holistic in nature, and depends on the opinions and attitudes of respondents, subsequently bringing them together to develop a theory rather than for testing a theory. Therefore, in the current research study, the research design and methodology begin by reviewing relevant literature to determine existing knowledge about the specific research topic. It can also explore which area of a topic needs to be investigated further. Figure 5.1 clarifies the research design and methodology processes that were carried out in the current research. Hart (2018) pointed out that the literature review explores which area needs to be investigated

further, in order to expand the current knowledge about the works which have been already conducted in the field. As a result, an intensive literature review was carried out in chapters 2, 3 and 4 to examine the international SA practices, the existing practices of PWs development and sustainability practices in Jordan.

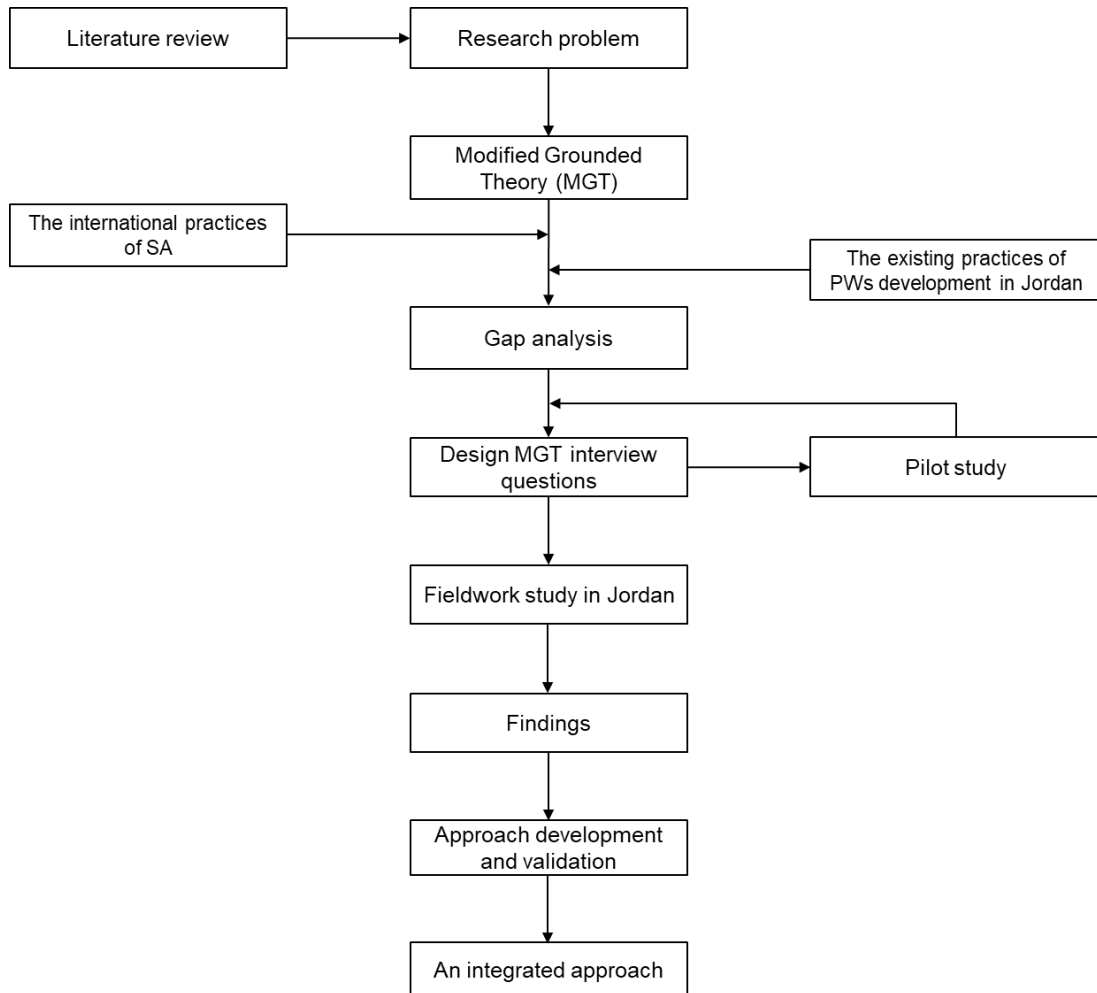


Figure 5.1 The design and methodology of the current research

There is a great deal of literature in regard to sustainability and SA practices at the international level while not a great deal in the context of Jordan. Thus, besides the literature, documentary data was also used to clarify the existing practices of PWs development and sustainability in Jordan. Therefore, an in-depth investigation was conducted which, in turn, resulted in filling the knowledge gap due to the limited research on the topic under investigation. Then, a gap analysis was conducted in order to compare the existing practices of PWs development in Jordan and the international SA practices. The comparison probed the question of what the gap practices are, in order to design the interview questions which are discussed in Chapter 4. Once the interview questions had been designed based on the

implications of the gap analysis, they were piloted with a small sample of interviewees in Leeds prior to conducting the fieldwork study in Jordan. The feedback from the pilot study was taken seriously in making modifications to the interview questions and then the fieldwork study in Jordan was carried out during the period of 01/10/2016 to 30/03/2017. During the fieldwork study in Jordan, all the collected data was analysed immediately once gathered from the first interview, and then a novel approach integrating SA into PWs development in Jordan was developed using MGT.

Finally, the developed approach was validated by two samples; the first was with Jordanian experts and the second sample was with non-Jordanian experts and then the final version of the integrated approach is presented to be applied in Jordan.

5.3 The Adopted Research Methodology and Justification

According to Saunders et al. (2003, p.83), the research process is divided into five layers, as shown in Figure 5.2. Each layer represents a variety of research philosophies, approaches, methods, strategies, and data collection techniques. This is essential to select the most appropriate research methodology, as discussed in the following sections.

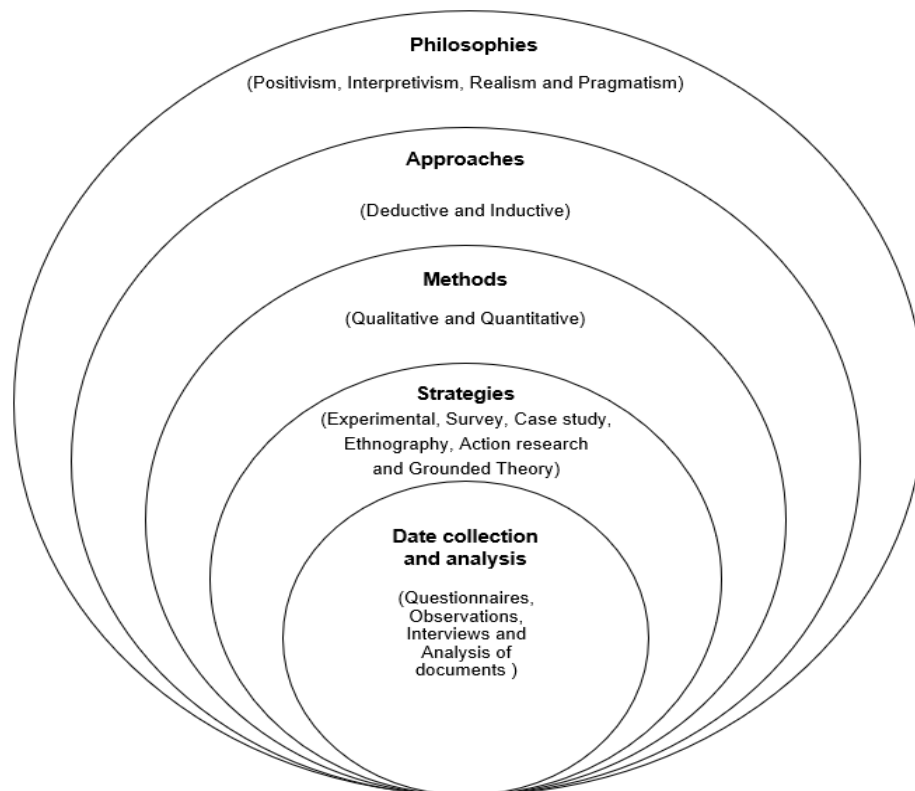


Figure 5.2 Available research methodology

5.3.1 Research Philosophies and Approaches

Four research philosophies are dominant in the literature on management and business research: positivism, interpretivism, realism and pragmatism (Saunders et al., 2003).

Positivism recognises only non-metaphysical facts and observable phenomena (Fellows and Liu, 2008). It refers to social facts and observed behaviour, and is closely related to rationalism and objectivity, with a strong relation with quantitative research (Fellows and Liu, 2008). Realism is based on the belief that the existing reality is independent of human thoughts and beliefs (Saunders et al., 2003). However, it is true that realism shares some philosophical aspects with positivism; it also recognises, in the style of natural science, that people themselves are not substances to be studied (Saunders et al., 2003). Therefore, these philosophies are not appropriate for this research study, as this research does not observe behaviour and is not related to rationalism.

Pragmatism is a worldview that arises out of actions, situations, and consequences rather than antecedent conditions (Creswell, 2013). Pragmatism applies to mixed methods research in that enquiries draw liberally from both quantitative and qualitative assumptions (Creswell, 2013; Saunders et al., 2003). However, as the philosophical underpinning for mixed methods studies, this research philosophy is not appropriate for the current research as the mixed method employs both qualitative and quantitative data, which is not suitable for the current research.

Interpretivism is valuable for research, particularly for management and other social fields, indicating that people who are involved in research can construct the reality, which is more likely to be a feature of qualitative research (Fellows and Liu, 2008). Therefore, this is necessary to motivate people's actions to explore subjective meanings. As a result, this philosophy is appropriate for this research, which is built based on subjective data that needs to generate theories.

Following the research philosophy, two research approaches are available. The deductive approach tends to test the developed theories and hypotheses, while the inductive approach collects data, analyses that data and then develops a theory (Saunders et al., 2003). It is useful to attach these approaches to different research philosophies. The deductive approach tends to be more linked to positivism and the inductive approach more linked to interpretivism (Saunders et al., 2003).

Interpretivism refers to being inductive and particularly that the theory would follow data (Saunders et al., 2003). The deductive approach takes a large sample size whilst, in the inductive approach, a small sample size might be more appropriate (Saunders et al., 2003). In this approach, the researcher needs to collect qualitative data and use a variety of data collection methods in order to build different views of phenomena (Easterby-Smith and Thorpe, 2002). The human behaviour in this approach is dominant; as such, the researcher is part of the research. As a result, in the current research study, based on the previous discussion, an entirely inductive approach was employed in order to develop a theory and investigate the research problem and phenomena on the ground.

5.3.2 Research Methods

The research methods can be classified into qualitative, quantitative and mixed methods (Bryman, 2003; Fellows and Liu, 2008). Qualitative research is considered as subjective in 'nature'. It is usually used to emphasise meaning and description (Naoum, 1998). It seeks to gain insight and understand people's perceptions of the world, whether they are individuals or groups (Fellows and Liu, 2008). The information gathered from the individuals or groups can be classified under two descriptions, which are exploratory and attitudinal (Naoum, 1998). Exploratory research is usually used when the knowledge about the specific topic is limited and not rich (Naoum, 1998; Sekaran, 2003). Attitudinal research is used to evaluate the opinions/views and perceptions of a person towards a particular object, which refers to an attribute, variable, factor or question (Naoum, 1998).

On one hand, qualitative research is an empirical study for gathering data from the respondents where the data does not take the form of numbers (Punch, 2013). Qualitative research tends to use the inductive approach for data collection, which means that the movement is from facts to theory and concerned with specific events (Fellows and Liu, 2008). The most common words in questions used in the qualitative approach are 'what' and 'how' (Fellows and Liu, 2008; Naoum, 1998), which are also used in the current research's questions. One of the disadvantages of this kind of research method is the small sample size, which would be an issue about whether the data is appropriate to analyse in order to develop a theory (Fellows and Liu, 2008).

On the other hand, the quantitative approach is defined as an enquiry into a social or human problem, based on testing a hypothesis or a theory composed of variables, measured with numbers, and analysed with statistical procedures, in order to determine whether the hypothesis or the theory is true (Creswell, 2013). The

quantitative approach uses the deductive approach for data collection, which is employed to test empirical observations (Naoum, 1998) where the data is in the form of numbers (Punch, 2013). Fellows and Liu (2008) and Naoum (1998) pointed out that the purpose of the quantitative approach is to verify theory/hypotheses rather than develop a theory. In fact, testing theories/hypotheses is conducted with a large sample size (Blaike, 2000).

One of the disadvantages of this kind of research method is that it provides wide and shallow data, and requires a large sample size, which is not suitable for the current research (Fellows and Liu, 2008). On the other hand, many researchers have suggested that using a mixed methods approach, which employs the qualitative (enquiry) and quantitative (validation) approaches, has a positive effect on the research (Fellows and Liu, 2008). However, due to the limited number of experts in the field of SPWs development in Jordan, it is difficult to conduct mixed methods research, which although it only requires a small sample for building a theory requires a large sample for validation.

The current research is holistic in nature, which means using unknown variables and method to understand a phenomenon about which little is yet known. Therefore, the purpose is to develop a theory and expand knowledge about the current research topic. Consequently, an entirely qualitative method was employed. The feature of qualitative data is attitude measurement based on opinions/views and perceptions (Bryman, 2008; Fellows and Liu, 2015). Therefore, utilising a qualitative method can give primary, rich and deep data which is required to provide in-depth investigation on how to integrate SA into PWs in Jordan due to the limited amount of literature on the subject.

5.3.3 Research Strategies

According to Chase (2003), the direction of the research should be weighed up and defined in order to identify strategies which need to be applied. The available research strategies are illustrated in Table 5.1, which also includes the selection of the most suitable one for the current research. These strategies are Experimental, Survey, Case Study, Ethnography, Action Research and Grounded Theory (Saunders et al., 2003). The current research seeks to gather rich and in-depth data to generalise a theory. It built up a clear view of thinking about how to integrate SA into PWs development in Jordan. Therefore, the decision was made to select grounded theory (GT) as the most appropriate research strategy, as it is suitable for gathering different views from different people.

Table 5.1 The available research strategies

Strategy	Used	Justification
Experimental	No	<ul style="list-style-type: none"> • In experimental research it is impossible to allow only this type of strategy on independent variables in construction management (Fellows and Liu, 2008). • The experimental style of research is proper for bounded problems or theories in which the theories are known or at least hypothesised with some confidence (Fellows and Liu, 2015). • Usually carried out in laboratories to test the relationship between variables by identifying the expected variables that affect the dependant variables (Fellows and Liu, 2015).
Survey	No	<ul style="list-style-type: none"> • A survey is not sufficient to collect in-depth qualitative data and answer the research question 'How?'. • It is operated on the basis of statistical sampling where it is only extremely rarely that full population surveys are possible (Fellows and Liu, 2008). • This strategy is not appropriate for this research. In this research, in-depth investigation is required to obtain qualitative data, while this strategy provides shallow and wide data (Remenyi et al., 1998; Saunders et al., 2003).
Case Study	No	<ul style="list-style-type: none"> • Case study strategy is crucial when selecting the multiple cases to be used. There is a danger that the cases might be not related to other cases (Denscombe, 2014). In other words, if the selected cases are similar to each other, and it depends on how far the case study examples are similar (Denscombe, 2014). In addition, despite the in-depth information provided (Naoum, 1998), case studies will limit this research because of its nature in time consuming and the author would have to restrict the study within a limited number of cases and therefore cannot capture more valuable data as Ling and Bui (2010) admitted. Also, there is a difficulty in examining and testing the proposed solution when it does not represent a sample in a very large population like SPWs development in Jordan. • In Jordan, public works development is not sustainable. Case study tends to use very deep data and investigate narrative data about phenomena (Fellows and Liu, 2015). Therefore, it is impossible to adopt case study strategy while public works are not factored by sustainability. In addition, due to the variety of public works development classifications and size, multi-case studies are not applicable. • Cross checking a large amount of information is sometimes a problem (Bell, 2014). • The required information is related to the strategic level of the organisation and this information is not from the project level and seems to be confidential. • Difficulties in approaching those who worked in applicable cases. Therefore, the case study is not suitable for this research.
Ethnography	No	<ul style="list-style-type: none"> • It is clear that the disadvantage under this strategy is that it is very time consuming and takes place for a long period of time (Saunders et al., 2003). • It studies people and their natural settings (Fellows and Liu, 2008). It is to understand the social world that the research subjects inhabit and how they interpret it (Saunders et al., 2003). • Its aim is to provide a detailed and permanent account of the cultures and lives of small, isolated tribes (Denscombe, 2014). • The main concern in this type of strategy is that the researcher should be accepted by the individuals who are being studied. • It deals with human behaviours and is usually conducted to observe human's patterns and their social environment (Saunders et al., 2003). • The integration of sustainability assessment into public works development cannot be obtained from purely observation; it is time consuming and takes a long time through observations of daily activity.
Action Research	No	<ul style="list-style-type: none"> • Action research is criticised for its lack of repeatability and consequent lack of rigour and for concentrating too much on organisational action at the expense of research findings (Bryman and Bell, 2007). • It is not suitable for this study, as it is about the evaluation of the problem and then solving it in an immediate situation, which is not suitable for this research. • This research strategy is not adopted in this research.
Grounded Theory	Yes	<ul style="list-style-type: none"> • Further discussion follows

Grounded theory (GT) was developed by the sociologists Glaser and Strauss and their first book, *Discovery of Grounded Theory*, was published in 1967 (Glaser and Strauss, 2017). A variety of social science disciplines have used GT extensively (Charmaz 2006; Corbin and Strauss 1990). GT is a qualitative research method that uses a systematic set of processes to develop an inductively derived GT about phenomena (Charmaz 2006; Corbin and Strauss 1990). According to Glaser (2006), it is a general methodology for developing theory that is grounded in data which has been systematically gathered and analysed, while Saunders (2003, p. 398) argues that it is designed to generate a theory around a core or central theme which has been obtained from the collected data.

The current research does not create a new strategy for answering the research question and solving the research problem. It employed the available GT strategy that is the most suitable ones in order to extend its use in the context of Jordan. As a result, there are several reasons which justify using GT as follows:

1. According to Fellows and Liu (2008), the best-known example of building theory is GT and, further supported by Backman and Kyngäs (1999), that theory can be developed through data which has been generated and then analysed. As a result, the theory is built upon continuously by generating a series of observations (Saunders, 2003), which is suitable to the current research study.
2. GT deals with different types of cases while a case study focuses on developing a description of a specific case, activity, or event (Creswell, 2013). However, the definition of a specific case would be difficult because finding a case to use would only generate data relating to a specific case, eliminating any type of generalizability (Creswell, 2013). This is due to possible misleading information from the context-dependent nature founded on a single case, which still might not address the process or creation of a theory (Creswell, 2013). Therefore, GT ensures that the generated theories are generalised to different types of cases (Creswell, 2013).
3. It is particularly evident that GT tends to be inductive and that researchers often use a GT to analyse the data and then to generate theory (Bryman, 2003; Charmaz, 2006; Corbin and Strauss, 1990). It moves backwards and forwards from data collection and theory generation that employs different research techniques to collect data and build a theory (Bryman, 2003; Saunders et al., 2003). Runeson and Skitmore (2008) support previous arguments that GT is rather a strategy which refers to the results of an empirical research project to

develop a theory rather than testing and verifying the existence of theories that have been widely accepted. As a result, it is suitable in the current research to solve the research problem and answer the research question by building a theory for how to integrate SA into PWs development in Jordan rather than for only testing a theory.

4. Another reason for selecting GT is that its design could be a possible design method to understand an experience or describe and interpret the interaction between the collected data (Creswell, 2013). It is particularly well suited to dealing with qualitative data of the kind gathered from participant observation, the observation of face-to-face interaction, semi-structured or unstructured interviews, and case study material or documentary source (Lawrence and Tar, 2013). Therefore, GT is a fast and flexible strategy that ensures the data is collected and analysed simultaneously in order to build a theory (Lawrence and Tar, 2013). This means that GT is a dynamic methodology as the data is analysed directly beginning after the first day of data gathering (Corbin, 2008, p.144). The process of data analysis in qualitative research involves working with data, organising it, breaking it down, synthesising it, and searching for patterns in which this process is not carried out in another type of conventional method of data analysis (Charmaz, 2006; Corbin and Strauss, 1990). During the analysis, categories are identified and developed in terms of their properties and dimensions through a process of theoretical sampling to describe the features of data and conduct constant comparisons between the developed categories (Backman, 1999).
5. GT allows in-depth data to be collected during the theoretical sampling technique (Corbin and Strauss, 1990). This can be reached in order to saturate the generated theories by digging deeper into the analysis. As a result, the comparison between the categories in which the similarities and differences among their dimensions and properties are compared and then classified into themes is defined as a constant comparison (Corbin and Strauss, 1990). In this case, the sample is considered targeted by those who further develop the concepts and explore the relationships between categories in order to develop a theory (Saunders, 2003).
6. It can ensure that the data collected is verified during the process of investigation. This means that only data agreed by the participants will be used for further investigation or if not, will be disregarded. In this case, the researcher may need to collect further data in order to establish relationships between the categories on which the theory is being built (Bryman, 2003). In this process,

the data collection reveals that no new data are relevant to a category, where categories have become well understood and developed and all relationships between them have been verified (Strauss, 1998). At this stage, theoretical saturation is reached (Corbin, 2008).

7. Lawrence and Tar (2013) concluded that GT in detail is a strategy that uses a qualitative material in order to systematically develop theories about a phenomenon being studied which previously has been little studied. As a result, GT might make its greatest contribution to areas in which little research has been done about the integration of SA into PWs development in Jordan. Therefore, GT is the most appropriate strategy for current research.

However, one of the main disadvantages of GT is that it relies heavily on the researcher to analyse the data directly once it has been collected (Strauss and Corbin, 1998). One of these disadvantages is the question of how deeply and widely the researcher should familiarise themselves with the research topic before the empirical study (Backman and Kyngäs, 1999). A classical approach starts with pure data when there is no theoretical background about a phenomenon (Glaser and Strauss, 2006). This approach is used to generate theories when there is no existing information, or only minimal information, such that it is more abstract and cannot be generalised (Glaser and Strauss, 2006). However, two schools were developed for conducting GT. Glaser (1998) found that it is better for the researcher to commence fieldwork without any theoretical background, while later Strauss and Corbin (1998) indicated that it is more suitable to explore the theoretical background about a phenomenon before conducting the actual study. The current research seeks to generate theory and then formulate this theory to describe phenomena. It employs the theoretical implications which were found from conducting the GA. For the purpose of this study, the best school for conducting GT is Strauss and Corbin's (1998) modified version of GT rather than Glaser's (1998) classical GT, due to the limited experience of integrating SA into PWs development in Jordan. Therefore, leveraging from international SA practices in the context of PWs development in Jordan has oriented the researcher in relation to such issues that need to be investigated in the country.

5.3.3.1 Modified Grounded Theory Strategy (MGT)

Gill and Johnson (2002) pointed out that if there are an existing theory and rough definitions for the phenomenon before conducting the research investigation, this allows the explanation of new relationships between the existing theories to be

built. The combination between the theoretical background and the grounded theory is termed 'Modified Grounded Theory' (MGT). In this strategy, the researcher starts the exploration of the existing theory while the study is built (Gill and Johnson, 2002). In this case, MGT enables the theory to be built based on the ground, while also allowing for new relationships to be built between the existing literature on the topic and new theories that are on the ground (Gill and Johnson, 2002). Bulawa (2014, p.165) added that "such variance is an indication that researchers can use not only any other version of the grounded theory approach of their choice, but they can also adapt it in a manner to be suitable for their own studies".

The problems also include the need to focus on the research problem and to choose the sampling method. Data analysis is a multistage process, which demands from the researcher both sensitivity and time to work out the findings which emerge from the data (Backman and Kyngäs, 1999). The research problem indicated that the existing PWs development and sustainability practices in Jordan are lacking in achieving sustainable development. In addition, the context of sustainability and SA in Jordan is still not well matured, which is considered a significant concern. Therefore, a combination of the theoretical background and GT was conducted. In the current research study, the MGT strategy allows issues to be delivered by comparing the existing practices of PWs development in Jordan and the international SA practices. As a result, a set of issues were founded in order to be investigated in Jordan and then to build a theory on how to integrate SA into PWs development in Jordan. These issues are listed as follow:

1. There are no specific SA processes with specific goals and targets for PWs development in Jordan.
2. There is no robust link between the levels of PWs development in Jordan.
3. The lack of the enabling environment at each level of PWs development in Jordan.
4. There is no comprehensive policy for the PWs development process and there are missing elements of the structure of policymaking to select individual projects in Jordan.

In this regard, the MGT strategy allows the existing theories to be studied before the actual observations are carried out. The current research, therefore, did not begin by exploring how to integrate SA into PWs development in Jordan from scratch. It investigated the theoretical implications of the international SA practices in order to leverage them in the context of PWs development in Jordan. Therefore, a

suitable strategy in the current research is to use a modified version of GT (Strauss's and Corbin's, 1990) and obtain a qualitative data, in order to guide theory development based on the experience of participants about a particular phenomenon (Bulawa, 2014).

5.3.4 Research Data Collection Techniques

Data collection is considered a communication process that involves a process of transferral from the provider (respondents) to the collector (researcher) (Fellows and Liu, 2008). Data collection can be classified as being primary or secondary (Naoum, 1998). Primary data is collected directly from respondents and might include any body language that they may present (Naoum, 1998). Secondary data is statements and clarifications of events and is found, for example, by library searches (Naoum, 1998).

There are several techniques for collecting data, namely: Questionnaires, Observations, Interviews, and Analysis of documents (Bryman, 2003; Naoum, 1998; Saunders et al., 2003). A questionnaire allows large sample size and tends to generate quantitative data, and enables a wide range of people to participate in the research, which is likely to be a random sample (Fellows and Liu, 2008). In addition, the questionnaire can gain shallow and wide data (Fellows and Liu, 2015), which is not suitable for this research as the required data is in depth and rich. Additionally, it is impossible to provide a large sample size because there are only a limited number of experts in the field.

The observation technique for data collection comprises two types, namely: first, direct observation, which requires the use of technology such as video and visual recording systems (Mlybari, 2011); second, participant observation, which is usually used to observe other communities' behaviour and cultural context (Mlybari, 2011). This technique is not suitable for the current research due to the time constraints during the research study. In addition, the targeted projects are not widely extended in Jordan, which will cause a problem in accessing the projects and conducting the data collection.

The interview is the most appropriate technique for conducting an in-depth investigation of a specific phenomenon (Bartlett and Payne, 1997). Interviews also emphasise how and why the processes are happening (Fellows and Liu, 2015). Therefore, in the current research study interviews were employed to collect the primary, rich and deep data required to provide an in-depth investigation and achieve

a deep understanding of how to integrate SA into PWs development in Jordan. However, despite the suitability of the interview questions, there are disadvantages in using this technique. It tends to use a small sample size in contrast with the questionnaire method (Fellows and Liu, 2008). It is expensive and needs more time to be conducted (Naoum, 1998). As a result, to reduce the limitations and the disadvantages by collecting data from interviews, the researcher can use several techniques, gaining the advantages from each of them (Fellows and Liu, 2008; Utomo, 2011).

Fellows and Liu (2008) stated that triangulation in research is to use two or more research techniques to investigate something. Therefore, in order to ensure the triangulation of the collected data and provide more validity (Yin, 2013), the secondary data was collected from archival documents. However, in some cases, the disadvantages that would arise from using triangulation are the time and the complexity of the data analysis (Denscombe, 2014), while in the current research the purpose is to add more verification to the collected data (Corbin and Strauss, 2008). Therefore, archival documents can be taken as one of the techniques for collecting data (Fellows and Liu, 2003; Fellows and Liu, 2008; Fellows and Liu, 2015; Naoum, 1998), which is appropriate to collect secondary data in addition to the interviews.

5.4 Gap Analysis (GA)

The basic concept of designing the integrated approach and its structure was established based on the implications provided by conducting GA. GA is a strategic tool used to compare the current situation with the desired situation that needs to be achieved (Business Dictionary, 2017). Orendorff (2017) added that GA is a quantitative or qualitative comparison of current performance (i.e., present state) with potential performance (i.e., desired state) in order to identify and then find solutions to the problems. In the current research, the 'current situation' is the existing practices of PWs development in Jordan while the 'desired situation' is the international SA practices as shown in Figure 5.3 the GA process.

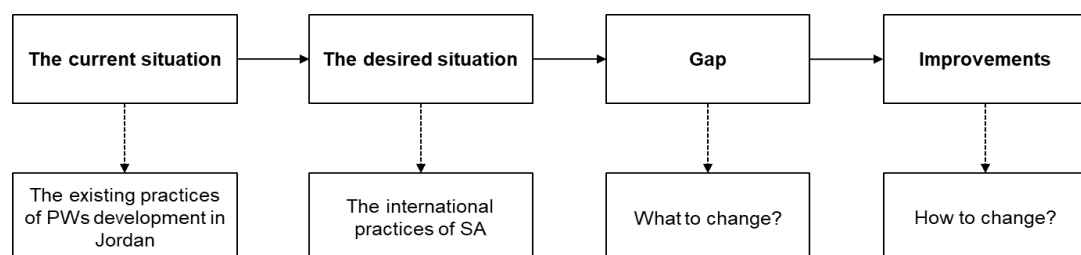


Figure 5.3 GA process, (Adopted from Orendorff (2017) and the researcher)

The justification for conducting GA is to clearly understand what to change in relation to PWs development practices in Jordan compared to the international SA practices to leverage from them (How to change?). GA provided the theoretical implications for the key issues that were generated to be investigated in Jordan. This allowed the existing practices to be studied before the actual investigation was carried out. As a result, a combination of the theoretical background and the GT was conducted. The investigation allowed for the emergence of new relationships between the existing practices. However, international SA practices do not fit into the context of Jordan as they are. In fact, each country has its own priorities, regulations, institutional structure, and political and financial situation (OECD, 2016b). Therefore, these international practices, lessons learned, should be formulated in the context of Jordan by conducting a fieldwork study in Jordan. As a result, it is necessary to draw the emerging theories together to ground theory on how to integrate SA into PWs development in Jordan.

Two steps of GA were carried out by investigating, firstly, the international level, and, secondly, comparing it to Jordan. The international level was analysed through identifying the international SA practices and lessons learned from journal papers and scientific documents such as UN and UNEP publications, OECD publications, OGC, RIPA, and others. Practices from Western countries such as the UK, Sweden, Italy, Germany, Switzerland, Canada, and Australia were studied. The justification for choosing these countries is that these are developed countries and have the same context and they have practices in SA that can be leveraged from them. In addition, some of these countries are highly ranked in terms of experiencing sustainability towards achieving the UN Agenda of Sustainable Development 2030, and so it is appropriate to leverage from them.

Additionally, those countries in the same region of Jordan as such the Middle East and North Africa (MENA) which share the same environment, such as the UAE, Saudi Arabia, Qatar and Egypt which were leveraged from as well. The literature review was carried out by conducting searches in Google Scholar, Scopus data base and visiting specific Journals' websites. The search started to find these practices to try to answer the research question about how to integrate SA into PWs development in Jordan. This can ensure what factors can facilitate the integration and the way to put these practices into PWs development.

The search terms used are a combination between sustainability and SA, PWs development, integrated sustainability assessment, sustainable public works

development, sustainable policy and planning, and sustainable infrastructure. The results include a systematic review of all of these issues that emerged throughout the research. The journals which were visited are the International Journal of Project Management, Management in Engineering, Ecological System and Indicators, Environmental Impact Assessment, Impact Assessment and Project Appraisal, Construction Management and Economic and Habitat International, etc. Then, in the context of PWs development in Jordan, the search was conducted on the publicly available documents to review them all regarding PWs development and sustainability practices in Jordan. These documents were searched in Google and directly from the ministries', authorities' and organisations' websites in Jordan.

In order to transform data to theory, the researcher identified related documents that can provide the in-depth information needed in order to identify the relationships between categories. The data analysis process involved studying the raw data obtained from the documentary data and grouping sets of incidents into appropriate categories. The microanalysis line-by-line method was employed to analyse the data provided from literature and scientific documents, which is recommended by (Charmaz, 2008). As a result, the relationships between these categories were identified.

Once the needed information which was provided from both literature and scientific documents appeared frequently and from different sources, it was coded. Therefore, the international SA practices were coded by (SP_{1...55}) into sets of themes and sub-themes that share the same meaning and perspectives to define theories. Then, the existing practices of PWs development in Jordan were generated and grouped under the same sequences as the international SA practices. As a result, the first version of the existing PWs development practices was assembled from documentary data by gathering theories that share the same aspects and discussing particular issues.

The key findings (gap practices) that were sought from the GA are, namely: SA process, goals, and targets, the development levels from national to project implementation levels, the structure of the policymaking process to select individual projects of SPWs development and, finally, the enabling environment. The key findings from GA outlined the need to make improvements not only in the existing PWs development practices in Jordan but also in the outcomes from these practices. Therefore, the implications from the GA were used to design MGT interview questions

in order to confirm theories and improve, modify and add such theories on how to integrate SA into PWs development in Jordan.

5.5 Research Instruments

Interviews, the current research instrument, can be conducted face-to-face, or by telephone or via a computer-based method (Sekaran, 2003). The literature emphasises that the appropriateness of each method in different circumstances depends on its advantages and disadvantages (Sekaran, 2003). In the current research study, a face-to-face interview is the most appropriate method for in-depth investigation in order to collect primary and rich data (Fellows and Liu, 2015), due to the geographical closeness of Amman, the capital of Jordan, to the researcher's location, while only one interview was conducted via Skype.

There are three interview types: unstructured interviews, semi-structured interviews and structured interviews (Fellows and Liu, 2015; Naoum, 1998). Unstructured interviews are usually conducted in order to obtain definite ideas that are not important or relevant to particular problem situations (Sekaran, 2003). Therefore, in an unstructured interview, the researcher does not enter the interview with a planned sequence of questions to be asked of the respondent (Fellows and Liu, 2015). Therefore, this type of interview is not appropriate for this research. In a structured interview, the researcher asks the designed questions as specified in the interview schedule (Fellows and Liu, 2015). Thus, the same question set is used for every respondent in the same manner, which is also not suitable for this research, as in MGT the interview can be amended based on the data provided. According to Bartlett and Payne (1997), the primary source of data in the early start of MGT is the semi-structured interview. The semi-structured interview is more formal than the unstructured interview in which there are a number of precise topics around which to construct the interview (Naoum, 1998). Therefore, semi-structured interviews were employed to collect primary, rich and deep data in order to answer the research question and solve the research problem.

5.5.1 Differences between Conventional and MGT Interviews

In MGT, it is important to identify the differences between conventional interviews and those appropriate when conducting MGT interview; these differences are given in Table 5.2 which is adopted by the researcher from (Bartlett and Payne, 1997; Corbin and Strauss, 1990; Fellows and Liu, 2015; Gill and Johnson, 2002;

Saunders et al., 2003; Strauss and Corbin, 1998). In conventional interviews, the interview questions are usually designed to be the same for all the interviewees. The traditional sampling methods used with conventional interviews are not undertaken until all the data is collected. However, in MGT, the data analysis begins after the first day of data gathering (Corbin and Strauss, 2008).

Table 5.2 The differences between the conventional interviews and MGT

Characteristics	Conventional interviews	Modified grounded theory interviews
Interviewee visit	Once	It could be multiple times
Question type	Fixed questions for all the sample	Subsequent questions for different interviewees in the sample
Analysis	Once all the interviews have finished	Directly from the first interview
Validity of data	Need to be validated	Valid
Sample	Small sample	Small sample but until it reaches theoretical saturation
Stages	One stage	Three stages, open, axial and selective coding

MGT interviews also allow all the gathered information to be verified during the data collection and agreed upon by the interviewees immediately. This means that all the collected incidents, which are placed into groups of categories, were asked about in the subsequent interview. In contrast, in conventional interviews, the categories are developed later, once all the interviews have been conducted. Moreover, in conventional interviews, the developed theory is not valid until the validation approach is undertaken. In addition, in MGT, the interviewees can be interviewed several times, while for conventional interviews the interviewees are only interviewed once.

5.5.2 Design the Fixed Set of MGT Interview Questions

Denscombe (2014) pointed out that, when the researcher needs to gain insights into things such as people’s opinions, feelings, emotions, and experiences, interviews will almost certainly provide the most suitable method. Strauss and Corbin (1998) stated that the first part of conducting GT is to develop a list of interview questions related to the topic that answers the research question. The interview questions are usually designed as one of two types, open or closed (Fellows and Liu, 2015). Open-ended questions are usually designed so that the respondent can answer in full whereas closed questions have a set of available responses (Fellows and Liu, 2015). The closed-ended questions could be designed under a questionnaire with a limited number of responses, and the respondents can select the answer from them, or by Yes or No answers (Fellows and Liu, 2015).

The initial list of interview questions or areas of observation might be based on concepts derived from the literature, experience or from preliminary fieldwork (Strauss and Corbin, 1998). Bell (2014) agreed that the design process of interview questions is started after the researcher has conducted all the preliminary work of planning and deciding what needs to be found out. As a result, there is a need for well-designed interview questions that can give the information needed, that are acceptable for the research topic, and that can give no problems later in the analysis (Bell, 2014).

Fellows and Liu (2008) suggested that the designed questions should be clear and easy for respondents to answer and should not contain requests for unnecessary data. In addition, Fellows and Liu (2008) and Naoum (1998) pointed out that, in qualitative research, questions to be asked are opinion questions that are designed to obtain subjective data. Bell (2014) claimed that, although question-wording is important, it may not be quite as important to be precise about the use of certain terms, but the language used must be understandable to the respondents. As a result, appropriate interview questions should be formed in plain language which is understood by a wide range of respondents. Therefore, the interview questions should be designed to be fairly straightforward (Denscombe, 2014).

In the current research, there is a need to obtain data from respondents on how to integrate SA into PWs development in Jordan; therefore, closed questions are not appropriate. The current research is exploratory in nature and needs in-depth and rich data to be collected. In fact, open-ended questions are typically used in exploratory studies where the researcher is not in a position or is not willing to pre-specify the response categories (Remenyi et al., 1998). As a result, open-ended interview questions were selected to design MGT interviews based on the implications obtained from the GA. However, many researchers find it difficult to enter the fieldwork without early concepts of what they are going to study.

Therefore, the design structure of the fixed interview questions was derived from the implications of GA which was carried out through studying the existing practices of PWs development in Jordan and the international SA practices as follows:

1. There is a need for a specific SA processes with specific goals and targets for PWs development in Jordan.
2. There is a need for robust link between the levels of PWs development in Jordan.

3. There is a need for creating enabling environment at each level of PWs development in Jordan.
4. There is a need for a structure of policymaking to select individual projects in Jordan.

From each of these implications of GA, set of fixed interview questions were derived and were asked to each participant. Moreover, these fixed interview questions, which were designed based on the expected information that was required from the interviewees, as shown in Figure 5.4, were asked to all participants during the fieldwork study in Jordan. Therefore, it is clear in Figure 5.4 that the early concepts which arise are considered the beginning of data collection. In fact, these concepts are considered provisional for use in order to give the researcher the ability to understand where to go next, and then must be discarded once the data is being collected. GA gave the overall picture with the main purpose being to investigate six main issues which are provided in **Appendix C**.

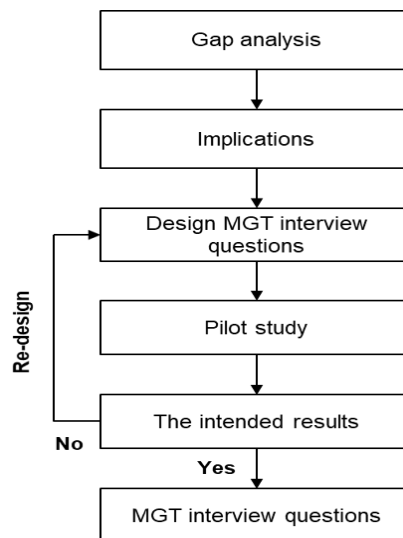


Figure 5.4 Design of MGT interview questions process

The set of questions has been carried out based on the principle of not leading respondents and ensuring they talk freely about each investigated issue. Some cards were provided to the interviewees in order to confirm such issues that emerged from GA, and they are provided in **Appendix C**. Consequently, the researcher set out the required information that was required from the interviewees. This means that the required information led the researcher to design the MGT interview questions. This was followed by drafting the set of MGT interview questions. They were tested by a small group of participants in order to examine whether the required information was being obtained or not, which resulted in rewording the questions until they become

appropriate for the setting. The researcher decided whether the intended results were obtained or not by comparing them with reality from the implications of the gap analysis. This process is the so-called 'pilot study'.

5.5.3 The Pilot Study

Once the six groups of fixed interview questions were designed based on the implications of the GA, the pilot study was conducted in Leeds. The pilot study is a process of assessing the interview questions that will be asked and the pre-testing of a particular research instrument. The piloting process examines whether the questions are intelligible, easy to answer and clear through obtaining feedback from the respondents (Fellows and Liu, 2015). The feedback gives the opportunity to improve the designed interview questions, filling in any gaps, and to identify the time required to complete the interview (Fellows and Liu, 2008).

Walsh and Wiggins (2003) argued that a pilot study is a small trial run of an investigation to check whether the planned procedures and methods actually work. Therefore, a small sample size of interviewees was selected which comprised four participants, two PhD students, an MSc student and an engineer working in the field, all of whom had a clear understanding of the Jordanian context, and their responses were in both English and Arabic. Extant literature suggested that, according to Connelly (2008) and Johanson and Brooks (2010), a pilot study sample should be 10% of the projected sample. In the current research, the projected sample size for qualitative research using MGT was 30 experts. Therefore, the current study pilot's sample size of four participants meets this requirement.

The results from the pilot study were not included in the analysis; they were only used to check whether the questions are understandable, easy to answer and clear or not, and discover the time taken to complete the interview. It enabled the interviewer to ensure propriety and highlighted in advance any potential problem or failure prior to conducting the interviews during the fieldwork in Jordan. It is clear that, when the set of modifications were made, the interview questions took less time to be answered. The pilot study examined to what extent the designed set of interview questions provided approximately the expected outcomes. In addition, it examined where the weaknesses and gaps are in the process and where the difficulties in such questions are and then what possible adjustments could be made. As a result, a few modifications were made to the designed set of interview questions prior to conducting the fieldwork study in Jordan.

5.5.4 The Development of Subsequent MGT Interview Questions

5.5.4.1 Two-Stage Interviews (Open and Axial Coding)

Having piloted the designed MGT interview questions, the researcher conducted the fieldwork study in Jordan. During the fieldwork study, two interview stages of open and axial coding were carried out for both the public and non-public sectors. As a result, interview groups produced a set of subsequent questions, which started from GA and the implications of interviews over the process of MGT. In fact, the researcher stimulated the interviewees to talk freely about the topic in order to obtain in-depth information and new ideas that had not previously emerged from the GA. The most important feature for using MGT is that the interview questions were changed during the data collection process. That is, there was an interplay between the data collection and data analysis. The data analysis began after the first data-gathering interview. In this case, the nature of questioning is different from conventional interviews. It is important to clarify that the emergent incidents, categories, and their relationships were designed into questions for further investigation in the following interview for verification. Each group of questions includes three steps, an example is shown in Figure 5.5.

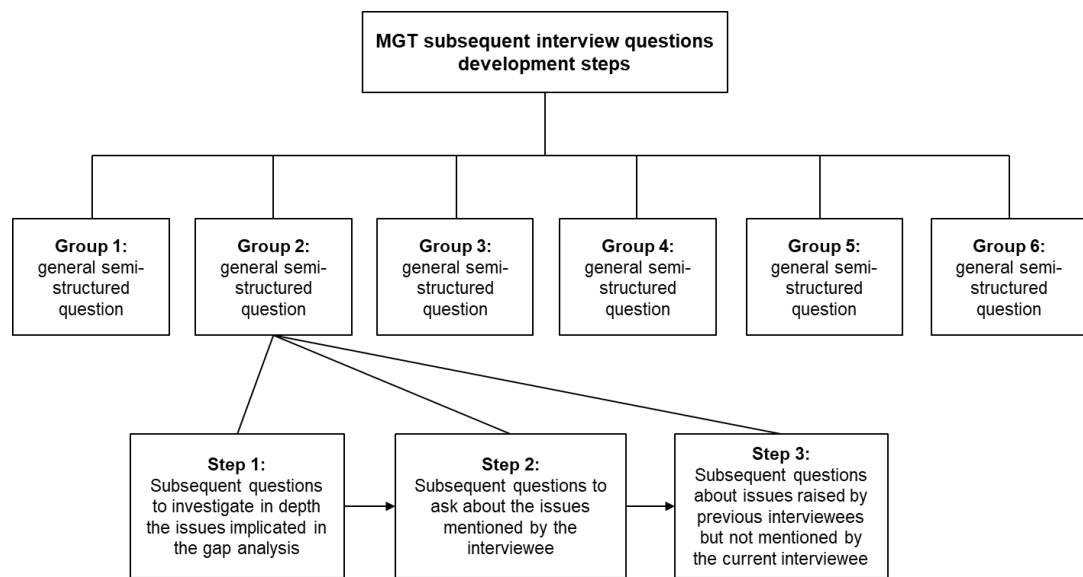


Figure 5.5 The MGT interviews development steps and groups

The first step includes questions derived from the main issues which were investigated through GA, with the purpose of further investigation about new information to be obtained from the fieldwork and explore new relationships between categories. It enabled the interviewees to give their opinions and judgements during the fieldwork, whether to confirm or modify existing theories or propose new ones.

However, the first set of questions was not asked for all interviewees. As mentioned previously, the analysis began from the first interview and the researcher continued to re-design the questions, moving from forward to backward to allow for new information to be obtained and then investigate the research problem in depth. The emergent categories from each interview were added to prepare for the following interview's questions.

The second step of the interview questions investigated in depth the issues which were mentioned by the interviewees and which had not emerged during the gap analysis. In some cases, a set of subsequent questions were asked during the interview when the interviewee mentioned new information until the researcher reached a level of detail such that no further information emerged.

In the third step, the subsequent questions were designed based on the implications of the current interviews for the following interviews. It enabled relevant data to be obtained which was not mentioned by the current interviewees or from the following interviewees. In addition, this process allowed for new categories to be identified and then to verify the findings directly by the following interview and obtain further information. This process was important to give validity for the data provided by the interviewees to be accepted or rejected during the fieldwork study in Jordan. Each of these groups of interview questions which had resulted in a set of subsequent questions produced sets of categories and subcategories from both open coding and axial coding. Each category emerging from each interview was recorded from where it emerged in preparation for the subsequent interview. In some cases, some categories were not developed during the open and axial coding; therefore, during the selective coding, a set of subsequent questions was designed to develop these categories until they were fully saturated.

5.5.4.2 Subsequent MGT Interview Questions for Selective Coding

Two stages of MGT (open and axial coding) were undertaken with a group of interviewees in order to generate categories and investigate incidents and relationships on how to integrate SA into PWs development in Jordan. Poor and undeveloped categories were clarified in the following stage of data collection through selective coding. At this stage, these categories were linked to each other. Therefore, at this stage, the sampling becomes a very careful process involving the researcher choosing sites, people and documents that will maximise opportunities for comparative analysis (Strauss and Corbin, 1998). As a result, in order to probe any missing and undeveloped categories and strengthen the relationships between them,

a group of questions was designed for selective coding. Each of them includes a set of subsequent questions to investigate in-depth issues not developed or saturated around the emergent core category. These sets of questions were most likely to be structured than to be semi-structured, with a few questions encouraging the interviewees to talk freely about the research issues. This is due to the type and the area that needed to be investigated to agree or disagree with the information provided from previous interviews. These interview questions examined which issues need to be investigated further, and provided in **Appendix C**.

5.6 The Fieldwork Study in Jordan

During the fieldwork study in Jordan, the overall MGT procedure was started by conducting MGT interviews and collecting data with the development of subsequent interview questions and then proceeding to analyse this data through three stages of coding: open, axial and selective. In each of these coding systems, a set of activities are carried out where there is an activity called the 'theoretical sampling', which begins from starting the analysis process of the first interview's responses during the open coding, and the moving onto axial coding, until the last steps of filling in any gaps during the selective coding. The overall MGT procedures are summarised in Table 5.3 (Bartlett and Payne, 1997) and (Corbin and Strauss, 1990; Gill and Johnson, 2002; Saunders et al., 2003; Strauss and Corbin, 1998).

Table 5.3 MGT procedures

Action	Remarks
Collecting data	<ul style="list-style-type: none"> The source of data employs MGT interviews.
Data transcript	<ul style="list-style-type: none"> In this case the responses are fully written in order to prepare for analysis.
Open coding	<ul style="list-style-type: none"> Sets of categories are developed starting from the first interview. Further differentiation and discrimination are needed by breaking the provided data down into incidents and labelling them into categories.
Theoretical saturation	<ul style="list-style-type: none"> The data collection reveals that no new data is relevant to a category, where categories have become well understood and developed, and all relationships between them have been verified (Strauss and Corbin, 1998).
Abstract definition	<ul style="list-style-type: none"> Categories result from conceptually similar terms in nature and meaning and then are grouped under more abstract concepts which are the outcomes from events, happenings, objects and actions. The main aim of naming the phenomenon is to enable the researcher to collect as many similarities between the events and happenings and group them under a common classification heading (Strauss and Corbin, 1998).
Constant comparison	<ul style="list-style-type: none"> This form of analysis uses comparative analysis to break the data down and dig deeper into the analysis. Comparing between incidents and categories to find the similarities and differences and then classifying them into themes.
Theoretical sampling	<ul style="list-style-type: none"> The process by which to collect data and improve the concepts and then develop these concepts into sets of categories (Saunders et al., 2003). Bartlett and Payne (1997) added that theoretical sampling means what data is needed from the following interviews and then from which particular group of people.
Axial coding	<ul style="list-style-type: none"> Strauss and Corbin (1998, p.123) defined axial coding as "the process of relating categories to their subcategories, termed 'axial' because coding occurs around the axis of a category, linking categories at the level of properties and dimensions".

Core/central category And theoretical integration	<ul style="list-style-type: none"> • The core category emerges from among the identified categories and becomes known as the core category because all other categories are related to it. • The name or phrase used to describe the central category should be sufficiently abstract that it can be used to conduct research in other substantive areas to the development of GT. • The integration between the categories around a central one begins from the beginning of analysis and does not end until the writing ends. • The integration between the categories around a central one begins from the beginning of analysis and does not end until the writing ends (Strauss and Corbin, 1998).
Selective coding	<ul style="list-style-type: none"> • According to Corbin and Strauss (1990, p.14), "selective coding is the process by which all categories are unified around a 'core' category, and categories that need further explication are filled-in with descriptive detail". The main central phenomenon is represented by the core category in the study. The central category is the main category to which all other categories are linked and then the relationships between them are identified (Strauss and Corbin, 1998). • During the selective coding the categories are integrated along the dimensions to form the relationships between each category and fill in gaps any further information (Strauss and Corbin, 1998).

5.6.1 Data Collection Process (Using MGT Interview Questions)

MGT interviews were employed to collect primary data in order to give flexibility by using this method to answer the research question, which gave a deep and rich understanding of how to integrate SA into PWs development in Jordan. A preliminary sample was identified with the appropriate skills and experience to be part of the research. However, the MGT employed 'theoretical sampling' and 'snowball sampling' to decide which respondent was needed at each interview question. Therefore, a preliminary sample was contacted in order to conduct the first set of interview questions. This is followed by identifying the following interviewees, and the overall MGT interviewees' profile is provided in **Appendix D**. The overall MGT interview process is summarised in Figure 5.6.

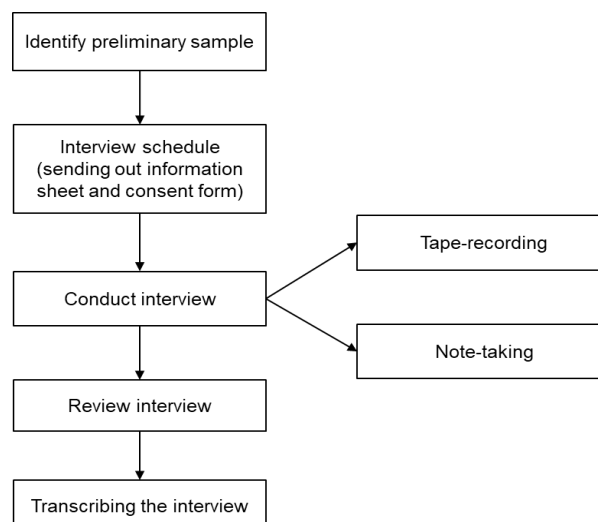


Figure 5.6 MGT interview process

During the interview, the interviewees have received the existing PWs development practices in Jordan and answer specific questions. All questions from

both fixed and subsequent questions that have been asked to which expert are provided in **Appendix E**. The sample of participants received two documents, namely consent form and information sheet to be part of the research are provided in **Appendix F** and **Appendix G** respectively. It was entirely up to them to decide whether to participate or not. They were given one week to state whether they wanted to take part or not. No extra time was given to them in order to decide to take part in the research or not. If there had been no response, the participant was dropped from the list. The researcher conducted the interviews once the time and the date had been agreed with the participants. In addition, the researcher visited their offices in-person and made an appointment via the secretary in order to conduct the interviews. Once the participants agreed, they were interviewed face-to-face during working hours. No other times were chosen to conduct the interviews. Twenty-three interviews were undertaken face-to-face, with one conducted via Skype. During the interviews, the researcher presented the purpose of the research under investigation.

The interviews ranged from 40 to 110 minutes in length. The length depended on how much information the experts wanted to give and express their own opinions when they answered the interview questions. In order to ensure that the interviews would be saved, they were both tape-recorded and written down by hand. Once the data from the interviewees was collected, it was reviewed in order to ensure it covered the intended interview questions, and then it was transcribed and prepared for analysis. The overall transcripts from conducting MGT interviews are provided in the attached CD with the current thesis.

5.6.2 Analysis of MGT Data

The huge amount of data collected was qualitative in nature. The feature of qualitative data is attitude measurement based on opinions/views and perceptions (Bryman, 2008; Fellows and Liu, 2015). Denscombe (2014) pointed out that, when the researcher needs to gain insights into things such as people's opinions, feelings, emotions, and experiences, interviews will almost certainly provide a more suitable method. Therefore, in the current research study, the interviewees provide qualitative data referring to opinions and attitudes about specific issues they were asked about. In MGT, the interplay between data collection and data analysis was examined. Figure 5.7 illustrates the procedures for adopting the analysis of collected data from MGT interview questions.

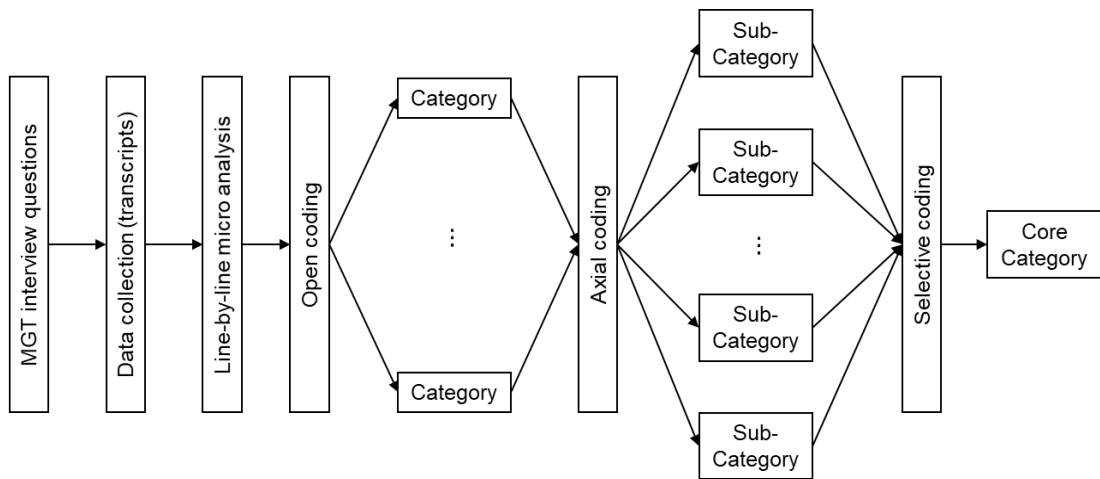


Figure 5.7 The analysis and coding process

During the analysis, coding was employed. The coding process is the main feature and the heart of MGT. Data analysis was conducted through coding the information using an open, axial and selective coding technique. Coding is the analytical process through which data is broken down, conceptualised and integrated into the form of theory (Strauss and Corbin, 1998).

The traditional methods of analysis are unlikely to be carried out where the researcher does not start analysing the data until the entire data has been collected, while in GT the data analysis begins after the first day of data gathering (Corbin and Strauss, 2008). The analysis might be related to the unit of data related to words by words, graphs, sentences or a number of sentences. The current research employed the sentence and words as the units of analysis that describe the main issues. The results of in-depth detailed analysis for data come up with labels (Strauss and Corbin, 1998). The sentences that were navigated which referred to the theme under investigation were generated into the same label. This means that for example under 'institutional governance', the sentences that were searched for referred to the governing, management system and controlling, monitoring and stakeholder engagement.

Indeed, the line-by-line grounded theory coding goes deeper into the phenomenon and attempts to explicate it, which gives the researcher more directions to consider emergent links between processes in the data (Charmaz, 2008). Therefore, each interview transcript was analysed line-by-line immediately it had been written. The data analysis process involves studying the raw data obtained from the interview and then sets of incidents were grouped into appropriate categories that have the same meaning or contribute to the same point of view. In addition, the

relationships between these categories were identified and the set of questions was prepared for the following interview to be conducted. Then, the accumulative incidents which were generated during the analysis were coded into appropriate categories through (open, axial and selective coding). Further discussion on how the analysis was conducted and results obtained is provided in Chapter 6 section 6.3.

5.6.2.1 The Coding Stages for MGT

Three types of coding are dominant in MGT. The disaggregation of data into units is called open coding, the process of recognising relationships between categories is referred to as axial coding, and the integration of categories to produce a theory is termed selective coding (Corbin and Strauss, 1990; Strauss and Corbin, 1998). Moreover, at all stages of the MGT, the researcher ensured that the process of developing a theory had solved the research problem and answered the research question.

The heart of open coding involves developing categories. The initial reading of the collected data allowed the analysis to produce dozens of incidents. The amount of information gathered allowed for new categories to be developed. Therefore, the accumulative incidents were generated when they had become meaningful to a unit of analysis. At the final step of open coding, it was clear that further differentiation and discrimination was required by breaking the categories down into subcategories. Continuing the process of analysis, there is a need to go further into 'axial coding'. Strauss and Corbin (1998, p.123) defined the axial coding as "the process of relating categories to their subcategories, termed 'axial' because coding occurs around the axis of a category, linking categories at the level of properties and dimensions".

Axial coding refers to the process of making relationships between the categories of data that have emerged from open coding (Saunders et al., 2003). At this stage, the relationships between categories are related to their subcategories, and the relationships tested against data (Corbin and Strauss, 1990). At the final stage, selective coding takes place, which is likely to occur in the later stages of a study (Corbin and Strauss, 1990). Corbin and Strauss (1990, p.14) describe selective coding as "the process by which all categories are unified around a 'core' category, and categories that need further explication are filled-in with descriptive detail".

In the current research study drawing all the emerged categories together around a central category is referred to as 'A novel approach integrating SA into PWs development in Jordan'. The overall results from the coding are provided in Table 5.4, while the discussion is provided in Section 6.3.

Table 5.4 The categories that emerged from the MGT coding stages

Coding	Open coding	Axial coding	Selective coding
Category	<ul style="list-style-type: none"> The need for SPWs development 	<ul style="list-style-type: none"> The need for comprehensive view of SPWs development 	<p>'An integrated approach of SA into PWs development in Jordan'</p>
	<ul style="list-style-type: none"> SA process, goals and targets 	<ul style="list-style-type: none"> Identifying the SA process Identifying set of SA goals and targets 	
	<ul style="list-style-type: none"> The development levels of SPWs development 	<ul style="list-style-type: none"> National level Sub-national level Local level Project implementation level 	
	<ul style="list-style-type: none"> Creating an enabling environment 	<ul style="list-style-type: none"> Institutional governance Regulatory frameworks Technical support Public funding 	
	<ul style="list-style-type: none"> Structuring the policymaking to select individual SPWs projects 	<ul style="list-style-type: none"> Identifying the national vision of sustainability in Jordan Creating a comprehensive vision of SPWs development in Jordan Assessment and problem identification of existing situation of public works development in Jordan Formulate strategic sustainable objectives of SPW development Identify alternative options of SPW development in Jordan Evaluate and select the right option for SPW development in Jordan Implementing Monitoring and evaluation 	

5.6.3 Documentary Data

Documents or archival documents can be taken as one of the data collecting techniques (Fellows and Liu, 2008; Fellows and Liu, 2015; Naoum, 1998). This technique of data collection would be appropriate for collecting secondary data and was employed in addition to interviews. It enables the triangulation among the data gathering techniques to give value to the research (Yin, 2013).

The documentary data was used in two stages in the current research study. The first stage was in clarifying the existing practices of PWs development from public documents in order to clarify the existing practices of PWs development in Jordan. The second stage involved selective coding. In this stage, the documentary data was used to verify the findings alongside the interviews during the selective coding. The documents were in both English and Arabic. They included the Jordan Green Building Guide, Jordan Vision 2025, local development plans, PWs system, ministries' strategies, policies and laws, and public articles from newspapers and websites. This technique of data collection was started by identifying which kind of data was needed and from which sources as well.

The documents which were relevant to the research gave insights into the aim of this research and the research problem. Once the documents had been collected, the next step was the evaluation process, which is divided into originality, credibility, accuracy and reliability (Naoum, 1998). In case some of the provided documents were not from the official sources, they were reviewed with original documents from the authorities responsible for publishing the data. The overall process of using documentary data is clarified in Figure 5.8.

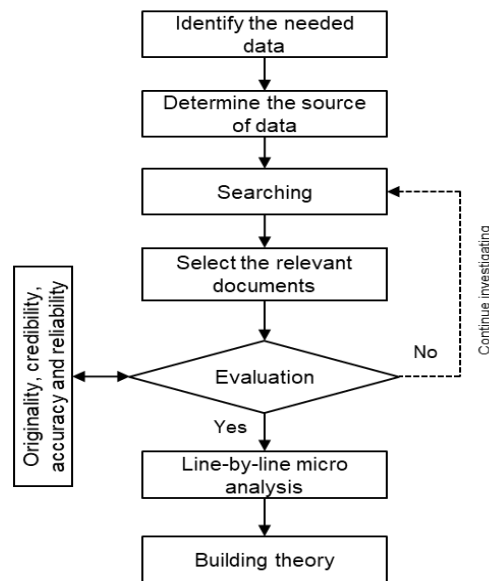


Figure 5.8 Documentary data technique process

The data analysis process involved studying the raw data obtained from the documentary data and grouping sets of incidents into appropriate categories. The microanalysis line-by-line method was employed to analyse the data provided from the documents. Then the theories were built and grouped in categories as presented into the findings Chapter throughout abstract definitions and statements.

5.6.4 Presenting the Findings of MGT

Qualitative research is considered to be subjective in ‘nature’ where the data does not take the form of numbers, while quantitative research is referred to as ‘empirical research where the data is in the form of numbers’ (Punch 2013, p. 4). Presenting qualitative findings in some format is a challenge as they cannot be set out in a neat series of graphs as would be typically found within quantitative research reports (Crimson and Leontowitsch, 2006). In qualitative research, the key findings under each main theme or category are simply reported, using appropriate verbatim quotes to illustrate them (Burnard et al., 2008). MGT is qualitative research. It seeks

to generate theories and confirm them subsequently rather than to test these theories and count the response rate. Therefore, in the current research, the data is presented in a text rather than graphical format. Some groups of findings are presented in tables, while only the data provided from the fixed interview questions (refer to questions Q1, Q11, Q18, Q26, Q29, Q36, Q42, and Q44 and see **Appendix C**) are presented in graphical format using a radar chart (spider chart). A spider chart is an excellent means to visualise displayed multivariate data in the form of multiple quantitative variables represented on axes starting from the same point. The justification for using this chart is that the data obtained were responses to the same questions asked of all interviewees and so they can be counted. In addition, a spider chart can be used to compare two or more items under various functions of typical metrics. Therefore, the obtained data, which are quantitative in nature, can be presented by using this visualising graphical form.

5.7 Sampling Procedure for MGT Interviews

Sampling is a technique that enables the researcher to reduce the amount of data collected by considering only the data from a subgroup rather than all possible cases or elements (Saunders et al., 2003). Generally speaking, there are two types of sampling techniques, namely, random and non-random sampling (Denscombe, 2014). The current research employed non-random sampling due to the type of potential data that needed to be collected. According to Denscombe (2014), there are two types of non-random sampling namely, theoretical sampling and snowball sampling. In the current research study as part of MGT, both types were employed.

The fieldwork study was conducted in Jordan. Jordan is a developing country and it is widely accepted that its sustainable development issues are extremely different from developed Western countries. Therefore, it is important to ensure these sustainable development issues are overcome properly. However, the importance and significance of choosing the right sample for a study play a pivotal role in the quality of the collected data in regard of sustainable development. The justification for the sample being composed only of Jordanian sample is that nobody from Non-Jordanian sample can understand the Jordanian context. The only people who know Jordan are those who are working or living in Jordan. In fact, there are experts from international parties, such as NGOs, UNDP, UN, and GIZ, who work in Jordan. Therefore, it is important that those who participate in the current research should know the Jordanian context very well.

In fact, each country has its own organisational structure, interests, financial capabilities and regulatory environment (Pope et al., 2017; Yigitcanlar et al., 2015). Therefore, it is logically acceptable that only internal participants from the country under investigation are able to participate in developing an integrated approach as they know how the system in Jordan works and can modify/add such improvements to the existing system. Indeed, this research did not investigate how the SA process can be integrated into PWs development from scratch while Jordan never implements SA practices. The current research undertook to leverage international SA practices in Jordan. As a result, before the fieldwork study commenced in Jordan, the implications from conducting the GA had derived a set of international practices that could be leveraged from and be used in Jordan. Thus, the participants should be knowledgeable about the regulations in Jordan, the organisations' structure, governance system, the financial capability and technical skills that Jordanians possess. Therefore, the targeted sample for participating in MGT interviews was carefully selected from both the public and non-public sectors in Jordan who can contribute on how to integrate SA into PWs development in Jordan.

5.7.1 Selection of Experts for MGT Interviews

Experts are expected to know more about the subject of study than others (Sourani, 2013). Therefore, usually, experts are not randomly selected; they should be well acquainted with the research topic and have wide experience in the related research topic as well (Keeney et al., 2001; Sourani, 2013).

In the current research study, the sampling technique was carefully employed to select participants from both the public and non-public sectors. Participants had to be knowledgeable in the current research topic to planning and implementation levels of PW development and sustainability in Jordan. However, Jordan does not have well-developed sustainability practices in the same way as Western countries which might consider those who work in sustainability as experts. In Jordan however, the most knowledgeable people in sustainability only participated. As a result, the selected knowledgeable people were those who can answer inquiries on how to integrate SA into PWs development in Jordan because they have good records and years of working in sustainability and PWs development in Jordan.

In fact, the current research began by studying the existing practices of PWs development in Jordan comparing them with international SA practices, in order to leverage the international SA practices into PWs development in Jordan. However, policies in Jordan largely funded by various Western or multilateral aid donors, raising

the risk that some issues or areas might potentially be over- or under-covered, or influenced by donors' perspectives (Combaz, 2019). Therefore, only persons who are familiar with the context of Jordan can contribute on how to leverage the international SA practices in Jordan. As a result, the sample is composed only in Jordan.

Hence, it was also important that the selected participants have accredited certifications such as LEED practical knowledge, and experience in international and/or regional practices regarding SA, PWs development and sustainability so that they can ensure that these practices are leveraged in the context of Jordan. Moreover, in Jordan, knowledgeable participants who can contribute to the current research, can be found in both the public and non-public sectors, such as ministries, associations, firms, NGOs, and universities, who were selected based on specific criteria. The overall methodology for selecting the participants is shown in Figure 5.9.

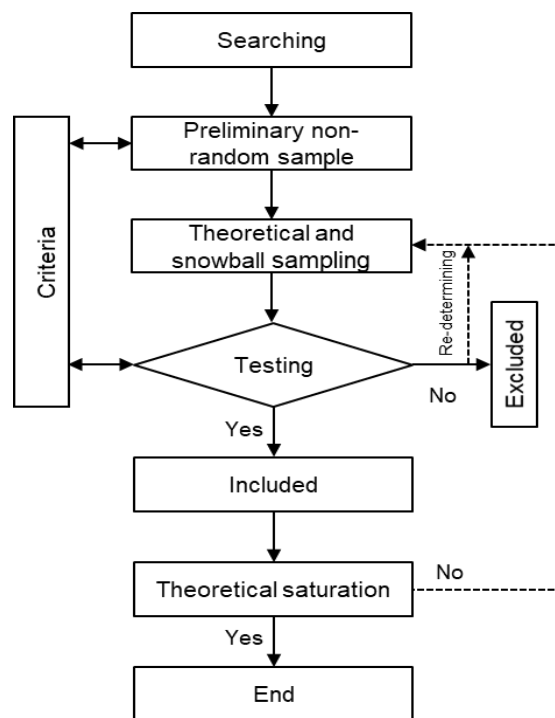


Figure 5.9 Methodology for selecting MGT participants (adopted by the researcher)

The figure shows the overall process from predetermining the sample to the end of the process. The justification for the selection was based on the following selection criteria:

1. The targeted sample was selected based on those who have a high reputation related to knowledge in planning and implementation levels of PW development and sustainability from public and non-public sectors.

2. Those who have solid and relevant years of experience in both PWs development and sustainability at different organisational levels in public and non-public sectors.
3. Those who are proposed by at least one of the following organisations; the Ministry of Public Works and Housing, Jordan Green Building Council (JGBC), Ministry of Environment, Ministry of Planning and International Cooperation, Royal Scientific Association, Jordan Engineers Association, and honoured by professional societies such as NGOs, JGBC, and LEED certification.
4. Academicians who have teaching experience and knowledge in both planning and implementation levels of PWs development and sustainability in Jordan.

Due to the nature of the research in need of targeted groups of participants, the researcher searched for participants in the field who could meet the identified criteria. The researcher employed non-random sampling by selecting a preliminary sample of participants to start the investigation. This sample includes one participant in the public sector working as an advisor for the mayor of Amman. Later, both theoretical and snowball sampling techniques were performed. Snowball sampling is a method that has been widely used in qualitative research (Biernacki and Waldorf, 1981). The snowball sampling technique leads to a study sample through referrals made among people who share details about the study or know others who have some characteristics which match the research interest (Biernacki and Waldorf, 1981). Snowball sampling was used when the current participant suggested that further investigation of an emergent issue was required; this was achieved by finding new participants, based on recommendations from the current participant.

Moreover, theoretical sampling is a process in which data gathering is guided by the evolving theory and the aim is to develop categories in terms of their properties and dimensions and integrate them (Gentles et al., 2015; Saunders et al., 2003). Consequently, the researcher did not predetermine the participants; the provided data which had been obtained from the participants steered the researcher to choose other participants. This means that the chosen participants were based on the categories that emerged from the data in order for them to be able to provide the needed data about these categories. This ensured the data quality was improved by the chosen participants in each interview. Therefore, if a category that had emerged did not develop well, it was investigated further. The sample of participants was tested against the identified criteria. Only those that passed the testing were included. Only information relevant to PWs development and sustainability was obtained and once

theoretical saturation had been reached the researcher stopped the investigation. Further discussion on theoretical saturation is provided in Chapter 6, section 6.3.1.2.

5.7.2 Sample Size for MGT Interviews

The justification for the appropriate sample size can, therefore, drive the question as to what the appropriate sample size is. The answer, in this case, is that there is no number that could be set in advance for the appropriate sample size; this would be indicated when theoretical saturation occurs (Corbin and Strauss, 2008; Corbin and Strauss, 1990). This means that when no new information is being obtained from the participants, and the overall categories have been developed and strengthened and theoretical saturation is achieved, there is no need for more participants to take part in the research (Strauss and Corbin, 1998).

The current research is inductive; therefore, as Easterby-Smith and Thorpe (2002) pointed out, it is conducted based on just a few participants as this approach may be required to establish several views of a phenomenon based on different data, which is required when working and keeping with the nature of qualitative data. Furthermore, for qualitative researchers, the choice of people and events for inclusion in the sample tends to be based on non-random sampling (Denscombe, 2014; Hammarberg et al., 2016; Ritchie and Lewis, 2003), while in quantitative research random sampling is dominant (Fellows and Liu, 2008), which is not suitable for the current research. Therefore, it is important to note that small-scale samples only work in qualitative research if good purposive or theoretical sampling has taken place (Ritchie and Lewis, 2003). Although there is no specific sample size to be used in GT, most researchers consider that, in qualitative research, as a rough guide, for interview studies analysed using constant comparative approaches, theoretical saturation will probably be reached by conducting 20–30 interviews (Boddy, 2016; Creswell, 2013; Dworkin, 2012; Hancock et al., 2009; Marshall et al., 2013; Morse, 2000; Thomson, 2010). However, 20–30 is the number required for classical GT without any theoretical background.

In fact, the current research study employed MGT by conducting an extensive analysis of the existing practices of PWs development Jordan and international SA practices which, in turn, resulted in reducing the number of participants. A variety of participants can provide triangulation of the collected data and ensure its consistency, filling in any gaps and any missing data. However, it is difficult to contact a large sample of participants from the 4,000 who work in PWs in Jordan, while a representative sample is needed. In the current research, therefore,

in total, 24 interviews were conducted in Jordan from both public and non-public sectors and academics in the field, through theoretical sampling and snowball sampling techniques. The purposive sample of participants was selected carefully, based on specific, targeted people who can contribute to the current research.

In Jordan, as SA is still lacking in PWs development it is difficult to conduct a large sample size of those who have good knowledge of SA. In addition, this research conducted a gap analysis the implications of which guided the researcher to understand what should be asked, rather than starting from scratch, which would lead to a small sample size. In fact, the sample size can be affected by the quality of the data collected from the interviews. Hence, the purposive sample included the following: a former minister, professionals, and experts in the field of PWs development and sustainability, a secretary general, an advisor to the capital's mayor, directors, senior engineers, academics, a mayor, consultants, engineers working in NGOs in Jordan, a professional from the UNDP in Jordan and a professional working with the UN in Jordan. All the interviewees were marked up IR1... IR24 and the full interviewee profiles are given in **Appendix D**.

It should be noted that interviewees from the public sector were selected from three areas: those working in sustainable policy planning but not in the implementation of sustainability; the non-public interviewees were those who participated in planning with the public sector but not implementation with the private sector; and academicians who participated in planning with the public sector and implementation with the private sector. By choosing experts with different standpoints internally selected from Jordan who can provide triangulated valuable information, it is hoped that the gap in the knowledge can be closed by the current research.

5.8 Development and Validation of an Integrated Approach

This research includes three phases. The first phase investigates the need for an integrated approach of SA into PWs development in Jordan. Thus, an extensive literature review was carried out and documents were reviewed critically and analysed from both international SA practices and PWs development practices in Jordan. GA was conducted prior to the fieldwork study being undertaken in Jordan. The justification for this process of development is that the Jordanian experience in SA is still lacking. Therefore, employing a theoretical implication from the existing theories is essential to leverage from them by investigating them in the context of Jordan. The second phase focuses on the approach development by conducting MGT interviews

and verify the integrated approach. In the third phase, the research focuses on the validation of the integrated approach for SA into PWs development in Jordan. Further discussion is provided in Chapter 7.

5.8.1 Verification and Validation

It is important to understand that the verification process is employed to ensure the validity and reliability of the research study (Fellows and Liu, 2015; Remenyi et al., 1998). It examines whether the structure of the model is correct or not by testing the outputs resulting from the model under a given set of inputs (Fellows and Liu, 2015). In addition, the verification means that the outputs are appropriate when they match the approximate expectations. As a result, a good model of reality would be produced (Fellows and Liu, 2015). In the context of the current research, 'verification' means evaluating whether the provided data by the interviewees properly addresses the issues that strongly influence the integration of SA into PWs development in Jordan. Therefore, MGT was used to verify the data provided by the interviewees (internal verification). The data provided was tested against responses from each interviewee and only data that ensured consensus was accepted in developing the integrated approach.

On the other hand, once the verification is carried out, then the next stage is the validation process. Fellows and Liu (2015, p.120) stated that in the validation process, the developed approach's outputs resulting from known inputs are compared to reality. Patton (1990) cited in (Mishler, 1990, p. 418) has another view that he defined the validation process as ensuring the credibility of the research by strengthening confidence in the research findings. Moreover, 'validation is essentially a type of scientific inquiry, that a validity judgement is an inductive summary of all available information, with issues of meaning and interpretation central to the processes' (ibid.). In fact, research quality can be judged through four concepts which are relevant; trustworthiness, credibility, conformability, and dependability (Yin, 2003). For example, Corbin and Strauss (2008) referred to the term 'credibility' with regard to qualitative research as it indicates the trustworthiness and reliability of the findings. These views consider the validation process as a judgemental process that helps to enhance the credibility of the research findings.

In the current research, the validation process is designed to seek modifications, changes, and evaluation of the integrated approach. It means evaluating whether the approach would satisfy the aim and objectives of the research or not. In addition, it aims to refine and examine usability, usefulness, and

appropriateness of the integrated approach of SA into PWs development in Jordan in which its application can assess the extent to which emerging policies, plans, and projects of PWs achieve sustainable development. Therefore, there is a need to validate the proposed integrated approach by conducting two stages of validation. The first stage of validation was carried out by conducting the Delphi method with Jordanian experts and the second stage of validation was carried out by conducting the validation interviews with non-Jordanian experts.

5.8.1.1 The Justification for Conducting the Delphi Validation Method with Jordanian Experts

It is expected that a conventional validation approach of conducting interviews or questionnaires will be difficult, the Delphi method was performed to validate the integrated approach using a group of experts in Jordan. The reason for this, that the questionnaire needs a large sample size usually which is not available currently in Jordan from those who work and have well experienced in the sustainability and SA process. Therefore, conducting the Delphi validation method by a group of experts with significant experience and knowledge about sustainability and SA in Jordan is more appropriate. This increases the opportunities for finding any improvements while providing valuable insights into the subjects being investigated. Moreover, conducting the interviews will not get a consensus in their opinions among each other's while there is a need to reach a consensus as such the interviewees in this method are usually interviewed once. Therefore, this method is not appropriate for the current research. On one hand, one of the methods for validation is to apply the approach to one or more real cases of emerging policies, plans and projects of PWs development in Jordan. Nevertheless, validating the integrated approach of SA into PWs development in Jordan based on applying it might be difficult due to the time required. It might take a long time for some outcomes to be produced from the PWs policies, plans, and projects that emerge when applying the integrated approach. Therefore, it is not feasible to use this method for validation. Alternatively, the integrated approach can be validated by interviewing a sample of experts in the field using the Delphi method in Jordan.

Another method for validation that is to expand the MGT interviews. In fact, there are several reasons that justify conducting a Delphi validation rather than expand MGT. During the MGT, the theories were developed, and the interviewees started to repeat the data thus indicating that at this level the theories were saturated, and no new information was provided by the interviewees. In addition, in Jordan,

public sector experts of sustainability are not that number making it difficult to conduct more interviews. The best way was to conduct the validation process with a sample of experts who were not participated in MGT from those who work at international NGOs in Jordan, and not from domestic NGOs as what was conducted in the MGT interviews. Lastly, the Delphi method is suited for research studies when there is incomplete knowledge and works well with under-researched topics (Skulmoski et al., 2007). Therefore, in the current research study, the Delphi method was used to validate the proposed integrated approach of SA in PWs development in Jordan.

5.8.1.2 Justification of Conducting the Validation interviews with Non-Jordanian Experts

As the current research topic is still not well researched in Jordan, there is incomplete knowledge on how to integrate SA into PWs development in Jordan well has been developed. Therefore, it is not realistic to only obtain feedback from Jordanian experts. It is more appropriate to present the approach to non-Jordanian experts who are practicing SA for years. The feedback and judgments then should be made by qualified and competent people who are nominated experts in the field of the current research study. As a result, the conventional interviews using semi-structured form were conducted. This is justified that once the integrated approach is validated using Jordanian judgments non-Jordanian judgments are needed from experts that have already been practicing SA in their strategic and project levels. This is essential to consider here that the non-Jordanian experts can only provide their judgments in regard to the suitability of applying the proposed integrated approach in real cases of assessing the emerging policies, plans, and PWs projects. However, due to the time limit of conducting the current research, expanding the use of the Delphi method that comprises two rounds with non-Jordanian experts was difficult. This needs more time which was not available. As a result, conducting the validation interviews with a group of non-Jordanian experts was more appropriate than to run two rounds of Delphi method.

5.9 Research Ethics

Ethics are an important research concern (Fellows and Liu, 2008). The researcher is required to seek ethical approval prior to the fieldwork being conducted. As a compulsory requirement, the form of the ethical consideration was completed and then submitted to the Faculty Research Ethics Committee at the University of Leeds, and it was accepted under the Ethics Reference **MEEC 15-018**.

During the fieldwork study, no interview was carried out until consent had been obtained from the interviewee. This can ensure the interviews are carried out ethically and with the full agreement of the interviewees. Once they agreed to take part in the current research, they gave permission for the information they provided to be used for research purposes only. In addition, arrangements were made for the time, place and date of the interviews, and the interviews were all conducted by the researcher. Moreover, it was entirely up to the participants to agree to the interview being tape-recorded or not. One of them was tape-recorded and the rest of them were not. To remember all the issues and information given by the interviewees, a summary of what the researcher wrote was presented to them in order to verify the collected data. The provided data was in both Arabic and English. Therefore, data provided in Arabic was translated into English and then presented in the current research study. All provided data was kept strictly confidential and anonymous. Moreover, the validation process using the Delphi validation method with Jordanian experts and validation interviews with Non-Jordanian experts took the same ethical considerations as in the MGT interviews. For the collected data from MGT interviewees, Delphi method and validation interviews the names of the interviewees were kept confidential and not published.

5.10 Summary

This chapter has critically justified the chosen research methodology. The chapter illustrated the research philosophies, approaches, methods, strategies, and data collection techniques. In this kind of research, qualitative data is gathered using the MGT strategy. Moreover, the fieldwork study in Jordan is the only source of data by conducting semi-structured interviews and searching for documentary data. However, one of the disadvantages of GT is that it relies heavily on the researcher to ensure the analysis is carried out on the data once it is collected. Therefore, the researcher employed the modified version of GT by comparing the existing practices of PWs development and international SA practices. The issues arising from GA were used in designing MGT interview questions for conducting the fieldwork study in Jordan. The fieldwork study was carried out in Jordan and the findings obtained from the fieldwork were used to propose the integrated approach. The following Chapter 6 provides the overall findings of conducting MGT during the fieldwork study in Jordan, followed by providing Chapter 7 that discusses the development methodology of the integrated approach and the findings obtained from conducting the validation.

Chapter 6 Findings

6.1 Introduction

This chapter presents the analysis of the qualitative data obtained from the fieldwork study in Jordan by using Modified Grounded Theory (MGT) and documentary data. It aims to explore the data in as much depth as possible and provide a sequence of actions on how to integrate sustainability assessment (SA) into public works (PWs) development in Jordan. Some interviewee statements in this chapter were translated into English; these statements, which are both positive and negative, are provided.

The chapter starts by justifying the need for sustainable public works (SPWs) development, the main development levels of SPWs and strategic links between these levels. The chapter then clarifies the enabling environment needed for enabling SPWs development in Jordan and the process of policymaking to select individual projects. This is followed by clarifying the process of integrating sustainability assessment (SA) at each level of SPWs development in Jordan. These levels are the sub-national level and the local level from policymaking to selecting individual projects.

6.2 Interviewees' Profile

In total 24 interviewees were interviewed during the fieldwork study in Jordan. This total can be divided as follows: 13 from the public sector, eight from the non-public sector and three academicians, as listed in Table 6.1 and presented in Figure 6.1.

Table 6.1 Interviewees' profile

Sector	Interviewees	Number
Public	IR1, IR3, IR5, IR6, IR7, IR8, IR9, IR11, IR13, IR15, IR17, IR18, IR23	13
Non-public	IR2, IR4, IR10, IR16, IR19, IR21, IR22, IR24	8
Academician	IR12, IR14, IR20	3
Total	IR1-IR24	24

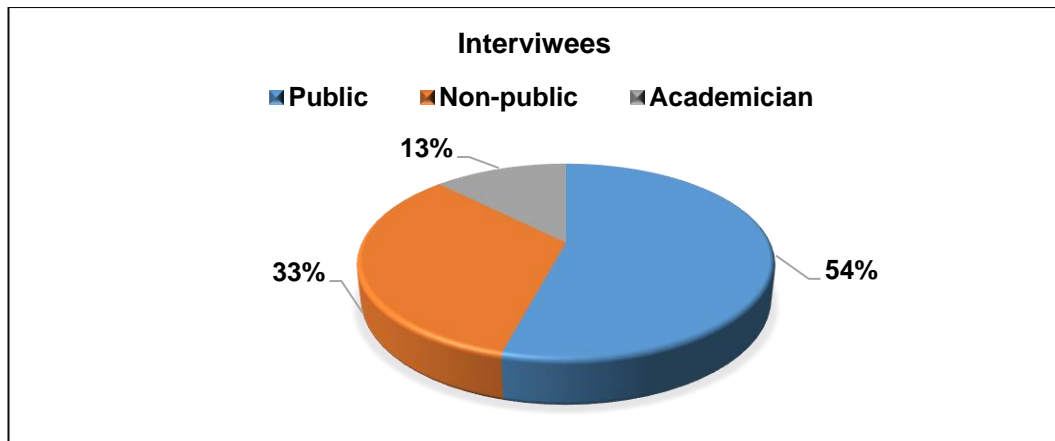


Figure 6.1 Interviewees' profile

The interviewees were selected based on theoretical sampling and snowball sampling techniques from those who have wide and solid experience in both PWs development and sustainability in Jordan. The main objective of the interviews was to investigate the key issues obtained from the gap analysis (GA) in the context of Jordan in order to leverage them. The interviews also aimed to explore the experts' opinions and attitudes towards developing an integrated approach on how to integrate SA into PWs development in Jordan. The interviewees are classified in terms of their experiences, positions, and qualifications which are provided in full in **Appendix D**.

6.3 Data Analysis and the Results Obtained of MGT

The collected data in the current research was obtained by interviewing 24 interviewees in the field. In addition, in order to fill in gaps in these undeveloped or unsaturated theories, the documentary data was used, which gave more validity to the data provided from the interviews. Both fixed interview questions and subsequent questions were asked during the MGT process that obtained the findings. As a result, the vast amount of data collected from MGT interviews and documentary data was qualitative. In order to move from data to theory, the data gathered from both MGT interviews and documents were studied line-by-line and broken down into incidents. Those incidents that shared the same meaning and discussed the same issues were labelled and grouped into appropriate categories to generate theories. Each of these categories was developed in relation to their properties and dimensions. Moreover, the relationships between these categories were identified during the process of analysis. The analysis was performed qualitatively by employing three MGT coding systems: open, axial and selective.

6.3.1 Open Coding

6.3.1.1 Developing Categories

During the fieldwork study, the data collected from each interview was immediately analysed line-by-line using the microanalysis method. This enabled all the collected data to be broken down into discrete parts which included concepts, incidents, and ideas (Corbin and Strauss, 1990). Once similar incidents began to accumulate, they were then grouped under a specific category.

6.3.1.2 Theoretical Saturation

The main aim of open coding is to generate categories and keep them open for any further changes. These categories continued to grow until theoretical saturation for each category was achieved. Strauss (1987, p.21) pointed out that theoretical saturation occurs 'when additional analysis no longer contributes to discovering anything new about a category'. Saturation means that no additional data are being found in order to develop properties of a category when a similar instance appears over again. In this case, the researcher feels confident when a category is saturated (Glaser and Strauss, 2006). The overall process of theoretical saturation conducted in the current research study is provided in Figure 6.2.

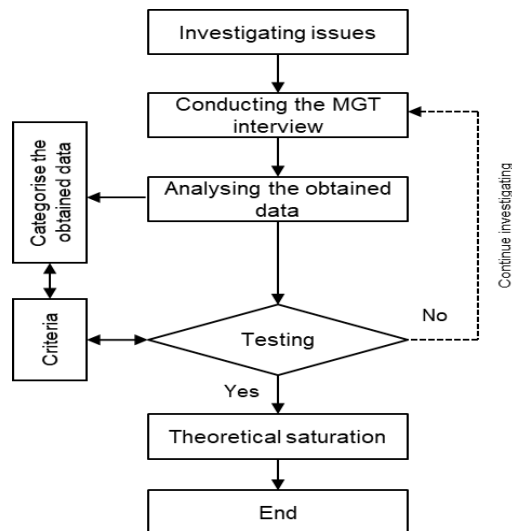


Figure 6.2 Theoretical saturation process, (adopted by the researcher)

According to Strauss and Corbin (1998), three criteria are provided to decide whether the categories are saturated or not, namely: no more information is provided, the interviewees start repeating what has already been obtained and a level of verity is reached in the provided information. Saturation was achieved in the current research once no more information was gained during the data collection process

and the data was repeated; the researcher then stopped looking for more information on a specific category. Theoretical sampling is a way of deciding what information to collect next based on data from interviews that have already been coded and analysed. Therefore, the type of data provided steered the researcher's further investigation. As a result, once several interviewees about more than 4 to 5 had confirmed the data which was under a set of categories, it was accepted by the researcher. If the data under a group of categories were not confirmed by the interviewees, they were rejected. The confirmed data under specific categories were labelled and marked up as 'IR1, IR2 ... IR24.'

6.3.1.3 Abstract Definitions

Strauss and Corbin (1998) stated that category names come from three sources: names which emerge from the collected data, or those based on the terms given by the participants and/or names that come from the terms used by the existing theories and literature. In the current research, therefore, once the categories were saturated into the process of theoretical sampling and snowball sampling, they were given specific names which were clearly understood by the interviewees. They were constantly compared regarding their similarities and differences in order to be given specific names.

6.3.2 Axial Coding

During open coding, the relationships between categories began to emerge, which were broken down. In axial coding, it was necessary to work on reassembling broken-down data and the coding around the category axis was built. It became apparent that some incidents that were grouped and labelled under a specific main category shared the same properties or related to specific issues under the main category, and these were given specific names under sub-categories.

6.3.3 Selective Coding

During the selective coding process, the categories were integrated to form relationships between each category. At this stage, the poor or undeveloped categories were addressed, and the overall gaps in relationships were filled in and strengthened. Therefore, during the fieldwork, some of the sites and people were visited/called a second time in order to conduct further investigations. Then, the researcher started to integrate all the provided categories around the central category and then structured the overall approach based on the provided categories. This was important in order to reach the final level of detail, in which the integrated approach

needs to be fully developed and to fill in gaps for any missing elements. Once the obtained theories were agreed upon, the process towards grounding the theory in order to develop the overall element of the integrated approach was carried out.

6.3.3.1 Documentary Data

The relevant documents to the current research gave insights into the aim of this research and the research problem. At this stage, the information needed from each document was then searched for by the researcher, to ensure that it was included. For example, 'stakeholders' engagement' was one of the emerging categories; therefore, the documents relevant to Jordan and containing the pertinent information according to the keyword 'stakeholders' engagement' were selected. In addition, and according to the categories that emerged, 'sustainability goals and targets' were not saturated during the interviews; therefore, the documentary data related to 'sustainability goals and targets' was analysed line-by-line in order to validate the data emerging from the interviews. As a result, once the required information provided by these documents appeared frequently and from different sources, it was accepted by the researcher.

The data analysis process involved studying the raw data obtained from the documentary data and grouping sets of incidents into appropriate categories. The microanalysis line-by-line method was employed to analyse the data provided from the documents. As a result, the relationships between these categories were identified. In some cases, the emergent categories in the MGT were not saturated and needed further investigation. Therefore, during the selective coding, the documentary data was employed as a source of data to collect secondary data where the level of detail was not obtained through the interviews. As a result, in order to transform data into theory, the researcher identified related documents that can provide the in-depth information needed to saturate categories, strengthen the relationships between categories, and result in more validity. The obtained documentary data is presented in Table 6.3 and in text format throughout the findings, besides the collected data of MGT interviews.

6.3.4 Example of Coding

An example of coding is shown in Figure 6.3, which provides the emerging main category and sub-categories in their dimensions, properties, and targets as derived from both MGT interviews and secondary data (documentary data). The full coding system is provided in a CD attached to the current thesis.

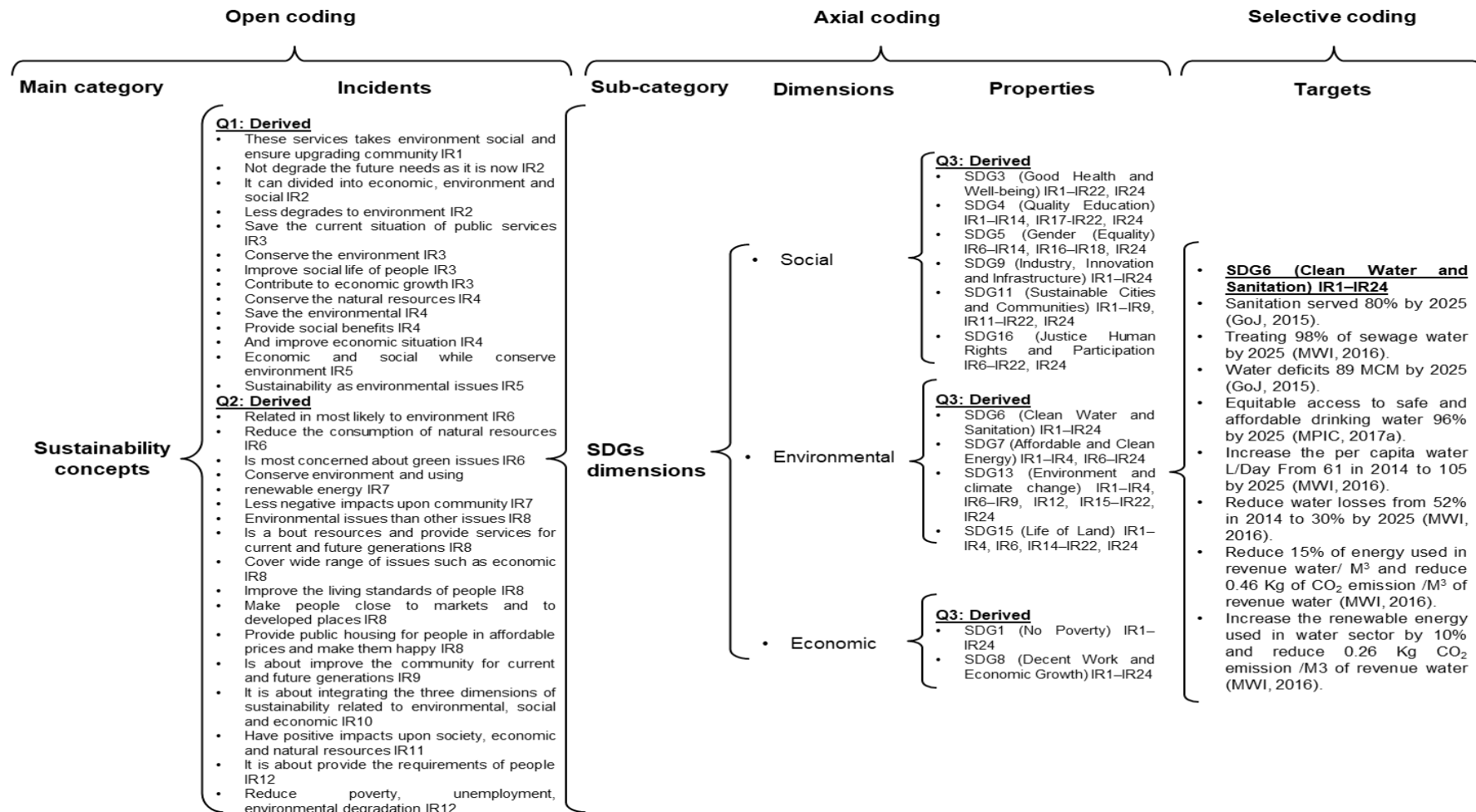


Figure 6.3 Example of coding system

Figure 6.3 clarifies the coding process in that the open and axial coding is provided from the interviewees' data while the selective coding is produced from documentary data. This is justified because the targets in the provided example of coding cannot be proposed only by those who work in the policymaking process in the country who developed these provided documents.

6.4 The Need for SPWs Development in Jordan

In this study, it is important to define what sustainability means in the context of PWs development in Jordan. The findings suggested a practical definition for sustainability in Jordan as continuing to provide services to current and future generations (confirmed by interviewees IR1–IR4). The findings also suggested other views of SPWs development that can deliver long-term services (also confirmed by interviewees IR1–IR4), such as focusing on green issues to reduce consumption of resources, water and energy, and lessen negative impacts on the environment (confirmed by interviewees IR6–IR8). The findings then provided an overall definition of SPWs development in Jordan. It is the process of delivering PWs from formulating policies to select individual projects to meet service requirements and enhance economic growth, reduce environmental damage, achieve social welfare, and improve the community for current and future generations (confirmed by interviewees IR1–IR4, IR6–IR12). There is no doubt that SPWs development is needed in Jordan. However, unsustainable PWs will not have operational benefits and will not provide the intended service requirements (confirmed by interviewees IR12–IR19).

6.4.1 The Need for a Comprehensive View for SPWs Development in Jordan

In Jordan, Alkhasawneh (2015) indicated that there is a lack of integrated and comprehensive approaches which include sustainability objectives in sectorial policies. In addition, each sector in Jordan develops its own policy (sectorial approach) with no integrated and comprehensive sustainable policy for all sectors. Furthermore, as indicated in Chapter 4, regarding sustainability practices in Jordan, at the sub-national level, there are specific policies for water, energy, and environment. However, PWs development is not considered by these policies.

The findings indicated that existing practices in PWs development in Jordan were found to promote inequality in opportunities and create gaps with an absence of community engagement. Moreover, the strategic decisions for policy formulation are

made by one person (the minister). As a result, policy formulation will, in some cases, be due to the minister's attitude, with no coordination with other sectors to ensure that policy formulation is comprehensive to ensure that policy formulation is comprehensive and includes other sectors as necessary (confirmed by interviewees IR1–IR4, IR6–IR7). As a result, the findings stressed that a comprehensive view of SPWs development is needed to achieve sustainable development. This means that each sector will not have its own separate policy; the policy will be comprehensive for all sectors considering the three dimensions of sustainability: environmental, social and economic (confirmed by interviewees IR6–IR7). Another view was outlined by interviewee IR5: that a comprehensive view of SPWs development can create complexities, risks and delays in PWs development in Jordan. In addition, in some cases it could be impossible to have a robust comprehensive view of SPWs development as each ministry has its own strategic objectives, leading to potential conflict between them.

The findings argued that there is a need for a comprehensive view of SPWs development, so that each PWs project can be related to another. This means that schools need roads, a transportation system and a water network, etc. (confirmed by interviewees IR8–IR9, IR11–IR16).

However, according to interviewee IR10, "simply, I can say that there is misalignment between the existing policies in the country. It is difficult to say that a comprehensive view of SPWs development is easy to do. It is interesting to say we need a comprehensive view. If this is done well, we will have a robust policy for SPWs development in Jordan. However, several barriers can affect this happening. As a result, I think there is a need to do huge efforts towards making this happen". Interviewee IR16 supported the previous point that "there is a need for a comprehensive view of SPWs development in Jordan and that PWs development actions are influenced by each other, in a similar manner to the so-called 'butterfly effect'". Therefore, a comprehensive view for SPWs development in Jordan can thus improve all sectors and, at the same level, ensure equality in opportunities across the country (confirmed by interviewees IR13–IR19).

6.5 The Need for SA for PWs Development in Jordan

Existing PWs development practices in Jordan indicated that PWs development policies are not assessed to ensure compliance with the country's national vision. This means that the policies which are intended to achieve

sustainable development are formulated without a comprehensive assessment in terms of the environmental, social and economic impacts of PWs development in Jordan.

The findings suggested that SA is a process of understanding the impacts from PWs development at each level of development and its impact on the country from the three triple bottom lines of sustainable development. Therefore, the integration of SA into policymaking means that the policy will be assessed against sustainability to meet sustainable development for the country (confirmed by interviewees IR1–IR4).

Existing practices in Jordan (as mentioned in Table 4.1) do not show that the emerging policy and local plan are assessed against a specific baseline that ensures the link between national objectives will be translated into reality. The findings, however, indicated that the existing practices of PWs development in Jordan, from policy formulation to selecting PWs development and finally implementing policy, are not assessed against people’s actual needs and the country’s national vision (confirmed by interviewees IR6–IR8). The findings stressed that, in order to ensure that the delivered PWs are sustainable, SA should be carried out. There is a need to integrate the assessment into the overall process of policymaking and ensure PWs development in Jordan is delivered in a sustainable manner (confirmed by interviewees IR8–IR15).

Interviewee IR24 stated that “SA is the main tool to understand Jordan’s current situation in relation to sustainable development goals. This can build up the current situation of the country and the targeted situation that needs to be achieved. SA is not a slogan. It is a requirement for each policymaking process in order to be translated into reality”. As a result, the findings suggested that, from the available SA stages, the following stages are appropriate in the context of Jordan as provided in Table 6.2 which shows all interviewees responses while Figure 6.4 gives the percentage of those participants out of the overall sample of 24.

Table 6.2 SA stages

SA stages	Interviewees
• Identify the scope of assessment, goals and targets (baseline)	IR1–IR4, IR6–IR9, IR11–IR24
• Conduct the assessment against the baseline	IR1–IR4, IR6–IR9, IR11–IR24
• Identify assessment options	IR1–IR4, IR6–IR20, IR22, IR24
• Assess purposes, options and selection	IR1–IR4, IR6–IR9, IR11–IR24
• Decision-making and adaption	IR1–IR4, IR6–IR14, IR17, IR19–IR24
• Monitoring and evaluation	IR1–IR3, IR5–IR11, IR14–IR22, IR24

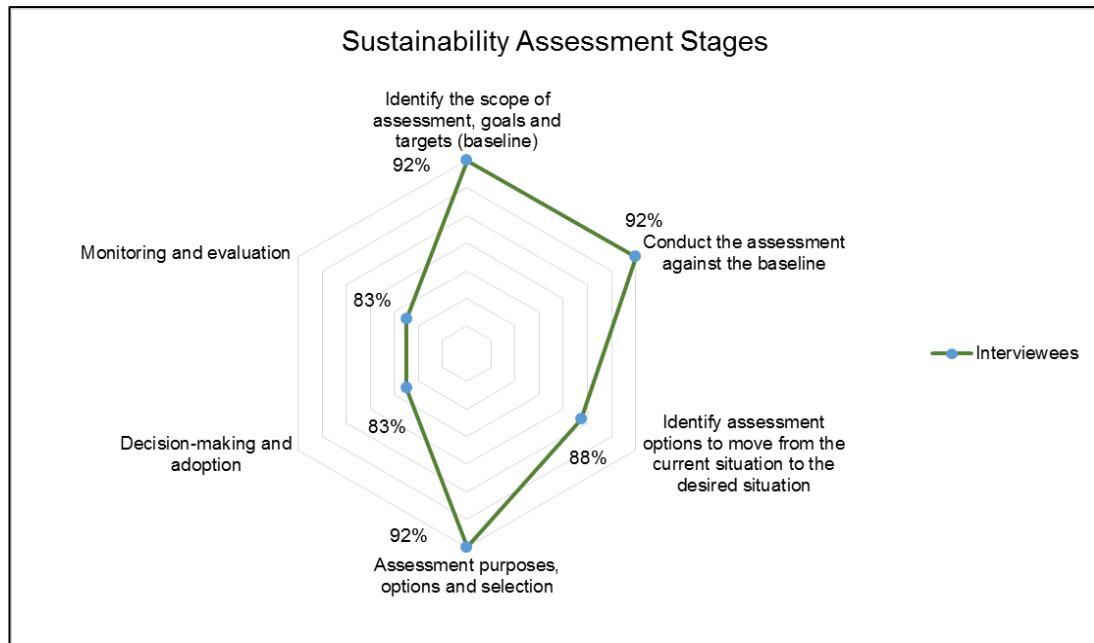


Figure 6.4 SA stages

6.5.1 SA Goals and Targets

The existing sustainability practices in Jordan, as discussed in Chapter 4, indicated that there is no clear vision of sustainability for PWs development in the country (Alkhasawneh, 2015). Only a design guide (Jordan Green Building Guide, JGBG) issued by the MPWH deals with environmental sustainability for buildings. In fact, a list of 230 indicators is provided by the UN Agenda (IAEG, 2016) which can be used to assess each SDG for Jordan taking into account its context. The existing practices in Jordan, as per Chapter 4, indicated that there is no baseline for sustainability to assess current PWs development in the country. However, the current assessment indicators (Provided in Chapter 4 Table 4.1) are conventional and proposed by several parties in the country.

The findings indicated that, with regard to the SA baseline, these criteria are considered the starting point for assessing the current situation of PWs development in Jordan against the targeted situation. As a result, there is a need to identify the set of SA goals and targets as provided in Table 6.3 which shows all interviewees responses while Figure 6.5 gives the percentage of those participants out of the overall sample of 24.

Table 6.3 SA goals and targets

Dimensions	Global (SDGs)	National Goals in Jordan	Targets in Jordan
Environmental	<ul style="list-style-type: none"> • SDG6 Clean Water and Sanitation • SDG7 Affordable and Clean Energy • SDG11 Sustainable Cities and Communities • SDG12 Responsible Consumption and Production • SDG13 Environment and Climate Change • SDG14 Life Below Water • SDG15 Life on Land <p>(UN, 2015a)</p>	<ul style="list-style-type: none"> • SDG6 Clean Water and Sanitation (IR1-IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Sanitation for 80% of the population by 2025 (GoJ, 2015). • Treating 98% of sewage water by 2025 (MWI, 2016). • Reduce water deficits to 89 MCM by 2025 (GoJ, 2015). • Equitable access to safe and affordable drinking water for 96% of the population by 2025 (MPIC, 2017a). • Increase the per capita water L/Day from 61 in 2014 to 105 by 2025 (MWI, 2016). • Reduce water losses from 52% in 2014 to 30% by 2025 (MWI, 2016). • Increase the renewable energy used in the water sector by 10% and reduce the emissions by 0.26 Kg CO₂ emission /M³ of water (MWI, 2016). • Reduce 15% of energy used in non-revenue water/M³ and reduce 0.46 kg of CO₂ emission /M³ of non-revenue water. Non-revenue water (NRW) refers to water sent into the distribution system but is not billed (MWI, 2016). • Rehabilitation/replacement of existing infrastructure. and reducing non-revenue water (NRW) (MWI, 2016). • Contributes about 18% of GDP and employ about 15% of the total number of workers in Jordan (MWI, 2016).
		<ul style="list-style-type: none"> • SDG7 Affordable and Clean Energy (IR1–IR4, IR6–IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Renewable energy to have an 11% share of the total energy mix by 2025 (GoJ, 2015). • Reduce the usage of non-renewable energy for pumping water from M³ 5.8 KW in 2017 to M³ 4.6 KW in 2025 (GoJ, 2015). • Reduce the energy losses from 16.6% in 2017 to 11% by 2025 (GoJ, 2015). • Energy efficiency and advanced and cleaner fossil-fuel technology (EPC, 2018). • Ensure access to affordable, reliable and modern energy services with acceptable prices (EPC, 2018). • Achieving energy security in a sustainable way through programmes that increase the contribution of domestic resources to the overall energy mix (EPC, 2018).

		<ul style="list-style-type: none"> • SDG13 Environment and climate change (IR1–IR4, IR6–IR9, IR12, IR15–IR22, IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Reduce solid waste generated in landfill from 80% in 2017 to 60% by 2025 (GoJ, 2015). • Reduce solid waste from 40% in 2017 to 20% by 2025 (GoJ, 2015). • Increase the recycled medical waste from 70% in 2017 to 80% by 2025 (GoJ, 2015). • Reduce CO₂ emissions, which were found in 2016 to comprise 4.41 tons, to 4.2 tons by 2025 (MPIC, 2017a). • Protect and maintain ecosystems and vitality (ME, 2017c). • Prevention and reduction of negative effects on environment caused by pollution and climate change (ME, 2017c). • Develop institutional capabilities and behaviour in environment protection (ME, 2017c).
		<ul style="list-style-type: none"> • SDG15 Life on Land (IR1–IR4, IR6, IR14–IR22, IR24) 	<ul style="list-style-type: none"> • Combat desertification, restore degraded land and soil (GoJ, 2015; MPIC, 2017a). • Reduce the degradation of natural habitats, halt the loss of biodiversity (GoJ, 2015).
Social	<ul style="list-style-type: none"> • SDG1 No Poverty • SDG2 No Hunger • SDG3 Good Health and Well-being • SDG4 Quality Education • SDG5 Gender Equality • SDG9 Industry, Innovation and Infrastructure • SDG11 Sustainable Cities and Communities • SDG16 Peace and Justice Strong Institutions • SDG17 Partnerships to achieve the Goal (UN, 2015a) 	<ul style="list-style-type: none"> • SDG9 Industry, Innovation and Infrastructure (IR1–IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all (GoJ, 2015; ME, 2016; MPIC, 2017a). • Upgrade infrastructure; for example, increasing the existing road network from 7500 km in 2015 to 7600 km by 2025 (GoJ, 2015). • In addition, the number of buses/1000 population needs to reach 1.25 by 2025 (GoJ, 2015). • Using clean and environmentally sound technologies (EPC, 2018; ME, 2016).
		<ul style="list-style-type: none"> • SDG11 Sustainable Cities and Communities (IR1–IR9, IR11–IR22, IR24) 	<ul style="list-style-type: none"> • Ensure healthy and safe community (GoJ, 2015; MPIC, 2017a).
		<ul style="list-style-type: none"> • SDG3 Good Health and Well-being (IR1–IR22, IR24) and (MPIC, 2017a) • SDG4 Quality Education (IR1–IR14, IR17–IR22, IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Improve the quality of education and the health sector (GoJ, 2015; MPIC, 2017a) • Develop the high school exam (GoJ, 2015; MPIC, 2017a). • 95% of the elderly to be covered by health insurance by 2025 (GoJ, 2015; MPIC, 2017a).
		<ul style="list-style-type: none"> • SDG5 Gender Equality (IR6–IR14, IR16–IR18, IR24) and (MPIC, 2017a) • SDG16 Justice Human Rights and Participation (IR6–IR22, IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Stakeholder engagement (public and non-public) (GoJ, 2015; MPIC, 2017a). • The Municipal Councils to include 25% of their seats for women, and the 2015 Decentralisation Law allocated a 10% quota for women (MPIC, 2017a)

Economic	<ul style="list-style-type: none"> • SDG1 No Poverty • SDG8 Decent Work and Economic Growth • SDG9 Industry, Innovation and Infrastructure • SDG12 Responsible Consumption and Production (UN, 2015a) 	<ul style="list-style-type: none"> • SDG1 No Poverty (IR1–IR24) and (MPIC, 2017a) • SDG8 Decent Work and Economic Growth (IR1–IR24) and (MPIC, 2017a) 	<ul style="list-style-type: none"> • Gross domestic product (GDP) to be developed from 4.5% in 2017 to reach 6% by 2025 (GoJ, 2015). • GDP from transportation to be developed from 9.31% in 2017 to reach 9.41% by 2025 (GoJ, 2015). • Reduce the unemployment rate from 13% 2017 to 8% by 2025 (GoJ, 2015). • Encourage green economy and green financing for investments (ME, 2017c; ME, 2016). • Create good job opportunities for poor people (GoJ, 2015; MPIC, 2017a). • Protect labour rights, and promote safe and secure working environments for all workers (ME, 2017c; ME, 2016; MPIC, 2017a). • Eradicate poverty and reduce the proportion of people not in employment (GoJ, 2015; ME, 2016; MPIC, 2017a). • Transformation to green economy (ME, 2017c).
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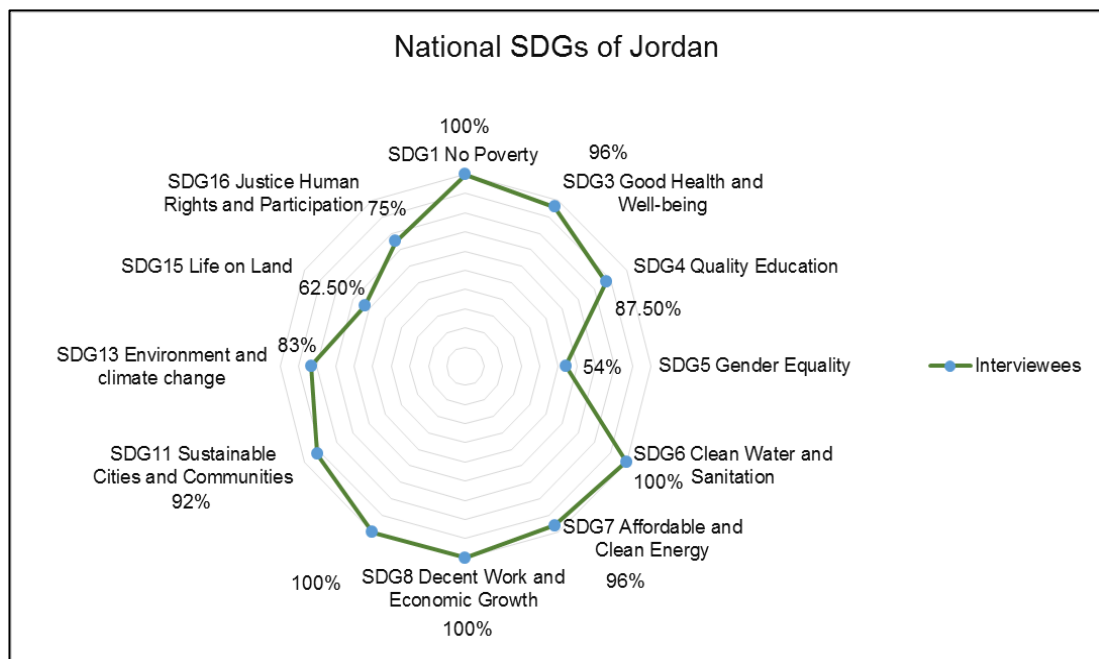


Figure 6.5 SA goals and targets in Jordan

6.6 SPWs Development Levels in Jordan

The existing practices of Jordan’s sector public work indicated that there is a national vision that is formulated at the national level for all development sectors in the country (GoJ, 2015). This document provides a long-term vision for the desired situation, which is targeted to be reached by 2025.

The 2030 sustainable development goals proposed by the UN (UN, 2015a), however, are not integrated into the national vision of Jordan; only the UN’s

millennium development goals (MDG) have been integrated (Awad, 2016). In addition, the national vision of Jordan indicates that PWs development is still developed in a conventional manner, and sustainability is essentially absent (GoJ, 2015).

The findings indicated that there are such limitations in the current national vision relating to PWs development in Jordan. This means that the current national vision looks for conventional PWs development to deliver citizens' service requirements, with no implications regarding which PWs development contributes to the economy, unemployment and poverty, uses renewable energy and water, or generates waste, and their negative impacts on the environment are also not considered (confirmed by interviewees IR1–IR7). As a result, the national vision of Jordan should be reformulated in order to integrate the global sustainable development goals (SDGs) (confirmed by interviewees IR7–IR9 and documentary data (Awad, 2016; Edama, 2016; MPIC, 2016a; MWI, 2016)).

The existing practices documented in Chapter 4 indicated that there are four levels of PWs development in Jordan – national, sub-national, local and project implementation. However, the findings confirm that these levels are not linked in an appropriate manner. This means that each of these levels has its own objectives with no coordination between sectors, for example, water sector, health and education sectors (confirmed by interviewees IR1–IR7). In addition, the findings stressed that a robust link between these levels is needed to follow the national vision towards SPWs development in Jordan (confirmed by interviewees IR8–IR12).

However, interviewee IR6 mentioned that, “I can see from the existing process that there is a link between the national to project implementation levels, while the problem is evolving the outputs from each level of development to the following levels. Therefore, the link is created while the problem is how to ensure the link is effective in the absence of KPIs and monitoring”.

Following the need to create a link between national, sub-national, local and project implementation levels, at each of these development levels, SA should be included in its three dimensions. In addition, there is a need to formulate specific SA objectives in the context of Jordan. These objectives should consider the 2030 SDGs as the starting point to formulate the overall objectives at each level of development and then consider each of these objectives as guidance for policy, local and project implementation plans (confirmed by interviewees IR8–IR12). As a result, the findings indicated that, at each level of development, the emerging policies, plans and projects

should be assessed against sustainability objectives from an early stage and at each development level (confirmed by interviewees IR10–IR14).

The four levels of development should follow the global 2030 SDGs. As a result, at the national level, these goals should be shaped in the context of Jordan to create a national vision of SA. At the sub-national level, the SDGs of Jordan should then be shaped in the context of PWs development to create a comprehensive policy for SPWs development. At the local level, the SDGs of PWs should be translated into the local level and then the current situation of the local level should be assessed against these objectives to create the local development plans. Finally, at the project implementation level, the findings suggest that there is a need to follow the SA objectives of the selected individual project to create a project implementation plan (confirmed by interviewees IR9–IR19 and documentary data (Edama, 2016; Fakhori, 2015; ME, 2016; MPIC, 2016b; MPIC, 2017a; MWI, 2016; MPWH, 2013b)).

6.7 Enabling Environment for SPWs Development in Jordan

The existing practices discussed in Chapter 4 indicated that PWs development in Jordan is factored by the enabling environment which includes institutional governance, regulatory frameworks, technical support and public funding.

The findings suggested that the enabling environment must be identified as a departure point for the overall process of integrating SA into PWs development in Jordan at each level. Thus, at each level there is a need for specific enablers which are linked with each other. These enablers are the institutional governance, regulatory frameworks, technical support and public funding (confirmed by interviewees as provided in Table 6.4 which shows all interviewees responses while Figure 6.6 gives the percentage of those participants out of the overall sample of 24). These enablers are affected by each other. Therefore, an effective enabling environment can influence the on-going SPWs development in Jordan (confirmed by interviewees IR14-IR19 and documentary data (Edama, 2016)).

Table 6.4 Enabling environment (Enablers)

Enablers	Interviewees
• Institutional governance	IR1–IR24
• Regulatory frameworks	IR1–IR15, IR17, IR19–IR24
• Technical support	IR1–IR4, IR6–IR20, IR24
• Public funding	IR1–IR24

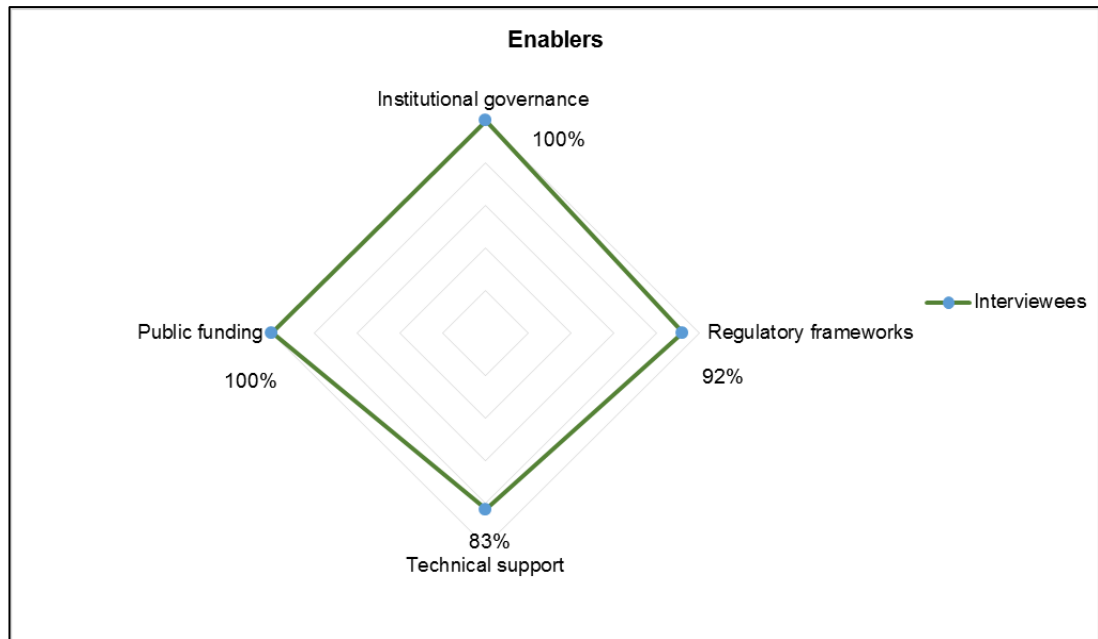


Figure 6.6 Enabling environment

However, interviewees IR4 and IR5 had the same view that “an enabling environment is needed while the existing enablers are not effective, but with more ‘political will’ they will be effective for SPWs in Jordan”.

6.7.1 Institutional Governance

The existing practices of PWs development in Jordan outlined in Chapter 4 indicated that the current institutional governance is headed by the prime minister of Jordan. All ministries in Jordan should follow the government trend (sectorial approach). In addition, at the local level there are representative local houses for most ministries in Jordan. Finally, at the project implementation level the MPWH is in charge of implementing all PWs development in Jordan.

The findings confirmed that institutional governance should be established to enable SPWs development in Jordan. This can ensure that all ministries share a common language and link the policy with on-the-ground reality in order to ensure consistency (confirmed by interviewees IR1–IR4, IR8–IR9).

Interviewee IR7 had a different point of view in that “all ministries in Jordan should be considered customers of the MPWH. As a result, each ministry can work as it currently does and, finally, they can follow MPWH regulations”. Interviewee IR8 stated that “the MPWH is in charge of managing the implementation of all PWs development in Jordan. The interviewee added that it is impossible, for example, for the Ministry of Health to seek sustainable hospitals while the Ministry of Education is

not seeking sustainable schools. Therefore, it is necessary to consider institutional governance for enabling SPWs development in Jordan". Interviewee IR10 also argued that, "at the project implementation level, the MPWH is responsible for implementing all PWs development in Jordan. Consequently, it is difficult for the MPWH to ensure compliance with sustainability at the project implementation level while at earlier levels (sub-national, local) they are not doing so. Therefore, compliance with SA should be considered as early as possible, from the policy formulation process to select individual projects. This can ensure that the national vision of SA in Jordan is translated into reality and overcomes such barriers that would hinder SPWs development in Jordan, and from an early stage".

Institutional governance is required due to political changes in the country and unstable decisions in PWs development. Policymakers are continuing to change over time, with no fixed decision-making being made for PWs development. In addition, their thoughts are most likely to be based on their interests and attributes rather than regarding the actual needs of the country's citizens (confirmed by interviewees IR8–IR10, IR12–IR14). The Higher National Committee of Sustainable Development (HNCSD) was established in Jordan (MPIC, 2017a). This committee formulates the UN's 2030 SDGs in the context of Jordan and creates a national vision for a sustainable Jordan. According to the UN report of participatory for Jordan (UN, 2016b) and a document describing Jordan's manner of sustainable development (MPIC, 2017a), it has been suggested that there is a need for each of Jordan's development sectors to have its own sub-committee with a similar work plan and the same objectives as those of the others. Institutional governance can ensure that the decisions are not only being made by small groups of people. The decisions should be fixed and consistent with the national trend to be translated into reality. Hence, institutional governance can ensure that monitoring for accountability, transparency and participation at each level of development is achieved. Thus, there is a need to create institutional governance and monitor its actions to ensure transparency when it takes decisions for SPWs development, ensuring that it takes into account the participation of public and non-public stakeholders (confirmed by interviewees IR12–IR14 and documentary data (MPIC, 2017a)). The findings suggested three committees at each level of development – sub-national, local and project implementation – and that each of these committees should be linked with the HNCSD in Jordan. The findings suggested that the monitoring committee should comprise different parties such as the HNCSD in Jordan headed by the country's prime minister, the audit bureau for external monitoring, and internal monitoring by

the interior audit at the ministry itself. Therefore, the communication between each of these committees should be carried out from the prime minister to the project implementation level and vice versa. In addition, there is a need to enhance communication between each of these committees in a top-down and bottom-up manner. This can ensure the decision-making is conducted in the correct manner (confirmed by interviewees IR14–IR19). It is considered a sub-committee from the national higher committee (HNCSD) of sustainable development (confirmed by documentary data (Alkhasawneh, 2015; Awad, 2016; UN, 2016b)).

The findings suggested that each of these committees will have a role in enabling SPWs development in Jordan. This means that the national committee will be in charge of assessing Jordan's current situation against the national vision of SA in the country, the sub-national committee controls the formulation of a comprehensive policy for SPWs development and the local committee controls delivery of the local development plans (confirmed by interviewees IR17, IR19–IR24). Interviewee IR18 stated that it is difficult to ensure coordination between each committee where there is no monitoring of their performance between them. Such monitoring would ensure that each committee addresses the requirements that need to be achieved.

Interviewee IR24 observed that "sustainability needs 'political will'. Therefore, an effective institutional governance is essential to enable SPWs development in Jordan". At each level of PWs development, there are, however, not enough effective stakeholders being engaged from both public and non-public stakeholders (Ajarmeh, 2016). Only internal and external public stakeholders are engaged. The findings suggested that, at each level of SPWs development in Jordan, a wide range of stakeholders need to be engaged at day one, from both external and internal public stakeholders and from external non-public stakeholders. The justification is that, in order to bridge the gap between the government and local communities, engagement is needed. In addition, the local community can provide innovative ideas and participate in developing the policy because they are the ultimate end users of PWs in Jordan. Moreover, their feedback can be considered by the monitoring committee to ensure their requirements are being taken into account (confirmed by interviewees IR6–IR14 and documentary data (Almadadha, 2015; MPIC, 2016c)). The findings classified the stakeholders into internal public stakeholders, external public stakeholders (confirmed by interviewees IR16–IR24) and external non-public stakeholders (confirmed by interviewees IR15–IR20, IR22, IR24).

Interviewee IR18 argued that “it is difficult to engage all of the stakeholders from different sectors in the institutional governance, although they can be engaged partially and having a representative sample is more efficient”. The findings suggest conducting stakeholder briefing workshops in order to identify them, their roles and the nature of their engagement, at which development level, timing and the tools of engagement. The level of engagement can be classified into decision-making, information providing, financing, affected by and consultation (confirmed by interviewees IR15, IR17–IR19 and documentary data (MPSD, 2014b)).

Interviewee IR24 provided a different view, “observing that, while engagement of the aforementioned groups is necessary, it is difficult to engage third-party consultants who are experts in sustainability. This will require additional cost at this level of development as well as creating conflicts of interest. Therefore, professionals from the Royal Scientific Society and representatives from the Engineers Association who can provide valuable information should be engaged instead”. The list of stakeholders is classified in Table 6.5 which shows all interviewees responses while the percentage of those participants out of the overall sample of 24 and the proportions of the responses are presented in Figure 6.7.

Table 6.5 The list of stakeholders

Public		Non-public
Internal	External	External
<ul style="list-style-type: none"> Ministers IR1-IR9, IR11, IR14-IR24. Tendering Department IR1-IR2, IR6-IR9, IR11, IR14-IR24. National Building Council IR2, IR4-IR9, IR11, IR14-IR24. Strategic Board at each Ministry IR1-IR3 IR6-IR9, IR11, IR14, IR17-IR24. Internal Audit Unit of the Ministries IR6-IR9, IR11, IR14-IR17. 	<ul style="list-style-type: none"> General Budget Department IR3-IR9, IR11, IR14-IR24. Audit Bureau IR1-IR9, IR11, IR14-IR24. Association of Contractors, Association of Engineers IR2-IR4, IR6-IR11, IR14-IR24. Royal Scientific Association IR1-IR11, IR14-IR24. Department of Statistics IR7-IR8, IR11, IR15-IR16, IR19-IR20. Department of Surveying IR3-IR11, IR14-IR16, IR22-IR24. Institute of Standards and Metrology IR7, IR10, IR15-IR17, IR20, IR23-IR24. Regulatory Bodies, Municipalities IR1-IR24. 	<ul style="list-style-type: none"> NGOs IR6, IR11-IR12, IR14-IR20, IR22, IR24. Academics IR1-IR2, IR4-IR9, IR12, IR14- IR20, IR22, IR24. Engineers and Consultants IR1-IR24. Politicians IR1, IR5-IR24. Women, Youth IR1-IR2, IR4-IR9, IR14-IR17, IR19, IR22, IR24. Suppliers IR6, IR7, IR11, IR14-IR15. Jordan Green Building Council IR1-IR24. Local Community IR1-IR24.

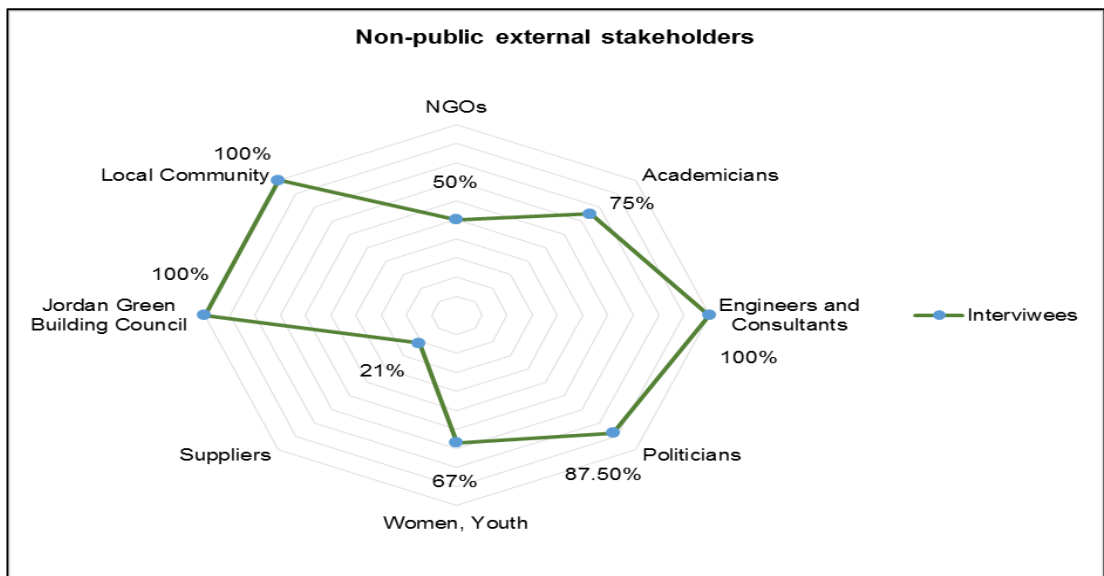
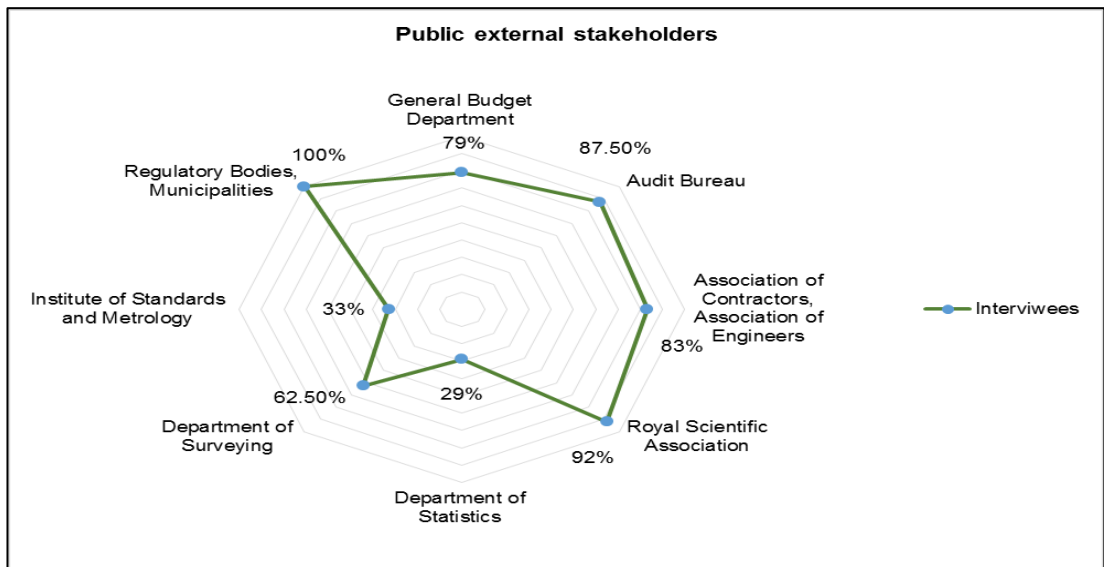
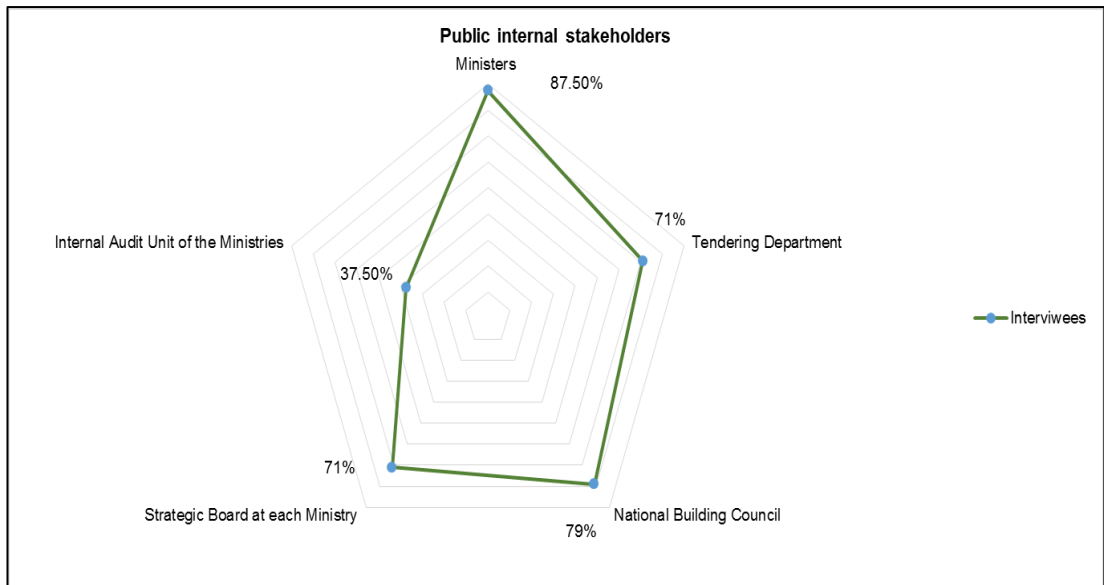


Figure 6.7 Public and non-public stakeholders

6.7.1.1 Sub-National Committee

The existing practices in Jordan, as outlined in Chapter 4, indicated that institutional governance at the sub-national level for each ministry formulates the sectorial policy, which is represented by the strategic board of each ministry.

The findings thus indicated that, in order to ensure that the policy for SPWs development in Jordan is comprehensive, there is a need to establish a sub-national committee for SPWs development. Its role can be clarified as managing the process of formulating a comprehensive policy for SPWs development (confirmed by interviewees IR8–IR12 and documentary data (UN, 2016b)).

The sub-national committee should consist of three main parties – steering, technical and communication committees (confirmed by interviewees IR15–IR18). The steering committee will lead the process of formulating a comprehensive policy for SPWs development in Jordan and make the final decision. The technical committee is to conduct the required sustainability studies and engage experts in sustainability from its three dimensions with respect to who should share the same language, then the communication committee coordinates between each party with the help of a facilitator (confirmed by interviewees IR16–IR19 and documentary data (MPIC, 2016c)).

6.7.1.2 Local Committee

Existing practices indicated that, at the local level, there is a representative for the MPWH in Jordan (local house). The local house monitors existing PWs development at the local level. However, it is not conducting technical studies to identify the need for PWs development in Jordan.

According to the decentralisation Law No.49 2015 in Jordan (GoJ, 2015b), two councils should be allocated at the local level. The first one is the executive council and is appointed by the government and headed by the governor, and the second one is elected (the governorate council).

However, the findings indicated that this step is considered the first step to ensure the local community is engaged in prioritising SPWs development in Jordan (confirmed by interviewees IR1–IR24). However, more work and adjustments are required to the governance system structure through engaging a wide range of stakeholders (confirmed by interviewees IR6–IR14).

The findings, therefore, indicated that there is a need to create a local committee in charge of assessing the current situation of PWs development in Jordan against the services provided and then identify the most proper option for SPWs development at the local level. Therefore, the executive council should include different representatives from PWs ministries in Jordan that will steer the overall process of the local committees and make the final decision (confirmed by interviewees IR14–IR16).

In addition, the findings indicated that it is difficult to engage a wide range of stakeholders from local communities and consult them in a small room. Therefore, it is important to identify those who will be effective so that they can be a representative sample (confirmed by interviewees IR9–IR12).

Other views were also expressed that, due to cultural issues in Jordan, the elected council will be selected from tribes or/and relatives, whether they are knowledgeable about sustainability or not. Therefore, at the local level, the elected people will not be effective in terms of participating in decision-making (confirmed by interviewees IR13–IR15). Interviewee IR15, however, argued that “this committee could create problems with local authorities due to overlap or conflicts in their roles”.

Therefore, the findings suggested that those elected people at the governorate council who will engage in SPWs development in Jordan should be knowledgeable about sustainability (confirmed by interviewees IR13–IR17). The findings also suggested conducting orientation and capacity development workshops for local committees before conducting SA for PWs development (confirmed by interviewees IR14–IR17).

Following the need for a local committee, the findings suggested that this committee will have a similar work plan to the national committee. Therefore, the executive council then should include representatives from each ministry in Jordan (confirmed by interviewees IR15–IR19).

There is also a need to include both technical and communication parties. The former conducts all technical studies at the local level if needed and ensures compliance with local regulations at the local level. The communication party manages coordination between each party in the local committee and with the local community with the help of effective facilitators (confirmed by interviewees IR15–IR19 and documentary data (MPIC, 2016c)). The findings also suggested that a third-party consultant (sustainability advisor) should also be engaged to serve on this committee, as well as local authorities such as municipalities which provide valued information to

be used in local development plans for SPWs development at the local level (confirmed by interviewees IR16–IR17, IR19).

Finally, the findings indicated that the local committee should be integrated with policy formulation at the sub-national level for two reasons. The first is to gather information in regard to such issues as the current situation of PWs across the country. Second, the engagement of the local committee with the sub-national committee can enable the former to build its knowledge and improve its capacity for sustainability (confirmed by interviewees IR17, IR21–IR22, IR24).

6.7.1.3 Project Implementation Committee

The findings suggested that, at the project level, a project implementation committee needs to be created by the MPWH (confirmed by the interviewees IR13-IR14, IR19). However, this committee is not a focus of the current study because it is out of the research scope.

6.7.2 Regulatory Frameworks

The existing regulatory frameworks in Jordan are divided at each level of PWs development – sub-national, local and project implementation. These frameworks can include, at the sub-national level, the national laws in terms of environment protection, biodiversity, water use and energy, road laws, transport laws, building laws, etc. At the local level, regulations can include land use and local master plans, and, finally, at the project implementation level, the regulatory frameworks can include PWs system 1986 and design codes.

However, the existing practices of PWs development in Jordan, as discussed in Chapter 4, indicated that each sector in Jordan formulates its policy based on its own regulations and laws, with no coordination with other sectors. For example, there are regulations in terms of environment conservation, which are not considered by other ministries to formulate their policies. Therefore, these regulations do not affect the formulation of other sectors' policies and the development of their projects. Therefore, the findings indicated that compliance with these regulatory frameworks is thus not effective. In addition, the regulatory frameworks at both local level and project implementation level are not consistent with sustainability. This means that the regulatory frameworks should embed sustainability dimensions and update them to ensure consistency with country trends and to deal with any circumstances that may arise at each level of development (confirmed by interviewees IR1, IR3-IR4, IR6-IR8).

The findings suggested development of comprehensive regulatory frameworks to govern policy formulation for all SPWs development in Jordan. This means that each sector of PWs development in Jordan should be affected by the regulations of other sectors (confirmed by interviewees IR9–IR12).

Interview IR11 provided the example that “the roads development policy should consider environmental regulations, biodiversity, water, etc. Therefore, the roads should not negatively affect the environment, prevent the cutting-down of trees, contaminate surface water or reduce consumption of non-renewable energy, but should provide safe travelling for people”.

The findings suggested regulatory frameworks are required at each level of SPWs development in Jordan, and the responses rates are presented in Figure 6.8.

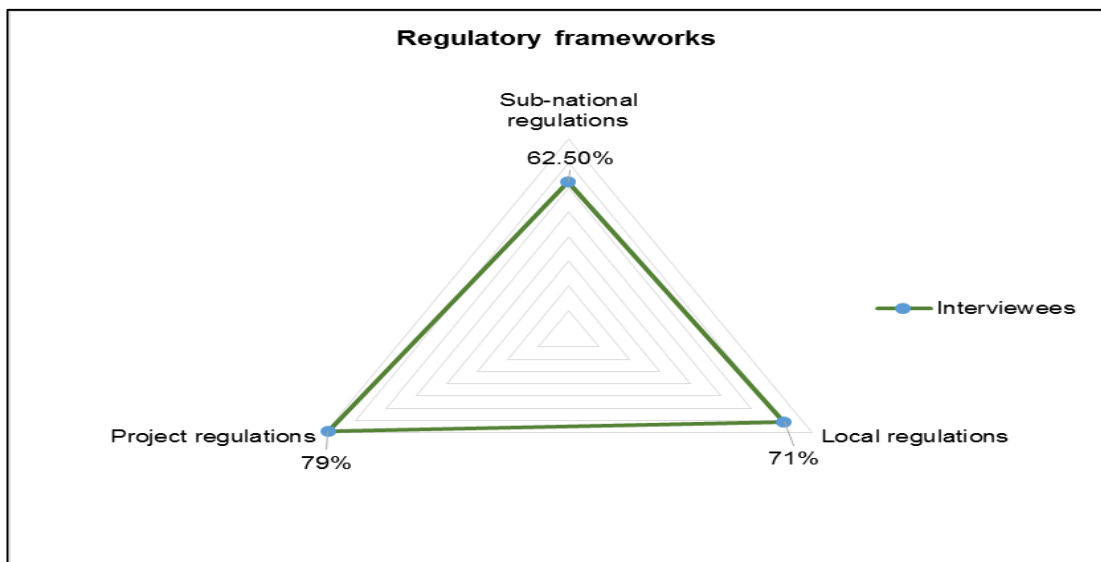


Figure 6.8 Regulatory frameworks

At the sub-national level, the regulations are issued by the central government of Jordan in terms of water, energy, environment, etc. At the local level, the regulations are specific for each municipality, such as master plan and land use, permits and administrative approvals (confirmed by interviewees IR1, IR3, IR6-IR7, IR9, R12-IR17, IR19, IR21-IR22, IR24). The findings also suggested that the regulatory frameworks should be considered to govern policy formulation and ensure compliance with the national vision of SA in Jordan. Therefore, reviewing the regulations, master plans, land use laws, codes, etc., at each level of SPWs development can ensure consistency in sustainability (confirmed by interviewees IR1, IR3, IR7-IR19, IR22, IR24). At the project implementation level, SPWs development should follow the Jordan Green Building Guide (JGBG), design codes for water and

energy efficiency, and take social and economic dimensions of SA into account (confirmed by interviewees IR1-IR11, IR13, IR15, IR18–IR24 and documentary data (Edama, 2016; MPWH, 2013b).

6.7.3 Technical Support

The existing practices of PWs development in Jordan as mentioned in Chapter 4 indicated that the technical skills required at sub-national and local levels to enable PWs development are usually not assessed. Although there is no specific technical support needed at these levels of PW development in Jordan, the findings indicated that decision-makers at each level of development are not being assessed to ensure that they are able to provide the required technical support in conventional PWs development. That lack of technical support is one of the most significant barriers (confirmed by interviewees IR1–IR4).

One point made by interviewee IR5 was that “sustainability can create gaps in capabilities that need more technical support, skills, and an appropriate level of experience, which can create differences in the overall quality of PWs development in Jordan”. Therefore, the findings indicated that the correct technical support is essential to enable SPWs development in Jordan at each level of development. The policymakers, then, should have a high level of qualifications and knowledge with regard to sustainability in order to support policymaking and ensure that policies are translated into the on-the-ground reality in Jordan (confirmed by interviewees IR6–IR10).

The findings did, however, indicate that policymakers are able to define strategic objectives well, while failing with respect to selecting the most appropriate PWs to be implemented. Thus, the selection of correct SPWs development is not carried out due to lack of skills, poor human intervention in prioritising PWs, and lack of sustainable policy, regulations and others. In addition, the findings indicate that the levels of knowledge, skills and experience are not consistent (confirmed by interviewees IR8–IR10). Therefore, at each level of SPWs development, technical support is needed for different skills, knowledge and experience; hence, public and non-public stakeholders at each level must have specific technical support (confirmed by interviewees IR10–IR13). The findings in relation to this aspect are presented in percentage out of the original sample of 24 in Figure 6.9.

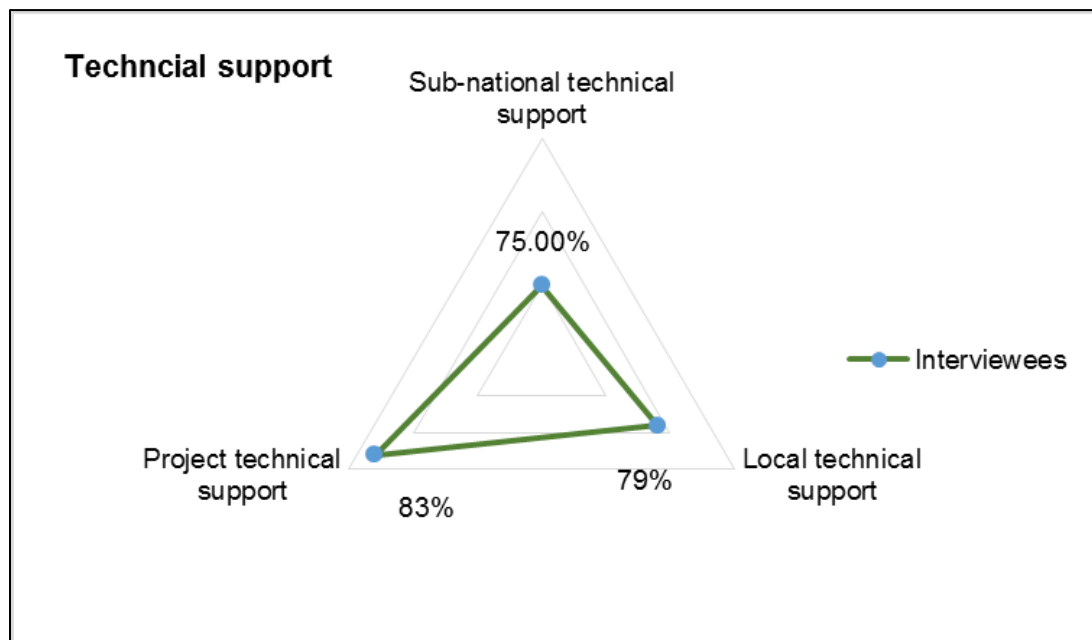


Figure 6.9 Technical support

At the sub-national level, policy-makers should have a high level of knowledge and experience in regard to SA, regulatory frameworks, and other documents related to sustainability in order to formulate policies for SPWs development in Jordan (confirmed by interviewees IR1–IR4, IR6–IR10, IR15–IR19, IR22–IR24). At the local level, technical support needs to be in line with basic and detailed skills in sustainability solutions, and knowledge information needs to be in line with innovative ideas, local regulations, strategic planning and analysis. This is justified because the local committee will be in charge of selecting the most appropriate SPWs development in Jordan. Therefore, they should be educated in sustainability (confirmed by interviewees IR1–IR6, IR9, IR11–IR12–IR15, IR17–IR19, IR21–IR24).

At the project implementation level, the technical support which is needed from tenderers involves a high level of assessing sustainable procurement, contract and tenders against sustainability to select appropriate designers and contractors. In addition, designers should assess their designs against sustainability for optimisation, which should agree with the specifications in the Building Information Modelling (BIM) process and/or Jordan Green Building Guide (JGBG). This is justified because designers will be in charge of designing SPWs development in Jordan and the contractors will deliver it. Therefore, their technical skills should be at a high level to support this (confirmed by interviewees IR1–IR4, IR6–IR14, IR16–IR19, IR22–IR24).

6.7.4 Public Funding

The existing practices of PWs development in Jordan, as mentioned in Chapter 4, indicated that the environmental and social impact assessment (ESIA) is conducted at the project implementation level for those projects which are not funded by the government (CC, 2012; RSS, 2012). This is part of the term of references (TOR) on the contract to assess the impact of social and economic projects during implementation. However, for those PWs developments which are fully funded by the government, no ESIA is being conducted. The existing practices indicate that public funding is centralised by the government of Jordan (GBD, 2015). Public funding is allocated based on previous strategic plans and the organisation's objectives and its main specific role. However, public funding is not allocated based on the actual need for PWs development that can ensure equality in opportunities. It is being allocated due to the need for PWs which are selected without an effective assessment of the actual need for them.

This process is criticised because it cannot ensure equality in allocating public funding for each sector. In addition, the allocation of public funding is based on previous strategic plans where sustainability is absent. This process is also not effective because each sector can prioritise its requirements, whether they are high priority or not (confirmed by interviewees IR1, IR3–IR4, IR6–IR7).

Another viewpoint, made by interviewee IR5, was that “allocating public funding and making policymakers work within a specific amount is not appropriate. This reduces the effectiveness and innovation in SPWs development when policymakers and all stakeholders are working within a specific amount of funding. In such a case, policymakers would not provide effective solutions for sustainability. SPWs development requires technology, which needs more money than conventional PWs development in Jordan”. Interview IR6 had a different point view that, “to be optimistic, according to the existing practices, public funding is adequate. It is based on previous strategic plans and similar stories. In the case of sustainability, it can be possible to request money for the requirements of sustainability”.

The findings suggested that there is a need to request funding as early as possible in order to formulate policies based on funding availability. Therefore, the achievement of policy objectives must be estimated based on lessons learned from previous and similar stories and historical data (confirmed by interviewees IR8–IR10). The findings indicated that whether the existing practices for public funding are adequate or not is not important. The most important thing is to find a mechanism that

considers funding from the early stages of SPWs to be prepared based on the availability of funding data. In addition, there is no prioritising system that can ensure only the most appropriate projects which have positive impacts environmentally, social and economically will be delivered (confirmed by interviewees IR11–IR14). However, interviewee IR15 criticised this approach based on previous strategic plans because they can create inequalities in opportunities. Therefore, there is a need to develop an effective approach for funding SPWs development in Jordan. Jordan is a small, developing country and, working within the availability of funding, can only formulate the most sustainable policy to be implemented on the ground. Thus, allocating funds from the very beginning is essential for ensuring that sustainable development is achieved in developing countries such as Jordan (confirmed by interviewees IR15-IR18).

The existing practices indicated that the general budget department is responsible for reviewing each proposal option for PWs and obtaining a decision on whether to allocate funding for these proposals or not. In fact, there is no equality in opportunities when allocating funding based on this process (GBD, 2015). To ensure equality in opportunities across the country when allocating budgets, the findings suggested that there is a need to assess the current situation in each local community and allocate funds based on such constraints. These constraints are the level of economic growth, poverty, unemployment rate, population and the area itself (confirmed by interviewees IR15–IR20).

Interviewee IR15 stated that, “in case there is a gap of funding due to additional costs of more projects and programmes, the government will then allocate additional budgets by issuing budget addenda”. Interviewee IR22 observed that “sustaining PWs is worthwhile because it leads to savings due to operation benefits for other development plans and initiatives and to improve communities. Therefore, considering SA from an early stage through policymaking can ensure that the requirements of sustainability are being achieved and that the final product will be sustainable”. This can ensure that policymakers are formulating policies based on the availability of funding and which take into account SA as a fundamental part of the decision-making (confirmed by interviewees IR19–IR21). Finally, the findings suggested several sources of public funding in order to secure public funding for SPWs development, such as the energy fund in Jordan and governorates fund, which are still considered public funding (confirmed by interviewees IR21–IR24).

6.8 Structuring the Policymaking Process to Select Individual SPWs Development Projects in Jordan

In Chapter 4, it was explained how the existing practices of PWs development are conducted from formulating PWs development policy to selecting PWs. However, SA is not factored into these processes. This research, therefore, seeks to show how to integrate SA into PWs development in Jordan, from policy formulation at the sub-national level to select individual projects at the local level.

The findings indicated that there is a need to restructure the policymaking process for PWs development in Jordan in relation to the selection of individual projects, as provided in Table 6.6 and presented in percentage rate in Figure 6.10.

Table 6.6 SPWs development process in Jordan

Levels	Stages	Interviewees
National	<ul style="list-style-type: none"> National vision of sustainability in Jordan 	IR1–IR4, IR6–IR12, IR14, IR17, IR19–IR24
Sub-national	<ul style="list-style-type: none"> Create a comprehensive vision of SPWs 	IR1–IR15, IR17, IR19–IR24
	<ul style="list-style-type: none"> Assessment and problem identification 	IR1–IR4, IR6, IR8–IR19, IR22–IR24
Local	<ul style="list-style-type: none"> Formulate strategic sustainable objectives 	IR1–IR4, IR7–IR24
	<ul style="list-style-type: none"> Identify alternative options 	IR1–IR4, IR6–IR20, IR24
Project	<ul style="list-style-type: none"> Evaluate and select the right sustainable alternative options 	IR1–IR4, IR6–IR20, IR24
	<ul style="list-style-type: none"> Implementation under 'sustainable procurement' 	IR1–IR10, IR13–IR15, IR17–IR19, IR23–IR24
All levels	<ul style="list-style-type: none"> Monitoring and evaluation 	IR1–IR3, IR5–IR11, IR14–IR22, IR24

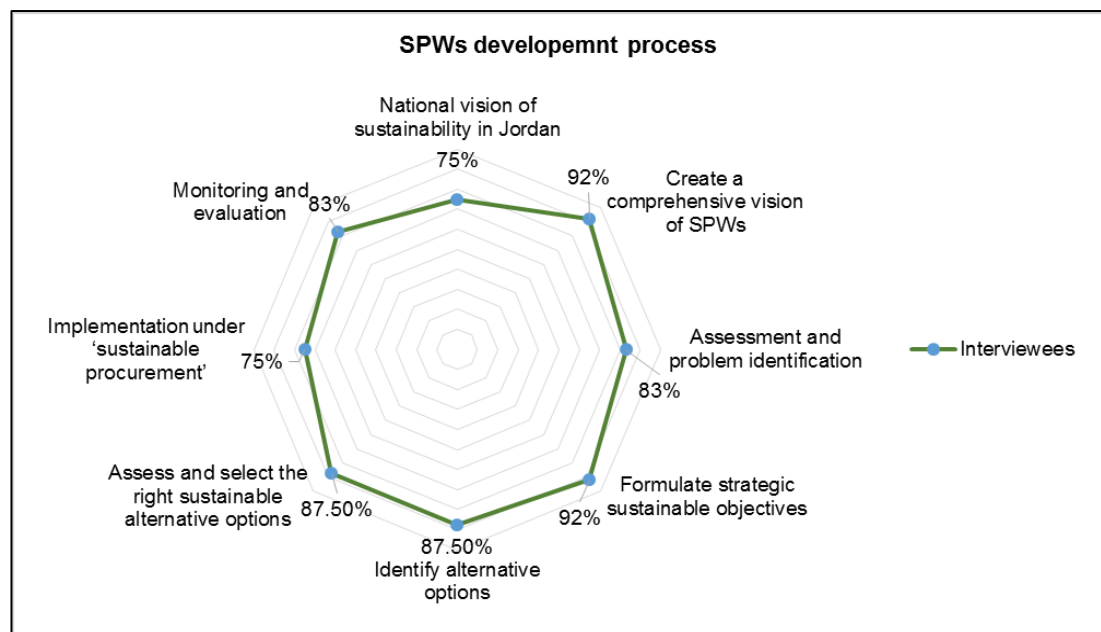


Figure 6.10 SPW development process in Jordan

6.9 Integrating SA into PWs Development in Jordan

6.9.1 National Level

The findings indicated that, at this level, the country's goals and targets should be identified. This starts by identifying the set of environmental, social and economic goals of sustainability assessment against which the country will be assessed. As a result, the overall outputs from the assessment indicated where the country is and the targeted situation that needs to be achieved. In fact, the country's targeted situation in the context of PWs development will then be identified at the sub-national level (confirmed by interviewees IR1–IR8).

6.9.2 Sub-National Level

The existing practices outlined in Chapter 4 of PWs development in Jordan indicated that the sub-national level does not formulate the overall policy of sustainability or ensure that it is within the regulatory frameworks. In addition, the technical support is not assessed at this level. Only the funding is allocated based on previous plans.

As a result, the findings suggested that, in order to formulate a comprehensive policy for SPWs development at the sub-national level, there is a need to work within the regulatory frameworks, which should be consistent with sustainability (confirmed by interviewees IR2–IR4, IR6–IR11).

6.9.2.1 Identifying the National Vision of Sustainability in Jordan

The existing practices outlined in Chapter 4 indicated that the sustainable development goals are provided as a guideline for each country to adopt in accordance with their priorities and their environmental needs (UN, 2015a).

At the national level, Jordan's current situation should be assessed against these sustainable development goals, which can ensure these goals are shaped in the context of the country. Thus, such goals can become the main input for policymaking (confirmed by interviewees IR1–IR4, IR6–IR7). The outcomes from this assessment can determine where improvements are required (confirmed by interviewees IR6, IR9–IR11). Each country has its own specific goals with respect to sustainable development (confirmed by interviewees IR9–IR12, IR14).

Interviewee IR16 stated that "it is important to link the national vision of sustainability in Jordan with the country's PWs development objectives. This can

ensure consistency between PWs development objectives and the national trend towards sustainable development”.

6.9.2.2 Creating a Comprehensive Vision of SPWs Development in Jordan

The existing practices discussed in Chapter 4 indicated that PWs policies for development in Jordan are subjected to many inputs. PWs policies are developed based on reactive actions, such as human interventions, problems, initiatives, and previous efforts and studies. Therefore, there are many inputs for each ministry in Jordan to develop its policy. However, the large variety of these inputs, such as the national vision of Jordan, social pressure, list of problems, previous strategic plans, local plans, etc., can result in conflicts when formulating a policy for PWs development in the country.

At this stage, the findings suggested that, prior to formulating a comprehensive policy for SPWs development in Jordan, there is a need to ensure that the integration of SA into policymaking is fully understood by all policymakers and stakeholders, from public and non-public sectors. Therefore, an assessment should be carried out of all participants engaged in the policymaking process and who should be fully knowledgeable about how to formulate a policy for SPWs development in Jordan (confirmed by interviewees IR1–IR4, IR6–IR13 and documentary data (UN, 2016b)).

6.9.2.2.1 Define SA Baseline (Goals and Targets)

At the sub-national level, the sub-national committee is in charge of shaping the vision of sustainability for PWs development in Jordan. This can ensure that the national vision of sustainability in Jordan is broken down from being abstract to fit into the context of PWs development in the country (confirmed by interviewees IR8, IR10–IR14 and documentary data (Awad, 2016; Edama, 2016; MPIC, 2016a; MWI, 2016)).

Assessment of PWs development in Jordan against the agreed SA baseline should be conducted with the participation of public and non-public sectors in order to obtain valuable information and different views (confirmed by interviewees IR15–IR19). The findings stressed that it is important to ensure that all regulations in regard to sustainability are reviewed in order to be within the regulatory frameworks at the sub-national level when defining the SA baseline (confirmed by interviewees IR17–IR19). Thus, the agreed baseline should ensure a balance between the three

dimensions of sustainability (environmental, social and economic) and link them with the national vision of sustainability in Jordan (confirmed by interviewees IR21–IR24).

The findings suggested a mechanism to propose and identify a baseline for incorporating SA into PWs development in Jordan. They also suggest clarifying the national vision of sustainability in Jordan, then to collect and build shared ideas, discuss provided ideas that have the same shape and trend through a working group session, neglect unrelated ideas, rank each of them based on importance in the context of PWs in Jordan and, finally, develop an agreed baseline for SA in Jordan (confirmed by interviewees IR17–IR20, IR23–IR24). Interviewee IR24 mentioned that, if this task is not carried out as early as possible at this stage, anybody at another stage of PWs development can suggest sustainability objectives from his/her perspectives. Therefore, there is a need to follow the 2030 SDGs. As a result, these goals should be shaped in the context of PWs development in Jordan to enhance the country's image globally and its compliance with the global trend of sustainable development.

6.9.2.3 Barriers to Implementing the Vision of SPWs Development in Jordan

The findings suggested that there is a need to identify that the delivery environment for implementing the comprehensive vision of SPWs development in Jordan is appropriate as early as possible (confirmed by interviewees IR1–IR3, IR6, IR8–IR13). This can enable SPWs in Jordan. They further suggested that any barriers should be overcome at this stage of policymaking (confirmed by interviewees IR1–IR3, IR6, IR8–IR13 and documentary data (Goussous et al., 2015; ME, 2017a; MEMR, 2016; MH, 2017; MPIC, 2017a; MPIC, 2017b; MPWH, 2017c; MT, 2018)). It is essential to set out mitigation measures to overcome these barriers within a specific timeframe. Moreover, it is important to identify those bodies which are in charge of taking the role to overcome these barriers (confirmed by interviewees IR14–IR19).

Institutional framework is the main barrier that affects the overall integration of SA into PWs development in Jordan. Therefore, it is essential to avoid bureaucratic practices and create a one-stop shop, activating an accountability system for non-compliance (confirmed by interviewees IR1–IR3, IR6, IR8–IR14, IR19–IR24).

However, interviewee IR24 stated that “the ‘old soldiers’ of PWs are not fully educated in SA and are resistant to change”. Moreover, a lack of effective regulations was found to hinder integration of SA into PWs development in the country. Therefore,

at each level of development the regulations should be consistent with SA (confirmed by interviewees IR1–IR3, IR6, IR8–IR13).

Technical barriers were also found to affect the overall integration of SA into PWs development in Jordan (confirmed by interviewees IR1, IR3, IR6, IR11–IR14, IR17, IR19–IR24). As a result, all public and non-public stakeholders should be knowledgeable, experienced and have a high level of technical skills in terms of SA. Therefore, motivation and capacity development are required (confirmed by interviewees IR12–IR13, IR23–IR24).

These barriers are, namely, institutional, regulatory, technical and financial, and the responses rates are presented in Figure 6.11.

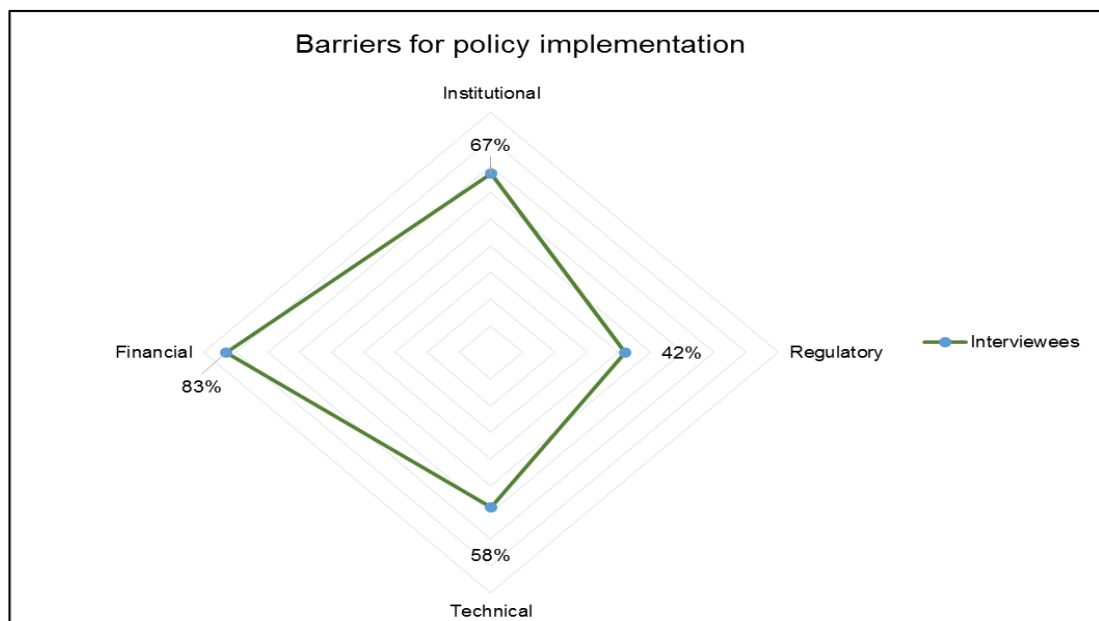


Figure 6.11 Barriers to policy implementation

Finally, the findings indicated that public funding for PWs development in Jordan is not constantly available. In addition, the existing approach to public funding is not effective (confirmed by interviewees IR1–IR8, IR10–IR11, IR13–IR19, IR21–IR23). Therefore, there is a need to find other sources of funding through partnering with the private sector and use a green tax scheme that encourages investments that reduce the impacts on the environment and also use foreign sources (confirmed by interviewees IR14–IR19). The findings indicated that, at this level, the barriers should be overcome by identifying set of mitigation measures for each barrier (confirmed by interviewees IR19–IR24).

6.9.2.3.1 Capacity Development

The existing practices of PWs development in Jordan indicated that a lack of experience and knowledge is considered the most important factor that affects delivery of PWs development in Jordan (Najmi, 2011). However, capacity development is not carried out for those engaged in PWs development.

To obtain appropriate technical support from each level of development (sub-national, local and project implementation), there is a need to conduct capacity development as early as possible (confirmed by interviewees IR1–IR4, IR6). However, others expressed the view that public and non-public stakeholders have the required skills and knowledge with respect to SA but that there is a need to motivate and attract them through an incentive scheme (confirmed by interviewees IR5 and IR7). Therefore, technical support must be assessed as early as possible to avoid any failure of SPWs development. In addition, it can ensure that the public and non-stakeholders at each level of development are familiar with the SA (confirmed by interviewees IR1–IR4, IR6, IR8–IR13). Capacity development can be carried out by identifying the baseline for technical support required from public and non-public stakeholders (confirmed by interviewees IR11–IR15). As a result, the outcomes from the assessment can indicate where the capability gaps are in order to overcome them (confirmed by interviewees IR16–IR19).

The findings suggested that each programme should be well defined based on type of programme, timeframe, fund and responsible party, and, finally, evaluating the outcomes of these provided programmes (confirmed by interviewees IR19–IR22). In addition, conducting such programmes in terms of training, awareness, information exchange, knowledge sharing, pre-qualifications and certified courses was suggested (confirmed by IR22–IR24 interviewees). Tools for development of team capacity include engineer training centres, the Royal Scientific Society (RSS), schools, universities and media such as virtual platforms and social media (confirmed by interviewees IR22–IR24).

6.9.2.4 Policy Formulation

The existing practices of PWs development in Jordan outlined in Chapter 4 indicated that each PWs sector set out its strategic plan using a sectorial planning approach. There is no coordination with other sectors to ensure alignment.

There was found to be no integration of SA into PWs development in Jordan. Therefore, the on-going effort is carried out sectorially to develop conventional

policies for each sector in Jordan. In this regard, and even by formulating conventional policies (sectorial approach), the ministries are failing in translating the country's national vision into reality. The ministries develop their policies based on different views and inputs, which can lead to conflicts with respect to prioritising their projects (confirmed by interviewees IR1–IR6). To ensure strategic alignment between SPWs development and the national vision of sustainability in Jordan, there is a need to ensure that the latter is formulated based on global SDGs. Then, the national vision of SA in Jordan should be the main input for formulating a comprehensive policy for SPWs development in the country (confirmed by interviewees IR7–IR9).

A comprehensive policy (vision) must be formulated as a guideline to identify the directions for SPWs development that needs to be delivered (confirmed by interviewees IR6, IR9–IR11); linking policies with the most appropriate SPWs development is possible only if there is a clear policy (confirmed by interviewees IR9–IR15).

6.9.2.4.1 Assessment and Problem Identification of the Existing Situation of PWs Development in Jordan

The existing practices PWs development in Jordan outlined in Chapter 4 indicated that the current PWs development situation is usually not assessed against sustainability indicators, although there is a set of conventional indicators to identify the need for PWs in Jordan.

At the sub-national level, there is a need to assess the current situation of PWs development in Jordan and to what extent the PWs meet citizens' service requirements and achieve sustainable development. Therefore, all assessment outcomes must be provided from public and non-public stakeholders with communication between sub-national and local committees across the country (confirmed by interviewees IR8–IR14). As a result, the findings indicated that there is a need to assess existing PWs against the SA baseline. The outcomes from this assessment can indicate to what extent the current PWs achieve sustainability in the country in order to create the targeted situation for SPWs development in Jordan. Therefore, the gap between current and targeted situations has become a problem that must be dealt with (confirmed by interviewees IR14–IR16). Interviewee IR16 noted that it is important to understand where the country is living up to meeting various sustainability requirements as, without this understanding, the targeted situation that needs to be achieved cannot be identified.

There is a need to assess future requirements and make predictions for future generations (confirmed by interviewees IR14–IR19). Consequently, the assessment of to what extent it serves the service requirements and achieves sustainable development must then be classified with respect to their impacts on the overall community. The outcomes from the assessment should be grouped into a set of issues (environmental, social and economic) (confirmed by interviewees IR19, IR22–IR24).

6.9.2.4.2 Formulate Strategic Sustainable Objectives of SPWs Development

The existing practices of PWs development in Jordan as outlined in Chapter 4 indicated that strategic objectives for each ministry are formulated according to the organisational level, without input from non-public stakeholders. In addition, the existing practices indicated that strategic objectives are formulated by public stakeholders' attitudes and opinions without taking into account actual needs for PWs development in the country.

The findings indicated that a comprehensive policy needs to identify a set of sustainability targets (objectives). Further, existing PWs development should be assessed in terms of how PWs can be sustained through a set of sustainable measures which are relevant to environmental, social and economic factors (confirmed by interviewees IR8–IR19). The findings stressed that all regulations in regard to sustainability should be reviewed at the sub-national level in order to formulate strategic sustainable objectives without conflicting with these regulations. In addition, all regulations should be followed by each ministry in Jordan (confirmed by interviewees IR15–IR17, IR19).

Strategic sustainable objectives for each PWs development sector will then be formulated through requesting comments and suggestions from both public and non-public stakeholders. Therefore, SMART objectives should build up the overall policy for SPWs development in Jordan. It is essential, therefore, to rank each of these objectives into a higher order to clarify the final set of SMART objectives (confirmed by interviewees IR15–IR16). The finalised objectives will then be clarified and linked with KPIs to measure the achievement of them. The KPIs will then be the achievement of the overall vision of SPWs development (confirmed by interviewees IR15–IR18, IR20). Interviewee IR24 argued that "it is important that the sub-national committee keep formulating the strategic objectives. This can ensure that the overall picture of the country is monitored from different perspectives. However, if the local communities just set out their own strategic objectives, they can prioritise their own

needs with no link with other communities. In fact, in some cases PWs development needs to be linked with other local communities”.

6.9.2.5 Gateway Approval

The findings suggested that, once the strategic sustainable objectives are formulated, gateway approval is needed to ensure the sub-national and local levels are linked, which can provide more validity. This gateway is controlled by the monitoring committee in terms of both internal and external monitoring. This committee is in charge of agreeing whether to proceed to the following (local) level or not. Internal monitoring by the MPWH and other ministries ensures compliance with the national vision of sustainability in Jordan. External monitoring is carried out by the national committee of sustainable development in Jordan, the general budget department and the audit bureau. These approvals are obtained to ensure compliance with the regulatory frameworks, availability of public funding and the national vision of sustainability in Jordan (confirmed by interviewees IR19–IR20, IR22, IR24).

6.9.3 Local Level

The findings indicated that, at this level, the strategic sustainable objectives will then be translated into reality through linking each objective with the most appropriate sustainable option (confirmed by interviewees IR8–IR14).

6.9.3.1 Selecting the Right SPWs Development

The existing practices outlined in Chapter 4 indicated that PWs development in Jordan is selected without a systematic prioritisation at the local level. Therefore, the findings indicated that the agreed set of strategic sustainable objectives at the sub-national level should become the trend for the local level in order to ensure the strategic link between the SPWs development vision and translation into reality (confirmed by interviewees IR8–IR14).

6.9.3.1.1 Identify Alternative Options of SPW Development in Jordan

The findings indicated that the local committees at this level can identify alternative options of SPWs development in Jordan. They should work to generate alternative options based on the baseline of SA and with three main constraints – availability of public funding, strategic sustainable objectives and regulatory frameworks at the local level (confirmed by interviewees IR14–IR17).

All generated proposals should include and provide such details in terms of social and economic achievements and environmentally friendly proposals. Only the most appropriate ideas will be developed to create viable proposals. Therefore, an assessment of the benefits of each proposal and how they would serve sustainability goals, current situation, future expansion and government trends in the national policy is required (confirmed by interviewees IR14–IR19). The local committee at this level will be responsible for starting to identify and rank alternative options of SPWs development. In addition, this is essential to investigate the highest-ranked proposals to create a list of options that will achieve strategic sustainable objectives in line with a comprehensive vision of SPWs development in Jordan (confirmed by interviewees IR17–IR22). Developing such best practices and initiatives would be supportive for SPWs development (confirmed by interviewees IR15, IR18–IR19). These proposals should be divided into related and/or unrelated projects, best practices and initiatives (confirmed by interviewees IR15, IR17, IR19, IR22–IR24).

6.9.3.1.2 Evaluate and Select the Right Option for SPW Development in Jordan

The evaluation and selection of the most appropriate SPWs development in Jordan is carried out by evaluating identified options of SPWs development against the baseline of SA. The decisions should then be linked with the strategic sustainable objectives of SPWs development in Jordan (confirmed by interviewees IR15–IR18). Each option of SPWs development needs to be evaluated in line with strategic objectives. Therefore, prioritisation will be carried out between these alternatives to select the most sustainable option. The higher-ranked one is assessed against the SA baseline (confirmed by interviewees IR15–IR17, IR19). The evaluation process for each option can be conducted by such tools as a voting system, Delphi analysis based on requirements of sustainability or using a matrix analysis (confirmed by interviewees IR15, IR17, IR19–IR21, IR24).

6.9.3.2 Transfer the Role from Local Level to Project Implementation Level

Once the preferred options of SPWs development are selected, there is a need for the local committee to communicate with the sub-national level to seek approval for the overall local development plans. This process will be maintained until final approvals for the overall proposals are obtained from the sub-national committee. The most preferred options of the local development plans will be formulated as an overall comprehensive development plan. The final outputs from the

preferred comprehensive development plan will include a set of related and unrelated projects, initiatives and best practices (confirmed by interviewees IR15, IR17, IR19, IR22–IR24).

6.9.3.3 Gateway Approval

To ensure compliance with strategic sustainable objectives, regulatory frameworks at the local level and the allocated public funding, the final outputs from the preferred comprehensive development plan of SPWs development in Jordan should be approved. This can ensure the strategic link with the policy of SPWs development is translated into on-the-ground reality. Hence, a gateway approval point is required. The findings indicated that both an internal and external monitoring system can be conducted by the MPWH and other ministries' internal audit unit, and externally by the sub-national committee, the general budget department and the audit bureau of Jordan. Therefore, the decision should then be taken whether to proceed to the following (project implementation) level or not (confirmed by interviewees IR19–IR20, IR22, IR24).

6.9.4 Project Implementation Level

The existing practices of PWs development in Jordan outlined in Chapter 4 indicated that the local development plan of PWs development is implemented by the MPWH.

The findings suggested that, at this level, the preferred comprehensive development plan should be implemented by the MPWH (confirmed by interviewees IR15, IR17–IR19). The comprehensive local development plan will include related and unrelated projects, best practices and initiatives (confirmed by interviewees IR15, IR17, IR19, IR22–IR24). Appropriate definitions are required for each of these outputs related and unrelated to projects required for building, with, in some cases, projects needing to be supported by others. This means that schools need roads, water networks and electricity, etc. As a result, the related projects – those that share the same characteristics – are grouped under one programme, while the unrelated ones are they left out of the programme. The initiatives can be carried out on existing PWs to make them more sustainable in terms of water efficiency, renewable and clean energy, energy auditing, waste management, social responsibility and capacity development of the local community, etc. The best practices are a set of mitigation measures that can be carried out to improve the current situation of PWs development in Jordan and make PWs more sustainable in terms of improving awareness about

energy efficiency and water efficiency, etc. (confirmed by interviewees IR15, IR17, IR19, IR22–IR24 and documentary data (Edama, 2016)). Interviewee IR22, however, noted that “PWs developments are related to each other. Therefore, projects with the same characteristics can be grouped into the same programme to be implemented at this level, and a clear plan for implementing each of these outcomes into the action plan should be well clarified with an estimated timeframe and budget availability, as well as the required technical support, to ensure implementation of these outcomes. The regulatory frameworks can be divided into codes, codes of practices, PWs system No.71, etc.”.

Implementing the policy, as mentioned previously, means that: projects, initiatives and best practices should be delivered through sustainable procurement (confirmed by interviewees IR17–IR19, IR23–IR24). However, interviewee IR21 had a different viewpoint: that “a commitment to sustainability can influence the policymakers, planners and developers to follow SA requirements indirectly. They know that their preferred SPWs options will be carried out by the MPWH and should include sustainability. Therefore, this can force them to consider sustainability from an early stage as they realise that, if their PWs projects are not sustainable, they will not be implemented. Therefore, public procurement is still valuable”.

Interviewee IR24 had another view: that “if sustainable procurement is not considered as the only way to implement SPWs, sustainability will not be considered in the delivery of SPWs development. Sustainable procurement, by its name, includes the sustainability requirements, goals and targets. It can ensure that only the most sustainable option that meets the requirements of sustainability and matches the strategic sustainable objectives is selected. As a result, only sustainable procurement can achieve this”.

6.9.5 Monitoring and Evaluation

The existing practices of PWs development in Jordan outlined in Chapter 4 indicated that the MPWH and other ministries monitor the progress of projects internally, while external monitoring is carried out by the audit bureau. There is no clear indication, however, of how each ministry benefits from previous lessons and evaluates the effectiveness of policy implementation on the country. All reports are provided to the prime minister of Jordan, while the evaluation is not effective (confirmed by interviewees IR1–IR3, IR8–IR10). At the final stage of the policy cycle, therefore, an evaluation can be carried out in order to understand to what extent the policy is effective and improves the country’s current situation in regard to SPWs

development. As a result, any weaknesses and feedback can be reviewed in order to benefit from them. Thus, monitoring is needed at each level of SPWs development (sub-national, local and project implementation levels) to ensure that the national vision of sustainability in Jordan is translated into reality (confirmed by interviewees IR10–IR15). In addition, the findings suggested that the KPIs should assess the achievements of the strategic sustainable objectives (confirmed by interviewees IR15–IR18).

Interviewee IR16 supports this point, “in that it is important to update the policy so that it can be adaptable to predict uncertainties and adjustments based on any circumstances that occur. This would ensure that any changes in the policy at each level would affect other areas. Hence, considering all such circumstances internally and externally can affect the policy at sub-national, local and project implementation levels”. As a result, the findings indicated that the policy should be adaptable for any modifications and changes. It should be flexible to change based on circumstances that could occur in the country, both internally and externally (confirmed by interviewees IR15–IR18). The findings suggested that there should also be an update of the comprehensive policy of SPWs development in Jordan periodically by those in charge in order to ensure that the national vision of SA in Jordan is achieved (confirmed by interviewees IR19–IR22, IR24). IR21, however, had a different view, stating that “updating the SPWs policy could cause problems in those prioritised projects that had already been identified. Therefore, only in extreme circumstances should this be taken into account. This is due to the delay in delivering these SPWs projects which are needed by people”.

6.10 Summary

In summary, this chapter presented the findings obtained from the fieldwork study in Jordan. It included all the information required for developing a novel approach on how to integrate SA into PWs development in Jordan. It tackled the need for SPWs, SA process, targets and goals, structuring policymaking to select individual projects and an appropriate enabling environment. The negative and positive statements from interviewees were provided. Finally, the chapter presented the findings for the monitoring and evaluation of the overall process of SPWs development in Jordan at the sub-national and local levels. The following chapter discusses how the integrated approach is developed and validated.

Chapter 7 An Integrated approach Development and Validation

7.1 Introduction

The findings of MGT were employed for proposing an integrated approach to show how to integrate SA into PWs development in Jordan. This chapter, therefore, presents the definition, the aim of the integrated approach and discusses the design and the development methodology of the integrated approach. In addition, the validation findings of the approach are discussed.

7.2 An Integrated Approach Definition

The current research has developed an integrated approach to show how to integrate SA into PWs development in Jordan. The integration is conceived as the alignment and interaction at the whole sum of the individual components in the logical sequence of many different functions for the collective optimum performance of the intended results in long-term benefit to the environment, society, and economy (Battaglia et al., 2016; De Villiers et al., 2016; Maas et al., 2016). The research's definition of an 'integrated approach' is, thus, a logical structuring process that combines different elements in order to direct the decision-making process from the policymaking process to select individual projects in one structure. It ensures the extent to which the emerging policies, plans, and projects of PWs development can contribute to achieving sustainable development.

7.3 An Integrated Approach Aim

The integrated approach aims to improve the outcomes from the policies, plans, and projects of PWs development to achieve sustainable development in Jordan. It is a methodological process that can help policymakers, planners and developers of PWs development to make the right decisions regarding sustainable development. It ensures coherence in both directions: vertical and horizontal. Vertical coherence is achieved when the developmental stages are in a rational sequence and the right order. Horizontal coherence can be achieved among different sectors in the country to create a comprehensive vision for SPWs development in Jordan.

Integrating SA into PWs development in Jordan means involving the major results of the assessment that highlight impacts on important environmental, social and economic objectives on the policymaking process to select individual projects. This integration has the potential to increase the sustainability performance of PWs development outcomes. As a result, adopting the integrated approach could help address the environmental, social and economic impacts of ongoing policies, plans and projects of PWs and guide policy decisions towards sustainable development in the country. One of the controversial arguments is that SA can make trade-offs between socio-economic and environmental dimensions. Therefore, the integrated approach will ensure a balance between the three dimensions of SA by studying the interactions between them. This integration will ensure a strategic link between the national vision of SA in Jordan and ground reality which, in turn, will result in equal opportunities across the country. In addition, it ensures that the public services which are provided by PWs meet the requirements of people at the same level of development. Lastly, the integrated approach can ensure that only SPWs development projects which have a positive impacts on the environment, society and economy are funded which, in turn, will reduce expenditure on PWs which have negative impacts upon communities, the economy and the environment.

7.4 An Integrated Approach Design and Development

7.4.1 An Integrated Approach Development Methodology

GA is a strategic tool used to compare the current situation with the desired situation that needs to be achieved (Business Dictionary, 2017), and then find solutions to problems (Orendorff, 2017). Following its process can be used to understand and explore means of improving the issues pertaining to a situation. The GA process addresses a situation where what is happening is less than desirable, with the aim of rectifying the situation (Orendorff, 2017). The key principles of GA process are: (1) an analytic of current situation (i.e. whether what is happening at present is less than the desired situation); and (2) an identification of improvement measures (i.e. aiming to forward improvement actions) (Orendorff, 2017).

The application of GA process to the results of this study (literature review, documentary data, and MGT interviews findings) helps to arrange the findings in a logical sequence (refer to Figure 7.2). The findings of this research covered mainly three key aspects: an analytic of the existing practices of PWs development and sustainability in Jordan, improvement measures by leveraging the international SA

practices, and new findings from fieldwork study. The three key aspects provide a sound base to propose an integrated approach of SA in PWs development in Jordan.

In the current research study, three phases of the integrated approach development were carried out as shown in Figure 7.1.

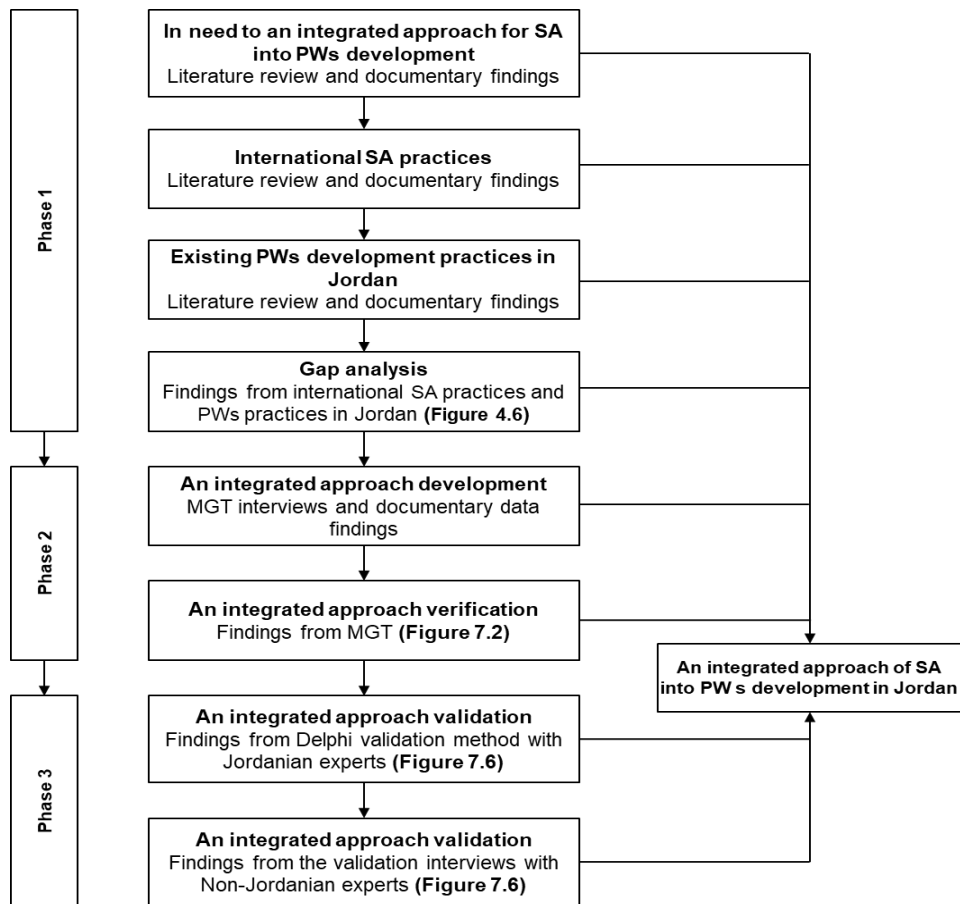


Figure 7.1 Methodology process for the integrated approach development

The first phase investigated the need for an integrated approach of SA into PWs development in Jordan. An extensive review of literature and documentary data was undertaken and critically analysed from practices of sustainability, SA and PWs development both internationally and in Jordan. The reviewing literature is usually used to review the existing knowledge on the specific topic of research (Hart, 1998). Unfortunately, there is no clear evidence from the literature and documentary data on SA methods or approaches into PWs development in Jordan. The literature in the research study was found to be rather limited, particularly in the context of Jordan. Consequently, the international SA practices were investigated and coded under a wide range of categories using MGT. The theories which emerged from an intensive review of literature and documentary data were then grouped under an appropriate set of categories facilitating the comparison between international SA practices, and

the existing practices of PWs development in Jordan. As a result, the first version of the integrated approach was created initially from the existing practices of PWs development in Jordan which was then marked up with the international SA practices into the conceptual approach as shown in Figure 4.6. Then, GA was conducted prior to the fieldwork study. The GA was employed to design the MGT interview questions in order to understand what issues are needed to be investigated in Jordan. However, due to the lack of SPWs development in Jordan, entering the fieldwork without a theoretical background is not suitable, so a theoretical background was combined with grounded theory. The results of the GA indicated that there are such issues that need to be investigated in Jordan considered to be at the heart of an integrated approach of SA into PWs development in Jordan.

In the second phase of the integrated approach development, both primary and secondary data were collected by conducting the fieldwork in Jordan. The MGT interviews were carried out as well as the documentary data was collected to generate theories to show how to integrate SA into PWs development in Jordan. This process allows only theories through the MGT process to be agreed upon. The generated theories which were coded under appropriate categories were packaged around a central category. This process allowed the verification of the provided theories before validating them at the final stage of the approach development. The findings confirmed that there are four main elements that need to be considered in order to integrate SA into PWs development in Jordan which relates to:

1. Identify SA processes, goals and targets of SPWs development in Jordan.
2. Link the development levels of SPWs development in Jordan.
3. Create an enabling environment at each level of SPWs development in Jordan.
4. Structure a comprehensive SPWs development process in Jordan from policymaking process to select individual projects.

In fact, by conducting the fieldwork study in Jordan, some of the international SA practices were not factored in as from Jordan's perspective they did not reflect the integrated approach. This is since each country has its own specific interests, structure and regulations, and that Jordan is a developing country. Therefore, Jordan's interests regarding SA are different from other countries and this was evidenced by the findings of the current research study.

Finally, at the third stage, the validation process was carried out using the Delphi method by interviewing Jordanian experts and external validation by

interviewing Non-Jordanian experts. As a result, the approach was modified from both samples and then presented to be applied in practice.

7.4.2 An Integrated Approach Structure

The structure of the integrated approach comprises four elements as identified in section 4.10.1. The integrated approach is divided into four main levels, namely: national, sub-national, local and project implementation levels. The enablers that facilitate the integration are linked with each level. It includes the structure of the policymaking process to select individual projects of SPWs development in Jordan. As well as the SA process, goals and targets are integrated at each level of development. The structure of the integrated approach presents two directions of horizontal and vertical coherence. The horizontal coherence ensures alignment among each sector in the country and vertical coherence ensures alignment within the roles at each organizational level (from the national committee to project implementation committee) of SPWs development in Jordan. Moreover, particular attention was given to the proposed integrated approach layout which was advised in the line with the rational sequence of PWs development in Jordan.

7.4.2.1 The Proposed Integrated Approach

The purpose of conducting MGT is to explore and investigate elements of the integrated approach which have not been realised from the GA process to acquire contributions from the experts which show how to integrate SA into PWs development in Jordan. In fact, the results collected from the fieldwork significantly contribute to what was initially proposed (adopted from the literature and documentary data, Figure 4.6). Nevertheless, when linking the findings, it provides a vivid picture of integrating SA into PWs development in Jordan. From the results collected it can be seen that there are many similar comments made by the experts which have contributed to the development of the integrated approach.

When looking at the experts' contributions, it can be seen that many of them are similar to the international SA practices which have been proposed in the integrated approach. Moreover, from the collected results it can be recognised that Jordan is a developing country that is still facing many sustainability issues. Some of these issues resulted from its geopolitical location while some have arisen because of existing governance practices such as government financial difficulties, a lack of follow up of the regulatory framework, a lack of well-developed institutional governance with respect to SPWs development and lack of competence and

experience. In fact, so far, no proper solutions to cope with these issues have been offered so they continue to have an adverse impact on the outcomes of many emerging policies, plans, and projects. Therefore, it is not surprising that these issues are only overcome after a project has started. The proposed approach can, thus, enable the integration of SA into PWs development in Jordan in which emerging policies, plans, and projects achieve sustainable development.

In the proposed integrated approach, four levels as previously discussed in Chapter 4 were kept as they are and relevant SA process from policymaking process to select individual projects were added. Although there are significant changes in the details in Figure 4.6 within each element of the proposed integrated approach, the layout of boxes, lines, and arrows stayed the same. This is because the collected data correctly reflect the relationships between the elements as well as their details when one relates to and interacts with another, as pointed out previously. Two bars were added, the first is to enable the integration of SA into PWs development and the second is to monitor, evaluate, and communicate with the public and non-public stakeholders. From this, it was found that stakeholders from both public and non-public sectors need to be involved when assessing the emerging policies, plans, and projects of PWs development in Jordan. In addition, the assessment should be conducted against the SA baseline which needs to be clarified at the beginning of the SA process of PWs development in Jordan. The results from the assessment ensure that acceptance will not be gained as to whether to proceed to the following level or not until approval is granted by the committees at each level of SPW development in Jordan.

Figure 7.2 reflects the main characteristics of PWs development in Jordan as a developing country. This can be seen in existing practices of PWs development which show the same rational sequences, where such details were modified/added with relevant methods to carry out SA with guidance on how to ensure the strategic link between the national vision of sustainability and ground reality. Detailed discussions will be provided in Chapter 8 of this thesis. Although the integrated approach was developed by conducting MGT which might verify the provided data alongside the analysis, there is still a need for experts from outside the actual sample of 24 to validate the integrated approach (external validation) using the Delphi method. In fact, if the data collected are similar to what has been proposed, the proposed approach will be accepted.

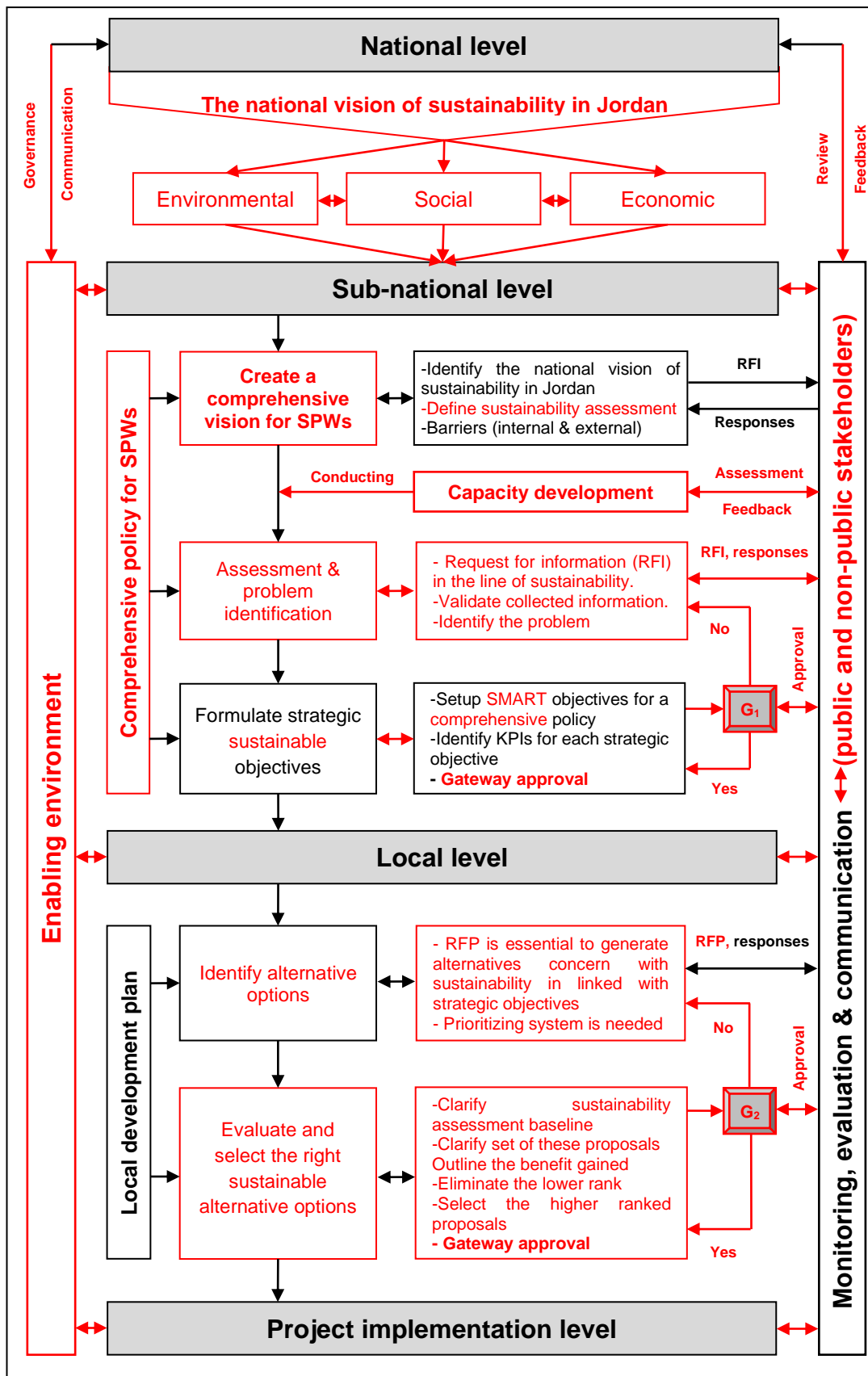


Figure 7.2 The proposed integrated approach by conducting MGT interviews and documentary data (adopted by the researcher)

Conversely, if the collected data is different or contains different information missing in the approach, or rejects some proposed elements and details, it will have to be modified to reflect what should be carried out in SPWs development in Jordan. Section 7.5.3 will discuss results that have been found from the data collected when conducting the Delphi method.

7.4.2.2 The Interactions and Interrelations Between the Integrated Approach's Elements

Besides using critical and inductive thinking by comprehensively reviewing a large number of previous studies in regard to the existing practices of PWs development in Jordan and the international SA practices, the current study has recognized that it is necessary to combine the main four elements gained from the existing theories with the findings from the fieldwork study in Jordan to form an integrated approach to show how to integrate SA into PWs development in Jordan. This integrated approach reflects on theory and practices by creating a new way of thinking for policymakers, planners and procurement staff to achieve sustainable development in the country.

A key conclusion of this research is that the integration of SA into PWs development in Jordan is affected by the following: the SA process, goals and targets; SPWs development from policymaking process to select individual projects; and the enabling environment, which includes institutional governance, regulatory frameworks, technical support, and public funding. These elements ultimately influence the achievements of SPWs development in Jordan. A number of practices at the international level have been developed on which concern about assessing sustainability in PWs infrastructure projects at the micro level have emerged from the literature (Alam et al., 2017; Bryce et al., 2017; De la Fuente et al., 2016; Kostevšek et al., 2015; Mansourianfar and Haghshenas, 2018; Shen et al., 2010; Sierra et al., 2018; Ugwu et al., 2006a; Zhang et al., 2015). However, little has been done concerning how to integrate SA into planning at a macro level. These practices can be used as a theoretical and practical methodology for PWs infrastructure while their practical application in the context of PWs development in Jordan is still lacking. As a result, they were leveraged by tailoring them to become consistent with Jordan's context, organizations, its regulations, and its interests.

It can be seen that the integrated approach provides a clear understanding of the nature of the relationship between its structural elements. It includes the integration between these elements by drawing links to each of them. It covers multi-

dimensional aspects in both vertical and horizontal coherence, thus influencing the achievements of sustainable development. The rational sequence of the integrated approach's structure provides a consistency throughout its elements. The interactions between these elements resulted in a process to assess the extent to which emerging policies, plans, and projects of PWs achieve sustainable development in Jordan.

Throughout the integrated approach layout, there are vertical, horizontal and oblique arrows. The vertical arrows connect the development stages from the policymaking process to select individual projects. They demonstrate the link between each separate stage with the next stage, while the horizontal arrows clarify the processes which are conducted at the same stages, and lastly, the oblique arrows show the interactions between the dimensions of the national vision of sustainability. In addition, there are two vertical bars, namely, the enabling environment bar and the monitoring, evaluation and communication bar. Moreover, two gateway approvals were allocated between the sub-national and local levels, and the local and project implementation levels. These two gateways provide more consistency in the alignment between the development levels by communicating with both public and non-public stakeholders. Therefore, before accepting the outputs from each level (such as the comprehensive policy for SPWs and the local development plans), each is reviewed and then approved.

The integration of the four elements with clear links between them has not been done before in any works or models that have resulted in integrating SA into PWs development in Jordan. The integrated approach could thus be used to ensure the emerging policies, plans and projects achieve sustainable development. It ensures the outcomes from these are in line with government policy and consistent with the service requirements of the people. Moreover, it can ensure that only activities that have positive impacts upon community, environment, and society are approved for implementation.

7.5 Verification and Validation

7.5.1 Verification

In the current research study, verification was carried out by generating PWs development practices from several sources of data which were analysed qualitatively to show the first version of PWs development process. These sources are credible and publicly published by authorities in Jordan and ministries. Later, a

GA was conducted in order to understand where the gaps are in the existing practices of PWs development compared with international SA practices, in order to leverage from them. This provides more validity to the approach as it is compared with the international level.

The findings from the GA were used to design the interview questions. During the initial stage of MGT interviews, a pilot study was conducted prior to fieldwork study in Jordan. The data collected was reviewed in order to ensure its suitability for the study and whether the research question is answered, and the research problem solved. This process examined whether the outcomes are sufficient and appropriate for the ongoing research in an empirical study. Once the data was collected and the gaps in practices identified, it was analysed to examine whether it is in line with reality. These processes showed whether the designed interview questions would provide expected outcomes or whether there was a need to modify the interview questions. Therefore, the collected data was not taken into account at this stage for the data analysis to develop an integrated approach. It was only used to modify, adjust, add or remove questions where needed.

The current research used MGT interviews rather than conventional interviews. The MGT interviews verified the provided information throughout the process and from both primary data (interviews) and secondary data (documentary data). It can be argued that MGT enables the researcher to examine and test his findings by employing a microanalysis method. This means that the researcher verifies and then judges the findings immediately during the data collection process. Therefore, while conducting the data analysis from each interview, the researcher in some cases called some of the interviewees for more clarification and validation on the provided data. This means that once the analysis had been carried out, the researcher prepared a set of interview questions for the following interview until theoretical saturation was achieved.

Yin (2013) noted that in order to construct validity, multiple sources of data collection are more suitable than the use of one single method to achieve triangulation. This is confirmed by Fellows and Liu (2008, 2015) who state that triangulation in the construction of the research is to use two or more research methods to investigate the same thing. Therefore, to provide more validity, secondary data was collected using documents from credible sources such as ministries and authorities. This process was carried out using selective coding and the data collected triangulated that collected from the interviews. Throughout the process of MGT, only

the agreed provided data was subsequently used for analysis and they were used to ground the integrated approach which was judged later. Thus, only the overall findings which had been taken into consideration and verified throughout the process were confirmed.

7.5.2 Validation

The aim of carrying out MGT is to expand and generalise theories and not to count frequency. As a result, qualitative judgements are needed in order to provide validity to the findings. Thus, the validation process in the current research study aims to evaluate whether the approach would satisfy the aim and objectives of the research or not. In line with achieving this aim, the following objectives have been set out:

1. To determine the clarity of the proposed integrated approach structure, the clarity of information flow and their detailed contents; and
2. To examine usability, usefulness and appropriateness of the proposed integrated approach to be implemented for SPWs development in Jordan from policymaking to select individual projects.
3. To examine the ability to use and apply the integrated approach into practice.

In order to achieve these particular objectives, two stages of validation were carried out. The first stage aimed to conduct validation with Jordanian experts using the Delphi method while the second stage aimed to conduct the validation interviews method with Non-Jordanian experts. The overall process of the validation for both stages are discussed in the following sections.

7.5.3 Delphi Validation with Jordanian Experts

In this stage, using a sample of Jordanian experts was the case. Therefore, the Delphi method was deemed to be the most useful for the current research. The Delphi method was developed in 1950 by Dalkey and Helmer (1963), and it is a widely used and accepted method for achieving convergence of opinion concerning real-world knowledge solicited from experts within certain areas and topics. The current research seeks to reach a consensus between different views throughout iterative rounds, rather than generate views and then make overall improvements to the integrated approach. Delphi method originally sought to collect data from a panel of experts, intending to achieve a consensus of narrative in a group of opinions (Hsu and Sandford, 2007). It can involve a range of viewpoints to reach a consensus which has not established in a conventional validation approach (Sourani, 2013). It conducts

a series of iterative processes to collect the anonymous judgements of experts (Hsu and Sandford, 2007; Keeney et al., 2001).

Despite the advantages of this method, it also has a number of disadvantages, as listed in Table 7.1 (Martino, 1993).

Table 7.1 Advantages and disadvantages of the Delphi method

Advantages	Disadvantages
The sum of information available to a group is at least equal to the information available to one individual member.	The sum of misinformation available to a group is at least equal to the misinformation available to one individual member.
The number of factors that can be considered by the group is greater than or equal to the factors that can be considered by one member.	The majority of a group can exert social pressure over one or more of its members to agree with the majority's opinion when such member(s) feel that this opinion is wrong.
	A member with a persuasive personality or with an ability to develop a rigorous argument can have excessive power over the group discussions and thoughts.
	Although an argument adopted by a minority in the group could lack sufficient objectivity, this minority may be able to overpower the majority through vigorous presentation of that argument.
	The goal may become to reach the lowest common denominator that does not offend anyone but that is not strongly supported by anyone either.
	Members may be interested in certain views so that the goal of reaching a valid conclusion may be compromised in seeking to win the group's support of these views.
	Common bias in the group often results from group members sharing a common culture (this may be related to the field in which the members have expertise).

There is a big debate that the nature of the Delphi method might be considered quantitative, qualitative or both (mixed) (Sekayi and Kennedy, 2017; Sourani, 2013). However, qualitative validation requires a small sample, rather than in quantitative validation, which requires a large sample size, which is impossible to achieve with the group of experts in Jordan. Therefore, in the current research, a qualitative form was employed due to the lack of experience of SA in Jordan.

7.5.3.1 Delphi Validation Process

A classical process of the Delphi method potentially includes three rounds, which may extend to four, depending on the feedback gained throughout the iteration process (Hsu and Sandford, 2007; Keeney et al., 2001; Sekayi and Kennedy, 2017). Usually, the first round consists of an open-ended questionnaire (Hsu and Sandford, 2007; Keeney et al., 2001; Sekayi and Kennedy, 2017; Sourani, 2013). However, it is difficult to retain a high response rate within a Delphi method that has many rounds as participants may become bored (Sourani, 2013). Thus, the topic under investigation needs to be of great interest to the panel members. Therefore, using a modified version of the Delphi method is more appropriate that is limited to specific rounds (Hsu and Sandford, 2007; Keeney et al., 2001; Sekayi and Kennedy, 2017).

As a result, in order to retain a high response rate, the Delphi method in the current research study was limited to two rounds.

Delphi method is appropriate when the information that needs to be validated is available at experts who participate in the validation process (Hsu and Sandford 2007; Keeney, Hasson and McKenna 2001; Sekayi and Kennedy 2017). In the current research, information about the integrated approach that needs to be validated is available at experts in Jordan. In fact, the Delphi method is a systematic procedure to induce expert opinions (Sourani 2013). Its intended outcomes are to achieve a reliable consensus among a selected panel of experts (Hsu and Sandford 2007; Sourani 2013). Therefore, in the current research, the only experts who have solid experiences were selected to be part of the Delphi method and not being considered from those participate in MGT interviews. The two rounds of the Delphi method were conducted in Jordan between 09/12/2018 and 14/03/2019, as shown in Figure 7.3.

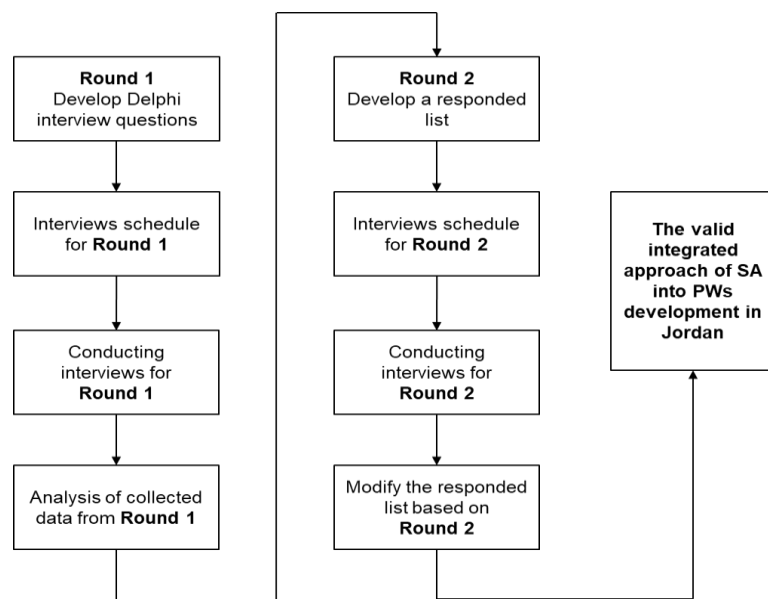


Figure 7.3 Delphi method process, (Adopted by the researcher)

By conducting the Delphi method, the developed integrated approach was presented in simple elements to the panel of experts during the interviews in the first round. The participants were directly asked specific open-ended questions on the developed integrated approach which ensured that feedback was specific to the interview questions pertaining to certain issues. As a result, a summary of the results of the previous round (responded list) was included in order to conduct such modifications and obtain improvements from experts on the developed integrated approach. Subsequently, following the first round the responses were analysed and based on the analysis, the integrated approach was modified and then the validation

interviews were conducted in the second round with the same experts aiming to further refine and examine the appropriateness of the proposed integrated approach in terms of issues raised in the first round.

In the second round, a series of semi-structured interviews was conducted by presenting the integrated approach in order to get a consensus even if they were not ideally contributing to these modifications. Thus, the overall comments at the second round which were provided by the experts were grouped in order to do such modifications if needed on the validated integrated approach and then the final version of the integrated approach was presented which was reviewed by the experts two times in order to reach the level of consensus. Sourani (2013) agreed previous argument in which the Delphi method is considered a self-validating method. As a result, at this stage, the integrated approach was validated to be applied in assessing the emerging policies, plans, and projects of SPWs development in Jordan.

7.5.3.2 Design a Set of Delphi Interview Questions

Denscombe (2014) pointed out that, when the researcher needs to gain insights into things such as people's opinions, feelings, emotions, and experiences, interviews will almost certainly provide the most suitable method. The interview questions are usually designed as one of two types, open or closed (Fellows and Liu, 2015). Open-ended questions are usually designed so that the respondent can answer in full whereas closed questions have a set of available responses (Fellows and Liu, 2015). The closed-ended questions could be designed under a questionnaire with a limited number of responses, and the respondents can select the answer from them (Fellows and Liu, 2015).

In the Delphi method, usually, the first round consists of an open-ended questions (Hsu and Sandford, 2007; Keeney et al., 2001; Sekayi and Kennedy, 2017; Sourani, 2013). As a result, the list of interview questions or areas of validation were designed based on concepts derived from the proposed integrated approach. In fact, designing closed questions is appropriate as well when large sample size is available, however. In the current research, a large sample is not available. Therefore, closed questions are not appropriate as such the interview questions were designed to answer directly insight on the integrated approach specific issues in order to reach the level of consensus. Bell (2014) agreed that the design process of interview questions is started after the researcher has conducted all the preliminary work of planning and deciding what needs to be found out. As a result, there is a need for well-designed interview questions that can give the information needed, that are

acceptable for the research topic, and that can give no problems later in the analysis (Bell, 2014).

Thus, in the current research, the design process of Delphi interview questions is carried out by studying the developed approach structure, its elements, and detailed contents. As a result, at each level of development, there are certain stages, enablers, and activities which inform the design of the questions (**Appendix I**). These questions were designed to get a direct response to specific responses in order to obtain the intended results. Delphi validation interview questions aim to examine (i.e. provide clarity of the structural elements). These questions investigate the clarity of the integrated approach's detail contents and the flow of actions. Moreover, they investigate the implementation of an integrated approach, which ensures a strategic link along with the development levels of SPWs, from national to project implementation levels, as well as clarity of its elements. And finally, they examine whether the integrated approach improves the outcomes from the emerging policies, plans, and projects of SPWs development in Jordan.

In the second round, these issues which were risen from the first round were included in the revised integrated approach and then presented to the same experts at the second round. As a result, a set of interview questions were designed based on these issues obtained from the first round as well as to investigate the barriers behind not applying the integrated approach. In fact, the main aim of the second round is to examine what the overall modifications which had been conducted on the integrated approach were accepted by the same sample of experts who were participated in the first round in order to reach the level of consensus. This is important to ensure the usefulness and appropriateness in which the integrated approach meets its main aim to assess the extent of emerging policies, plans and PWs projects achieve sustainable development in Jordan.

7.5.3.3 Data Collection Process (Delphi Interviews Protocol)

Since the researcher studies in the UK, it was difficult to ensure that every interviewee could be reached after arrival in Jordan, hence some appointments were made in advance and agreed by interviewees prior to the researcher traveling to Jordan. The consent form combined with an information sheet was sent to the targeted sample of ten experts who had been selected (**See Appendix F & Appendix J**). They were given only one week to respond to be part of the Delphi validation process or not. Once they had agreed to participate, the interview date, time and location were arranged. The researcher contacted the experts in different ways, such

as direct calls, email or meeting in person in order to arrange the interview. The panel of experts was unknown to each other and their interaction was managed in a totally anonymous way. This ensured that there was no chance for any experts to win the panel's support for certain views, which was not the case for the MGT interviewees as some were known to each other.

The interviews were not undertaken until consent had been gained from the experts in both rounds. The interviews were conducted face-to-face (which was deemed to be the most suitable method for the experts). Once the interviews had been conducted the researcher immediately reviewed all the gathered information to confirm that all issues and questions had been covered during the interview. Once all interviews for the first round completed, the researcher prepared the respondent list of interviews and a list of statements for improvements on the integrated approach to be investigated in the subsequent second round. The overall responses from conducting the Delphi method in both rounds were written in transcripts and presented in text format which is attached with a CD with the current thesis.

According to Yeung et al. (2009), one of the difficulties in the Delphi method is to maintain a high response rate. Thus, in the current research study, the experts were notified in the information sheet supplied in advance that they would be contacted to participate in the second round. In addition, the researcher re-informed the experts during the interview that they would be contacted to conduct the second round for validation. This ensured that a high response rate would be retained from those participating in the second round. The date, time and location for the interviews were arranged as per the previous round. The experts in the second round received the final version of the integrated approach that shows how SA is integrated into PWs development in Jordan.

7.5.3.4 Analysis of Collected Data for the Delphi method

The comments gathered from both rounds were analysed by collecting the statements from experts who share the same views into one theme. The overall analysis process is provided in a CD with the current thesis. A set of modifications, and/or the content of the integrated approach and the outputs at each level of development from national to project implementation levels were carried out. Such narrative and statements obtained were considered and, based on the analysis, a responded list was developed and presented to the experts in the second round. The iterative nature of the Delphi method provides experts with feedback involving new

information in each round. They were, therefore, able to reconsider the information they had provided in previous rounds in light of the overall results.

The experts were asked either to leave statements as they are or to make modifications to the statements in such a way to make them more understandable and applicable. As a result, the researcher worked on the comments/feedback from the panel of experts on statements in the second round and then created revised statements with modifications. The final statements which were modified in the second round resulted in the consistent statements on the valid integrated approach. The overall process of analysis for both rounds is as follows:

Round 1 – Individual participants answered specific open-ended questions about the proposed integrated approach. The results gained were used in open coding to label statements which consisted of the initial sorting of the data gathered into limited groups. At this stage, the list of statements was prepared using the shared meaning granted by wording clear statements to create a group of responses and presented in the findings. In this case, the statement of individual experts was not being reduced until the most common meaning was being formed. This means that the emerged statements were conceptualised to be clear and understandable for all experts in the following round.

Round 2 – The generated statements' list on the proposed integrated approach was presented to all eight experts, even if they did not originally contribute to these statements. The revised integrated approach was presented to each expert either to leave statements as they are or make modifications to the statements in such a way to make them more applicable. The final statements gained from the second round examined the validity of the integrated approach and then reached consensus which, in turn, resulted in consistent statements on the valid integrated approach to be implemented in Jordan. These statements were reformed clearly and presented for discussion.

7.5.3.5 Presenting the Findings for the Delphi method

The findings from both rounds of the Delphi method were qualitatively analysed. These findings, which resulted in improvements in the proposed integrated approach, are presented in text format and in tables only.

7.5.3.6 Sampling Procedure for the Delphi method

According to Remenyi et al. (1998), validation can be employed both internally and externally. Internal validation means that the interviewees who participated in

building the approach receive it for validation, while in the external validation, the interviewees are those who have not participated in developing the model. At this stage, the validation used by the Delphi method was conducted through external validation with Jordanian experts and not being participated in developing the integrated approach, to gain independent judgements on the proposed integrated approach. In the Delphi method, some note that a sample size should be between six to ten experts (Mitchell and McGoldrick, 1994), while others maintain it should be seven or eight experts (Hallowell and Gambatese, 2010; Sourani, 2013). In the current research study, the Delphi validation process was targeted to ten experts of which only eight experts participated.

7.5.3.6.1 Selection of Experts for the Delphi method

According to Remenyi et al. (1998) validation can be employed both internally and externally. Internal validation means that the interviewees who participated in building the approach then receive it for validation. In the external validation, the interviewees are those who have not participated in developing a model. At this stage, validation using the Delphi method was conducted externally to gain independent judgements on the proposed integrated approach and not from the original sample of 24 interviewees who participated in developing the integrated approach using MGT. In the Delphi method, some agree that sample size can range from six to ten experts (Mitchell and McGoldrick, 1994), while others maintain it could be seven or eight experts (Hallowell and Gambatese, 2010; Sourani, 2013). In the current research study, ten experts were targeted for the Delphi validation process of which only eight participated.

Sampling is a technique that enables the researcher to reduce the amount of data collected by considering only the data from a subgroup rather than all possible cases or elements (Saunders et al., 2003). Generally speaking, there are two types of sampling techniques, namely random and non-random sampling (Denscombe, 2014). In the Delphi method, the targeted sampling technique for selecting experts is not the same as that conducted by MGT. In fact, a preliminary sample was contacted for the first set of interview questions, while in the Delphi method the non-random sampling technique was used for the experts who were unknown to each other in the targeted sample. The importance and significance of choosing the right sample for the study plays a pivotal role in the quality of the collected data. According to Denscombe (2014), there are two types of non-random sampling; theoretical

sampling and snowball sampling. The current research employed theoretical sampling due to the type of potential data that had to be collected.

Every country has its own organisational structure, interests, and regulatory environment. Therefore, it is logical that only interviewees from the country under investigation are able to participate in validating the proposed integrated approach for Jordan as they know how the system in Jordan works and have the ability to modify/add such improvements to the system. They should be knowledgeable about the regulations in Jordan, the structure and governance system of organisations, their financial capability and the technical skills of Jordanians. Therefore, only interviewees from Jordan were selected as they can contribute to validating the proposed integrated approach for integrating SA into PWs development in Jordan.

Generally, 'experts' are expected to know more about the subject of study than others (Sourani, 2013) and therefore are not randomly selected; they should be well versed in the research topic as well as have experience in the field (Keeney et al., 2001; Sourani, 2013). A valid study also requires that the respondents are appropriate to the study and can provide in-depth knowledge of the research topic. In the current research study, Delphi method interviews were employed to reach consensus to refine the appropriateness of the integrated approach to be applied in integrating SA into PWs development in Jordan. Thus, the sampling technique employed to select experts who agreed to be part of this research was to choose those with a good reputation and related knowledge of sustainability (at both planning and implementation levels) from both the public and non-public sectors. The overall methodology for selecting the experts is shown in Figure 7.4.

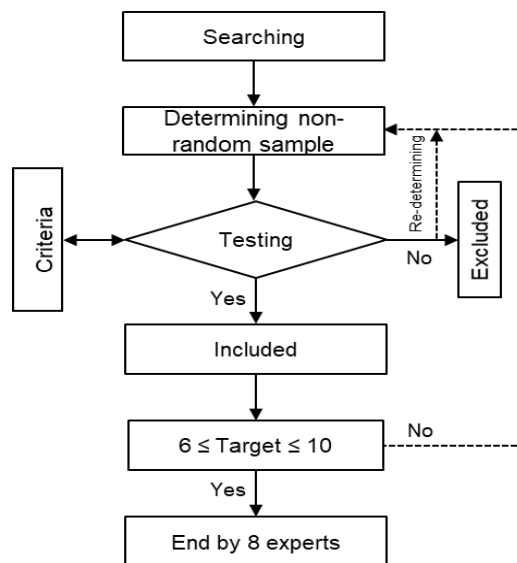


Figure 7.4 Selecting the experts' methodology of the Delphi method

The overall process for determining experts as shown Figure 7.4 was based on the criteria given at the end of all processes. The researcher sought experts in the field who are well versed with sustainability issues in the context of Jordan and would meet the identified criteria. The following selection criteria were employed:

1. Those who have experience of more than 10, 15, and 20 years and considered seniors in sustainability field. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.
2. Those who have worked with international and/or national bodies in sustainability in Jordan such as Western non-profit organisations (NGOs) (e.g. EDAMA, USAID, UNDP, and GIZ), who were not considered from the MGT interviewees.
3. Those who have been honoured by professional international and/or national societies and certified awards in sustainability.

The sample of experts tested against the identified criteria were only included if they passed the test within the criteria outlined above. As the information to be obtained was about sustainability issues in Jordan, only experts working in this field were selected at both planning and implementation levels, and they were unknown to each other. Once the interviews with the targeted sample were completed, the researcher ended the investigation. Only eight of the original experts who were interested in participating in both rounds were interviewed. The overall experts' profiles for Delphi method are provided in **Appendix H**.

7.5.4 Delphi Validation Results

The findings of the Delphi validation method are related to two rounds. In the first round, Delphi validation involved interview questions in an open-ended format to facilitate the exploration of the subject and assist in developing more representative answers and reach consensus among the participants. Their views were used to improve the proposed integrated approach. In the second round, Delphi validation involved the improvements which had been carried out at the integrated approach in the first round and presented to the same sample of experts. Its aim was to further refine and examine the usability, usefulness, and appropriateness of the proposed integrated approach in terms of the issues raised in the first round of the Delphi validation (such as clarity, information flow, and improvement measures). The overall findings of the Delphi validations from both rounds are discussed in the following sections.

7.5.4.1 First Round

The list of open-ended questions was presented to all eight experts who had agreed to take part in the current research. The questions included the four levels of SPWs development from national to project implementation levels. Their comments were to refine and examine the usability, usefulness, and appropriateness of the integrated approach and to discuss its application. The result was that the experts put forward several recommendations to enhance national, sub-national, local, and project implementation levels and the corresponding integrated approach components.

7.5.4.1.1 National Level

Table 7.2 presents measures proposed by the experts to improve the national level of the integrated approach components and the actions taken to modify and/or refine its components accordingly.

Table 7.2 Measures proposed for improvements at national level

Proposed improvements	Action taken
'The national vision of sustainability in Jordan' should be reformed for 'assessment': E3, E6.	<ul style="list-style-type: none"> • Reworded this to become 'the national vision of SA in Jordan'.
Make the balance between the three dimensions of SA refer equally to environment, social and economic: E1-E8.	<ul style="list-style-type: none"> • The importance of each dimension was given equal attention for all proposed SDGs.
The enabling environment should be linked to this level to make it the same as other levels: E1-E8.	<ul style="list-style-type: none"> • Extended the enabling environment bar to be linked to the national level.
The national vision of sustainability in Jordan should be driven by communication with public and non-public stakeholders in the country: E1-E3, E5-E6, E8.	<ul style="list-style-type: none"> • Extended the communication bar to be linked to the national level.

All the experts agreed that one of the controversial arguments is that SA can have trade-offs between socio-economic vs environmental issues, therefore, an integrated approach would ensure a balance between the three dimensions of SA by studying the interactions between them. The experts stressed that SDGs are many, and there are interrelations between them, thus these goals should not be considered individually but in an integrated manner. This means that 'SDG6 Water', for example, seeks the provision of safe drinking water of high quality for people, and should be

factored into 'SDG8 Decent Work and Economic Growth', in which the water sector contributes to economic growth by improving GDP and creating job opportunities for people. As a result, the classification of these SDGs as presented in the proposed approach ensured that these interactions were noted.

All experts stressed that the country should be assessed in a balanced way against the proposed SDGs for Jordan. Experts E3 and E6 agreed that the national vision should be for sustainability assessment and includes the three dimensions of SA with respect to the environment, society, and economy. Therefore, slight change is needed to become 'the national vision of SA in Jordan'. The country's level of development can then be identified (i.e. the current situation) compared with the desired outcome that needs to be achieved. In fact, if the first element of this approach (national level) is clear and appropriate then the SA process can go ahead. The evidence is that when the experts agree with the way of presenting the approach, this seems to ensure the balance between the three dimensions of sustainability.

In response to the most important SDGs, all the experts agreed that SDG1, SDG6, SDG7, SDG8, SDG9, SDG11, and SDG13 are the most important in the context of Jordan and require more attention. However, all experts argued that while SDG3 'Good Health and Well-Being' and SDG4 'Quality education' are important, in Jordan the level of education and health is high, so although Jordan still needs to pay them some attention this is not as much as is required for SDG6 'Water' and SDD7 'Energy'.

At the national level, all experts pointed out that at this level there is a need to consider the enabling environment to be the same as other levels. However, the same enablers are needed while differences due to the specific role of the level can be seen. At this level, the king of Jordan' request for developing the country in different sectors should be followed by the prime minister (PM). Accordingly, experts E1–E6 agreed that the key stakeholders at this level who deliver the national vision of sustainability in Jordan are the PM and ministers of Jordan with the participation of different stakeholders at each level. Experts E1–E6 strongly agreed that those ministers who participate in formulating the national vision of sustainability in Jordan should be selected by the PM of Jordan in a more appropriate way. This means that they should be technocratic and have considerable experience in their respected fields, such as water, energy, transportation, etc.

Most of the experts (E1–E3, E5, E6, and E8) argued that under the proposed integrated approach, the national vision of sustainability seems to be driven by the government in a top-down approach. As a result, the current situation of Jordan will be assessed without bearing in mind the local community and thus there is a need to consider communication with public and non-public stakeholders when preparing a national vision of sustainability in Jordan.

Experts E1–E3, E5, E6, and E8 agreed that the key stakeholders at this level who deliver the national vision of sustainability in Jordan are the PM of Jordan and ministers, with the participation of public and non-public stakeholders. As a result, the formulation of the national vision of sustainability in Jordan should include stakeholders in the country from both public and non-public sectors at each level of development. They should also have the same technical skills at each level of development and provide their support accordingly.

Experts E1 and E3–E7 agreed that public funding is usually allocated at this level. Therefore, at this level Jordan's budget should be take into account SDGs as a fundamental part of policymaking. Further to this, experts E3–E7 agreed that additional ways of securing public funding can be gained internally from 'green' loans and externally from international funds for sustainable development. In addition, Experts E1 and E6 agreed that internal NGOs can provide funding for such public projects. As a result, green incentives can be provided to attract investments in sustainable infrastructure.

Experts E1–E8 agreed that the monitoring and evaluation of this level needs to be conducted internally by Jordan's prime minister in order to identify where weaknesses are in the existing process and identify lessons learnt. Expert E1 further proposed that the king of Jordan should be considered for external monitoring on the country overall. This would result in a decision made by him as to whether to change the overall government or not.

In addition, experts E2 and E5–E8, agreed that monitoring at this level should be carried out by the representatives of the citizens (parliament). This would give them the ability to discover any weaknesses in the decisions made by the government in respect of sustainable development. Any weaknesses will become known to parliament by them monitoring compliance with goals and targets that the government has proposed as the national vision for sustainability in Jordan.

Finally, Experts E1–E8 agreed that the evaluation of achievements of goals and targets be carried out internally and externally. Internally, as mentioned, by the government itself and its ministries, and externally by parliament based on feedback from the local community regarding whether the goals and targets meet their needs and expectations towards a better quality of life.

7.5.4.1.2 Sub-National Level

Table 7.3 presents measures suggested by the experts to improve the sub-national level of the integrated approach components and the actions taken to modify and/or refine its components accordingly.

Table 7.3 Measures proposed for improvements: Sub-national level

Proposed improvements	Action taken
All the policy stages should be marked up by 'stages' and all activities for each stage should be marked up by 'activities': E1-E3, E5-E6, E8.	<ul style="list-style-type: none"> Added the term 'stages' at the top of stages and added the term 'activities' at the top of activities.
The national vision of sustainability should become 'the national vision of SA in Jordan': E1-E3, E5-E6, E8.	<ul style="list-style-type: none"> Reworded the national vision of sustainability to become 'the national vision of SA in Jordan'.
Reconsider the term 'identify' the national vision of SA in Jordan to 'clarify': E1, E2, E5-E6, E8.	<ul style="list-style-type: none"> Removed the term 'identify' and added the term 'clarify'.
The activity 'define sustainability assessment' should become 'clarify SA baseline (scope)' as this activity is defined at the national level: E2-E5, E7.	<ul style="list-style-type: none"> Reworded the activity to become 'clarify SA baseline scope'.
One activity is missing from stage two – 'analyse the information': E5, E7-E8.	<ul style="list-style-type: none"> Added additional activity called 'analyse the information'.
There is a need to consider a very important activity called 'considering future expansion and uncertainties': E1-E5, E7.	<ul style="list-style-type: none"> Added additional activity refers to 'considering future expansion and uncertainties' before the decisions are made whether to proceed to the next level or not.

There was consensus among the experts (E1–E8) that the proposed stages at this level are appropriate. These stages provide a rational sequence and flow of actions that should be carried out to develop a comprehensive policy for SPWs. The experts agreed that policy should be linked to the national vision of sustainability in Jordan and that the proposed stages will ensure that SDGs are followed. Experts E1–E8 agreed that the gateway approval (G₁) is very important to ensure that the formulated strategic objectives are derived from the national vision of sustainability in Jordan. However, experts E1–E3 and E8 noted that the current arrow confuses in the

proposed integrated approach. The arrow should therefore be linked after the stage as shown in the modified version of the integrated approach.

Most of the experts (E1–E3, E5–E6 and E8) stressed that all stages should be marked as stages by adding the term ‘stages’ and the actions carried out with each of these stages should be marked up as ‘activities’. In addition, the same experts agreed that the stage ‘create a comprehensive vision for SPWs’ should be reworded from ‘the national vision of sustainability in Jordan’ to ‘the national vision of SA in Jordan’ in order to create consistency and remove any confusion caused by using different words. Moreover, at the same stage, experts E2–E5 and E7 proposed adding the word ‘scope’ to the second activity ‘define SA baseline’. They argued that this would provide a better explanation of what the baseline means. This activity should include the targets that need to be achieved for each SDG provided at the national level.

More than half of the experts E1, E4–E6, and E8 agreed that the location for conducting the capacity development is appropriate. They argued that once the baseline of SA (scope) is identified, public and non-public stakeholders should participate in conducting an assessment against the baseline. As a result, stakeholders who are engaged in the process should have high skills and knowledge of sustainability and the SA process. Therefore, as it is in the proposed integrated approach this action is most appropriate to conduct capacity development. Moreover, two experts (E5 and E8) pointed out that in the stage ‘assessment and problem identification’ one activity should be added, that is, ‘analyse the information’. This is important to clarify that the collected information, once validated, becomes ready to be analysed to identify the problem.

Most of the experts (E1–E5 and E7) concurred that the stage ‘formulate strategic sustainable objectives’, should have the activity ‘considering future expansion and uncertainties’ added. This is due to the fact that Jordan is a developing country in the heart of the conflict in the Middle East. Therefore, considering fixed goals and targets is not appropriate as the country is in an unstable region. Due to technology development and a change in living standards of people and their living patterns due to demographic changes, there is a further need to respond to the future under ‘uncertainties’. This could help ensure that goals and targets can work within unpredictable circumstances that may arise. Experts E1–E6 agreed that the enabling environment is appropriate at this level, while all agreed that there is a need here to identify the key public and non-public stakeholders that should participate in this level.

The key stakeholders are the ministers and different organisational levels of each ministry, in addition to NGOs and the local community, etc.

All the experts (E1–E8) agreed that monitoring and evaluation – both internally and externally – are needed at this level as well as the national level. Monitoring at this stage is to be conducted internally by an interior audit unit that should be appointed by each different ministry at the sub-national committee. External monitoring should be carried out by a monitoring committee comprised of the Higher National Committee of Sustainable Development, the audit bureau, and the general budget department. Feedback can then be considered as to whether to proceed to the local level or not. Experts E1–E3 and E5 agreed that the evaluation of this level should be conducted by the Higher National Committee of Sustainable Development in order to identify whether the intended outcome has been achieved or not. This evaluation would measure the achievements of each strategic sustainable objective.

7.5.4.1.3 Local Level

Table 7.4 presents measures suggested by the experts to improve the local level of the integrated approach components and the actions taken to modify and/or refine its components accordingly.

Table 7.4 Measures proposed for improvements: Local level

Proposed improvements	Action taken
All the local development plan stages should be marked up by 'stages' and all activities for each stage should be marked up by 'activities': E1-E3, E5-E6, E8.	<ul style="list-style-type: none"> Added the term 'stages' at the top of stages and added the term 'activities' at the top of activities.
The second stage 'evaluate and select the right sustainable alternative options' should include the word 'assess' and remove the word 'evaluate': E1, E3, E6.	<ul style="list-style-type: none"> Reworded this stage to become 'assess and select the right sustainable alternative options'.
There is a need to add a missing activity at the first stage called 'clarify the need': E4, E7-E8.	<ul style="list-style-type: none"> Added the activity 'clarify the need' at the top of first stage's 'activities'.
Reconsider the activity 'request for proposals (RFP) is essential to generate alternatives concern with sustainability is linked with strategic objectives' to become 'request for alternatives (RFA)' E1-E3, E5, E6.	<ul style="list-style-type: none"> Reworded 'RFP' to become 'RFA' refers to 'request to alternative options' that is 'concerned with strategic sustainable objectives'.
There is a need to add additional activity called 'set out mitigation measures' E1-E3, E5-E6, E8.	<ul style="list-style-type: none"> Added the activity 'set out mitigation measures' to the first stage.

Reconsider the activity 'clarify the alternative options and detail the benefit gained' E1-E3, E5, E6.	<ul style="list-style-type: none"> Transformed the activity 'clarify the alternative options and detail the benefit gained' to the first stage of this level.
Reconsider the activity 'prioritizing system is needed' E1, E4, E6-E7.	<ul style="list-style-type: none"> Removed this activity from the first stage.
There is a need to add a missing activity at the second stage called 'conduct the assessment against SA baseline' E2-E5, E7.	<ul style="list-style-type: none"> Added the activity 'conduct the assessment against SA baseline'.
Reconsider all terms 'proposals' to become 'alternative options' in order to ensure consistency E1-E3, E5, E6.	<ul style="list-style-type: none"> Reworded all terms from being 'proposals' to become 'alternative options'.

All the experts (E1–E8) held consensus that this level, as proposed in the integrated approach, is appropriate to ensure a strategic link between the sub-national and local levels. This is due to the alternative options to be generated at this level that will be assessed against the baseline of SA. This ensures that the generated options become linked with strategic sustainable objectives. Most of the experts agreed that the gateway approval (G₂), is very important at this level to ensure that selected alternative options are matched with the sustainable strategic objectives.

Most of the experts argued that the local community knows more than those outside of the community, therefore, considering them in assessing and selecting the most sustainable option is essential at this level. It is fitting that decision-making to select the right sustainable option will be carried out at this level rather than at the previous level. This means that the decision-making in selecting the right sustainable option at this level is appropriate to be considered. Three out of eight experts (E1, E3, and E6) agreed that the second stage should have the word 'evaluate' replaced by 'assess'. This is essential to distinguish between the evaluation of the level and assessment of each of the alternative options, which is more appropriate.

Experts E1–E8 agreed that the enabling environment at this level is appropriate. At the institutional governance, it should engage a wide range of public and non-public stakeholders. However, due to the wide range of non-public stakeholders, a representative sample is more appropriate. Therefore, the experts agreed that the governorate council is sufficient to participate instead of grouping a wide range of non-public stakeholders at the local level in a small conference room – which is, in fact, impossible. Experts E3–E7 stressed that, in order to ensure compliance with local regulations, the public authority, such as municipalities, should not grant any permissions for selecting any alternatives which are not in line with

strategic sustainable goals. This in turn, results in a strategic link between the sub-national level and the local level.

Experts E1, E3, E6 agreed that the second stage replaces the word 'evaluate' with 'assess' which is more appropriate. This is essential to distinguish between the evaluation and assessment of each alternative option. The assessment should be carried out based on the baseline of SA to select the most appropriate alternative options while the evaluation can measure the impacts of the selected alternative options.

Most of the experts (E1–E3, E5–E6, and E8) agreed that at this level there is a need to add the term 'stages' and 'activities' as is shown in the revised integrated approach in order to help understanding of what these details mean. In addition, half of the experts added that the activity 'set mitigation measures' should be added at the top of 'activities'. This is due to the strategic sustainable objectives that can be achieved by such related and unrelated projects, initiatives, and best practices. Such alternative options could thus provide mitigating measures to overcome such issues as affect the achievements of these objectives.

All agreed E1-E8 that the monitoring should be carried out at this stage on four main areas: compliance with administrative measures, compliance with regulatory frameworks, technical support to provide valuable information, and the allocated public funding. This can be carried out internally by the sub-national committee, and externally by the audit bureau, the general budget department, and the local community. This would ensure that feedback from both monitoring systems is accountable and ensure a level of consistency among the systems.

Experts E3–E5 and E8 agreed that evaluation at this stage is needed, which means that the development of each governorate should then be tangible with SDGs. This could then measure the achievements of SDGs at each governorate to close the gap between them and ensure equality in opportunities across the country.

All E1-E8 stressed that at this level each governorate should prepare its local development plan and include a set of alternative options of SPWs projects, initiatives, and best practices. Each of these options should then include in detail the objectives that need to be achieved in order for them to be delivered to the next level (project implementation level). As a result, it can be seen that each provided alternative option will ensure the national vision of sustainability in Jordan is translated into a list of alternative options that will be linked with on-ground reality.

7.5.4.1.4 Project Implementation Level

Table 7.5 presents measures suggested by the experts to improve the project implementation level of the integrated approach components and the actions taken to modify and/or refine its components accordingly.

Table 7.5 Measures proposed for improvements: Project implementation level

Proposed improvements	Action taken
<p>Five out of eight experts agreed that sustainable procurement (SP) is the best route to deliver SPWs development. However, the assessment should go beyond the existing tools such as the Jordan Green Building Guide (JGBG) and include additional assessment tools and schemes to cover all SPWs development: E1, E3-E6 and E8.</p> <p>Three out of eight experts agreed that public procurement is valuable, and they need only to reconsider 'sustainable strategy' as the compulsory requirements to be achieved: E2, E7.</p>	<ul style="list-style-type: none"> • Sustainable procurement should include the need to assess the design stages against the JGBG and develop other schemes concerned with environment, society and economy to cover all SPWs development projects in Jordan. • SP should assess and select only those suppliers who could deliver SPWs.
<p>There is a need to consider that SP should include experience and commitment of contractors, consultants, suppliers and so forth in delivering sustainable objectives E2, E4, E7.</p>	<ul style="list-style-type: none"> • SP should include these requirements of contractors, consultants and suppliers' strategies in delivering sustainability.

Most of the experts E1, E3-E6 and E8 agreed that the MPWH (project implementation committee) should work to deliver SPWs under sustainable procurement (SP). This means that when preparing tender documents, the MPWH should request that only sustainable standards be followed. This would result in only those consultants, designers, and contractors who have a wide range of experience in respect of sustainable projects, can participate in the tendering process.

Less than half the experts E2 and E7 believe that using SP is difficult however, due to the changes that need to be carried out on the current system of PWs No71. In addition, much work is needed to enable this to refer to regulations, organisation structure, and the capabilities of those who usually work in preparing public procurement, as they should be fully knowledgeable about sustainability. Therefore, in public procurement, the requirements of sustainability by the suppliers need to be addressed in the contract for delivering SPWs development in Jordan.

All the experts stressed that the design options should be assessed against the intended objectives for each project that is recognised by the stakeholders who participate in identifying and prioritising SPWs development alternative options. The assessment can be carried out using such tools as JGBG and LEED, especially when delivering public buildings. However, sustainability is more than an environmental dimension, nor is it social or economic. Existing practices for delivering green buildings do not meet the overall dimensions of sustainability. Experts E3–E5 and E8 agreed that PWs development is more than public buildings, schools, and hospitals; it refers to infrastructure development such as water, energy, roads, and transport infrastructure. Therefore, there is a need to work on developing a robust assessment scheme for PWs infrastructure that considers all classifications of PWs development and all the dimensions of sustainability to which they refer (environmental, social, and economic). In fact, further research is needed in this regard to enable sustainable public procurement in delivering SPWs development projects in Jordan.

7.5.4.1.5 General Questions

Table 7.6 presents measures suggested by the experts to improve the overall levels of the integrated approach components and the actions taken to modify and/or refine its components accordingly.

Table 7.6 Measures proposed for improvements: All levels

Proposed improvements	Action taken
There is a need to consider the term 'enabler' at each provided enabler in Figure 8.3: E2-E4, E6-E7.	<ul style="list-style-type: none"> Added the term 'enabler' at each provided enable in the enabling environment (Figure 8.3).
Reconsider the enablers at the national level: E1-E8.	<ul style="list-style-type: none"> Added four enablers at the national level to become the same as other levels (institutional governance, regulatory frameworks, technical support and public funding).
Reconsider the key stakeholders from both public and non-public sectors who are needed at each level of development: E1-E8.	<ul style="list-style-type: none"> Classified the public and non-public stakeholders who are needed at each level of development (Table 7.6).
Reconsider such stakeholders as 'prime minister', 'governmental department' and 'contractors': E1-E3, E7.	<ul style="list-style-type: none"> Added 'prime minister', 'governmental department' and 'contractors' to the list of key stakeholders (Table 7.6).
Reconsider the 'local committee' at the institutional governance to become 'local	<ul style="list-style-type: none"> Added 's' to the 'local committee' to become 'local committees'.

committees' as there are 12 local committees: E2, E5, E7.	
Reconsider more regulations that enable conducting SA at both national and sub-national levels: E1-E8.	<ul style="list-style-type: none"> • Added more regulations that need to be considered at both national level and sub-national levels.
Reconsider the monitoring, evaluation and communication at the national level E1-E8.	<ul style="list-style-type: none"> • Extended the monitoring, evaluation and communication bar to be linked to the national level.
The arrows at both gateway approvals which are referred to proceed to the next level are not correct. There is a need to link them with the following stage: E5, E8.	<ul style="list-style-type: none"> • Redrew the arrow and linked it with the following stage at both gateway approvals as shown in Figure 7.5.

There was consensus among all experts that, by reviewing the proposed integrated approach, SA is integrated overall into PWs development throughout the levels. In addition, the proposed processes are appropriate and fit with each level of development. However, such rewording terms should be carried out in order to provide more clarity and understanding of the process and flow of the integrated approach. As a result, as the integrated approach is presented, the emerging policies, plans, and projects are assessed directly at each level. This means that the process does not wait to develop the policies, plans, and projects then assess voluntarily whether they contribute to sustainable development or not. The proposed approach ensures the assessment becomes one process with policymaking, plans, and projects development. This ensures that only the emerging policies, plans, and projects of PWs which achieve sustainable development will be approved for implementation. As a result, the integrated approach will have the potential to identify improvements in the outcomes from the policies, plans, and projects of SPWs development to achieve sustainable development in Jordan.

Experts E1–E8 agreed that the integrated approach has the potential to increase the sustainability performance of SPWs development outcomes. One of the controversial arguments is that SA can make trade-offs between social-economic and environmental issues. Therefore, all experts maintain that the integrated approach will ensure balance between the three dimensions of SA by studying the interactions between them. They agreed that the integrated approach will ensure that only SPWs which have positive impacts upon the environment, society, and economy are funded which, in turn, will reduce expenditure on these PWs developments which have negative impacts upon the community, the economy, and the environment.

Experts E1 and E3–E5 agreed that, following the classifications of the United Nation assembly, SDGs will be broken down into targets and indicators. In fact, the targets will include many visions that are suggested by policymakers which are restricted so not just anyone can propose them. Therefore, they are impossible to be proposed by anybody. They depend on the ability of the country and its resources. As a result, assessments will be carried out against the SDGs in order to identify where the problems are and then propose a set of strategic sustainable objectives to overcome such problems. Moreover, all experts were in agreement that the proposed enabling environment (enablers) was appropriate. However, they noted that the national level should include the same enablers as other levels. Experts E1–E6 mentioned that the Higher National Committee of Sustainable Development (HNCSD) in Jordan has already been created and there is a need to be considered at this level. This would result in the proposed institutional governance being effective in terms of accountability, transparency, and public participation.

Expert E1 stressed that:

... 'the existing institutional governance seeks sectorial planning and concern with [the] specific sector. However, under the proposed institutional governance the overall sectors and ministers will work collaboratively. For example, let's talk about the SDG4 Quality Education, the Minister of Education will focus on delivering quality education for students without considering the infrastructure of education as such schools, which is the role of the Minister of the MPWH. In addition, providing clean energy to these schools will be the responsibility of the Minister of Energy i.e. each of them within its specialty. Therefore, the proposed institutional governance as proposed can ensure that all parties can share the same and common language'.

All experts agreed that the proposed regulatory frameworks will govern the overall development of policies, plans, and projects in which they are compliant with sustainability in the three dimensions referred to as the 'triple bottom line'. Technical support is needed for those who participate in SPWs who provide and assist SPWs development. So, if those who participate in the decision-making process have the technical capability, their decisions will be linked to achieving SDGs. Proposed public funding would ensure that only SPWs development actions that have the potential to provide positive impacts on the environment and enhance socio-economic growth are funded. This, in

turn, will reduce expenditure on PWs developments which have negative impacts on the environment, society, and the economy. Therefore, the proposed enabling environment (enabler) is appropriate for SPWs development in Jordan.

Half of the experts E1-E3 and E7 agreed that despite the progress that has been made, Jordan is still facing some challenges in democratic governance. This is due to low public participation in the decision-making process and the role of civil society institutions which still needs to be strengthened further. As a result, there is a need to identify the key public and non-public stakeholders that should participate at each level. All experts E1-E8, however, agreed that, due to the wide range of non-public stakeholders, a representative sample is more appropriate. The experts classified the proposed public and non-public stakeholders in Table 7.7.

Table 7.7 Public and non-public stakeholders

Level	Stakeholders		
	Public		Non-public
	Internal	External	External
<ul style="list-style-type: none"> National level 	<ul style="list-style-type: none"> Prime Minister: E1, E8 Ministers: E1-E8 	<ul style="list-style-type: none"> General Budget Department: E1-E8 Audit Bureau: E3, E5, E6 Association of Contractors, Association of Engineers: E2-E4, E6 Royal Scientific Association: E5, E8 Governmental Departments: E1-E4, E8 	<ul style="list-style-type: none"> NGOs: E1-E8 Academicians: E1-E8 Politicians: E1-E8 Women, Youth: E1-E8 Local Community: E1-E8
<ul style="list-style-type: none"> Sub-national level 	<ul style="list-style-type: none"> Ministers E1-E8 National Building Council: E3, E4, E7 Strategic Board at each Ministry: E5, E8 Internal Audit Unit at each Ministry: E3, E5, E6 	<ul style="list-style-type: none"> Royal Scientific Association: E5, E8 Institute of Standards and Metrology: E2, E7 Department of Statistics: E8 General Budget Department: E1-E8 Audit Bureau: E3, E5, E6 	<ul style="list-style-type: none"> NGOs E1-E8 Jordan Green Building Council: E1, E4, E8 Academicians: E1-E8 Politicians E1-E8 Women, Youth E1-E8 Local Community E1-E8
<ul style="list-style-type: none"> Local level 	<ul style="list-style-type: none"> Governorate Council: E1-E8 Municipalities: E1-E8 	<ul style="list-style-type: none"> Regulatory Bodies, Municipalities: E1-E8 Representative from Department of Surveying: E3, E5 Representative from Department of Statistics: E8 Representative from General Budget Department: E1-E8 Representative from Audit Bureau: E3, E5, E6 	<ul style="list-style-type: none"> Local Community E1-E8 Women, Youth E1-E8

<ul style="list-style-type: none"> Project implementation level 	<ul style="list-style-type: none"> General Tendering Department: E1-E8 	<ul style="list-style-type: none"> Department of Surveying: E3, E5 Department of Statistics: E8 Association of Contractors, Association of Engineers: E2-E4, E6 Representative from General Budget Department: E1-E8 	<ul style="list-style-type: none"> Engineers, Contractors: E1-E3, E7, and Consultants Suppliers: E1, E8 Local Community: E1-E8
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Less than half of the experts E1, E7-E8 agreed that regulations at the national level regarding SA are not specified. There is, therefore, a need to consider national regulations that enforce policymakers, planners, and procurement officers to deliver sustainable policies, plans, and projects throughout the country. These regulations, in terms of the constitution of Jordan, will ensure the provision of a high quality of life for all Jordanians, international agreements, specifications, and standards that should be followed at this level and finally, create SA law that enforces assessment to be conducted on emerging policies, plans, and projects.

All the experts agreed that the proposed regulatory frameworks should add such regulations at a sub-national level. These regulations are acquisition/ownership land law; antiquities law; labour law; agricultural law; environmental impact assessment (EIA) law; Jordan ambient air quality standards; environmental protection law; Jordanian standards for treated domestic wastewater; Jordanian drinking water standards; public health law; traffic law and renewable energy law.

All experts agreed that in order to enforce compliance with the regulatory frameworks, the proposed gateway approvals will show whether to proceed to the next level or not. As a result, this will enforce policymakers to work within the provided regulations and laws. Thus, the proposed integrated approach will ensure providing permission only for the development of policies, plans, and projects that achieve SA targets. Moreover, the proposed regulations will ensure that all sectors follow other regulations from other sectors as shown in Table 7.8. This means that each sector of PWs, for example, schools, should consider the regulations for conserving the environment and resources, such as water and energy.

Table 7.8 Regulatory frameworks

Level	Regulations
National level	At the national level these are the regulations, in terms of the constitution of Jordan, international agreements, specifications and standards that should be followed at this level and finally, create SA law: E1, E7-E8.
	Acquisition/owning land law, antiquities law, labour law, agricultural law: E2, E6.

Sub-national level	Environmental impact assessment law, renewable energy law: E1, E4-E5, E7-E8.
	Jordan ambient air quality standards, environmental protection law: E1, E4, E7-E8.
	Jordanian standards for treated domestic wastewater, Jordanian drinking water standards: E1, E5-E8.
	Public health law, traffic law: E2, E3, E6.

The experts agreed totally with the technical support that is proposed at each level of development. However, they recommend having technical support at the national level from those participating in formulating the national vision of sustainability. Half of the experts (E1, E5, E6 and E8) strongly agreed that those ministers who participate in formulating the national vision of sustainability in Jordan should be selected by the PM of Jordan in a more appropriate way and have wide experience in their field, such as water, energy, transportation, etc. In addition, there is a need to conduct capacity development for public and non-public stakeholders and ensure they are fully knowledgeable about the requirements that need to be achieved.

Seven experts out of eight (E1 and E3–E8) agreed that the proposed public funding process could ensure that those PWs which are least developed – yet have more positive impacts on the environment, society, and economy in contrast to others – will be properly funded. This would ensure that all sectors in the country are developed at the same level as this is the main aim of sustainable development. Experts E1 and E3–E8 agreed that public funding is usually allocated at a national level for the overall actions of the country. Jordan’s budget should at this level thus consider SDGs as a fundamental part of development. As a result, they agreed that the HNCSD should work on developing the national vision of sustainability in Jordan based on the available budget of the government, otherwise the national vision of sustainability in Jordan becomes a mere wish list. Thus, the financial capacity of the government should be considered early on in order to ensure the national vision of SA in Jordan is delivered.

The experts agreed that assessment at the project implementation level of the need for allocation of public funds is essential to understand if there is any gap in funding for ongoing SPWs development in Jordan. Thus, they agreed that the assessment of whether there is a need to identify new SPWs projects or recycle existing assets should not only be considered at a local level. Assessment of ongoing SPWs projects (under construction) would ensure that SDGs are being achieved rather than stalling due to the lack of availability of public funding. All experts thus

agreed that the means of securing public funding as proposed are appropriate; funding can be gained from both internal green loans and external funds from international organisations of sustainable development.

All agreed that overall an integrated approach will ensure that most of the sectors in the country are developed at the same level. This means that each sector in the country (e.g. education, health, water, and transportation), can be delivered to all people, which results in equal opportunity across the country. As a result, this could pave the road ahead between the government of Jordan and its citizens. This will happen only if policies, plans, and projects of PWs which have positive impacts on the environment, society, and economy are delivered which, in turn, will result in translating the government's vision to reality on the ground.

Nearly all experts agreed that monitoring and evaluation are needed at each level of development. They agreed that the monitoring should be carried out in four main areas: compliance with administrative measures, regulatory frameworks, technical support to provide valuable information, and allocation of public funding. They concerned that monitoring would ensure that once the national vision of sustainability in Jordan is in line with the country's trend it is committed to international agreements that can reflect on all sectors of development.

They added that, under the proposed process of monitoring that would be carried out at each level of development, the strategic alignment between SPWs development would definitely be achieved. This would ensure consistency at each level of development due to the parties involved in approvals at each level of development consisting of both public and non-public stakeholders. As monitoring will ensure that only proposals which are provided in line with the SA baseline will be funded, the alignment will be met directly between the national vision of sustainability in Jordan and ground reality. They added that evaluation at each level of development is necessary. This means that SPWs should be linked with SDGs, which would result in the achievement of the targets of these goals and close the gap between SPWs sectors and ensure equality in opportunities across the country. They added that this would identify whether the intended situation is achieved or not.

Expert E6 added that the evaluation of the achievements of each strategic sustainable objective can be measured by key performance indicators (KPIs) that should be linked with each objective in order to identify where the weaknesses are in the existing process and identify a set of lessons learnt. This would ensure that goals

and targets are linked with people’s hope towards a better quality of life with respect to environmental, social, and economic aspects.

7.5.4.2 Second Round

The findings from the first round were used to consider improvements in the integrated approach which are marked up (in red) as shown in Figure 7.5. To reach consensus among all experts regarding specific changes on the integrated approach in the first round of the Delphi validation method, open-ended questions were used to allow experts to determine the direction of the response. The questions were designed to direct the response with little free questions to guide their opinions. The generated statements’ lists from the first round on the proposed integrated approach were presented to the experts. The collection of narrative comments on the list of statements that were obtained from the experts was presented to all the experts participating in the second round, even if they had not originality contributed to information for every question.

Experts were asked either to leave statements as they are or to make modifications to the statements in such a way to make them more understandable and applicable. The experts preferred to see the changes in the integrated approach plus the lists, so the researcher worked on the comments/feedback from the experts on statements in the second round and created revised statements with modifications in a responding list. The final statements which were used to modify the integrated approach were presented to all experts in the second round to examine their validity and reach a consensus which, in turn, resulted in a valid integrated approach to be implemented in Jordan. All these statements are provided in Table 7.9.

Table 7.9 Second Round: List of statements

Proposed respondents’ statements	Experts							
	E1	E2	E3	E4	E5	E6	E7	E8
The approach and from its structure can ensure that only sustainable policies, plans and projects that achieve sustainable development will be delivered.	√	√	√	√	√	√	√	√
Because the national vision of SA is driven by the government, only the trend of politicians will be applied which is not necessarily to be in the line of actual need of people. Therefore, the approach can ensure the overall parties in the country participate in achieving sustainability.	√			√			√	

SDGs are appropriate and fit in Jordan's context and its need.	√	√	√	√	√	√	√	√
There should be communication between local communities, and public and non-public stakeholders to make locally appropriate decisions towards development.	√			√		√	√	√
This approach ensures the country will be in equal development levels and balanced in the overall goals of sustainable development SDGs.	√		√	√	√		√	√
The approach as it is will ensure the government's vision is translated to ground reality.	√	√		√		√		
Monitoring will ensure that the achievement of strategic alignment of SPWs remains consistent with the national vision of Jordan.	√	√	√			√	√	√
Evaluation that should update the policies, plans and projects at each level is needed.			√			√	√	√

When the experts were asked about the presentation of the integrated approach, all agreed that the layout was logical and clearly showed the links between its components. It was easy for them to follow and understand the detail and the assessment process of assessing the emerging policies, plans, and PWs projects against sustainability. It can be seen that the first objective of the validation has been achieved. This ensured that the completeness and presentation of the integrated approach was validated by the experts in this study as well. All experts had consensus that by such rewording and minor modifications, the overall integrated approach would be clear and understandable for those experts in the field willing to use it in improving their decision-making. In addition, they also believed that the integrated approach is very useful for achieving sustainable development when being applied in PWs development in Jordan.

The experts confirmed that the integrated approach provides strong assistance that can help policymakers, planners, and developers of PWs development to make the right decisions regarding sustainable development. It will provide all the necessary information in order to address the environmental, social, and economic impacts of ongoing policies, plans, and projects of PWs and guide policy decisions towards sustainable development in the country. As a result, they recommend that all policymakers, planners, developers, and procurement staff at each level of development understand the integrated approach in order to improve the overall emerging policies, plans, and projects of SPWs development which have positive impacts on the environment, society, and economy.

Looking at the integrated approach, the experts confirmed that it not only provides an understanding of the most important issues of sustainable development in Jordan that need to be addressed, or the improvements which are needed in the existing practices of PWs development, or the understanding of the most important public and non-public stakeholders who have the most influence on assessing policies, plans, and PWs projects; but it also provides the understanding of the most important processes and methods which need to be applied across specific levels of SPWs development to achieve the targeted situation for Jordan.

The usability, usefulness, and appropriateness of the integrated approach to be implemented for SPWs development in Jordan from policymaking to select individual projects have been validated by the experts in this study. It can be seen that the second objective has been achieved, that is, the potential application and implementation of the integrated approach in practice has also been validated by the experts. The experts all agreed that the integrated approach can be applied in a real-life scenario of SPWs development to obtain significant achievements of sustainable development.

In this research, the integrated approach has been developed for SPWs development in Jordan with the SA process which has been presented as a series of stages and activities from national to project implementation levels. According to the experts, at each level of development during the SA process, there are several stages and activities that need to be followed which have already been specified and allocated in that level to achieve better results. The presentation of the activities across the specific stages within the integrated approach levels provide the necessary solutions to assess the extent to which emerging policies, plans, and PWs projects can achieve sustainable development. However, the experts realised that not only is making sure all the stages at each level are followed a challenge, but it is also difficult to make sure that transparency is presented during the SA process. Nonetheless, they are confident that the monitoring systems, both internal and external, are adequate to ensure compliance with achieving sustainable development. The capacity development will also be applied as part of the SA process which can properly prepare different stakeholders. At the end of these processes, the experts agreed that following these stages at each level of SPWs development in Jordan as presented in the integrated approach, will evaluate how well SPWs projects have achieved the desired situation for the country. As a result, the evaluation outcomes

can indicate the extent to which emerging policies, plans, and SPWs achieve sustainable development.

When considering the enabling environment at the national level most of the experts agreed with all modifications. This will ensure that the overall levels are enforced by such enablers in order to integrate SA into PWs development in Jordan. All experts agreed that Jordan's goals and targets in respect of SDGs need to be tailored to fit the country-specific circumstances, that there is no 'one-size-fits-all' prescription for fostering sustainable development in each country. It can be seen that each SDG considers only one issue for each sector and that they should consider these goals in sum total as each has an impact on the other. As a result, the achievements of all in a balanced way would ensure that the development of each sector will be improved in equal opportunity across the country to achieve sustainable development. Furthermore, achieving overlapping objectives and goals occurs when decision-makers better recognise and understand how their actions, interests, and mandates link and interact with other components within the broader system of governance. This can ensure the SDGs are being followed and achieved accordingly.

The experts E1, E4, and E7 agreed that, if the national vision of SA is derived only from government, only politicians' trends and government orientation will be obtained, and these are not necessarily linked to the actual needs of the people. In addition, those at the implementation and operational levels will not be satisfied that their actual needs are being considered. This is because all infrastructure investment decisions are ultimately involved with the highly political interests of policymakers with no socio-economic assessment tools to replace political decision-making. Thus, communication between government bodies and other public sector and non-public stakeholders is necessary to ensure their actual needs are delivered. This would build trust between local communities and the government and achieve SDG16 (Peace and Justice Strong Institutions). Once the government responds to the needs of its people, and the latter have access to public services, the country will be more secure and safe in equal development.

Most of the experts E1, E3-E5, and E7-E8 believe that the integrated approach would ensure that the country will achieve balance in the three dimensions of sustainable development (environment, society, and economy). They all agreed that working under uncertainty is essential to manage the unpredictable issues that hinder development. As Jordan is part of the global system, it contributes indirectly to the reduction of GHG emissions from the overall amount responsible for global

warming and climate change. The evidence for this is that, once the overall emerging national vision of the country, PWs policies, local plans, and projects are assessed against the SA baseline, only sustainable options will be approved. As a result, decisions to be made at each level of development will be linked with achieving sustainable development which, in turn, will result in the reduction of negative impacts on the environment and enhance the socioeconomic growth of the country.

Most experts E1-E3 and E6-E8 agreed that monitoring at each level of development will ensure that emerging policies, plans, and projects can achieve sustainable development in the country. This means that at each level of development, the monitoring committee represented by the audit bureau in Jordan, the general budget department and the National Committee of Sustainable Development should observe each level of development. Half of the experts agreed that it should differentiate between monitoring and evaluation as the former will ensure that the overall constraints related to administrative, technical, financial, and regulatory frameworks are being followed, while evaluation can identify the extent to which emerging policies, plans, and projects achieve sustainable development. This can be driven by the two gateway approvals which ensure that the objectives at each level are derived from the previous level. As a result, no approvals as to whether to proceed or not will be obtained until the monitoring committee can ensure the delivered policies and plans are in line with the SA baseline. Half of the experts agreed that evaluation is needed at each level in order for such circumstances to occur. Hence, the need to update the policies, plans, and projects and each level should be informed by these circumstances in order to create awareness, which would lead to ensuring consistency at every level of development. More than half of the experts agreed that evaluation can be carried out once SPWs are delivered. This will ensure that any drawbacks and weaknesses will be considered to learn and then overcome those that hinder the achievement of SDGs in the country.

In fact, when commenting on the practicalities of trying to use and apply the integrated approach into practice, experts said that they do not see any difficulties or hurdles in doing so. Even so, some experts said the use of the integrated approach might be limited by a poor working attitude and lack of collaboration from non-public stakeholders. While these might be valid concerns, the presentation of each element within the integrated approach gives a clear message to key stakeholders in SPWs development. This should raise awareness of public stakeholders so that they will put more effort into SPWs development with greater responsibility and commitment which

will result in improved working attitudes and more effective collaborations with non-public stakeholders in the country. In this research, the final version of the integrated approach has been confirmed and validated by the experts as a valuable tool that can be applied to assess the emerging policies, plans, and SPWs projects in Jordan to achieve sustainable development. As a result, the third objective has been achieved.

The experts agreed that, although the integrated approach holds significant potential to support sustainable development in Jordan, several defects can be outlined in the integrated approach properly as provided in Table 7.10.

Table 7.10 The integrated approach defects

Defects	Experts							
	E1	E2	E3	E4	E5	E6	E7	E8
Human interactions, lack of interest from such stakeholders who are resistant to change.	√	√	√	√	√		√	√
Complexities that cause delays.			√	√		√		
Bureaucracy.				√	√	√		√
Lack of competencies in SA.			√			√	√	
Uncertainty due to political instability in the region.				√		√		
Unstable regulatory environment.	√				√			√
Lack of political will.	√						√	√

These defects are first, that human interactions in the approach can increase complexity and cause delays when considering decisions about SPWs development. This, in turn, might cause policymakers, planners, and procurement personnel to miss elements, stages, and determinations in the integrated approach. Second, half of the experts agreed that due to bureaucracy, lack of competencies in SA, an unstable regulatory environment, uncertainties from political instability in the region, lack of political will, and lack of interest from some stakeholders who are resistant to change, might delay the progress of SPWs development. Therefore, there is a need to consider all these defects when work begins on the development of SPWs from the national to project implementation level in order to overcome all these defects. Overcoming these defects might have a strong influence on choosing to follow the integrated approach process to achieve the intended outcomes upon the environment, society, and the economy.

Finally, at the beginning of the process, particularly at the sub-national level, according to the experts there is a need to conduct environmental scanning on the

internal and external barriers that hinder the implementation of SPWs policy. Doing so will help to create solutions to avoid or mitigate these barriers if they are encountered throughout the SA process; as well as solutions to better cooperate with both public and non-public stakeholders in Jordan, where a unique and special knowledge in sustainability will help to avoid misunderstandings or unnecessary conflicts. The experts said they were also able to exactly follow SA process as provided in the integrated approach and analyse how these could help to ensure that only SPWs which have a positive impact on the environment, society, and the economy are delivered which, in turn, will reduce PWs which have a negative impact on communities, the economy, and the environment.

All the above are the findings from the validation process of the integrated approach using the Delphi method. It can be seen that the integrated approach is validated and is totally agreed by the Jordanian experts that it will contribute to ensuring a strategic link between the national vision of SA in Jordan and on-ground reality. Thus, the integrated approach has the potential to increase the sustainability performance of SPWs development outcomes, resulting in an improvement of the achievement of sustainable development in Jordan.

7.5.5 Validation Using Interviews with Non-Jordanian Experts

In this section, a sample of non-Jordanian experts was selected in need to validate the integrated approach using interviews of the practice of SA into PWs development in Jordan. Validation means that the judgment of whether the integrated approach successfully fulfils its intended purpose or not. The validation at this stage aims to investigate whether the integrated approach would satisfy the aim of the research or not, this aim being to integrate SA into PWs development in Jordan. The interview questions focused mainly on the following issues relate to:

1. The maturity, and competency of the integrated approach in which SA is integrated into.
2. A realistic linkage between PWs development levels in Jordan.
3. Proper integration of SA into PWs development in Jordan in which improves the outcomes from the emerging policies, plans, and projects of PWs development in Jordan. As well as to investigate the barriers behind not applying the integrated approach in real-life scenario.

At this phase of validation, the integrated approach was validated using the interviews technique. This means that set of questions were designed which were

asked for all non-Jordanian experts who participated in the current research study. The non-Jordanian experts had the same chance to answer all the interview questions. As a result, the validation tool was designed to seek modifications, changes, and evaluation of the integrated approach from experts possessing significant experience and knowledge about SA at both strategic and project levels from non-Jordanian experts. The validation interviews requested qualitative and in-depth primary data through semi-structured interviews using open-ended questions. The overall validation interview process is summarised in Figure 7.5.

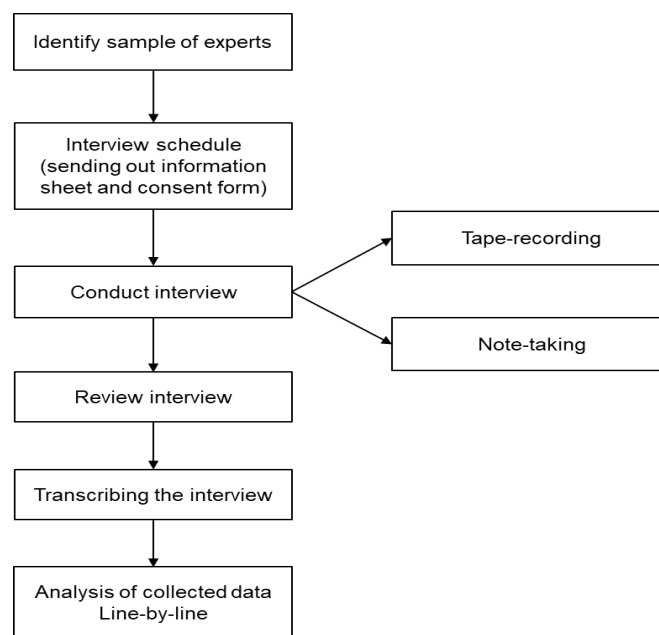


Figure 7.5 The validation interview process with Non-Jordanian experts

Prior to the interview, the experts had received the proposed integrated approach of SA into PWs development in Jordan in order to answer specific open-ended questions. All interview questions that were asked to each expert are provided in **Appendix L**. Since the researcher decided to conduct the validation interviews from a sample of Non-Jordanian experts, all appointments with them were made and agreed by the experts to be conducted remotely. The consent form combined with the information sheet was sent via (Email and/or LinkedIn) to the targeted sample of twenty non-Jordanian experts who had been selected (**See Appendix F & Appendix M**). It was entirely up to them to decide whether to participate or not. The interviews were not undertaken until consent was gained from the non-Jordanian experts. The interviews were conducted via Skype/MS Teams (which was deemed to be the most suitable method for the experts). The experts were given one week to state whether they want to take part in the research or not. In some cases, there was no response, that the experts were dropped from the list and no extra time was given to them in

order to decide to take part in the research. The panel of experts was unknown to each other and their interaction was managed in a totally anonymous way. In some cases, one of them suggested other experts they were known to each other. Once the experts agreed to participate, the interview date, time, and type of interviews via Skype/MS Teams were arranged. The interviews ranged from 30 to 45 minutes in length. The length depended on how much information the experts wanted to give and express their own opinions when they answered the interview questions. In order to ensure that the interviews are saved, they were both tape-recorded and note-taken.

Once the interviews were conducted the researcher immediately reviewed all the gathered information to confirm that all issues and questions are covered during the interview. Once all interviews were completed, then they were transcribed and prepared for analysis. As a result, the researcher prepared the respondent list of interviews and a list of statements for improvements were generated. The overall responses from conducting the validation interviews were written in transcripts and prepared for analyses. As a result, a summary of the results from the interview questions (responded list) was prepared to conduct such modifications and obtain improvements from experts on the developed integrated approach. Subsequently, following this the responses were analysed and based on the analysis, the integrated approach was modified aiming to refine and examine the appropriateness of its maturity, and competency.

7.5.5.1 Design a Set of Validation Interview Questions

Interviews can almost certainly provide the most suitable technique, when the researcher needs to gain insights into things such as people's opinions, emotions, and experiences, (Denscombe, 2014). Therefore, in the current research study the semi-structured interviews were designed in the form of open-ended questions (Fellows and Liu, 2015) in need for all experts to answer in full by giving their opinions with regard to the proposed integrated approach. As a result, the list of interview questions for validation were designed by studying the proposed approach's structure, its elements, and the outputs from its application. As a result, at each level of development, there are certain activities and enablers which formed the interview questions and provided in **Appendix L**. These interview questions were designed to get a direct response to specific issues in the approach in order to obtain the intended results. The validation interview questions aim to examine:

1. The maturity, and competency of the integrated approach in which SA is integrated into.

2. A realistic linkage between PWs development levels in Jordan.
3. A proper application of the integrated approach in which improves the outcomes from the emerging policies, plans, and projects of PWs development in Jordan. As well as to investigate the barriers behind not applying the integrated approach.

7.5.5.2 Analysis of Collected Data for the Validation Interviews

The information that was gathered from the validation interviews were analysed by collecting the statements from experts who share the same views into one theme. In fact, individual participants answered specific open-ended questions about the proposed integrated approach. The findings which were gained from conducting the validation interviews were coded using open coding to label statements which consist of the initial sorting of the data gathered into limited groups. At this stage, the list of statements was prepared using the shared meaning granted by wording clear statements to create a group of responses and presented in the findings. In this case, the statements of individual experts were not reduced until the most common meaning was being formed. This means that the emerged statements were conceptualised as they are or were modified to the statements in such a way to make them consistent. As a result, the researcher worked on the comments/feedback from the panel of Non-Jordanian experts on statements and then created revised statements in need to amend the integrated approach. The amendments which were carried out examined the validity of the integrated approach which, in turn, resulted in its applicability to be implemented in Jordan.

7.5.5.3 Sampling for Validation Interview of Non-Jordanian Experts

Experts, who are possessing significant experience and knowledge in SA at both strategic and project levels to ensure triangulations when answering questions and providing judgments and feedback. A sample of non-Jordanian experts was identified with the appropriate skills and experience to be part of the research. In this regard, non-random sampling was employed to select the experts who are needed for conducting the interviews. They had to be qualified and competent people who are nominated experts in the field for the current research study. The interviews sought insights into the elicitation of interviewees' perceptions and opinions. The semi-structured interviews were conducted to probe in-depth experts' opinions and knowledge for any improvements in the integrated approach. The sample size, as in any qualitative research can be small if the emphases concentrate on the variety of feedbacks and on achieving a better understanding of the aspects under

investigation. Thus, a convenient sample was employed from the non-Jordanian experts aimed at 8 participants while only 6 experts participated who agreed to be part of the current research. The countries that the experts were selected from are Australia, UAE, Saudi Arabia, the UK, South Africa, and Germany. The justification for choosing these countries is that they have been already practicing SA for years at both strategic and project levels. In addition, the experts who are the only agreed to be part of the research were from these countries. Therefore, the validation interviews were employed to collect primary data to give flexibility for all experts by using this technique by answering specific questions that gave rich information in need to validate the proposed approach. The overall process for determining experts was based on the criteria given at the end of all processes. The researcher sought experts in the field who are well versed with SA practices and who met the identified criteria. The following selection criteria for the non-Jordanian experts were employed:

1. Those with solid and relevant years of experience above 10 years in the field of SA. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.
2. Those who work in academia and have got solid base of research in SA practices, approaches and rating systems at both strategic and project levels.
3. Those who were honoured by professional international societies and certified awards in sustainability.

The sample of experts tested against the identified criteria was only included, if they passed the test within the criteria outlined above. Once the interviews with the targeted sample were completed, the researcher ended the investigation. Six non-Jordanian experts were interested in participating in the validating the proposed approach. The overall Non-Jordanian experts' profile is provided in **Appendix K**.

7.5.6 Validation Interviews' Results from Non-Jordanian Experts

The findings of the Delphi validation method with Jordanian experts are related to two rounds. The findings from the two rounds were used to improve the proposed integrated approach. At this stage of validation, the findings from conducting the validation interviews with Non-Jordanian experts are discussed with the aim to further validate the proposed integrated approach from external judgments. The findings from the validation interviews were used to consider improvements in the integrated approach which are marked up (in green) as shown in Figure 7.6. Experts were asked to make improvements to the proposed approach where needed. Most experts preferred to see the changes which were made in the integrated

approach from Jordanian experts and then proposed their improvements if needed, so the researcher worked on the comments/feedback from the Non-Jordanian experts and created revised statements. The final statements which were proposed by Non-Jordanian experts who were given the code (P1, P2...P6) were used to modify the integrated approach to examine its validity to be implemented in Jordan. There are three main issues that the validation interviews investigated in terms of such as maturity, information flow, and improvement measures which are presented and discussed as follows:

7.5.6.1 The maturity, and competency of the integrated approach in which SA is Integrated into

Table 7.11 presents statements proposed by the Non-Jordanian experts to improve the maturity, and competency of the integrated approach components. The general and most common statements which were provided by the Non-Jordanian Expert are only provided.

Table 7.11 Validation Interviews: List of statements

Non-Jordanian experts' statements	Experts					
	P1	P2	P3	P4	P5	P6
The integrated approach is matured to be applied in Jordan and can ensure the emerging policies, plans and projects achieve sustainable development in Jordan.	√	√	√	√	√	√
The maturity, and competency presentation of the integrated approach is clear and understandable in need of improving the decision-making process for the assessment of the sustainability of PWs development.	√	√	√	√	√	√
The integrated approach provides a strong assistant to all parties in the country in assessing the sustainability of PWs development to make the right decisions regarding sustainability.	√	√	√	√	√	√
Such components of the integrated approach could not be used due to the maturity level of the country in terms of the commitment to following the integrated approach.		√	√	√	√	
The presentation of the activities across the specific stages within the integrated approach levels needs to be followed which have already been specified and allocated in that level to achieve better results and provided the necessary solutions to assess the extent to which emerging policies, plans, and PWs projects can achieve sustainable development.	√	√	√			√
The integrated approach provides strong assistant to all policymakers in assessing the sustainability of PWs development to make the right decisions regarding sustainable development that fit the context of a country like Jordan.	√	√	√	√	√	√
The successful application of the proposed integrated approach cannot ensure its maturity, and competency by applying it only while there is a need to ensure different entities, organisations, and parties in the certain areas have the ability to understand it and how to applying it in the emerging policies, plans, and PWs projects.	√	√	√			√
Creating or/and adding a party called the assistant of SA practices or a mandate to the existing practices can ensure following up the proposed integrated approach properly especially at the local level.	√		√			√

The proposed integrated approach as it stands ensures in a theoretical way the global SDGs to be embedded in the national vision of SA in Jordan. In addition, it proposed the way of assessment in how the country is living up to these SDGs.	√			√	√	
In practice, it is very difficult in cascading the SDGs in the context of Jordan. This is by itself needs developed approaches and models that include different stakeholders in the whole country. Therefore, the proposed approach can in theoretical base ensures this happens while the interaction between the SDGs needs a holistic approach in how each SDG can reflect on others.		√	√	√		√

All experts P1-P6 agreed that the integrated approach is mature to be applied in Jordan. They all agreed that the layout is logical and easy to follow in the assessment of sustainability for the emerging policies, plans, and PWs projects. This means that the maturity, and competency of the presentation of the integrated approach is clear and understandable in its structure and components for those Non-Jordanian experts in need of improving the decision-making process for the assessment of sustainability for PWs development.

All experts P1-P6 confirmed that the integrated approach provides strong assistant to all policymakers in assessing the sustainability of PWs development to make the right decisions regarding sustainable development that fit the context of a country like Jordan. Their arguments were made based on their experience in which the integrated approach includes different components that are linked to each other. However, experts P2-P5 argued that in a country like Jordan in the developing world this might be possible while on the other hand, this is not useful to be applied in the developed world. This means that in the developed world, such components of the integrated approach could not be used due to the maturity level of the country in terms of the commitment in following the integrated approach. Therefore, all experts P1-P6 agreed that the integrated approach provides high-level details of how to assess the existing policies and the emerging policies which is well mature in providing all the necessary information in order to address the environmental, social, and economic impacts of the emerging policies, plans, and projects of PWs and guide policy decisions towards sustainable development in the country.

Moreover, looking at the integrated approach, all experts P1-P6 confirmed that the integrated approach does not only provide an understanding of the most important issues of sustainable development in Jordan by assessing the country against the SDGs relates to the environmental, social, and economic dimensions that need to be addressed; but also it provides the understanding of the processes which need to be applied across specific levels of SPWs development to achieve the targeted situation for Jordan.

According to the experts P3, P5 and P6, the presentation of the activities across the specific stages within the integrated approach levels need to be followed which have already been specified and allocated in that level to achieve better results and provided the necessary solutions to assess the extent to which emerging policies, plans, and PWs projects can achieve sustainable development.

Experts P1-P3 and P6 agreed that the problem in the maturity, and competency of the integrated approach are not measured by the approach structure itself. The maturity level of the integrated approach can be measured in how the commitment is when applying it in the emerging policies, plans and PWs projects in each area in the country. They added that in developing countries the development levels between areas are different. The skills, experiences and capabilities between the people who live in the area under study might not be matured as other areas in the country. Therefore, the level of maturity and competency can be varying that each area in the country can apply the approach based on their skills and capabilities. As a result, the outcomes from applying the integrated approach to each area in the country would be not the same and the reflection from the integrated approach would not be tangible to each of them in the same way.

Expert P6 stressed that the proposed integrated approach is mature in its structure while the problems can be risen in how to achieve the desired outcomes from applying it, especially in a country in the developing world as such Jordan. This is due to the limitations in skills, the availability of well experiences, culture, and capabilities that might not provide the outcomes that are wanted. However, while the level of maturity of the proposed integrated approach is appropriate to assess the emerging policies, plans, and PWs projects, getting the desired outcomes from the proposed integrated approach in practice is uncertain. As a result, the successful application of the proposed integrated approach cannot ensure its maturity, and competency by applying it only while different entities, orgainsations, and parties in the certain areas should have the ability to understand it in which to enforce its implementation correctly to the emerging policies, plans, and PWs projects. Thus, experts P1, P3, and P6 suggested proposing a party that can ensure following up the proposed integrated approach properly especially at the local level. Therefore, P6 suggested this party to be called 'the mandate' while experts P1 and P3 suggested the party to be called 'the assistant of SA practices'.

Expert P6 provided an example to explain previous arguments, as such in Amman city the capital of Jordan, it is expected that the skills, experiences, and

understanding SA practices might be higher than other areas in the country. Therefore, to follow the proposed integrated approach in assessing the emerging policies, plans, and projects, creating a 'SA mandate' at each governorate can be useful. This means that the maturity level of each governorate is not the same as of others. Therefore, the mandate that needs to be added to the existing local committees is essential that can assist different stakeholders in how to follow and apply the integrated approach.

Experts P1, P4 and P5 confirmed that the proposed integrated approach as it stands ensures in a theoretical way the global SDGs to be embedded in the national vision of SA in Jordan. In addition, it proposed the way of how the country will be assessed in how the country is living up to these SDGs. However, Experts P1-P4 and P6 argued that, in practices, it is very difficult in cascading the SDGs in the context of Jordan. This is by itself needs developed approaches and models that include different stakeholders in the whole country. In addition, experts P1-4 and P6 added that some of the global SDGs do not fit with the country as such Jordan while others do fit. Therefore, this needs another model to show how to form and assess the country against the SDGs while the current approach is only can make SA is integrated into PWs development. Therefore, this needs a lot of works and from different stakeholders in the country without leaving anyone behind.

Expert P5 stressed that embedding the SDGs needs a conversation between the ministries, mayors, etc. and to what extent the targets can be included in the vision of the infrastructure of the country. There are 17 SDGs which are fit with education, health, water, infrastructure, and peace; etc. Therefore, the ministries should understand which of these SDGs are needed and fitted with only the infrastructure. He added that it can improve the health sector by developing health infrastructure and the health sector by itself can be improved by providing training programs that improve the people who work in the health sector.

Experts P2-P4 and P6 added that forming the SDGs for any assessment system in the context of a country is a part of the environmental assessment that embeds the three dimensions of SA which the proposed integrated approach ensures this theoretically happens. However, they added that one of the controversial arguments is that SA can have trade-offs between socio-economic vs environmental issues which in practice, it is difficult to make the balance between the three dimensions of SA. Therefore, they recommended that the interaction between the SDGs needs a holistic approach on how to ensure the interrelations between them.

7.5.6.2 A Realistic Linkage between PWs Development Levels in Jordan

Table 7.12 presents statements proposed by the Non-Jordanian experts throughout conducting the validation interviews refer to the realistic linkage between PWs development levels in Jordan. The general and most common statements which were provided by the Non-Jordanian Expert are only provided.

Table 7.12 Validation Interviews: List of statements

Non-Jordanian experts' statements	Experts					
	P1	P2	P3	P4	P5	P6
The proposed integrated approach is appropriate to ensure a strategic link between all development levels.	√	√	√	√	√	√
There are two directions of the information flow that can be conducted to refer to a top-down and bottom-up approach. The only thing is not clear how different levels can ensure the bottom-up direction will work.	√	√		√	√	
The proposed integrated approach is applied on a consistent basis the used language and the direction of information flow go up-down easily and transfer the information and issues at each level are clear.			√	√	√	

Expert P3 stressed that the approach is realistic and very useful to be applied for a small country like Jordan while in Australia is not realistic. This is due to the different components and practices that the country should follow by applying the proposed integrated approach that is not realistic in a large-scale country in which the approach makes the assessment too complex.

All the experts P1-P6 held consensus that the proposed integrated approach is appropriate to ensure a strategic link between all development levels. It is realistic and it flows well, that top-down approach can support and follow up the policy. The proposed integrated approach is realistic in which it does integrate the SA in the overall process of PWs development in Jordan. Nearly most of the experts agreed that at the overall provided information flow down from the national to project implementation levels. However, nearly half of experts P2, P4-P5 stressed that one of the issues that should be considered when the policymakers practice this approach is that to understand which relevant stakeholders need to be engaged in the applicability of the approach. This means that it is important to understand who will be in charge such as ministers, mayors, etc. for assessing the emerging policies, plans, and PWs projects. As a result, the engagement of relevant stakeholders in practicing the proposed integrated approach can ensure the only issues which are risen in the country will be overcome properly.

Expert P5 agreed that the proposed integrated approach does elaborate on the assessment process of sustainability and its integration with PWs development in a well top-down structure. Expert P5 added that the strategic link between different levels is a robust top-down direction. Experts P1-P2 and P4-P5 indicated that there is another direction of communication that can be conducted referring to a bottom-up approach. The only thing is not clear of how different levels can ensure the bottom-up direction will work. Therefore, there is a need to add both directions to the proposed integrated approach (top-down and bottom-up).

Indeed, experts P2, P4-P5 agreed that combining top-down with the bottom-up approach is necessary that makes the communication easy and ensure the consistency between the government's policy and ground reality. Expert P5 argued that in some cases if there is a problem occurs at the lowering levels there is a need to inform the top levels about this. However, the proposed integrated approach as it stands indicates no evidence in which there is transforming in the information.

Expert P6 provided an example to support the previous point that, at the local level where the projects are selected and then approved to be implemented; in some cases, at the sub-national level where the strategic objectives are formulated it might decide to create a solar system or nuclear power plant. However, at the local level, it might be indicated that this is not feasible in the local areas due to land use or for this kind of project. In addition, it might indicate that there are other resources needed or systems or/and different kinds of projects that fit with a certain area to be delivered. Therefore, the communication and the interactions between the national and local levels is needed to be taken into consideration.

Experts P1 and P3-P5 stated that the bottom-up approach could completely consume all resources, but it would represent the most precise picture of the sustainability issues that can be identified. This is due to the local community's resources that would be invested in a specific area in which other areas in the country would not benefit from them. However, conducting a top-down approach only cannot ensure delivering the equality of opportunities across the country. This is because different areas in the country might not be the same in their development levels. Some areas might need more PWs projects to be delivered while others might need less. Experts P1-P2 and P4-P5 argued that the local community knows their requirements more than others. Therefore, the interactions between top-down – bottom-up

approaches can ensure the interests at the higher levels are consistent with the needs at the lowering levels which make the proposed integrated approach works better.

Experts P1 and P3-P5 stressed that the two approaches can interact with each other. This means that the top-down approach is carried out by the government and the decisions will be made by the top management level that the government's interests will be translated into a policy based on specific sustainability issues. On the other hand, the bottom-up approach will be carried out by the local community. The interactions mean that the local community can respond to the national policy and identify sustainability issues arising at the local level.

However, Experts P3, P5, and P6 stated that these two approaches may conflict, and in this conflict, the top-down approach has the upper hand. This means that usually, the top-down approach delivers the policy for the country where the interests and goals are needed. On the other hand, at the bottom-up approach, the needs of the local community are identified to be met. Therefore, this might make a conflict between both approaches in which the government's trends are similar to the needs of the local community or not. As a result, the proposed approach as it stands can ensure that the communication top-down – bottom-up approaches to be conducted properly. Experts P3, P5, and P6 built their arguments that the proposed process breaks down the SDGs from the national level to the local level into specific objectives and then targets. Therefore, the governments' interests can be seen at the lowering levels. Experts P2-P4 agreed that the local community will identify the need based on the issues arising from the assessment. The feedback from the local community then can ensure the strategic alignment of SPWs remains consistent with the ministries' primary services.

Expert P4 stressed that top-down – bottom-up approaches can build trust between the government and the community and improve communication channels within all management levels. Therefore, communication between national and local levels can provide valuable information to be used for reducing the conflicts in the interest between the government and the local community.

Experts P4 and P5 agreed that with an effective bottom-up approach allowing a set of modifications and changes on the policy driven by a top-down approach can be occurred on the way to be sustainable. As a result, most Experts P1-P3 and P5 agreed that the communication in both way top down – bottom up is essential to be considered in the proposed integrated approach that the government can set its goals

at the national level, then, the local communities can follow the government's goals and ensure their needs are met.

Experts P3-P5 stressed that if the proposed integrated approach is applied on a consistent basis, the used language and the direction of information flow will go up-down quickly and the transfer of the information and issues at each level will be very easy and clear. Overall, it is very well explained, and the arrows and communications are very clear in how they are working. Expert P6 stated that stakeholders engagement at each level of PWs development as proposed is theoretical while in practice this can be applied in small scale projects in order to ensure the outcomes are well studied and to learn from lessons and drawbacks.

Nearly half of experts P1 and P5 agreed that the national level is understood as the country level and where the prime minister can create the vision of the country. They added that it is clear that the sub-national level where the ministers of all sectors are, and at this level the overall sectors of the country should follow the national vision of Jordan 2025. However, expert P5 mentioned that in Australia the sub-national level refers to provision and state while in Jordan this level refers only to the ministries that focuses on the infrastructure. This means that in each country, the structure and the system are different especially when comparing large- and small-scale countries due to the differences between them. Almost all Experts P1-P3, P5, and P6 agreed that it is clear for all of them that the local level is known by them as to where the projects are proposed for the local community. This means that at the local level, the policy of the country which should be followed by the ministries will be translated into a set of infrastructure projects refer to water, energy, health sector, education and, etc.

Experts P1-P6 all agreed that the comprehensive vision of PWs development in Jordan is very useful that all sectors in the country will work together and coordinate with each other in order to identify where the critical issues in each PWs sector are. Expert P3 provided an example to clarify this that for example, the minister of the health sector with coordination with other sectors of PWs might say that there is a need to build a hospital for 10 thousand people. As a result, the relevant stakeholders of PWs development should meet together in order to create a comprehensive plan for this project taking into consideration the water and energy networks for example, and public transportation system that are needed to support building the new project. This is essential to remove any conflicts between any sector of PWs and ensure the consistency of creation PWs development in Jordan.

Table 7.13 presents measures proposed by the Non-Jordanian experts to ensure the realistic linkage between the levels of PWs development in Jordan and the actions taken to modify and/or refine its components accordingly.

Table 7.13 Validation Interviews: Measures proposed for improvements

Proposed improvements	Action taken
There is a need to consider both directions of communication (top-down and bottom-up) P1-P6	<ul style="list-style-type: none"> Added the arrows and link them with each level of development
There is a need to ensure each level of PWs development follows the previous levels P1, P5.	<ul style="list-style-type: none"> Added the link that clarifies the flow of information from top-down direction

7.5.6.3 A Proper Application of the Integrated approach and the Barriers Behind not Applying the Integrated Approach

Table 7.14 presents statements proposed by the Non-Jordanian experts throughout conducting the validation interviews refer to a proper application of the proposed integrated approach. The general and most common statements which were provided by the Non-Jordanian Experts are only provided.

Table 7.14 Validation Interviews: List of statements

Non-Jordanian experts' statements	Experts					
	P1	P2	P3	P4	P5	P6
The proposed integrated approach can be applied in a real-life scenario to obtain significant achievements in sustainable development.	√		√	√	√	√
The proposed integrated approach is logical in its structure. However, it is very difficult to follow its process in practices due to such constraints as such the combination and the interactions between the main four components of the integrated approach.	√	√	√		√	
All sectors in the country need to work collaboratively. Therefore, the political will is one of the main enablers that can ensure the proposed integrated approach is followed.		√	√	√	√	
The proposed enabling environment is linked to each level properly. The enabling environment as it stands facilitates the integration of SA at each level.	√	√	√	√	√	√
The continuous monitoring at each level of development will ensure that emerging policies, plans, and projects can achieve sustainable development.	√		√			√

All experts P1, P3-P6 agreed that the proposed integrated approach can be applied in a real-life scenario to obtain significant achievements of sustainable development. The approach theoretically does the integration of SA into PWs development in Jordan. As a part of the assessment, the emerging policies, plans,

and PWs projects can be assessed against sustainability. However, the application of the integrated approach needs a lot of work from different parties in the country as such the policymakers, mayors, civil societies, and local communities without leaving anyone behind. In addition, the proposed integrated approach should be enforced to be applied through the emerging policies, plans, and PWs projects. This can be achieved by creating SA regulations that can ensure the application of SA by using the proposed integrated approach to become compulsory in practice rather than optional. This can be achieved throughout the process of PWs development and from the policymaking to selecting PWs projects.

Experts P1-P3 and P5 agreed that the proposed integrated approach is logical in its structure. However, it is difficult to follow its stages and actions in practices due to the combination and the interactions between its main four components and working with relevant stakeholders. Therefore, there is a need to simplify the approach for the government by giving them guidelines and implementation guides to be applied in practices throughout providing detailed explanations of how the integrated approach works.

Most experts P2-P5 agreed that if the approach is followed in detail, the infrastructure of a country as such Jordan can develop it to a sustainable state. The Experts P2-P5 built their arguments based on the structure of the proposed integrated approach that includes the main practices in which they interact with each other's to assess the emerging policies, plans, and PWs projects. However, this will not be easy to achieve the desired situation of SPWs development while this needs from all sectors in the country to work collaboratively and ensure the coordination between them. Therefore, the political will is one of the main enablers that can ensure the proposed integrated approach is followed. Indeed, while there is a proposed enabling environment to ensure the integration of SA into PWs development, without a political will the approach would become optional to be applied rather than a compulsory requirement in practice.

All Experts P1-P6 agreed that the proposed enabling environment is linked with each level properly. They stressed that the enabling environment as it stands facilitates the integration of SA at each level. Experts P2, P5, and P6, stressed that the proposed enablers at each level of PWs development are linked with each other. They stressed that the enablers as they are proposed cannot act separately while they should interact with each other.

All experts P1-P6 agreed that while each country has different enablers due to the country systems, structures, and its interests, the proposed ones all are fit with a country in the developing world as such Jordan. Experts P3-P6 confirmed that these proposed enablers cannot fit in all with developed countries due to the well-developed systems that they have. Therefore, the proposed integrated approach can be more realistic to be applied in a country in the developing world than to be applied in the developed ones. Experts P1-P2 have different perspectives in which the enabling environment in the developing world should focus on developing the skills of relevant stakeholders who will apply the proposed integrated approach as well as improving the awareness at each level of PWs development in need to conduct SA. The government cannot apply the SA process without making awareness and providing the full picture of how to follow the integrated approach and creating new tools to inform politicians and decision-makers.

Table 7.15 presents measures proposed by the Non-Jordanian experts refer to a proper application of the proposed integrated approach and the actions taken to modify and/or refine its components accordingly.

Table 7.15 Measures proposed for improvements

Proposed improvements	Action taken
The integrated approach is proposed in high-level details P2-P3, P5.	Recommend preparing guidelines (manual) for how to use the integrated approach
The starting of implementing point is needed P6	Added the term 'start' to the proposed integrated approach
The high-level details of the proposed integrated approach should be consistent with each stage of PWs development P2-P3, P5.	Added the term 'detailed actions for each stage and add 'IA' for each stage refer to 'Integrated Approach'
The KPIs at the sub-national level should be followed by the local level P5, P6.	Added the 'KPIs' and linked with the need at the local level.
The assessment for selecting the most sustainable option of PWs should include Smart tools and/or techniques	Added the term 'Smart' to the assessment of selecting the alternatives.

Experts P2, P3, and P5 stressed that under the proposed SA process the proposed integrated approach is in high-level details which does not provide how to be followed. Each stage needs to be elaborated and broken down into lower-level details to make it easy to follow. In addition, Experts P3 and P5 suggested creating a manual (guideline) to the users on how to apply the integrated approach. Therefore, this might need to conduct workshops with politicians and make a significant change

in the existing government practices. This do need a lot of work from different parties in the country to see changes in PWs development in Jordan and along the whole process from policymaking to selecting individual projects.

Expert P2 mentioned that the proposed integrated approach process is appropriate to ensure the sequence of creating PWs development in Jordan. However, the expert suggested the sequence in a different way that starts with the inputs, actions, outputs, and outcomes. This means that for example in creating a hospital, the inputs are the requirements for certain people in the community who need improvements in the health sector and who encouraged to build a hospital, the actions then will be to build the required hospital, the outputs will be the certain number of people who got served by creating new hospital while the outcomes will be to deliver a healthy society with a sustainable health sector. Therefore, there is a need to follow this flow of (a program logic) by studying the need for PWs infrastructures and made the right decisions to deliver them for the local communities. As a result, expert P2 added that the starting point when applying the proposed integrated approach then focus on the inputs which represent the SDGs that should be formed in the context of Jordan. Thus, following the inputs based on the country's needs and interests will be appropriate to ensure getting the desired outcomes from the proposed integrated approach in practice.

Most experts P1-P3 and P6 agreed that continuous monitoring at each level of development will ensure that emerging policies, plans, and projects can achieve sustainable development in the country. However, experts P2-P4 and P5 realised that it is not only to make sure that all the stages at each level of PWs development are followed properly is a challenge, but it is also a challenge to make sure that the getting the desired outcomes from following the proposed stages of the integrated approach. They are confident that the monitoring as it presented and linked with each level of PWs development is adequate to ensure compliance with achieving sustainable development. They added that under the proposed process of monitoring at each level of PWs development, ensuring the alignment between the national vision of SA in Jordan and ground reality can be achieved.

Experts P5 and P6 defined the KPIs as a measurable tool that demonstrates how can effectively achieve the key sustainable objectives. Therefore, they stressed that the KPIs at the sub-national level should be followed at the local level. Therefore, they believe that there is a need to extend them to the local level. They added that some issues might be seen at the sub-national level which might not be seen at the

local level. Therefore, extending the KPIs from the sub-national level to the local level is necessary. Expert P6 added that the evaluation of the achievements of each strategic sustainable objective can be measured by a set of KPIs that should be linked with each objective in order to identify where the weaknesses are in the existing process and identify a set of lessons learned. This can ensure that strategic sustainable objectives are linked with the people's needs towards a better quality of life with respect to environmental, social, and economic issues.

Expert P6 criticised one issue in the proposed integrated approach that where is the starting point of the implementation of the approach. This means that there is a need to add the term 'start' to the proposed integrated approach. Experts P3 and P5-P6 stated that the main issue risen from the proposed integrated approach is how to conduct the assessment at the local level and in a smart way. They do believe that the proposed activities are clear in practice. However, there is a need to add smart tools and techniques to conduct the assessment process for selecting the most appropriate alternatives of PWs al the local level. Experts P5 and P6 added that conducting a multi-criteria decision-making method when selecting the most appropriate options of PWs development needs further research. This means that PWs infrastructures that have positive impacts on the environment, society, and economy will be only accepted to be delivered.

Expert P5 stated that building infrastructure has negative impacts. In fact, studying infrastructure sustainability is not as studying sustaining in different means in the country. Therefore, at the local level, it is very useful to use different assessment tools that can help to identify the most sustainable option to be delivered.

All experts P1-P6 agreed that, although the integrated approach holds significant potential to assess the emerging policies, plans, and PWs projects, several barriers can be outlined behind not applying it in the real-life scenario as provided in Table 7.16.

Table 7.16 Barriers behind not applying the integrated approach

Barriers	Non-Jordanian Experts					
	P1	P2	P3	P4	P5	P6
Lack of skills and experiences	√	√	√	√	√	√
Resistant to change		√		√		
The availability of funding		√		√		
Lack of political will		√	√	√	√	

All Experts P1-P6 confirmed that at each country there are set of barriers to adopt any new system especially when it makes a change in the traditional behaviour to sustainable behaviour. According to the experts P2-P5, one of the barriers to practicing the proposed integrated approach is the lack of political will that enforces adopting it in a real-world scenario. In addition, the proposed integrated approach is formulated in the context of a country in the developing world, where the capabilities, skills, and experiences are still weak. Therefore, this might cause missing elements, stages, and components when following the proposed integrated approach. Therefore, expert P5 stressed that educating different stakeholders who will be in charge to follow the proposed integrated approach is essential.

Experts P2 and P4 added that there are other barriers for applying the proposed integrated approach as such the availability of funding that delivering SPWs project might be costly. Therefore, proposing SPWs by this approach can make the decision-makers think twice in how to ensure the only SPWs will be delivered. Moreover, experts P3 and P5 added that understanding the culture, the availability of resources, the level of knowledge that the people have and from those resistant to change, the alignment with each sector in its purpose and trend are essential for relevant stakeholders to work together and in the same view to create a comprehensive vision for SPWs development in the country.

Experts P5 and P6 stressed that testing the overall proposed integrated approach is by applying it at small scale areas in Jordan are considered a preliminary assessment that can be done to ensure the approach is ready to be implemented. P6 added that sharing the success story of practicing the integrated approach can encourage the others to follow and then learn from the experiences. This can ensure overcoming any drawbacks and limitations in the proposed integrated approach.

Lastly, overcoming these barriers might have a strong influence to follow the integrated approach process to achieve the intended outcomes upon the environment, society, and the economy.

7.6 The Validated Integrated Approach

Based on the results from the Jordanian Experts using the Delphi validation method, and Non-Jordanian Experts using validation interviews there were minor modifications had been made on the proposed integrated approach at each level of development: first, to link the national level with the enabling environment and the monitoring, evaluating, and communication bars. As a result, some additional

contents to the enablers were added to match the changes. Second, some details were modified in the given stages of the integrated approach as well as such terms reworded. Finally, some arrows were reallocated to ensure consistency and remove potential confusion in the integrated approach when assessing emerging policies, plans, and projects.

Apart from that, all the layout and details of the framework remain intact. The integrated approach, eventually, has been developed as shown in Figure 7.6. It contains all the details which have been verified and validated in the current research study within the four main elements which are interacting with and interrelated to each other. These elements are, namely, the baseline of SA goals (which includes environmental, social, and economic), the enabling environment, the development levels and structuring the policymaking process to select individual PWs development. Indeed, the integrated approach has been confirmed valid by the experts who note that the elements and their connections should be viewed holistically and encompassed simultaneously in order to accomplish a completely full picture on how to integrate SA into PWs development in Jordan. In this case, following the guidelines as proposed in the integrated approach provides important insights into the assessment of sustainability for emerging policies, plans, and projects of PWs development in Jordan. Beyond that, the integrated approach also provides a clear methodological process that can help policymakers, planners, and developers of PWs development to make the right decisions regarding sustainable development. It is a process that has the potential to increase the sustainability performance of PWs development outcomes which, in turn, will result in equal opportunities across the country. The proposed integrated approach can ensure both top-down – bottom-up approaches can interact with each other. As a result, the communications between these approaches can ensure the interests at the higher levels are consistent with the needs at the lowering levels which make the integrated approach work better.

Lastly, as shown in figure 7.6, it is important to understand that the black colure refer to the existing practices of PWs development in Jordan. The red one refers to the MGT findings, Blue colour refer to the findings from Delphi method and the green colour refer to the findings from Non-Jordanian experts using validation interviews. Detailed discussions are provided in the next chapter on how the integrated approach works.

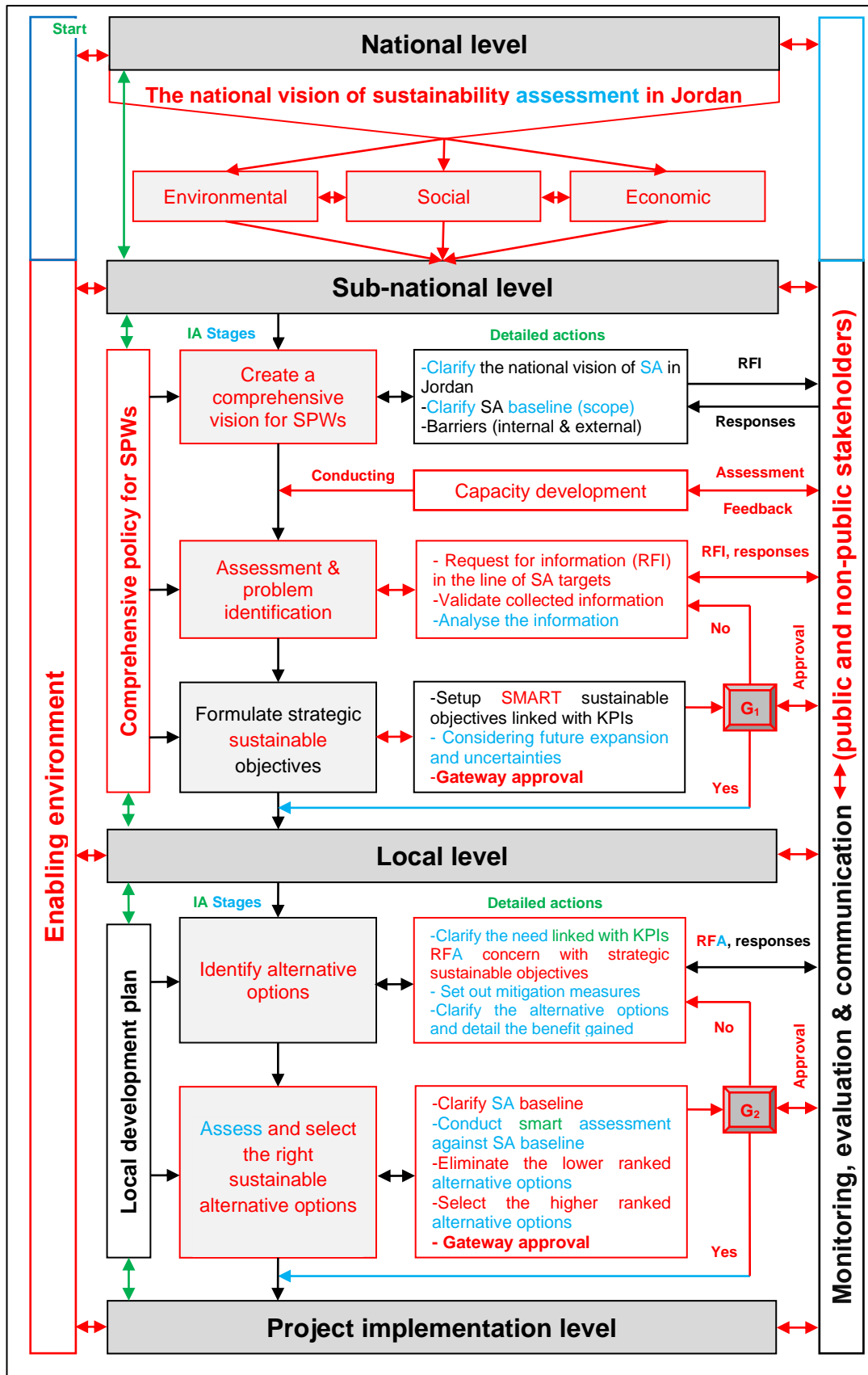


Figure 7.6 The validated integrated approach (IA) of SA into PWs development in Jordan (Adopted by the researcher from the MGT findings, Delphi validation findings, and validation interviews with Non-Jordanian Experts), where, G₁&G₂ are the gateway approvals.

7.7 Summary

In summary, this chapter discusses in detail the development process of the integrated approach and how to integrate SA into PWs development in Jordan. The chapter clarifies how the integrated approach was validated using the Delphi method. The results that emerged from the validation method, which made improvements on the proposed integrated approach, indicate that the proposed approach is appropriate to be conducted in Jordan by considering some modifications to its structure. The overall improvements/modifications on the integrated approach that have been considered from both rounds are marked up in blue and provided in Figure 7.5. They are employed to reflect the proposed integrated approach using MGT and then present a valid integrated approach to be applied in Jordan. Then, the approach was presented to a group of 6 from Non-Jordanian experts in the field and they provided feedback of the integrated approach. This is an external validation approach in which to get feedback from external sample outside Jordan. Their feedbacks were used to modify the integrated approach that all changes and additional information were provided in green. The next chapter discusses the overall findings and how the integrated approach can be used in the assessment of emerging policies, plans, and SPWs projects development in Jordan. It reflects critically the international practices on the findings of the current research.

Chapter 8 Discussion

8.1 Introduction

The preceding chapter shows how the integrated approach has been developed and validated. This chapter draws the findings to discuss the emerged (categories) from the fieldwork study in Jordan namely; the SA process, its goals and targets, the SPWs development levels, the enabling environment, and the structure of policymaking process to select individual projects. The chapter clarifies the rational sequence of SPWs development in Jordan and the contribution to theory and practice. The critical reflection of the international SA practices in PWs development in Jordan and the new findings from the fieldwork study compared to the international SA practices are provided. There is also a consideration of the less-reflected international SA practices in PWs development in Jordan. It discusses how the aim and objectives were achieved and how the research question was addressed. Finally, the limitations, recommendations, and further research are provided.

8.2 The Need for SPWs Development in Jordan

In Jordan, the existing definition of sustainability refers to the continuity of providing public services to citizens. The findings indicate that SPWs development in Jordan is a process and a final product. Raynsford's (2000) definition confirmed the findings that sustainability in the construction industry is a process to create a final product. However, this definition does not capture the overall picture of sustainability. Therefore, the findings suggested a further definition for SPWs development that captures sustainability dimensions (environmental, social and economic). It is continuity in providing service requirements for current and future generations that reduce the negative impacts on the environment, improve the living standards of people, enhance the economic growth and conserve limited Jordanian resources. This is totally reflected the view of the literature which states that there is a common agreement that sustainability is understood through its three dimensions, often referred to as triple bottom line TBL (environmental, social and economic) (Aarseth et al., 2017; Banihashemi et al., 2017; Carvalho and Rabechini, 2017; Kivilä et al., 2017; Othman and Ahmed, 2013; Zabihi et al., 2012).

However, the existing practices of PWs development are not ideal. It creates inequalities in opportunities and the overall service requirements of people are not achieved. Therefore, the findings pointed out that, considering sustainability in PWs development can ensure equality in opportunities. This is confirmed by Wang (2014) and Zhang et al. (2014), that public infrastructure has long-lasting environmental, social and economic impacts on communities. As a result, the need for SPWs development in Jordan is justified due to the financial situation, poverty, environmental degradation and limited natural resources (Awad, 2016; MPIC, 2016a). Adding to that, 'high unemployment rates and low private sector competitiveness' and high public debt, are considered the most significant challenges facing Jordan's economy ((MPIC, 2016c, p1), which is classified as an "Upper-middle income country" (MPIC, 2017a).

8.3 Structuring Elements of the Integrated Approach

In this section the overall elements of the integrated approach are discussed critically, reflecting the international practices of SA on the findings. In addition, drawing these elements together shows how SA is integrated into PWs development in Jordan, which resulted in the integrated approach. The findings confirmed that there are four main elements that need to be considered in order to integrate SA in PWs development in Jordan which relate to:

1. Identify SA processes, goals and targets for SPWs development in Jordan.
2. Link the development levels of SPWs development in Jordan.
3. Create an enabling environment at each level of SPWs development in Jordan.
4. Structure a comprehensive SPWs development process in Jordan from policymaking process to select individual projects.

8.3.1 Sustainability Assessment Process

Having studied the existing practices of PWs development in Jordan, there is a lack of considering SA process from policymaking to select individual SPWs projects. As a result, the process of SA becomes new in the context of PWs development in Jordan. Therefore, the findings indicate that SA is a process to assess the PWs development can achieve sustainable development in the country and at the early stages. This is supported by Sharifi and Murayama (2013), where SA is a tool to measure in which the SDGs are achieved. As a result, SA can direct the decision-

making process and becomes integrated into policymaking in (one process) without a separation between them to select individual SPWs projects. This, in turn, results in a strategic link between national policy and ground reality in Jordan. This is confirmed with the research done by (Mansourianfar and Haghshenas, 2018; Mathur et al., 2008; Sala et al., 2015; SCC, 2011; Shen et al., 2010; Sierra et al., 2018), in which SA should be integrated from policymaking, plan development and select individual projects. It is further reflected by (Bond et al., 2012; Mathur et al., 2008; Sala et al., 2015), where SA should not be a separate process, rather, it should be closely integrated with the strategic decision-making. As a result, this is reflected in the findings' justification for the early integration of SA into PWs development in Jordan. The findings also suggested a rational SA process stages to be followed in Jordan as shown in Figure 8.1. These stages are namely: identify the scope of assessment, goals and targets (baseline), conduct the assessment against the baseline, identify assessment options, assess purposes options and selection, decision-making and adaption then finally monitoring and evaluation.

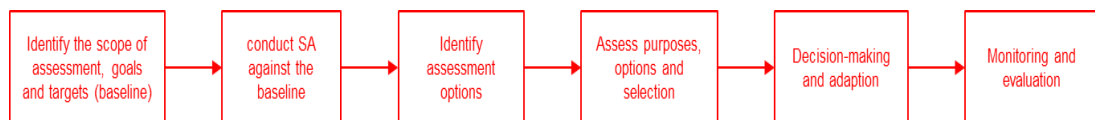


Figure 8.1 SA process in Jordan

The international SA practices as such (Bond et al., 2013; Historic England, 2016), indicate that the screening stage is needed, while this stage is not reflected in the Jordanian context. The first, second and fourth stages in proposed SA process in Jordan are fit with the international practices according to (Bond et al., 2013; George, 2001; Gibson et al., 2013; Historic England, 2016; Sala et al., 2015). However, stage three is fit with (Bond et al., 2013; George, 2001; Gibson et al., 2013; Historic England, 2016), while stage five is fit with (Bond et al., 2013; Historic England, 2016; Sala et al., 2015) and stage six of SA in Jordan is fit with (Bond et al., 2013; Gibson et al., 2013). All these international SA stages are fully discussed in Chapter 3 in the current thesis. It is clear that Jordan does not have the same process stages as such the international forms. This means that the international practices do not reflect all in Jordan. The findings indicated that due to the proposed practices of SA in the context of PWs in Jordan, there is a need to simplify these processes rather than making them complicated. Though, the findings indicated that only 83% of the response rate compared to other stages was on the monitoring and evaluation. This is due to the following up of the practices whether to ensure compliance to sustainability or not, which is unlike policymakers.

It can be concluded that some researchers prefer merging different stages together and make them simpler, while others split each stage into sub-stages. In fact, there is no common agreement that specific stages are fit to all countries, while the most important thing is to ensure the compliance in following these stages in proper way (Bond et al., 2013; Gibson et al., 2013).

8.3.1.1 Sustainability Assessment Goals and Targets

The existing practices of PWs development in Jordan as aforementioned in Chapter 4 (Table 4.1), indicated that the conventional goals, targets and indicators are dominant for assessing the current situation of Jordan in the context of PWs development. However, little of goals, targets, and indicators are in line with the sustainability, but most likely to be in line with social sustainability than the other dimensions. Therefore, the findings agreed that there is a need for identifying sets of SA goals and targets to be considered as a baseline for assessment (Table 6.3). This is strongly confirmed by (Bond et al., 2013; George, 2001; Historic England, 2016; Sala et al., 2015), in which the baseline of SA is crucial to understand where the country living up to now, in order to draw up the desired situation that needs to be achieved. This is further reflected by the Sweden Government (2017), that Sweden should be assessed against the baseline of sustainability to understand where the country is living up to these goals and targets. As a result, in order to ensure the SDGs are integrated, the assessment becomes the main priority for the country.

In fact, at the global level, 17 SDGs were proposed by the UN assembly in 2015 (UN, 2015a), and a list of targets and 230 indicators were provided by the UN Agenda (IAEG, 2016), which can be used to assess the achievements of each goal. In fact, the goals and targets that Jordan intends to achieve are provided in Table 6.3 derived from the documentary data (ME, 2017b; EPC, 2018; GoJ, 2015; ME, 2016; MPIC, 2017a), and the fieldwork study in Jordan. Indeed, each country has its specific goals, targets and indicators based on its interest, regulatory frameworks (Pope et al., 2017; Yigitcanlar et al., 2015). However, the findings indicated that it is difficult to propose what are the indicators to assess the achievements of each goal. This task is carried out by the policymakers in the country with a wide range of experts in each field which becomes a difficult task. In addition, in practices, it is very difficult in cascading the SDGs in the context of Jordan. This is by itself needs developed approaches and models that include different stakeholders in the whole country. Therefore, further research is needed in order to propose a list of indicators for each SDG in the context of Jordan.

The findings also indicate that these goals need to formulate the SDGs 2030 Agenda for the country at the national level. Consequently, according to sustainable development report of Jordan (MPIC, 2017a), these goals are prioritized as follows; SDG1 (No Poverty), SDG2 (No Hunger), SDG3 (Good Health and Well-being), SDG4 (Education), SDG5 (Gender Equality), SDG6 (Water), SDG7 (Energy), SDG8 (Prosperity and Decent Work), SDG9 (Industry, Innovation and Infrastructure), SDG11 (Sustainable Cities and Communities), SDG13 (Environment and Climate Change), SDG15 (Life of Land) and SDG16 (Justice, Human Rights, and Participation). Therefore, the findings stressed that these are the main sustainability issues to be given more attention in Jordan particularly in PWs development. Bhattacharya et al. (2016) reflects the findings in which the main aim of these goals is to invest in sustainable infrastructure. As a result, these goals become a baseline for any country (MoEnvi. of Egypt, 2014; UN, 2016b).

Moreover, the findings stressed that there is a need to follow global trends. This means that enhancing Jordan's image globally and its compliance with the globe's trend can be driven by the UN views with respect to sustainable development. This is totally matched with (MPIC, 2016a; MPIC, 2017a) which reported that Jordan has shown its commitment to achieving sustainable development through participation in international agreements and conferences in order to understand how to embedding these SDGs into its policies. The commitment of Sweden (Sweden Government, 2017), UK (DID, 2017), Switzerland (Swiss Confederation, 2016), Canada (Government of Canada, 2018) and Australia (Australia Government, 2018) reflect the findings when these countries responding to the SDGs 2030 Agenda by assessing their current situation in which they live up to now from these goals, as well as the way for how to achieve these goals at home and around the World. For that, formulating SDGs contexts is essential for understanding the particular needs associated with project development in developing countries (Sourani, 2008), which is totally matched with the findings of the current research. However, one of the differences between these countries and Jordan that Jordan is focusing only on its issues to be achieved at home while the developed countries tend to achieve these SDGs at home and around the World. This is due to Jordan is a small developing country face many sustainable development issues that need to be overcome, like other developing countries around the globe.

Finally, the findings indicated that there are four levels of SDGs that need to be followed in the context of Jordan. This means that at the national level, the SDGs will be generic and then become in more detail throughout each level from the sub-

national level to the local level. The targets of SA are derived from the national SDGs to be set out at the sub-national level. The indicators of SA should be developed based on the targets of SPWs development to be examined at the local level. This is totally confirmed by Hák et al. (2016), that the SDGs should be broken down from being abstract at the macro level to be more understandable in the context of project development and at the micro level.

8.3.2 The Development Levels

The existing practices of PWs development in Jordan show that the development levels are not linked with each other, and not influenced or reflect each other (Figure 4.1). In addition, the existing practices do not link the national vision of Jordan with local and project implementation levels. The findings, however, indicate that there is a need to identify the development levels of SPWs development in Jordan. It should include global, national, sub-national, local and project implementation levels. The findings also indicate that all provided levels are reflected with the international practices, such as (OECD, 2016b). However, slight differences in the outputs from each level are due to the context of Jordan, as the same as the devolvement levels in England and Germany that include regional level i.e. (Mell et al., 2017) while in contrast, Jordan does not, see Chapter 2. Figure 8.2 shows the development levels which were proposed by the findings of (MGT in red and validation in blue), the outputs from these levels and the linkage between them.

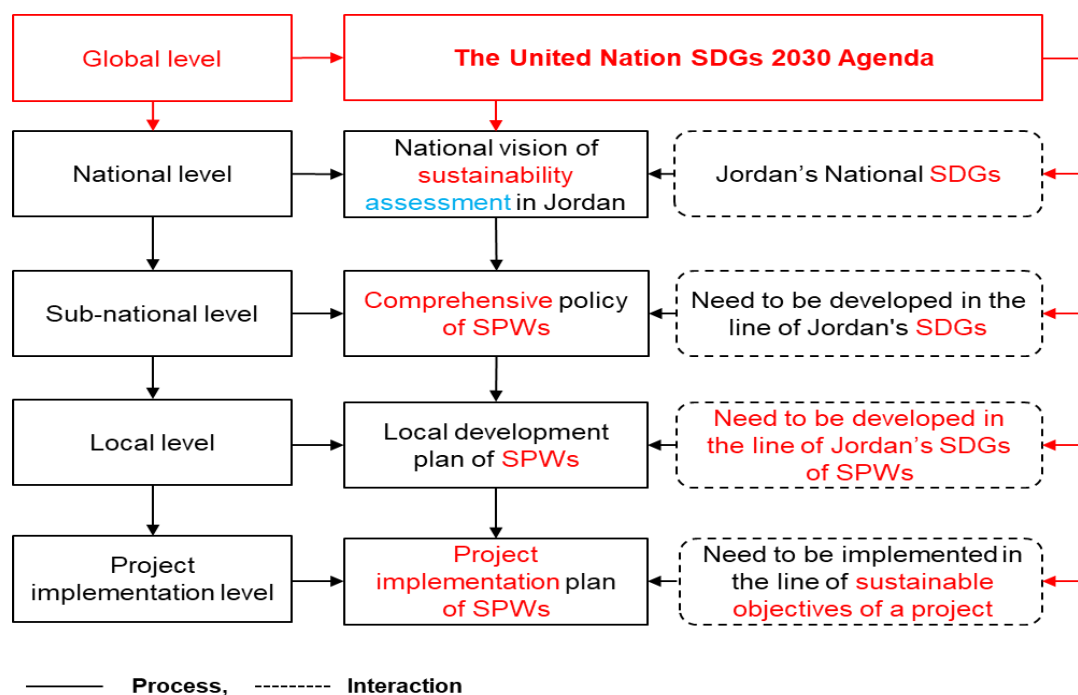


Figure 8.2 SPWs development levels

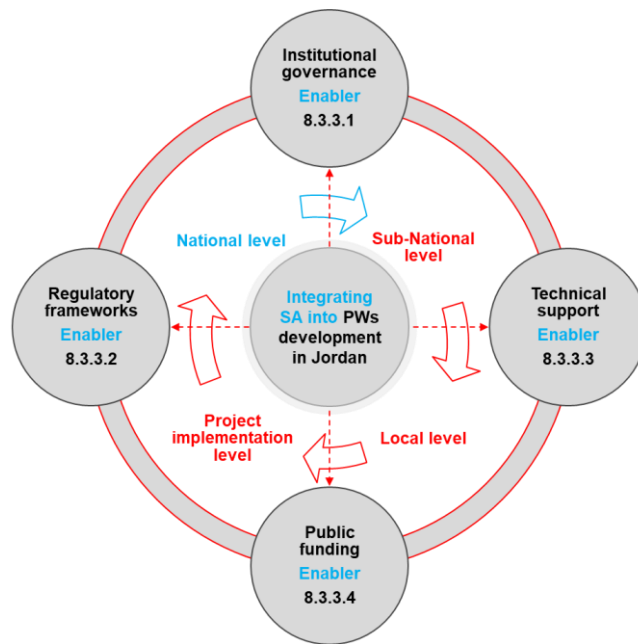
The existing practices of PWs development in Jordan in Chapter 4 show that many inputs are considered at the sub-national level to formulate a policy for conventional PWs development. However, the variety of these inputs can create conflicts of interest. Accordingly, the findings indicate that, at each level of SPWs development, SA goals at the national level should be derived from the SDGs 2030 Agenda. While, the sub-national comprehensive policies' objectives should be driven from the national vision of SA in Jordan, and the objectives of selected SPWs projects should be derived from local development plans. The findings indicated that some of the global SDGs do not fit with the country as such Jordan while others do fit. Therefore, this needs a lot of works and from different stakeholders in the country without leaving anyone behind in order to assess the country against the SDGs. George (2001), and OECD (2016b) reflect the findings in which national objectives of sustainable development are derived from the global SDGs proposed by the UN, where regional objectives are derived from the national objectives, and lastly the local objectives should all be derived from regional objectives. As a result, the findings suggest that at the national level, the Jordan Vision 2025 should be updated to include the SDGs 2030 Agenda, to become the national vision of SA in Jordan. This is followed by the sub-national level to create a comprehensive policy for SPWs development including the objectives derived from the national level to the local level, involving the development of the local plan to select SPWs projects. However, the project implementation level is not studied in detail in the current research.

8.3.3 Enabling Environment

The findings stressed that in order to show how to integrate SA into PWs development in Jordan, the enabling environment needs to be identified. This is consistent with (Du Plessis, 2007; Qureshi, 2015; Sourani, 2013), in which the developing countries in particular need to create an enabling environment, to ensure the sustainability can be operated at different scales and time horizons. Thus, there is a need to clarify which enablers should be developed in Jordan. The existing practices of PWs development indicated that there are four enablers for PWs development (Figure 4.2). However, the existing enablers are most likely to be separate, with no link or interactions between them at each level of PWs development. The findings stressed that there is a need to make such improvements on the existing enablers to ensure that they effectively facilitate the integration of SA into PWs development in Jordan. The findings, therefore, point out that the interactions between these enablers clearly support sustainable development. The findings have reflected the view of Du Plessis (2007), which indicates that clear

enablers affect each other to support sustainable development. This is further reflected that, the interaction between these enablers is essential for producing sustainability in policy development (Qureshi, 2015; Sourani, 2013).

The findings indicate that four enablers are major in the current context: institutional governance, regulatory frameworks, technical support and public funding which can create a viable response to sustainable development (Figure 8.3). The black lines and texts are the existing enablers, the red are the findings from MGT, and the blue are the findings from the validation using the Delphi method.



----- Interaction

Figure 8.3 Enabling environment

The findings reveal that the institutional governance is governed by the regulatory frameworks that the policymakers, planners, and tenderers will work within the regulations, legal frameworks, laws and design codes. This is confirmed by William Dobson (2013), that government regulations have a large effect on sustainability practices adoption within the construction industry.

The findings stressed that institutional governance’s stakeholders should have the technical skills and knowledge to support sustainable development. On other hand, public funding can ensure the emerging policies, plans and projects which are in the line of sustainability are translated into reality. This is compatible with literature, in which funding is a fundamental part of achieving sustainability for example (Edama, 2016; Robichaud and Anantatmula, 2010; Sourani, 2013; Sourani and Sohail, 2011), and further confirmed by Martin and Walker (2015) that the lack of funding is one of

the barriers for policy implementation to achieve its objectives. Consequently, there is a need for more attention to ensure funding is consistently available. However, with the availability of public funding, the institutional governance can work on policymaking, plan development and then selecting SPWs projects. In addition, compliance with regulatory frameworks requires innovative methods such as clean technology to be funded. Therefore, this can ensure how the interactions between these enablers occur. The following sections discuss these enablers comparing the findings with literature and international experiences.

8.3.3.1 Institutional Governance

The findings reveal that there is a need to modify the existing institutional governance of PWs development in order to meet the requirements of SPWs development in Jordan (Figure 4.3). Institutional governance can be defined as the organization structure which bears direct responsibility for all aspects of the executive management in the government department and is accountable to senior management for effective performance, and compliance with policy implementation according to MPSD (2014a). In PWs development, the findings indicated that institutional governance plays a key role to ensure compliance with regulations and requirements needed for sustainable development and to work within the availability of public funding and technical requirements.

The findings thus suggest three committees to be linked with the higher national committee of sustainable development in Jordan namely, the sub-national committee, local committee, and project implementation committee. The findings have reflected the view with (MDPS, 2014; OECD, 2016b) that the establishment of the sustainable development committee and sub-committees are needed with formulating the SDGs. It is further confirmed that, it is important to include national, sub-national and local governmental levels in the implementation of the SDGs (UNDP, 2017).

In Jordan, the higher national committee of sustainable development (HNCSD) was established in 2017 (MPIC, 2017a). It includes the coordination committee, technical committee and working groups from different bodies and sectors in the country. This goes with the international practices that many countries established a national committee for sustainable development (UNDP, 2017). However, reflecting the structure of these committees on the HNCSD in Jordan, indicate that, the Indonesian, Colombian and Nigerian scenarios are slightly similar to the Jordanian context in which they include steering, coordinating and monitoring

committees according to (UNDP, 2017). This might be due to these committees are particularly established for developing countries such as Jordan where slightly differences are due to the context of the country.

The findings indicate that, in Jordan, and due to the instability of the government, and ministers are always being changed, which results, in unstable the decisions being taken for PWs development in Jordan. According to OECD (2017), all infrastructure investment decisions are ultimately political and no socioeconomic assessment tools will ever replace political decision-making, however. Hence, decision-making involves the highly political interests of policy-makers (Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009). The findings, therefore, have reflected previous views of which the unstable decisions often result from the successive changed ministers. Indeed, politicians can be subjected to focus on their own interests rather than those of their constituents that in developing countries, politicians are more likely to build big projects as part of a so-called “big man syndrome” (Tadege Shiferaw and Jonny Klakegg, 2012; p.26). Therefore, assessment tools of sustainability can be used to help improve the quality of political decisions and increase the role of deliberation in decision-making.

The findings suggest establishing cross-sectoral governance that can ensure the coordination between each sector in the country. It is thus, important to create sub-national, local and project implementation committees linked with the higher steering committee (the Prime Minister of Jordan) (Figure 8.4).

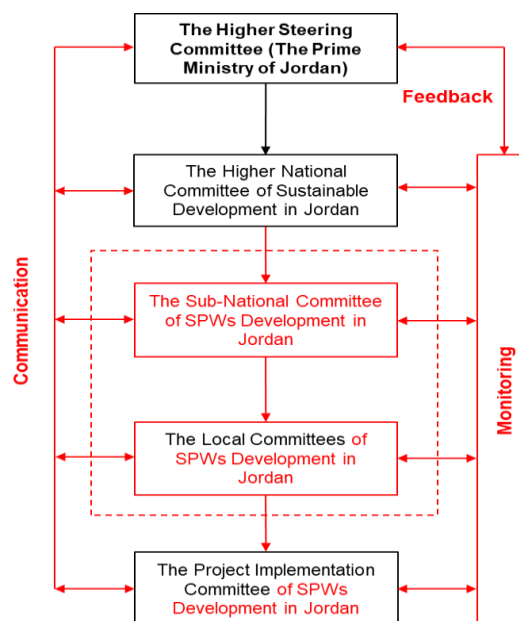


Figure 8.4 The institutional governance

This is in line with Tadege Shiferaw and Jonny Klakegg (2012) that, there is a need for formal institutional governance to allow control and manage delivery of project development, and further confirmed by Sachs (2012, p.2208), that “the three bottom lines will depend on a good governance at all levels, local, national, regional, and global”. Following the need for these committees, the findings show that the higher national committee formulates the SDGs in the context of Jordan and then assesses the current situation of the country to understand where Jordan is living up to these goals provided in (Table 6.3). The national committee should include different ministries in the country to study the current situation and then shape the SDGs in the context of Jordan. The findings have reflected Germany practices that all ministries work collaboratively to shape the SDGs (FGoG, 2017), and further supported as in the UAE, (NCSDGs, 2017), that the higher national committee shapes the SDGs for the country by considering its sustainability issues that need to be addressed. The findings indicate that communication for institutional governance should be at different SPWs development levels. However, the institutional governance at the national level differs from the project implementation level, due to the responsibilities and tasks that should be carried out to ensure a strategic link between the policy and SPWs projects. Therefore, the communication between these committees that involve both top-down and bottom-up approaches is needed. This is in line with the UN (2016b), that using the participatory approach bottom-up is recognized as a key for decision-making at each level of the country.

The findings reveal that, at each level of development of SPWs development in Jordan, public and non-public stakeholders should be engaged at the early stages. This view is reflected by Li et al. (2012) and Luyet et al. (2012) that, it is vital to consider the time of engaging stakeholders for different groups. However, international practices do not identify the right stage or specified starting point to engage stakeholders. So, the current research considers the early engagement of stakeholders at policymaking, plans development and selecting SPWs projects, which can ensure that different views are taken in these processes.

The findings classify public stakeholders into internal and external, while non-public stakeholders are classified as external stakeholders. They can include the local community, NGOs such as Jordan Green Building Council, Women, Youth, Unions, associations, and politicians should participate in delivering the SDGs 2030 Agenda. This view is reflected Sweden's experience in which broader and deeper collaboration and new partnerships between several different stakeholders were established, on the basis of the 2030 Agenda (Sweden Government, 2017). This is further reflected

in the Government of Canada (2018) in which, the principles of the 2030 Agenda to “leave no one behind.” This means that everyone can participate in, contribute to and benefit from the achievement of the SDGs (Government of Canada, 2018). Further, the engagement can ensure that the local community provides innovative ideas and determine the exact problems in their communities (Sweden Government, 2017; UNDP 2017). However, due to the lack of considering SA practices in PWs development in Jordan, the findings show that engaging stakeholders without capacity development will be useless. The participants will not be able to provide appropriate information to support sustainable development 2030 Agenda. Accordingly, all stakeholders should be assessed in which they can participate in, contribute to, benefit from, implement, and, then, operate the 2030 Agenda.

The findings state that the monitoring system is required at national, sub-national, local and project implementation levels. This is reflected by the UNDP (2017), that the monitoring should be carried out at both bottom-up (local community) and top-down (government and ministries) levels. Monitoring and evaluating the overall process of decision-making to assess actual environmental, social and economic impacts of SPWs development actions is thus of high importance. This can ensure compliance with conducting SA at each level of SPWs development which, in turn, ensure follow up the national vision of SA in Jordan.

The findings stress that the overall monitoring reports should be provided to the Prime Minister of Jordan for accountability. This reflects the view of Garland (2009), in which it should activate the accountability system and ensure effective decision-making. Thus, the findings stress that accountability, for non-compliance with SA processes should be carried out. This means that at each level of development, the monitoring committee represented by the audit bureau in Jordan, the general budget department and the national committee of sustainable development should monitor each level of SPWs development in Jordan. This is reflected by the UNDP (2017) that, establishing institutional mechanisms and coordination structures for the SDGs can facilitate cross-sectorial action, and ensure the accountability across different ministries, agents, governmental levels is conducted. In addition, it can build communication channels by monitoring each level of development and among each sector in the country (UNDP, 2017).

8.3.3.1.1 Sub-National Committee

In Jordan, the higher national committee of sustainable development (HNCSD) was established as the national platform for dialogue on sustainable

development issues (MPIC, 2016a). However, a sub-national committee for SPWs development does not exist (MPIC, 2017a). Therefore, the findings suggest creating a sub-national committee linked with the national committee (Figure 8.5). This supports the need for sub-committees with similar work plans and sharing the same objectives for each sector of development in Jordan (MPIC, 2017a).

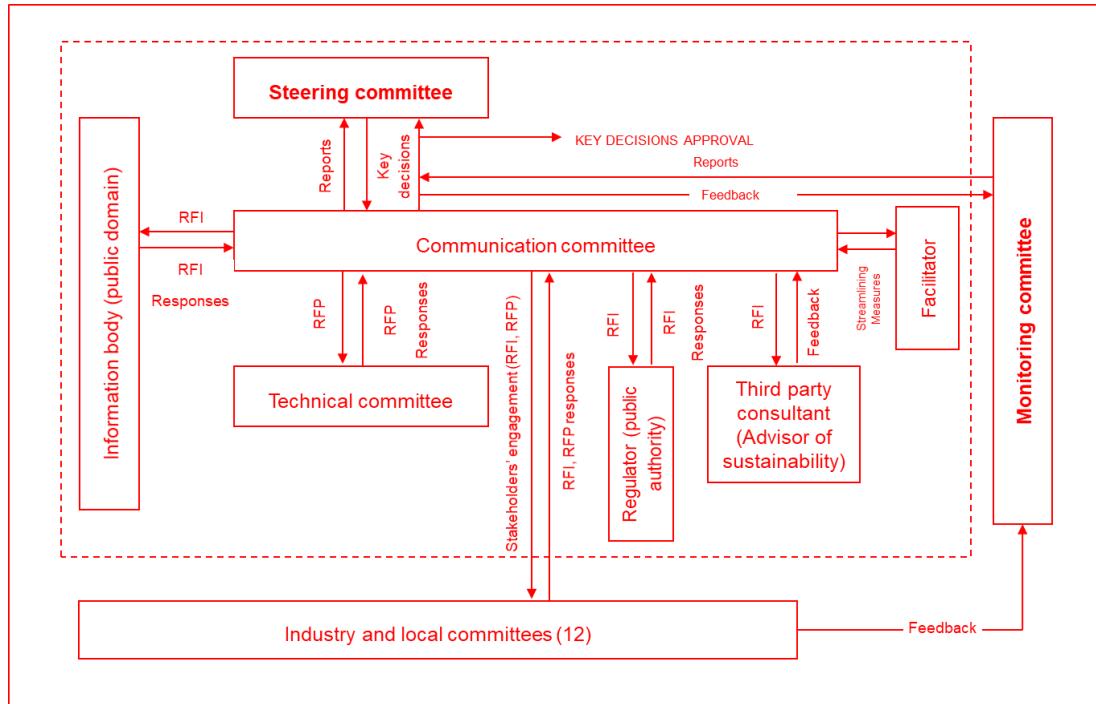


Figure 8.5 The structure of sub-national committee

In the UK, the independent authority of the National Infrastructure Commission (NIC) assesses the need for national infrastructure (NIC, 2016). However, an independent authority in Jordan is not viable, because it would create conflict among ministries and increase complexity due to the organizational structure of the government and ministries. The findings thus, state that the sub-national committee should be from the same body of the ministries in coordination with public and non-public stakeholders. This can make control on SPWs development at the sub-national level followed by other committees at local and project implementation levels.

This committee connects a set of targets with each SDG in the context of PWs development in Jordan. This can ensure compliance with the national vision of SA in Jordan. The sub-national committee should consult with regulatory bodies, information bodies, local committees, and project implementation committee when formulating the SPWs policy. This is in the line of Du Plessis (2007) and Mont et al. (2014), that it may be useful to engage various stakeholders to achieve the SDGs, ensure the consistency between theory and practice and link the policy with on-

ground realities. Therefore, the findings confirm that the sub-national committee should comprise different ministries in Jordan which means that all ministries should have a comprehensive vision rather than being sectorial. This reflects the view of what is in Sweden that at the institutional level, the cross-ministerial committee is established to map out the national strategy (Nilsson and Stevance, 2016). Therefore, getting different ministries together in one room to discuss priorities can help to be consistent and share the same language (Nilsson and Stevance, 2016).

Moreover, the findings assert that the sub-national committee should include a steering committee, to manage the overall process and to own the power for key decision approval. The communication committee is to coordinate between each party as such a local committee, information body (public domain), authorities and the industry with the help of a facilitator. In addition, the regulatory bodies ensure compliance with sustainability regulations while the technical committee conducts technical SA processes. These arguments reflect the view of the UN (2016b), that it is important to appoint sub-committees and technical committees that are armed to address themes related to sustainable development. Further reflections come from Sweden (UNDP, 2017), Germany (FGoG, 2017) and the UAE (NCSDGs, 2017) that, there is a need for such bodies at the committee to work collaboratively in conducting technical studies and communication between each body. However, the findings indicate that slight differences in the structure of the committee are due to the structure of each country, and the bodies engaged at each committee.

Moreover, the findings suggested engaging a third-party consultant in this committee (advisor of sustainability) who should be independent and not affected by any party. This suggestion confirmed by Robichaud and Anantatmula (2010), that a third-party advisor should be independent, to ensure that all the decisions are consistent with sustainability. However, many countries have developed an independent body for infrastructure investments in which a third-party consultant is not considered, for example, Australia (IA, 2016) and the UK (NIC, 2016). In Jordan, the need for this party is significant for integrating SA into policies, plans, and PWs projects. Therefore, a third-party consultant can ensure that the overall SA processes are followed. Finally, the findings suggest conducting monitoring internally and externally for the sub-national committee. This view is reflected by the UNEP (2009), in which both direct and indirect monitoring can ensure the overall development process of policy implementation is in line with sustainable development.

8.3.3.1.2 Local Committee

The findings also suggested engaging the local community to identify problems in their communities and participate in providing information to the sub-national committee, so that the local committee should consist of different parties. However, the findings proposed such amendments for the existing local committees at each governorate as seen in Figure 8.6. This is supported that at the local level, institutional modifications are required to be reflected in different sectors to achieve the SDGs (MDPS, 2014). Therefore, this committee should share the same structure of the sub-national committee and the modifications are marked up in Figure 8.6.

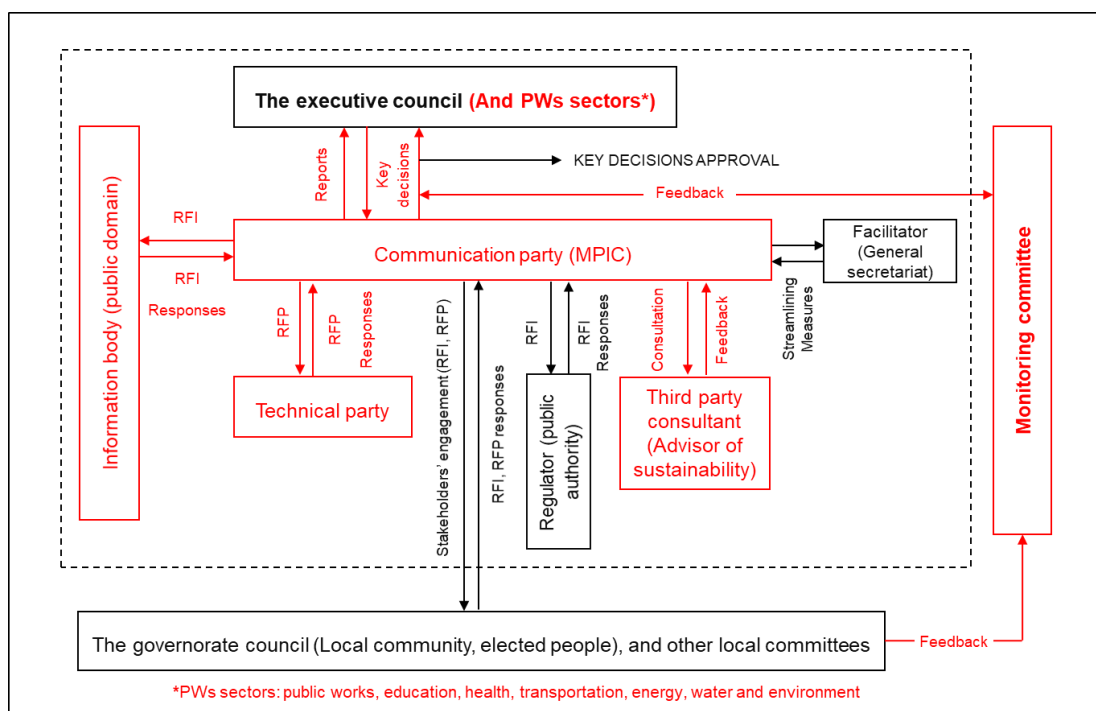


Figure 8.6 Structure of local committees

According to decentralisation law No.49 in Jordan, stakeholders' engagement is required. This view is in the line of Sweden practices, where the decentralised structure is governed by democratically elected decision-making assemblies at the local level (UNDP, 2017), and further reflected from the UK that, using participatory approach bottom-up is a key principle for decision-making at each level in the country locally and nationally (Alwan et al., 2017). However, an entirely conducting bottom-up approach is not effective in Jordan. The sustainability practices in Jordan are not matured that need more work in which to reach the level of Sweden's practices. Therefore, the findings indicated that two councils at the local committee are required namely, the executive and governorate councils (GoJ, 2015b). On one hand, the

executive council with a representative from PWs sector manages the overall process and request for proposals, information and makes the final decision approvals. The technical party gathers required information and analyses it to prioritize SPWs development. The communication party manages overall coordinate between each body at the committee such as municipalities (regulatory body) and third-party consultants with the help of a facilitator. The regulatory party can provide the needed local regulations in regard to sustainability to ensure compliance. On the other hand, the governorate council (elected council) offers sustainability proposals and provides information regarding sustainability problems in existing PWs development in Jordan. This view reflects the same practices of Canada for instance that, it strongly supports the achievement of the 2030 Agenda to “leave no one behind.” It means that everyone can participate in, contribute to and benefit from the achievement of the SDGs (Government of Canada, 2018). This ensures policies and programmes respond to the distinct challenges faced by under-represented and putting people at the centre of decision-making (Government of Canada, 2018).

The findings stress that the local community should participate in strategic decision-making for selecting SPWs development in Jordan. This is totally confirmed by Du Plessis (2007), that it is difficult to consult stakeholders and engage them in a small conference room, while a representative sample could be meaningful. The representative sample should be independent (not affected by anyone) and well-informed about the needed requirements. Pope et al. (2017) confirms this idea that the most successful plan occurs when the most appropriate team member is not influenced by anyone and given the necessary independence. However, some views in the findings claimed that a representative sample from those elected people would not be effective in SPWs development. This is due to the cultural issues in Jordan, where the elected sample would be from tribes and/or relatives whether they are knowledgeable in SA practices or not, which will affect the quality of decisions. As a result, it is important here to understand that the right stakeholders’ identification can come up with the right decisions.

In order to conduct the SA process, the findings reveal that communication at the local committee is both vertically and horizontally. Moreover, horizontal communication is carried out when there is a need for a project which is shared between two governorates. This is totally agreed by Curran et al. (2018), that in sub-Saharan in order to align or closely align across sectors; vertical and horizontal coherence among the ministers and cross-sectoral approach is required. Therefore, the outcomes will be consistent across sectors and at governorates. The findings

stress that the monitoring committee at the local committee will be the sub-national committee and represented by both the audit bureau and the general budget department, in order to ensure compliance with the strategic sustainable objectives. Furthermore, the local community and governorate councils are the 'watch look' of the overall development plan, which gives feedback to the monitoring committee as shown in Figure 8.6.

8.3.3.1.3 Project Implementation Committee

In Jordan, the MPWH is responsible for the delivery of PWs development, from developing and preparing set of plans, programmes and managing the implementation for PWs (Housing 2017; Jordan Times, 2017). Therefore, the findings suggest that SPWs still need to be managed by the MPWH as the project implementation committee. Therefore, the findings reflect the view of Tadege Shiferaw and Jonny Klakegg (2012) that establishing a separate governance system in the context of a country is vital to ensure the strategic link between the policy and projects. This goes with the UK practices in which there is the Infrastructure and Projects Authority (IPA) that works with industry. It improves the delivery and performance of infrastructure and ensure the successful delivery of all types of projects across both the government and the private sector through to transformational programmes designed to improve efficiency and transform the way government interacts with citizens (NIA, 2016). The IPA is responsible for delivering the approved National Infrastructure Delivery Plan and sets out the path towards achieving the plans of the National Infrastructure Commission's Plan (OECD, 2017). It can be seen that the practices in both Jordan and the UK are the same in which these bodies share specific functions. However, in the UK the Authority is different from the context of Jordan, that the former one is an independent body while in Jordan this Authority is the MPWH which is the project implementation committee rather than a separate body. However, in the current research, this committee is not studied due to its existence.

8.3.3.2 Regulatory Frameworks

The findings reveal that regulatory frameworks enable SPWs development in Jordan. These frameworks can be defined as a set of regulations, laws, codes related to the sustainability issues of Jordan (water, energy, environment, poverty, etc.). They enforce decision-makers to follow the national vision of SA in Jordan. This is reinforced by the idea that clear regulatory frameworks have been established by

some OECD countries such as; Germany, Japan, and the USA, allowing them to direct activities to achieve the SDGs (OECD, 2015).

In fact, the international practices indicated that for instance, the UK has a strong record of regulatory independence and the fact that the UK still has a relatively strong regulatory framework within the OECD membership (OECD, 2017). In contrast with Jordan, the existing regulations in Jordan are many at each level of development while the problem occurs in the enforcement of them to be followed by all sectors. However, all these regulations are varying from being consistent with sustainability or not. For example, roads' development should be influenced by environmental, agricultural, water regulations, etc., rather considering the laws and codes of the roads. As a result, the findings stressed that in order to enable SPWs development; creating regulatory frameworks at each level of SPWs development in Jordan is a must. Therefore, the findings reflect the view of Alkilani (2012) and Kivilä et al. (2017), in which government legislations and effective regulations towards sustainability are required. It can derive the effective practices to be applied for water preservation, energy saving and protecting the environment at national, regional, municipalities and project master plan regulations. The findings also state that regulatory frameworks include laws, regulations, standards, and codes. This is supported by the Homes and Community Agencies in the UK, where the regulatory frameworks can include regulatory standards, guidance, and code of practices that are fit with the context of the country (Homes and Community Agency, 2015). The findings from both MGT and Delphi validation suggest the following regulatory frameworks at each level of SPWs development (Figure 8.7).

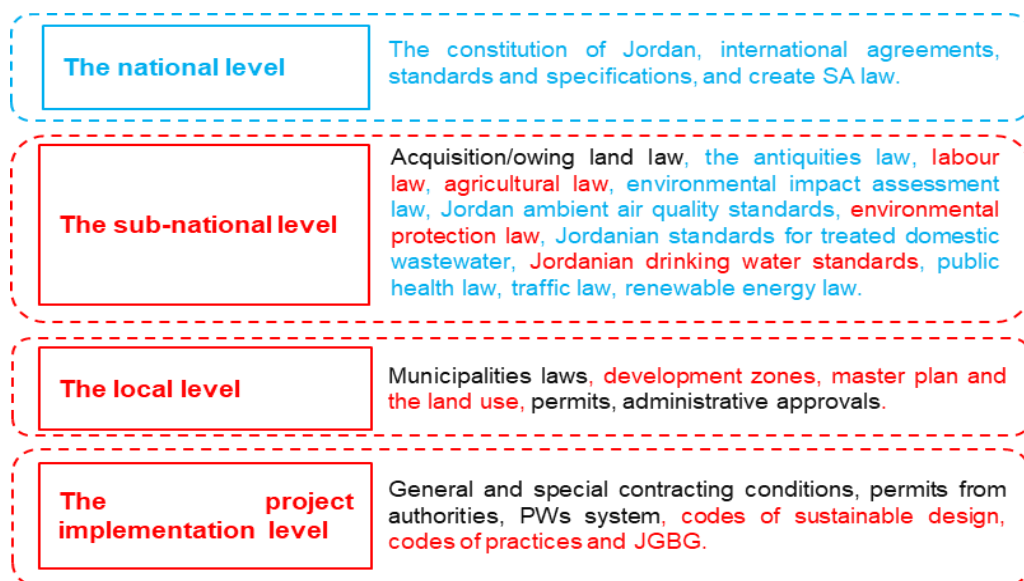


Figure 8.7 The regulatory frameworks

The findings suggest at the national level, the regulations are kind of country constitution, international agreements in regards of sustainability and legal requirements in terms of implementing SA as compulsory requirements to assess the emerging of national policies, in which they achieve sustainable development or not. This means that no one in the country follows the assessment process without compulsory regulations that the integration of SA into the policies, plans, and projects becomes voluntary in practices. This goes with the argument of the Western Australia practices, that in the absence of regulatory frameworks, SA such as the form of EIA seems to be voluntary (Bond et al., 2013).

At the sub-national level, the regulations, guidance, and standards are issued by the central government of Jordan in terms of water, energy, and environment, which can include social and economic regulations in terms of public health and safety and creates job opportunities, as shown in Figure 8.8. This is in line with France practices, where an Energy efficiency Law was established to reduce CO₂ emissions, reduce in total final energy consumption, reduce in fossil fuel consumption, use renewable energy in total final energy consumption and finally, use nuclear energy in electricity production (OECD, 2017). However, in Jordan still, a lot needs to be done in which to enable sustainability regulations. Indeed, in Jordan with respect to reducing fossil fuel consumption, use renewable energy the regulations are not in the level of France practices and other EU countries. The regulations in terms of renewable energy still optional and not compulsory. The findings stressed that Jordan is a small developing country with a contrast to the developed countries that still need huge investment in PWs development such as education and health sectors, water networks and transportation in order to meet the increased demand of people.

At the local level, these regulations are specific for each governorate such as master plans, land use, permits, and administrative approvals. This reflects the view of Kivilä et al. (2017), that sustainable project development can be subject to municipalities' regulations, which are different from the national and regional regulations that enable the local committee then to follow the regulatory frameworks at the local level.

At the project implementation level, the findings stress that the regulations should be consistent with sustainability objectives in terms of contracting, general and special conditions, permits from authorities, water and energy efficiency codes, standards, and guides. This means that these regulations can enforce the project implementation committee to follow sustainability considerations. This is confirmed

by Srour et al. (2010) and William Dobson (2013), that the government should enforce the adoption of SA and enable all parties to follow the rules of sustainability and codes. As a result, the findings pointed out that, all provided regulatory frameworks can support the integration of SA by law, that the emerging policies, plans, and PWs projects, and all are assessed in which they contribute to sustainable development and align with SDGs 2030 Agenda.

8.3.3.3 Technical Support

The existing practices of PWs development in Jordan indicate that there is no specific technical support is needed throughout the process of PWs development. However, at the project implementation level, the supply chain is only assessed in which it can deliver conventional PWs development. Matar et al. (2008) pointed out that a lack of technical support results in a subsequent lack of professional skills, training, education about sustainable practices and knowledge, which leads to an ineffective framework for adopting sustainability. Therefore, the findings reflect previous view that in SPWs development, technical support is required that can enable stakeholders at each committee to provide innovative solutions to sustainability which enables SA integration into public infrastructure development. Moreover, this is further reflected throughout the literature of (Edama, 2016; ME, 2016; Sourani, 2013), in which technical support is one of the main enablers to mainstreaming SDGs at each development level and time horizon.

Though, some views in the findings claimed that integrating SA in PWs development needs more technical support and skills, while public stakeholders' employees in the ministries are not interested in sustainability practices. This is not reflected in the view of Hill and Bowen (1997), who argued that sustainability can include improving the skills and knowledge of human resources to keep them up to date. As a result, it can also, enhance disadvantaged people to participate in a project through training and capacity development (Hill and Bowen, 1997).

The findings suggest that all engaged stakeholders should share the same common language concerning sustainability. They should be knowledgeable about the importance of sustainability. Thus, it is essential to undertake such learning, explaining and translating the objectives of sustainability in a vocationally relative language. This reflects the view of the UNDP (2003), that recognizing capacity development as a long-term process, creates an enabling environment with appropriate policy and legal frameworks, institutional development including community participation and human resources, and strengthening managerial

systems are stressed. In addition, Sweden practices reflects this trend that, it conducted consultation sessions in 2015, to obtain expert knowledge to initiate broad support in Sweden for the 2030 Agenda (OECD, 2016b). Therefore, the findings suggested that different bodies in the country can provide capacity development from both public and non-public sectors as such Royal Scientific Society, Edama, Jordan green building council, Jordan engineers training centre to provide the required technical support for stakeholders at each level of development.

The findings stressed that, at the national level, different public and non-public stakeholders need to be engaged in the development of the national vision of SA in Jordan. Consequently, they should share the same and common language in terms of sustainability. Indeed, the Prime Minister (PM) of Jordan leads the overall process at this level. Therefore, the PM should select those ministers, as their decisions will be in the line of sustainable development. This can be achieved by considering only those technocrat ministers who have a wide range of experience in their specific field of work. This totally reflects in what appears to happen in the UK, where it is not meant to ban the politicians from decision-making capacity and remove the necessary leadership and commitment, but to provide the politicians and other stakeholders with the full range of information, in which to improve the decision-making process (Gibson et al., 2013; OECD, 2017). Figure 8.8 shows the needed technical support at each level of SPWs development in Jordan.

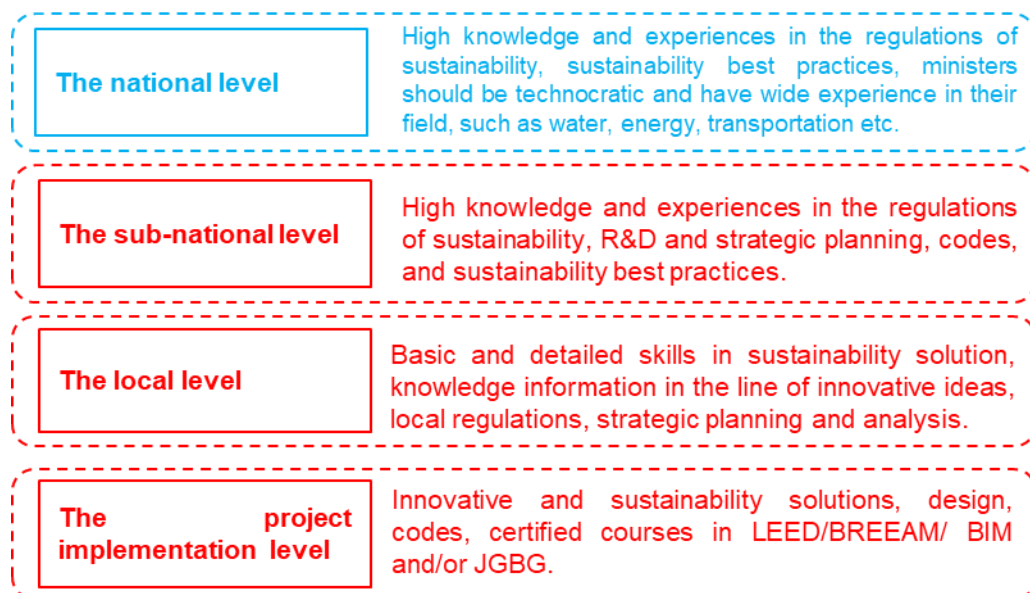


Figure 8.8 Technical support

The findings indicate that the sub-national committee should be at a high technical level, in order to identify SA targets and then formulate a comprehensive

policy for SPWs development. The local committee should have a level of technical support to enable assessment of the existing situation of PWs development. In addition, technical support at this level is needed for the local committees to ensure they make the right decisions in order to evaluate SPWs development options in Jordan, which has less negative impacts on the environment and proffer feasible socioeconomic benefits. On the other hand, the project implementation committee should have a high level of technical support in procuring SPWs development in Jordan in order to assess the most sustainable option for selecting the supply chain for implementation.

Furthermore, the supply chain comprising (consultants, designers, and contractors) must be of a high level of technical skill and knowledge and have certified training courses such as LEED, BIM, BREEAM and/or JGBG to provide an innovative solution of sustainability. Moreover, the findings suggest that technical support can include green technology as an enabler, which enables sustainability practices into PWs development in Jordan. This goes totally with the international practices that, technology can support the progress of sustainability practices as such by using smart meters in water and energy, solar system, waste disposal and water fitting devices (NCSDGs, 2017; UN, 2016a).

8.3.3.4 Public Funding

The findings indicate that public funding is one of the main enablers that influence the integration of SA into PWs development in Jordan. However, currently, the financial allocation for PWs is not available constantly, which in turn, hinders SPWs development in Jordan. There is consensus agreement in the literature that the lack of funding affects policy implementation (Martin and Walker, 2015; Robichaud and Anantatmula, 2010; Sourani and Sohail, 2011). This reflects the findings that, public funding should be allocated for SPWs development as early as possible and consider sustainability as a fundamental part of the funding. Hence, it is important to secure and take into account the requirements of sustainability as a fundamental part of project policy development (Robichaud and Anantatmula, 2010).

The findings show that allocating public funding should thus be earlier because if decision-makers are being asked to prioritise SPWs development in Jordan with no limitation of funding, they can assess most- and less-prioritised SPWs developments. As a result, public funding should be allocated from the national level in order to ensure that policy is being implemented successfully and avoid delays and

conflicts in interests. In contrast to international practices as such in the UK, public funding for infrastructure is estimated based on statistical analysis and predicting future needs based on historical data (NIA, 2016). However, the UK is a developed country while Jordan is a developing country. This means that there is no consistency in the development between each sector and over the years in Jordan. Therefore, it becomes difficult to estimate public funding in Jordan using historical data while public funding is not allocated to close the gaps among different sectors and ensures equality. This is in the same line of Germany however, that the available funds are unequally distributed to implement infrastructure policy (Anheier et al., 2016). The findings, therefore, proposed a new approach for allocating public funding for SPWs development, to ensure equality in opportunities across the country as shown in Figure 8.9.

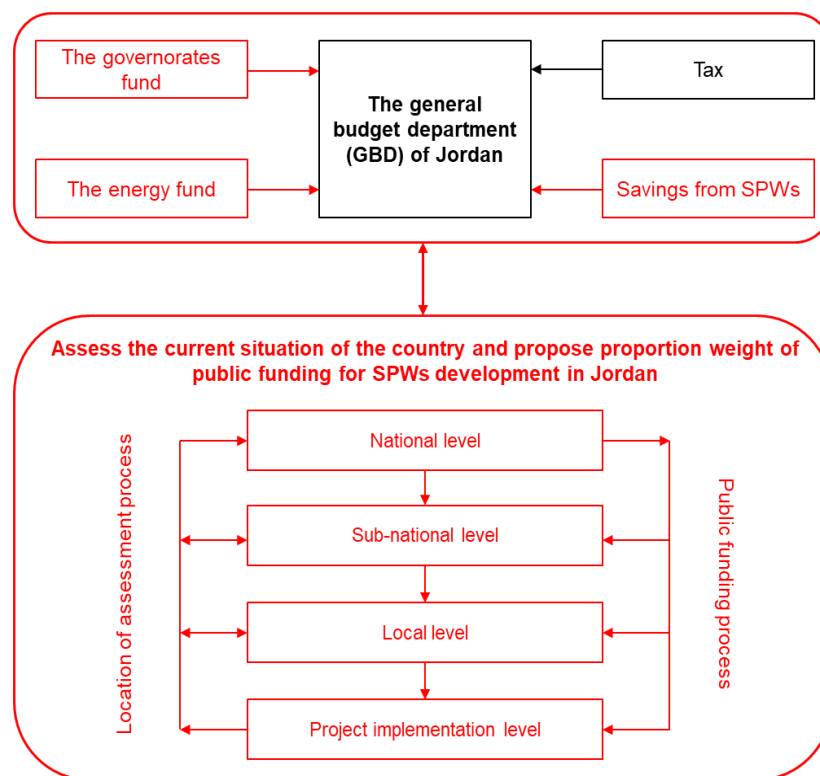


Figure 8.9 Public funding process

The findings criticise the existing process of allocating public funding of PWs development in Jordan. This process of allocating public funding cannot ensure equality in each sector, due to future expansion and the instability in the region. This is reflected by Martin and Walker (2015, p.45), where ‘experts most likely spending higher delivering services to reach rural and poorer areas, because of the lack of infrastructure and the need to pay premiums to workers to attract them to poorer and

more remote areas - so per capita allocations to these areas ought to be higher'. As a result, this needs more attention when allocating public funding.

The process of public funding can enable conducting the assessment of the current situation of PWs development in Jordan against SA indicators and allocate public funding based on the outputs. Each of these indicators should be weighted and then public funding allocated for required SPWs development accordingly and based on the level of development of the existing PWs development and their impacts on the environment and socioeconomic growth. This reflects the idea that funding the SGDs in many different groups of infrastructure actions without thinking about negative impacts could also negatively impact other areas (Martin and Walker, 2015). Therefore, the findings stress that in order to enable the integration of SA into PWs development by public funding, there is a need to allocate public funding for SPWs development in Jordan which have less negative impact on the environment, provide service requirements for people and drive socioeconomic growth.

Bhattacharya et al. (2016) confirmed previous argument that it is essential for shifting government expenditures away from investments that waste, overuse or make pressure on the environment. This can be achieved by the assessment of the on-going investments of public infrastructure in which only these proposed sustainable infrastructures are funded. As a result, the overall policymakers, planners and developers will follow the SA process to ensure the outcomes are in the line of sustainable development.

Finally, the findings suggest that the gap in funding can be secured from different sources of funding. Therefore, the energy and government funds are both sources of public funding, and savings from SPWs development during the operational phase can benefit and secure public funding. This reflects the international practices for financing sustainable investments throughout international funds, such as European Clean Energy Fund, London Green Fund, Green Investment Bank, DB Masdar Clean Tech Fund, Clean Energy Finance Cooperation and New York City Energy Efficiency Corporation (ME, 2017b).

Also, the international practices indicate that for example in Sweden, the Carbon tax is agreed to reduce the GHG emissions from these investments that have a high negative impact on the environment by raising funds to finance these investments that have fewer impacts upon the community (UN, 2016a). However, this practice does not reflect the context of Jordan because it is a weak economy. Jordan is a developing economy, which contrasts with the Sweden advanced one. Hence,

Jordan applied opposite practices to the carbon tax by applying an incentive scheme for sustainability practices, throughout reducing the customs tax on these investments, which are environment-friendly and provide green behaviour.

8.3.4 Policymaking Process to Select Individual SPWs Projects

The existing practices of PWs development in Jordan (Figure 4.4) indicate that there are five main stages of the policy-making process from national to project implementation levels. The findings reveal that at each of these levels where the policy-making process is formulated, its options generated and selected, implemented, monitored and evaluated were not identified in the literature. However, the policy-making process does not assess the current situation of Jordan, in which its sectors contributes to sustainable development or not. In addition, the local development plan includes the selected PWs which are generated without considering their positive impacts upon community, environment or economy. Therefore, the findings indicate that there is a need for restructuring the policymaking process to select SPWs projects as shown in Figure 8.10.

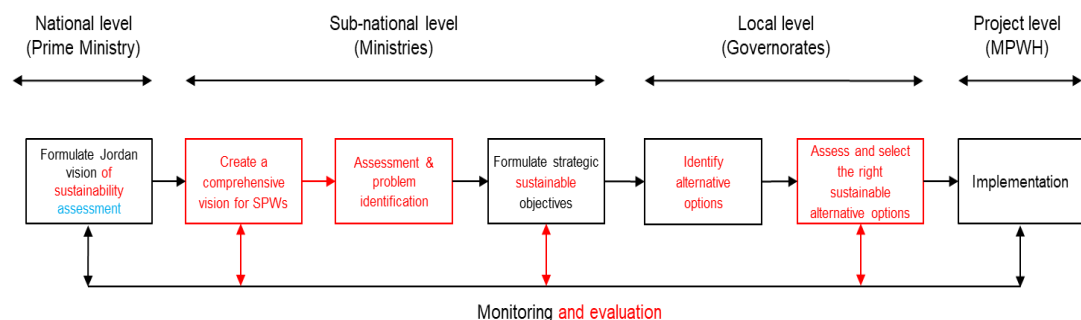


Figure 8.10 SPWs development process

The findings of the current study confirmed in need to formulate the national vision of SA in Jordan, which includes a set of goals and targets. This is reflected by the MENA countries, for example, Egypt, UAE and Qatar, and further reflected by international practices of Germany and the UK. This means that all these countries have a national strategy that embed the SDGs in their national strategy while Jordan still works to achieve this. In addition, the findings indicate that, at the sub-national level, there is a need to create a comprehensive vision of SPWs development in Jordan, which includes the targets that each sector of SPWs development intends to be achieved. These findings are reflected by the views of (EC, 2018; IA, 2016; Mell et al., 2017; MEST, 2017), that sustainable infrastructure can include targets that need to be achieved by reducing the negative impacts and enhancing the sustainable

pattern. The findings provide a clear definition of a comprehensive policy as a guideline to identify the directions of the government for SPWs development that need to be achieved. This is reflected by the OGC (2007a, p.7), where the policy is ‘the process by which governments translate their political vision into programmes and actions to deliver ‘outcomes’ – desired changes in the real world’. Moreover, Tadege Shiferaw and Jonny Klakegg (2012) argued that an effective policy can provide the most appropriate decisions for prioritising projects.

The findings indicate that while selecting individual SPWs projects throughout the policymaking, the stages 3 to 5 and 7 reflect the proposed policy to select individual projects by (Hák et al., 2016; UNEP, 2009). However, stage 6 (the decision-making stage) does not reflect the case of the UNEP (2009) policymaking process. This is due to Jordanian different bodies who should engage together to take decisions, which is not considered as a stage, while it can be considered as an engagement of different bodies in taking the decision, which will be taken at the sub-national level rather at the local level. This is due to the lack of experience of the local community in participating in the decision-making process individually whether to process or not for the implementation. Therefore, both committees which are discussed (section 8.3.3.1) in this chapter, will be engaged for the decision-making process. The existing practices of PWs development in Jordan (Figure 4.4) indicate that identifying policy options and assess these options against a baseline are not the case in Jordan. Accordingly, the findings propose new stages to identify SPWs alternatives and assess them against the SA baseline of Jordan, which are considered new in practice.

Finally, the findings indicate that the monitoring of PWs development is only carried out under the existing practices at the implementation level. For that, the findings suggest conducting the monitoring at each level of development, which ensures compliance with sustainable development. In addition, conducting the evaluation at each level to ensure that the emerged policies, plans, and SPWs development can reflect on the environment, society, and economy as intended. This reflects the international SA practices, where the policy implementation should be monitored to ensure the compliance with sustainability (Alkilani, 2012; Brugmann, 1996; Gething, 2011; Sinclair et al., 2013; UNEP, 2009), as well as to learn from deficits gained by evaluating the implementation of policies according to (FGoG, 2017; OECD, 2016b; Sweden Government, 2017).

8.4 An Integrated Approach of SA into PWs Development in Jordan (How Does the Integrated Approach work?)

Drawing the aforementioned elements of the integrated approach resulted in Figure (7.5). The combination of these elements on how to integrate SA into PWs development is discussed, and the international practices are compared with the findings. The process of developing the integrated approach was carried out based on the key issues derived from the GA in Chapter 4 and the key findings that investigated and confirmed in Jordan. And finally, the validation results suggested the integrated approach which has a clear structure and rational link of information flow. Thus, it allows users to view and understand links between the structural elements. The findings also indicate that the integration of SA into PWs development is enabled by considering four main enablers namely, institutional governance, regulatory frameworks, technical support, and public funding, as discussed in section 8.3.3. However, while, project implementation level is not studied in the current research, the approach includes four main levels from national to project implementation, where the findings identified these levels and where the SA stages are considered.

To create a comprehensive vision for SPWs development, the findings indicated that at the national level, the current situation of Jordan should be assessed against SDGs, followed by the sub-national level to assess the current situation of PWs development against SA targets. This is reflected in the practices of Sweden Government (2017) and Finland (OECD, 2016b), that the assessment per goal and target is essential on how these countries are currently living up. The outcomes from the assessment can identify where the country is at, and the targeted situation that needs to be achieved responding to each SDG. The targeted situation will be defined at the national level in three sustainability dimensions (environmental, social and economic). This is reflected in the Sweden practices, in which a clear vision and governance structure at the national level, primarily in the form of an overall gap analysis (Sweden Government, 2017). It is an assessment of the current situation and the setting of national objectives for goals and targets. However, the existing practices of PWs development in Chapter 4 indicate that sectorial planning approach is used (Figure 4.4).

Consequently, the findings indicate that PWs development can influence each other as a “butterfly effect”. Therefore, the findings suggest creating a comprehensive view of SPWs development. This is reflected in the practices of both Australia and the UK, which have developed a comprehensive long-term strategic approach to

infrastructure development (Atkins et al., 2017; IA, 2016; NIC, 2017). And further reflected that in order to ensure equality in opportunities, the argument for creating a comprehensive view is that, the country should be developed at one level to create a balance between each sustainable development goal (UN, 2015a).

The findings show that the comprehensive vision of SPWs can provide a clear and full understanding of the overall picture, where the country is currently living up. In addition, looking for the challenges in the country should be from different angles and in a comprehensive view. This is totally fit with OECD (2016b), where the SDGs challenges cannot be treated separately by fragmented institutions and policies. A comprehensive analysis of those challenges, their interconnections, and implications as well as good information on the views and roles of diverse actors at different levels (local, national, international), and within and outside the government, are vital for coherent and evidence-based decision-making in implementing the SDGs (OECD, 2016b).

At the sub-national level, the findings indicate that the national vision of SA in Jordan is the source of projects and is considered the departure point for the country's development. This is in the line of Pope et al. (2017) that SA should go into policy to select individual projects. This is reflected on the findings that there is a need to ensure the strategic alignment between the national vision of SA in Jordan and PWs development remains consistent. Plus, there is a need to consider it as the main input for the sub-national level to formulate a comprehensive policy for SPWs development. Accordingly, formulating a clear and comprehensive policy can be considered the source of SPWs development (UN, 2016b).

Thus, in the context of the current study, existing PWs development in Jordan and its overall impact on the country should be assessed against SA dimensions. As a result, the findings stress that defining a SA baseline in the context of PWs development is a very important task. This goes with the international practices that there is a need to involve assessing the existing situation against the baseline and creating the desired situation that needs to be achieved (Historic England, 2016; Morrissey et al., 2012). According to the England Local Development Plan, the baseline is developed at the local level (Historic England, 2016). However, this is not reflected in Jordan due to the lack of knowledge of the local community with respect to sustainability. Therefore, the baseline of SA should be defined at the sub-national level, as listed in Table 6.3.

The findings reveal that the assessment will be carried out by the sub-national committee in communication with local committees across the country. The findings indicated that the local community knows their requirements more than others. As a result, top down – bottom up approaches can build trust between the government and the community and improve communication channels within all management levels. Therefore, the assessment should be carried out against the agreed baseline through top-down and bottom-up approaches. This is similar to Australia practices (IA, 2016), where both approaches are used to list a priority infrastructure projects, and further reflected by the UK context (NIC, 2016) in which the need assessment is carried out by the NIC to prioritise the long-term plan of the infrastructure needs. This should ensure a balance between SA dimensions and link them with the national vision of SA in Jordan. Thus, there is a need to determine the impact of the environment on both social life and the economy, as well as social and economic impacts on each other. This can ensure that all these dimensions of SA are being achieved and meet the SDGs. This confirms the argument of Rodríguez-Serrano et al. (2017), that studying the impacts from different dimensions of sustainability on others can ensure the balance in considering their impacts and at each other. At this stage, a clear vision of the current situation of PWs development is created, in order to identify the desired situation that needs to be achieved. This is totally reflected the international practices such as the need assessment in Switzerland (OECD, 2016b), the UK (Atkins et al., 2017; Department of Transport, 2015) and Australia (IA, 2016), where there is a need to assess the current situation of PWs in order to identify and prioritize the need for infrastructure investments.

Once the current situation of PWs development is assessed, the next stage will be the assessment of the internal and external barriers that would face policy implementation. The findings propose that the assessment analysis needs to be conducted prior to policy formulation. This is essential for identifying barriers, capability gaps, and weaknesses, strengths, opportunities and threats to set out then a mitigation plan. This result is confirmed by Azapagic (2003); Wheelen and Hunger (2012), in which at the early stages of policy-making, conducting an assessment allows analysis of internal and external barriers that affect policymaking and understanding the impact of PWs infrastructure.

The findings also reveal that all engaged stakeholders should share the same common language concerning the SA, in order to achieve SDGs 2030. The findings are reflected the Sweden practices that the Ministry of Foreign Affairs conducted a

comprehensive consultation process towards the 2030 Agenda (OECD, 2016b). Therefore, the key stakeholders should be knowledgeable about the importance of SA, its process and stages. It is essential to undertake such learning, explaining and translating the objectives of SA in a vocationally relative language. As a result, capacity development should then be carried out to assess the capacity of public and non-public stakeholders. This is in line with the UNEP (2006), in which it is important to conduct capacity development for each group of stakeholders to be at the required level of technical skills for development.

The findings indicate that determining the problem or better understating of it can ensure that the right solution is identified. Therefore, the assessment of the current situation should be prior to identifying the problem. Indeed, the gap between current and targeted situations can then be viewed as a particularly relevant problem (Tadege Shiferaw and Jonny Klakegg, 2012). The findings suggest that the targeted situation is based on the vision for SPWs development which is identified earlier. The overall SA outputs then will be provided from the local level across the country, which is divided into 12 governorates in Jordan. Thus, the findings argued that the local community knows their requirements more than the others. Therefore, communication between sub-national and local committees can provide valuable information. These findings reflect the view of Mansourianfar and Haghshenas (2018); Sala et al. (2015); SCC (2011); Shen et al, (2010); Sierra et al. (2018), where policy-makers should communicate with the local community who would then be able to better grasp where the problem is in terms of SDGs. The outputs from the analysis must then clarify problems and set out objectives for each sector of SPWs development. In addition, this is matched with (Historic England, 2016; Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009), that once the problem is identified, the next step is to formulate strategic objectives for the policy.

At the local level in Jordan, the existing practices indicate that the development objectives are formulated with no link to the actual needs (MPIC, 2016c). However, according to BREEAM (2016), some local communities are affected by others or some projects are shared. Therefore, formulating overall strategic objectives is important to the entire country (Tadege Shiferaw and Jonny Klakegg, 2012). As a result, this reflects the findings that it is vital to keep formulating the strategic sustainable objectives at the sub-national level. This can provide a complete picture of the country from different views.

Moreover, the findings indicate that there is a need to predict future needs based on historical data and studies taking into account uncertainties. This is totally confirming the definition of sustainable development according to Brundtland (1987), in which the needs meet the requirements of current and future generations. It is further supported that, the strategic business needs should consider the needs of the current users and be flexible enough to accommodate future users (OGC, 2007b). Besides, predicting future expansion is important for formulating long-term policy (BREEAM, 2016), and further support by Sala et al. (2015) that, uncertainties should be considered throughout SA e.g. time series analysis, in order to understand how the world behaves, especially to react to pressure imposed by society and climate change.

Following this, the findings stress that at the local level, selecting the most appropriate SPWs development options. The options should be generated considering a 'no-action scenario' as one of these options. In some cases, the 'no action scenario' or some sustainability refurbishing of existing projects is preferable (OGC, 2007b). The validation findings suggest adding an activity to the first stage of the so-called 'clarify the need' level, in order to link each alternative option with the strategic alternative option. This is totally matched the OGC frameworks but in the different terms called 'identify the business case' (OGC, 2007b). In addition, the findings suggest to transform the activity 'clarifying the alternative option and benefit' to the aforementioned stage, which is matched with the OGC framework to 'identify the project requirements and prepare the project brief (OGC, 2007b).

The outputs from this stage are a set of alternative options. These include projects, initiatives, and best practices. Each option should be assessed at this stage to select the most appropriate one and rank each of them based on the defined SA baseline. This means that the most sustainable options are selected only to be implemented. These options are assessed through the participatory approach, conducted by engaging the governorate council, considering the viewpoints of the third-party advisor of sustainability. In order to make decisions, the outputs from each meeting (workshop) are conducted with the engagement of the elected council. This is reflected with the views of (Ashley et al., 2003; BREEAM, 2016; Du Plessis, 2007; Mita Patela, 2007; Mont et al., 2014; Sequeira and Warner, 2007; UNEP, 2015), that human judgement should be used to make the final decision on which option is the most sustainable. So, these arguments reflect the findings that the assessment of each option can be conducted at the local level as such brainstorming, voting system

and Delphi analysis. However, the international SA practices do not show at which level the decision-making is being made.

The findings from interviewing the non-Jordanian experts indicated that top-down – bottom-up approaches may conflict, and in this conflict, the top-down approach has the upper hand. This means that usually, the top-down approach derives the policy for the country where the interests and goals are needed. On the other hand, at the bottom-up approach, the needs of the local community will be identified that need to be met. Therefore, this might make a conflict between both approaches in which the government's trends would not match the need of the local community. Therefore, the two approaches would interact with each other. This means that the top-down approach is carried out by the government that its interests can be translated into the policy based on specific sustainability issues. On the other hand, the bottom-up approach will be carried out by the local community. This means that the community at the local level should respond to the policy and clarify the issues arising at the local level. As a result, the communication between the different levels can ensure the strategic alignment of SPWs remains consistent with the ministries' primary services or delivery objectives. In Jordan, however, an entire bottom-up approach is not reflected in practice due to the lack of sustainability technical skills from the local community, of which are usually elected from tribes, whether they are knowledgeable in SA or not. Therefore, at this stage, the sub-national level should be informed about the selected options, and then once the approval is obtained these options become ready to be implemented.

The findings indicated that the bottom-up approach could completely consume all resources, but it would represent the most precise picture of the sustainability issues in the country and could be completely measured. This means that in such cases the local community's resources can be invested in specific areas while other areas in the country cannot benefit from them. On the other hand, conducting a top-down approach only cannot ensure delivering the equality of opportunities across the country. This is because different areas in the country would not be the same in their development levels. Some areas might need more PWs projects to be delivered while others might need less. Therefore, the interactions between these approaches can ensure the interests at the higher levels are consistent with the needs at the lowering levels. This is reflected in the UK practices that a number of innovative projects have been successful through bottom-up local government approaches, encouraged by national government directives (Alwan et al., 2017).

At the project implementation level, the outputs from the previous level are a set of SPWs development options that are listed to be implemented by the project implementation committee within the availability of funding, and that according to project implementation regulatory frameworks and required technical support. The project implementation committee then should deliver these approved SPWs options under sustainable procurement (SP). This totally reflects the view of (HM Government, 2006; Fussey, 2012; Government of Canada, 2018; OGC, 2007b; Swiss Confederation, 2016), that in order to ensure that the sustainability objectives are followed, SP is the most appropriate option. Therefore, the findings stressed that SP can ensure the needed requirements of sustainability are translated into the delivered SPWs development projects in Jordan.

The findings of validation indicate that sustainability is more than environmental dimension. In fact, the only JGBG is issued to assess the on-going building and provide a rating award for environmental sustainability. Therefore, the assessment of the emerging PWs that to be delivered should be assessed against PWs infrastructure scheme, to cover all PWs development classifications refer to water and wastewater, roads, transportation etc. This totally reflects with the international practices of (CEEQUAL) in the UK (BRE, 2019), the Infrastructure Sustainability (IS) Rating scheme in Australia (ISCA, 2018) and (Envision) in the USA (ISI, 2018), that assess all types and sizes of infrastructure in all dimensions of sustainability. Moreover, the findings show that there is a need for considering two gateway approvals between the sub-national level and the local one, and between the local level and project implementation level. This can provide more validity to the outputs from each level and ensure compliance with the national vision of SA in Jordan, and ensure that the strategic link of the national vision of SA is translated into on-ground reality which is considered new findings obtained from a fieldwork study conducted in the country.

Finally, at each level of SPWs development in Jordan, monitoring is critical. This ensures that the national vision of SA is translated into reality. In addition, responding to circumstances, risks, uncertainties and future expansion that may occur, monitoring should be carried out from four perspectives with respect to the overall decision-making process; compliance with financial, regulatory, technical and administrative measures. Monitoring means that circumstances can be flagged to the following level. It allows each level of development to update the policies, plans, and SPWs development project requirements. Therefore, at each level of SPWs development from national to project implementation levels, internal and external

monitoring should be carried out. These findings are reflected in Sweden's practices, in which monitoring of the action plan for 2030 Agenda implementation is carried out at local, regional and national level (Sweden Government, 2017). This can unveil the weaknesses and gaps from different perspectives because each can focus on one issue and subsequently triangulate feedback. Also, the findings are totally reflected with the Germany practices, in which regular monitoring system is important to track the success and failures in the policy of sustainable development goals (FGoG, 2017). This is also, necessary to understand the weaknesses in the policy and the way to re-alignment the policy with SDGs (FGoG, 2017).

Following the monitoring, the findings stress that the evaluation of the emerging policies, plans, and SPWs projects should be conducted. The evaluation means that the implemented policy, plans and SPWs development projects can indicate to what extent the targeted situation of the country is achieved. This is confirmed by the OECD (2016b), that the evaluation can indicate that outcomes are intended changes. As a result, the evaluation can be carried out through a set of criteria in terms of linking each goal, targets and strategic sustainable objectives with appropriate Key Performance Indicators (KPIs), in order to measure the achievements of each of them. Consequently, once the policy is implemented, each of the specified KPIs at each of the strategic sustainable objectives can indicate whether they have achieved the intended situation or not. This, in turn, provide lessons learned, weaknesses and gaps in order to benefit from them. This is indeed reflected with Qatar practices in monitoring the achievements of SDGs, where a central monitoring function will be developed as a performance measurement follow-up indicators (MDPS, 2017). Therefore, the set of KPIs are used on a monthly basis, where possible, and on a quarterly basis at all rates (MDPS, 2017).

8.5 How the Aim and Objectives were Achieved?

The aim of this research was achieved by conducting an extensive literature review and examining documentary data and findings from fieldwork in Jordan. This has resulted in developing an integrated approach on how to integrate SA into PWs development in Jordan.

8.5.1 The First Objective of the Research

This first objective is achieved in Chapter 1 and 4. However, the findings indicated that existing practices of PWs development are not adequate to meet projected situation that the country wants to achieve. Achieving the first research

objective leads to a contribution in knowledge by providing an understanding of the current situation in Jordan which is critical regards to the environment, society, and economy. This understanding thus leads, to a need for an integrated approach that assesses to which extent the emerging policies, plans and projects of PWs achieve sustainable development in Jordan.

8.5.2 The Second Objective of the Research

This objective is presented in Chapters 2 and 3. Extensive international SA practices were reviewed which indicate that there are different practices throughout both developed and developing countries. In addition, the similarities and differences which remain confused in the literature are outlined. Achieving this objective contributes to knowledge by listing international practices of SA at each level of development which can be leveraged in the context of PWs development in Jordan.

8.5.3 The Third Objective of the Research

This objective is outlined in Chapter 4 which discusses existing practices of PWs development from policymaking process to select individual projects. Moreover, existing Jordanian sustainability practices were reviewed. Achieving this objective contributes to knowledge by indicating the limitations of PWs development practices. Although Jordan has recently started to work on developing a set of sustainability practices, how to integrate them into PWs development is still weak. As a result, existing practices of PWs development need to assess the impacts of emerging policies, plans, and projects of PWs in achieving sustainable development.

8.5.4 The Fourth Objective of the Research

This objective is achieved in Chapter 4. The GA provided the theoretical implications for the key issues generated that need to be investigated in Jordan. Achieving this objective contributes to knowledge on the key findings that were sought from GA, which outlined the need to make improvements not only on existing PWs development practices but also on the outcomes from these practices. Therefore, the GA findings were used to design MGT interview questions in order to confirm, modify and add such theories on how to integrate SA into PWs development in Jordan.

8.5.5 The Fifth Objective of the Research

This objective is achieved in Chapter 5, 6, 7, and 8. The integrated approach was developed in response to the need for SPWs development in Jordan. It ensures which of the emerging policies, plans and projects of SPWs better protect the

environment from development actions, enhance socio-economic growth and ensure equal opportunity across the country. Achieving this objective leads to a contribution in knowledge by developing a novel integrated approach on showing how to integrate SA into PWs development in Jordan.

8.6 How the Research Question was Addressed?

In order to answer the research question '*How can SA be integrated into PWs development in Jordan*', the findings from MGT indicated that there is a need to combine four main elements into an integrated approach, as a result of which the research question was answered. Therefore, it can be concluded that, in order to show how integration happens, SA should direct the decision-making process throughout policymaking to select individual projects. SA becomes integrated into PWs development (in one process) without separation between them. In other words, SA becomes an essential part of the integrated approach to formulate policies and plans and which SPWs projects are to be selected, rather than merely an additional or voluntary requirement to assess emerging policies, plans, and PWs projects. It is a process that produces a final product that comprises a series of decision-making actions that are factored by the SA process to produce final product. The final product of these processes can be recognised as SPWs development projects, best practices, and initiatives which resulted in linking the national vision of SA in Jordan and reality.

8.7 Limitations of the Research

The limitations of the current research are as follows:

1. This research is limited to Jordan application for SA into PWs development which is fully funded by the government of Jordan.
2. The strategic level of SPWs development is studied while the later (project implementation level) is beyond the current research scope. This is because the project implementation level is well-known and most focused on the existing practices and on this level, while the strategic level is not. Moreover, the strategic level is the starting point for SPWs development in Jordan. In addition, this stage has much more attention due to the policy, which is formulated, in which it becomes the source of projects.
3. Pure public and non-public stakeholders were chosen as a sample. This is because it is very difficult to develop an integrated approach without taking them

all together into account. In addition, the data is collected from different organizations in Jordan, and from both public and non-public, which ensures the triangulation of the data provided. However, Participants were unwilling to speak in the beginning. Therefore, pure data from a single organization was not taken as in the case of integrating SA into PWs development in Jordan.

4. The lack of literature in the current research study in the context of Jordan. Moreover, the language barrier with participants was one of the limitations that made it difficult to translate the terms provided from Arabic into English and then to match the Scientific synonyms.
5. This research focuses on creating a comprehensive system for SA in the context of PWs development in Jordan, which results in the integrated approach. However, the integrated approach does not detail the overall SA indicators into PWs development. Therefore, the only SA goals and targets are proposed while the indicators for each goal need to be developed by a wide range of policymakers, planners and both public and non-public stakeholders.

8.8 Recommendations

The current research recommends that:

1. It is necessary to further investigate and document the practical application of the integrated approach in a live small-scale SPWs development, as evidential proof of its effectiveness. In this case, any drawbacks and weaknesses which would hinder achieving sustainable development and meeting the required outcomes can be overcome when assessing large scale areas across the country.
2. Develop a solid database of all information in Jordan regarding population, the development areas, water and energy consumption, the waste generated from each sector, the GHG from each sector, the GDP from each sector and the proportion of each sector in offering job opportunities, etc. This can ensure that the availability of a solid database enables the policymakers to clearly understand the developments needed for each sector in the country.
3. Develop a manual for users on how to use the proposed integrated approach.

8.9 Further Research

It is clear that further research should continue particularly in:

1. This research develops an approach on how to integrate SA into PWs development in Jordan. It focuses on the national, sub-national and local levels (pre-procurement). However, the project implementation level is not studied. Therefore, further research is needed on how to deliver SPWs under (sustainable procurement).
2. Further research can study SPWs, which are not fully funded by the government.
3. Further research can be conducted in developing a model that identify a list of indicators of SA for each goal of the SDGs of Jordan
4. Further research can be conducted to develop an optimisation model for ensuring the balance between the proposed SDGs of Jordan.
5. Further research can go beyond the existing rating system of green buildings in Jordan (JGBG) and creates a score rating scheme that is able to assess all types and sizes of SPWs projects development at the project level.

8.10 Summary

In summary, this chapter discusses the overall findings derived from the fieldwork study with both Jordanian experts and Non-Jordanian experts which were used to develop a novel integrated approach of SA into PWs development in Jordan. It began by discussing the need for SPWs development in the country and provided the main research focus issues. However, the project implementation level is not discussed in detail. This was followed by discussing the development levels of SPWs, followed by discussing the enabling environment (enablers) and the relationships between all of them, and lastly the process of policymaking process to select the individual projects. Furthermore, this chapter discusses the process of how to integrate SA into PWs development in Jordan. It provided guidance for policymakers and planners to successfully deliver the national vision of SA, a comprehensive policy, local development plans and projects for SPWs development. The critical reflection of the findings compared with the international SA practices have also been discussed. Some international practices are reflected, and others were not or less reflected on Jordan. This is due to Jordan is a developing country and the international practices compared mainly with developed countries. Finally, how the research aim and objectives were achieved, the research question was addressed, the limitations, recommendations, and further research are provided. The next chapter summarises the main findings of the current research providing what is intended to achieve, what was found, the limitations and significant. Lastly, the main contributions in both theory and practice are provided.

Chapter 9 Conclusions

9.1 Introduction

This chapter presents the main conclusions regarding the achievement of the aim and objectives of the current research. This is followed by providing the contribution to knowledge of the current research for both theory and practice.

9.2 Achievement of the Research Aim and Objectives

The aim of the current research is to show how to integrate SA into PWs development in Jordan. Achieving the research objectives served to achieve the research aim by following the research methodology. The section emphasises the conclusions of the current research, with respect to each research objective.

9.2.1 The First Objective

The purpose of this objective is to study the current situation of Jordan, in need to identify the current sustainability issues. The findings of this objective revealed that Jordan currently faces serious sustainability issues related to severe water scarcity, limited primary energy, environmental degradation, poverty, high unemployment rates, and a high public debt economy. Therefore, Jordan is unable to provide high living standards that satisfied its citizens. The limitations of this objective have revealed that the existing practices of PWs development are not adequate to meet the desired level of sustainable development in Jordan compared to the international level. Therefore, the significance of this objective motivates the need of an integrated approach that can be readily applied to assess to which extent the emerging policies, plans, and projects of PWs achieve sustainable development.

9.2.2 The Second Objective

The purpose of this objective is to review the international SA practices in order to leverage them in the context of Jordan. The findings of this objective revealed that achieving the SDGs is a challenge for developed and developing countries while the developed countries excelling in the achievement of all SDGs. There is value in all countries learning from each other striving to apply important lessons within unique country contexts. As a result, analysing several international practices particularly from developed countries has helped the researcher to identify the opportunities to

leverage them in Jordan. Moreover, the critical analysis of international SA practices found that there are four main elements that have strong influences on the integration of SA into PWs development. They are 'SA process, goals and targets', 'The development levels of PWs', 'The enabling environment', and 'A structure of a policymaking process to select individual projects'. The limitations of this objective have shown that, although much international SA practices have been developed, there is still confusion in the literature in which specific practices can fit all countries. The significance of this objective motivates in need to list international SA practices into thematic categories in order to leverage their application in Jordan.

9.2.3 The Third Objective

The purpose of this objective is to critically review the existing practices of PWs development in Jordan and identify their limitations in achieving sustainable development. The findings of this objective showed that, despite all the efforts, Jordan is still lagging behind developed countries in the adequacy of the level of services provided to its citizens. In addition, there is no single systematic approach for assessing the emerging policies, plans, and PWs projects, particularly their long-term impacts on the environment, society, and economy. The limitations of this objective have shown that the critical review of the existing practices of PWs development in Jordan focuses theoretically on highlighting their limitations compared to the international level while practically needs to be fed from fieldwork sources. The significance of this objective motivates the need to make improvements not only on these practices but also on the outcomes from them.

9.2.4 The Fourth Objective

The purpose of this objective is to identify the gap practices in the existing practices of PWs development in Jordan compared with the international level. The findings of this objective showed that there are set of gap practices in the existing practices of PWs development in Jordan that need to be addressed. The results indicated that there is a need to change the conventional PWs development process by identifying SA processes, goals and targets, linking the development levels from national to project implementation levels, creating an enabling environment, and, lastly, restructuring the policymaking process to select individual projects. The limitations of this objective revealed that the gap practices are not applicable without confirming them in the context of Jordan. The significance of this objective motivates the need to conduct the fieldwork study in Jordan which, in turn, results in achieving a complete picture of how to integrate SA into PWs development in Jordan.

9.2.5 The Fifth Objective

The purpose of this objective is to develop and validate an integrated approach to assess in which the emerging policies, plans, and PWs projects achieve sustainable development in Jordan. The findings of this objective showed that the efforts were made to accomplish the aim of confirming, adding/modifying the key findings from literature and documentary data by conducting the fieldwork study with sufficient number of participants who nominated experts in the field who can contribute in developing a systematic and practical approach for SA in PWs development in Jordan. The incorporation of recommendations and findings resulting from the MGT interviews and documentary data have helped to propose an integrated approach. As a result, the proposed integrated approach comprised four main elements with sufficient details to make the integration happen.

1. There are specific SA process, goals and targets in the context of Jordan.
2. There is a need to ensure a strategic link with the development levels of SPWs development from the national to project implementation levels.
3. There is a need to specify an enabling environment at each level of SPWs development and ensure the interactions between them occur. Indeed, the findings revealed that all the enablers are significant while the most important one is the institutional governance. The key point here is it makes control on the process of integrating SA into PWs development in Jordan.
4. There is a need for restructuring the policymaking process to select SPWs projects, that set of modifications were required.

The proposed integrated approach was validated in exposure with eight Jordanian experts to data collected from developing country findings as such Jordan. The validation findings showed that the proposed integrated approach is favourably recommended for its usability, usefulness, and appropriateness and its application in Jordan. However, there are several suggestions which had been carried out, together for the improvement of the integrated approach.

Moreover, the integrated approach was validated with a set of six Non-Jordanian experts from developed countries across the world and the region. Their key issue focused on how the proposed integrated approach ensures the interaction “top-down – bottom-up”. This means that the top-down approach delivers the policy for the country while at the bottom-up approach, the needs of the local community will be identified. Therefore, this might make a conflict between both approaches in which the government's trends would not match the needs of the local community. The

findings indicated that the bottom-up approach could completely consume resources and invest them in specific areas while other areas in the country cannot benefit from them. On the other hand, conducting a top-down approach cannot ensure delivering the equality of opportunities across the country. Therefore, the interactions between these approaches can ensure the interests at the higher levels are consistent with the needs at the lowering levels. As a result, additional modifications were made on the proposed integrated approach to clarify the interactions between the development levels of PWs which make the proposed integrated approach works better.

The limitations of this objective revealed that many experts' comments in both MGT and Delphi interviews are similar to the international practices which were proposed initially to contribute to developing the integrated approach. However, some international practices were not or less reflected in Jordan. The significance of this objective resulted in the final version of the integrated approach in which to assess the extent to which emerging policies, plans, and projects of PWs achieve sustainable development in Jordan.

9.3 Contribution to Knowledge

The current research contributes to knowledge in theory from different perspectives:

1. It is the first time that a novel integrated approach has been developed in Jordan which encompasses practices, enablers and processes of a combined structuring elements that have strong influences on the integration of SA into PWs development. This shifts the conventional way of PWs development into a sustainable behaviour which has been established the first time in the current research study.
2. It is the first in its kind that specify a list of SA practices in the context of Jordan from policymaking process to select individual projects. As a result, the current research extends the theoretical knowledge of understanding and clarification of international SA practices and their critical analysis including their linkages with PWs development as there is confusion in the literature.
3. It is one of the few scholarly efforts that have been done to specifically explore the integration of SA into PWs development in Jordan at the strategic level.

The current research contributes to knowledge in practice from different perspectives:

4. The empirical findings and validity of the integrated approach have indicated that it is favourably recommended for its usability, usefulness, and

appropriateness of its application in Jordan. The implications of its structural elements have the potential for the incorporation with the practical standard documents as such the plan of work for the country. As a result, it contributes new insights for improving the outcomes from the policies, plans, and projects of PWs development to achieve sustainable development in the developing world as Jordan is the area of study. Therefore, it provides a possible way of applying the integrated approach in countries that have the same environmental and socioeconomic issues.

5. It is a methodological process that can assist policymakers, planners and developers of PWs development to make the right decisions in order to be aware of PWs impacts regarding sustainable development. Therefore, the current research is the first to do this among the available methodologies which have been developed so far in Jordan.
6. The integrated approach allows the country to be aware of the impacts of the policies, plans, and projects of SPWs development due to uncertainties that may occur.

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Appendix A

International SA practices

Categories		Code	International practices
Sustainability assessment concepts	Sustainability objectives	SP ₁	<ul style="list-style-type: none"> Sustainable development goals (SDGs) should be embedded into the overall policies, strategies and plans of the country (UN 2015). Set out the targeted sustainable development objectives in terms of minimising the carbon emissions and waste generated, using materials that have less impact on the environment, conserving the biodiversity, optimising positive and minimising adverse impacts on land, water, noise and air quality, accessibility of infrastructure, etc. (ODA, 2012; University of Cambridge, 2015).
		SP ₂	<ul style="list-style-type: none"> The SDGs should be broken down from being abstract in order to be more understandable in the context of project development and at each level. Therefore, there is a need for them to be shaped to ensure compatibility between them and achieve sustainable development (Othman and Ahmed, 2013; Sourani, 2013).
	Sustainability assessment	SP ₃	<ul style="list-style-type: none"> A baseline for sustainability assessment can be formulated based on the location, the country's interest, the institutional and regulatory frameworks, the resources available to make assessment, and the national policy, plans and programme that need to be assessed (Historic England, 2016; Yigitcanlar et al., 2015).
		SP ₄	<ul style="list-style-type: none"> There is a need to set out indicators to assess the different policies and projects, and at different levels, macro and micro levels (De la Fuente et al. 2016; Kostevšek et al. 2015; Shortall et al., 2015; Yigitcanlar et al., 2015).
		SP ₅	<ul style="list-style-type: none"> Sustainability assessment (SA) should not be separate from the development of policies, strategies, programmes and projects (Mathur, Price and Austin, 2008; Pope, Annandale and Morrison-Saunders, 2004). Assessing the extent of an emerging plan will achieve sustainable development (economic, environmental and social objectives)(SCC, 2011; Sala et al., p 2015; Shen et al., 2010).
		SP ₆	<ul style="list-style-type: none"> Moreover, recognising sustainability assessment is not an aim, it should be a process integrated into decision-making (Mathur, Price and Austin 2008; Sala, Ciuffo and Nijkamp 2015). These process are provided by a number of authors (Bond et al., 2013; Historic England, 2016; George, 2001; Gibson et al., 2013; Sala et al., 2015).
	Sustainable infrastructure	SP ₇	<ul style="list-style-type: none"> Sustainable infrastructure development is called sustainable when it is able to provide economic development, and meet the people's service requirements and in a manner consistent with natural resources and human rights (Bhattacharya et al., 2016; Bielenberg et al., 2016; Corfee-Morlot et al., 2016; Trading Economy, 2016; Singh et al., 2012), that their negative long lasting impacts should be assessed.
Sustainability enablers	Institutional governance	SP ₈	<ul style="list-style-type: none"> It is essential that the governance system in different sectors is more effective in order to ensure the projects' objectives are in line with the government's trend (Luyet et al., 2012; OGC, 2007a; Qureshi, 2016; UN, 2016b).
		SP ₉	<ul style="list-style-type: none"> The establishment of a sustainable development committee and sub-committees concerned with formulating sustainable development goals may be required. It is important to appoint sub-committees which are the arms to address themes of sustainable development in Jordan (UN 2016a). There is a need to reform higher sub-national committees and technical committees for each sector for sustainable development to meet the desired needs and control and manage the delivery of project development (MoEnv. Of Egypt, 2014; Tadege Shiferaw and Jonny Klakegg, 2012).
		SP ₁₀	<ul style="list-style-type: none"> The international practices of sustainability indicate that the governance and steering system should be appointed in a way to manage the overall process of formulating policy, and link policy with on-the-ground realities (Tadege Shiferaw and Jonny Klakegg, 2012; UN, 2016a).
		SP ₁₁	<ul style="list-style-type: none"> In Australia, Infrastructure Australia (IA) is an independent body to assess and propose the need for infrastructure investments (Australia Government, 2016). Similarly, in the UK, the NIC's National Infrastructure Assessment will be the first-ever multi-sector strategic infrastructure planning exercise in the UK (NIC, 2016). The National Infrastructure Commission (NIC) was created in 2015. It provides independent advice and analysis to the government on the infrastructure requirements and future strategy for infrastructure in the UK (NIC, 2016).
		SP ₁₂	<ul style="list-style-type: none"> Stakeholder involvement is needed particularly from the local community from similar or different backgrounds and several institutional positions that enables civil society organisations, political parties to understand clearly the purpose and scope of each work (Awad, 2016; BREEAM, 2016; Du Plessis, 2007; Mita Patela, 2007; Mont, 2014; UNEP, 2015).

			<ul style="list-style-type: none"> The engagement of stakeholders can be considered for several reasons. The nature of engagement can be divided into strategic decision-making, advisory and consultation, financing, providing information, affected by, or all of them (MPDS, 2014; Luyet et al., 2012).
		SP ₁₃	<ul style="list-style-type: none"> Decentralisation can occur in the following forms: by establishment of subnational bodies, by representation of local level and by virtue of local government decentralised structures. The level of decentralisation will depend on the size of the country, its population and its federal system (Alsubeh, 2013).
		SP ₁₄	<ul style="list-style-type: none"> Therefore, it is important to create a clear governance system to ensure each public sector is consistent with the government's development strategy (Luyet et al. 2012). Setting up a cogent and coherent green framework at the national level requires line ministries to engage in both multi-level and cross-agency collaboration (OECD, 2016).
	Regulatory frameworks	SP ₁₅	<ul style="list-style-type: none"> Public policy should provide signals and set the regulatory and institutional frameworks that influence the actions of all actors to enable sustainability (PwC, 2016; Qureshi, 2015; William Dobson, 2013).
		SP ₁₆	<ul style="list-style-type: none"> All provided regulations should be concerned with environmental protection, conserving water, using renewable energy, creating jobs, reducing carbon emissions, and increasing equality in opportunities and between genders. Therefore, these regulations can then govern the overall process of incorporating sustainability assessment into decision-making (OECD, 2015; Gabrynowicz, 2005). At the local level, there is a need to work within the regulatory framework (neighbourhood plan, site management plan, etc.) (Historic England, 2016).
		SP ₁₇	<ul style="list-style-type: none"> This needs the government to enforce adoption of sustainability practices and enable all parties to follow the rules of sustainability and building codes. The regulatory framework can include the regulatory standards, requirements, guidance and codes of practice (NIA, 2015; Srour et al., 2010; William Dobson, 2013). The international practices in this regard indicated that clear legal frameworks have been established by some OECD countries such as Germany, Japan and the USA, allowing them to direct activities to achieve sustainable development goals (OECD, 2015).
	Technical support	SP ₁₈	<ul style="list-style-type: none"> There is a need to ensure that the technical support is at a high level. However, a lack of technical support which results in a lack of professional skills, training, education about sustainable practices and knowledge leads to ineffective frameworks for adopting sustainability into the construction industry (OECD, 2015; Matar, 2008; UNEP, 2015).
		SP ₁₉	<ul style="list-style-type: none"> The team capacity of government organisations as well as the skills levels of local industry are essential for delivering the most sustainable option to meet potential requirements of the UNDP which are different at each level and horizon (Du Plessis, 2007; Mont et al., 2014; UNDP, 2003).
		SP ₂₀	<ul style="list-style-type: none"> Recognise the capacity building as a long-term continuing process, to create an enabling environment with appropriate policy and legal framework, and institutional development including community participation and human resources, and strengthening managerial systems (Mont et al., 2014; UNDP, 2003). Therefore, building team capacity is essential for those stakeholders and the value chain in order to ensure they are fully qualified in practices and understanding sustainability in the proper way (Al-Zu'bi, 2009; UNEP, 2009).
	Funding	SP ₂₁	<ul style="list-style-type: none"> It is essential to consider the funding allocation as sustainability is a fundamental part in project development to easily find funding approval (Martin and Walker, 2015; Robichaud and Anantatmula, 2010).
		SP ₂₂	<ul style="list-style-type: none"> Funding can be allocated by predicting the future need based on historical data (NIA, 2016).
		SP ₂₃	<ul style="list-style-type: none"> Funding allocation process should weigh all sectors and the poverty rate, the development from each sector and parameters in terms of health, education and environment. Therefore, in order to ensure equality in allocating funding, there is a need to consider the impacts of each sector and its contribution to the overall sustainable development goal (Martin and Walker, 2015).
Development levels	National, sub-national local and project level	SP ₂₄	<ul style="list-style-type: none"> The existing country-level frameworks for sustainable development can be divided into three main levels. These development levels are the national level, where the country sets out its direction and prepares its national development plan; the sub-national level, where the strategies are built for each sector in the country; and the local level, when the strategies become implemented in on-the-ground realities (CC, 2001; OECD, 2016; OECD, 2001; OECD, 2015; Sourani, 2013; Sourani and Sohail, 2005).
		SP ₂₅	<ul style="list-style-type: none"> The national objectives of sustainable development are derived from the global SDGs which are proposed by the UN, regional objectives derived from them, and regional and local planning processes should all be derived from them (OECD, 2016b). This can ensure that these objectives are broken down from being abstract and general to being more detailed, fit with each level of development, from strategic level to project implementation level. Although national, sub-national and municipal governments face different challenges and opportunities in promoting green growth, their policies and actions need to be coherent and strive towards the same overall objectives (OECD, 2016b).
Structuring the	Polycymaking process	SP ₂₆	<ul style="list-style-type: none"> The United Nations Environmental Programme (UNEP) provides guidance on integrated polycymaking for sustainable development in its dimensions (environmental, social and economic) (UNEP, 2009). This is further supported by Hák, Janoušková and Moldan (2016), who proposed the same structure with slight differences in policy cycle. The UNEP places solutions within a policy cycle that typically includes agenda-setting, policy formulation, decision-making, implementation and evaluation (UNEP, 2009).
Integrating	Global level	SP ₂₇	<ul style="list-style-type: none"> In 2015, the 17 SDGs were proposed. Therefore, each country has its own priorities and targets derived from these goals (UN, 2015a). The national objectives of sustainable development are derived from the global SDGs which are proposed by the UN, regional objectives derived from them, and regional and local planning processes should all be derived from them (OECD, 2016b).

	National level	SP₂₈	<ul style="list-style-type: none"> Identify baseline information to establish the current situation; this means providing a framework for the issues that need to be addressed at the national level and sub-national level (Historic England, 2016; UNEP, 2009). In Finland, there is a need to draw a baseline for Finland's implementation measures and, in particular, to point out those goals and targets where Finland needs to be (OECD, 2016).
		SP₂₉	<ul style="list-style-type: none"> The National Planning Policy Framework sets out the government's planning in England (England Government, 2012). It describes how to achieve sustainable development, which creates a targeted situation that needs to be followed by the local plans to ensure it is achieved in a sustainable manner. It includes all sustainability targets – environment, social and economic (England Government, 2012). Similarly, the UAE, Qatar, Saudi Arabia and Egypt have developed a roadmap strategy for the future that includes sets of targets and policies to be achieved by 2030.
	Sub-national level	SP₃₀	<ul style="list-style-type: none"> In the UK, according to the Roads Strategy 2015, the assessment of need for infrastructure investment is predominantly driven by population and economic growth rates in which many scenarios are used to consider different possible outcomes (Department of Transport, 2015). Similarly, Switzerland conducts status analysis of the extent to which the 2030 Agenda is already implemented in sectorial policies (gap analysis), and identification of future action areas with regard to the SDGs (OECD, 2016). In 2016, Infrastructure Australia (IA) released the first-ever 15-year Australian Infrastructure Plan (Australia Government, 2016). With regard to the UK, its share of international emissions is included in the European target to reduce emissions by at least 80% by 2050 (CCC, 2016). Therefore, long-term GHG emissions reduction targets as an overall constraint are also reflected in the strategic investment assessment (CCC, 2016).
		SP₃₁	<ul style="list-style-type: none"> It might be useful to engage various stakeholders in order to achieve sustainable development goals and in the decision-making process to ensure consistency between theory and practice and link the policy with on-the-ground realities (Du Plessis, 2007; Mont et al., 2014; MoEnv. Of Egypt, 2014). It is important to communicate with local communities, civil society and private sector (BREEAM, 2016; Du Plessis, 2007; Mita Patela 2007; Mont et al., 2014; UNEP, 2015).
		SP₃₂	<ul style="list-style-type: none"> Recognising sustainability assessment is not an aim, it should be a process integrated into decision-making key principles for decision-making at each level in the country, locally and nationally (Mathur et al., 2008; UN, 2016a).
		SP₃₃	<ul style="list-style-type: none"> Sustainability assessment has become a common practice in policymaking and infrastructure project development appraisal (Sala, Ciuffo and Nijkamp 2015).
		SP₃₄	<ul style="list-style-type: none"> Higher-level policymakers' essential task in relation to delivering sustainability is to coordinate sectorial strategies, plans and programmes while taking into account sustainable development goals (OECD, 2006; MoEnv. of Egypt, 2014; UN, 2016a). This can create a strategic link between the policy and project development (OGC, 2007a; Tadege Shiferaw and Jonny Klakegg, 2012).
		SP₃₅	<ul style="list-style-type: none"> There is a need to ensure that all sustainability dimensions, social, economic and environmental, are being integrated into policymaking in, all sectorial policies (Australia Government, 2016; Sourani, 2013; Sourani and Sohail, 2005; UNEP, 2009).
		SP₃₆	<ul style="list-style-type: none"> At early stages of policymaking, it is essential to conduct SWOT analysis to identify the overall internal and external factors that can affect the overall policymaking. Therefore, in formulating the policy, it is also essential to understand the impact of public infrastructure (Azapagic 2003; Wheelen and Hunger 2012).
		SP₃₇	<ul style="list-style-type: none"> Understand where the problem is in line with national sustainable development goals (CC, 2011; Sala et al., 2015; Shen et al., 2010; UNEP, 2009).
		SP₃₈	<ul style="list-style-type: none"> Singh et al. (2012) argued that a 'top-down' approach can enable experts to define a baseline for achieving sustainability. The 'bottom-up' approach requires systematic participation of various stakeholders to define a baseline. Consultation is essential to determine sustainability dimensions and the most suitable indicators for different levels, from macro policy level to micro project level (Singh et al., 2012).
		SP₃₉	<ul style="list-style-type: none"> After the assessment is carried out to identify the problem and generate such information about it, the next step is to formulate strategic objectives for the policy which become the overall objectives for the country (Historic England, 2016; Tadege Shiferaw and Jonny Klakegg, 2012; UNEP, 2009).
	Local level	SP₄₀	<ul style="list-style-type: none"> Integrate sustainability strategic objectives into the briefing process in terms of environmental, social and economic factors (UK's Department of Communities and Local Government, 2012).
		SP₄₁	<ul style="list-style-type: none"> The strategic sustainable objectives should be set out at the central level (sub-national level), while the local level of identification should follow these targets (OECD, 2006). There is a need to assess the local level in rural areas in line with sustainable development, where it should be formulated at the micro level (Ugwu and Haupt, 2007; UNEP, 2009).
		SP₄₂	<ul style="list-style-type: none"> Alternative solutions for a problem should be in line with sustainable development goals and assess the current situation against these goals, which can be developed for the country and at the macro level (UNEP, 2009). Development of a responsible and sustainable option should be based on sustainability appraisal criteria and evaluating the most proper option (Australia Government, 2016; CC, 2013; OGC, 2007b; UNEP, 2009). Sustainability assessment is not an aim, it should be a process integrated into decision-making in order to be implemented at the following stage (OECD, 2006; UNEP, 2009).

		SP ₄₃	<ul style="list-style-type: none"> There is a need to create a framework of sustainability practices and initiatives that should be carried out at the local level in terms of water efficiency, energy efficiency, carbon emissions, materials use, etc. (ILC, 2008).
		SP ₄₄	<ul style="list-style-type: none"> The review of related plans, programmes and policies will vary depending on the specific circumstances and the type of plan being assessed in order to be proportionate (Historic England, 2016).
		SP ₄₅	<ul style="list-style-type: none"> Identifying sustainability issues and problems based on the baseline information that describes the current and future likely condition of the historic environment (Historic England, 2016).
		SP ₄₆	<ul style="list-style-type: none"> According to BREEAM, there is a need to integrate appropriate stakeholders with members of the local community in consultation for a sustainability planning process (BREEAM, 2016). As a result, the engagement of local communities with the preparation of strategic plans may offer chances for them to make locally appropriate decisions relating to development (Alnsour, 2016).
		SP ₄₇	<ul style="list-style-type: none"> The integration of sustainability into a multi-criteria decision-making approach can provide the basis for choosing the most proper option which can achieve the sustainable development goals in the context of a country (Ashley et al., 2003).
	Project implementation level	SP ₄₈	<ul style="list-style-type: none"> Implementation is the stage where a selected policy option must be translated into action (UNEP, 2009).
		SP ₄₉	<ul style="list-style-type: none"> An appropriate procurement strategy should be selected in order to ensure the strategies of sustainability in terms of environment protection, water efficiency and energy, and reduce the WLCC are fully understood and incorporated in sustainable procurement (HM Government, 2006; Fussey, 2012; OGC, 2007b). The sustainable project can be delivered as a new project, or sustain the existing situation with no need for a new project (OGC, 2007b).
	Monitoring and evaluation	SP ₅₀	<ul style="list-style-type: none"> The results of the policy are then monitored and evaluated against the strategic objectives, which can allow for such adjustments to the policy, if needed (UNEP, 2009).
		SP ₅₁	<ul style="list-style-type: none"> The UNEP (2009) indicated that there is a need to identify specific evaluation criteria, collect data about the policy implementation, and conduct participatory monitoring and evaluation (Brugmann, 1996; UNEP, 2009).
		SP ₅₂	<ul style="list-style-type: none"> There are two monitoring systems, internal and external (Hill and Bowen, 1997). Monitoring and evaluation can allow lessons to be learnt from weaknesses and problems that could be caused by many factors during the implementation of the policy (UNEP, 2009).
		SP ₅₃	<ul style="list-style-type: none"> Both direct and indirect monitoring can ensure the overall development process of policy implementation is in line with sustainable development goals (UNEP, 2009). Participatory monitoring and evaluation are needed (Brugmann, 1996; UNEP, 2009). The collaboration system top-down and bottom-up approaches are essential for delivering supported action by the government and monitoring system by the industry behaviour (Alkilani, 2012).
		SP ₅₄	<ul style="list-style-type: none"> It should activate the accountability system and ensure effective decision-making, ensuring that all the stakeholders' interests are taken into account when developing a strategic investment plan (Garland, 2009).
		SP ₅₅	<ul style="list-style-type: none"> Learning lessons and reviewing feedback from past projects and similar stories is essential to ensure the project team shares the same vision when initiating a new project (Gething, 2011; Sinclair et al., 2013; UNEP, 2009).

Appendix B

Implications of the gap analysis

Category		Implications of public works development practices and sustainability assessment practices (gap analysis)
Sustainability assessment concepts	Sustainability objectives	<ul style="list-style-type: none"> • Formulate sustainable development goals. It is important from the early start of public works development to clarify the set of sustainable development goals to be fitted into the context of Jordan. The variety of sustainable development goals can cause a problem for understanding which of them are suitable to be integrated and prioritise public works based on this. • Sustainability does not mean just continuing to provide PWs development; it is also necessary to ensure that the services provided by these assets are sustainable
	Sustainability assessment	<ul style="list-style-type: none"> • Make sure to undertake the formal pre-assessment of sustainability and identification of key areas of design focus and sustainability aspiration to be reported and agreed. • The sustainability assessment should be considered by formulating a robust assessment process in the context of Jordan.
	Sustainable public works development	<ul style="list-style-type: none"> • Sustainable public works development should have the potential to have positive impacts on the environment, society and economy.
Sustainability enablers	Institutional governance	<ul style="list-style-type: none"> • It is important to create a governance system to ensure that projects in each sector are consistent with the government's development policy. As a result, it is essential that the governance system from different is more effective for the projects' objectives to succeed in line with the government trend. • It is essential that the innovation process is carried out via communication between the bottom and top management levels. This process will build the overall information to be added and the way to create and build a new way of thinking and the best ways to support the adoption of sustainability and then building the team capacity through innovative, sustainable solutions. • Stakeholder engagement is needed in developing and prioritising public works. They are not usually engaged and cannot affect the overall decisions to select the most proper option. It is important to understand that their feedback and their engagement can improve the overall public works development. • The engagement requires support from society, which includes policymakers, politicians, NGOs' representatives, suppliers, contractors, tenderers and civil society organisations. • Design committee must include all stakeholders, internal and external, including surrounding property owners and other representatives. • Identify at which level the key stakeholders need to be engaged. • Strengthen the cooperation among the responsible authorities including all related authorities, and cooperation between various stakeholders involved in the strategic plan.

	Regulatory frameworks	<ul style="list-style-type: none"> • Regulations then can govern the overall process of incorporating sustainability into decision-making. • Regulations should enforce adoption of sustainability practices and enable all parties follow the rules of sustainability. • Review all related legislation, regulations and governmental policies that would affect the progress of sustainability in the delivery of project development. • A clear legal framework should be established, allowing to direct activities to achieve sustainable development goals at each level of development.
	Technical support	<ul style="list-style-type: none"> • In order to support this point, it is important here to consider at this stage that the key stakeholders are fully knowledgeable about the requirements of sustainability. Moreover, an analysis of internal and external circumstances facing the development of sustainability practices is needed to overcome these barriers and capability gaps to practise sustainability correctly. • Conduct training in regard of sustainability and improve skills. • Strengthen the institution's capacity and public sector capacity. • A multidisciplinary approach that combines theoretical and action-oriented knowledge will likely lead to solutions based on a strong grounded conceptual understanding and on actual practices.
	Funding	<ul style="list-style-type: none"> • It should be learned from completed projects and similar projects that the operational benefits would be signs to adopt and encourage sustainability in practice; and that the funding for delivering public works should be allocated from an early stage, which requires different funding sources to ensure the project is delivered in a sustainable way in order to secure the on-going public plans and develop public works under sustainability requirements. • Align a preliminary budget with the project's unique goals towards sustainability. • The sustainability option for delivering public projects should be demonstrated to the key stakeholders, including financiers, in order to allocate funding for sustainability requirements. • Those tasked with considering funding for public works development should consider at an early stage the importance of incorporating sustainability into the policy for individual public works in order to allocate such funding early in a project's development. They should consider giving less developed sectors a higher proportion of the public funding. This will be met by proposing proportions of public funding by assessing these least developed sectors.
Development levels	National to Project implementation levels	<ul style="list-style-type: none"> • The existing country-level frameworks for sustainable development can be divided into three main levels. These development levels are the national level, where the country sets out its direction and prepares its national development plan; the sub-national level, where the strategies are built for each sector in the country; and the local level, when the strategies become implemented in on-the-ground realities. As a result, the development levels can comprise from the global level where SDGs are through national (government), sub-national (ministries), local (governorates) and to project implementation levels where the project is implemented by the MPWH.
Integrating sustainability assessment into	National level	<ul style="list-style-type: none"> • The need to integrate all of the existing policies to ensure the sustainable development objectives are fully understood and realised. The overall policy for achieving sustainable development should include the triple bottom lines together. Therefore, developing policies with regard to sustainability and incorporation between sustainability assessment dimensions is essential. • Co-ordination of institutions: a wider range of governmental department and agencies should be involved in the formulation and implementation of national strategies and overall responsibility. • National plans and strategies should give consideration to social, environmental and economic concerns in integrated approaches and by incorporated into national policies. • Ensure a strategic link between government policy and project investment. • The engagement of local communities in the preparation of sustainable policies may offer chances for them to make locally appropriate decisions relating to development. • The integration of sustainability into a multi-criteria decision-making approach can provide the basis for choosing the most proper sustainable option which can achieve sustainable development.

		<ul style="list-style-type: none"> Using a participatory approach, bottom-up planning is broadly recognised for implementation, which should be a key principle for decision-making at each level in the country, locally and nationally.
	Sub-national level	<ul style="list-style-type: none"> Conducting a SWOT analysis is essential for identifying internal and external factors that can affect policymaking and understanding the impact of public infrastructure. Ensure integration between all sustainability dimensions is being achieved in all sectorial policies. Inform a comprehensive planning process. The government should enforce the adoption of sustainability practices and enable all parties to follow the rules of sustainability and building codes. The strategic decision-making for public works development is usually carried out using a top-down approach. In this case, the top management level in the organisation only can realise their trend and orientation with no engagement with the local level – those who need services and public works and can give appropriate proposals and information for the delivery of public works in line with their needs and requirements. If they were consulted, the delivered public works would then meet service. The bottom-up approach is the most suitable way of identifying public works, as the engagement of stakeholders at all can give the opportunity to prioritise public works appropriately. The key decision criteria need to focus on the way to embed sustainability. In addition, the sustainable project team needs to be engaged with the decision-making process and the sustainability requirements need to be fully understood.
	Local level	<ul style="list-style-type: none"> Strategic decision-making for public works development is usually carried out using a top-down approach. In this case, the top management level at the organisation only can realise their trend and orientation with no engagement with those who need services and public works and can give appropriate proposals and information to deliver public works in line with their needs and requirements. Bottom-up approach is the most suitable way for developing public works, as the engagement of stakeholders at all levels can give the opportunity to identify public works appropriately. The key decision criteria need to focus on the way to embed sustainability in the local development plan. In addition, the local community needs to be engaged with the decision-making process and the sustainability requirements need to be fully understood. The engagement of local communities into the local development plans may offer chances for them to make locally appropriate decisions in relation to development. The integration of sustainability into a multi-criteria decision-making approach can provide the basis for choosing the most proper option which can achieve the sustainable development goals in the context of project development. Using a participatory approach, bottom-up planning is broadly recognised for implementation, which should be a key principle for decision-making at each level in the country, locally and nationally.
	Project implementation level	<ul style="list-style-type: none"> The requirements of sustainability should be assessed, then it should be ensured that the mechanisms and tools are correctly included in sustainable procurement decision-making. Sustainable public procurement should influence the policymaking. This means that the sustainable public procurement should integrate sustainability practices, which can have implications for the overall policymaking.
	Monitoring and evaluation	<ul style="list-style-type: none"> Monitoring links between the government policy and on-the-ground reality. It is important here to understand that the government's policies are set out based on the minister and top management level at the organisation. Then, these policies are translated to work on the ground by the other level at the organisation. Therefore, the top level should monitor the development of public works in such a way as to achieve the need. The prioritisation system should include the sustainability objectives in the selection of the most appropriate option. Sustainability should affect the strategic decision-making, and the prioritisation system is the most proper option to be focused on. Engage a sustainable team in the decision-making. Activate accountability and transparency. Monitoring and evaluation through independent bodies or process should be established. Integrated assessment tools should be used in national reports to identify sustainability principles and benefits. Any barriers which might face project development can be overcome through sets of programmes that should be integrated into the whole process of public procurement and strengthen the capability for each party in project development.

Appendix C

MGT Interview Questions

Interviewees' information		
Name:	Organisation:	Academic qualified:
Major speciality:	Position:	Experience () years.

Category		Interview question	
Sustainability Assessment Concepts	Sustainability concepts, targets and goals	Fixed question	<u>Open and axial coding question</u> 1. Could you identify from the proposed UN SDGs the most appropriate SDGs for Jordan?
		Subsequent question	<u>Open and axial coding questions</u> 2. What does sustainability mean in the context of Jordan and in PWs? 3. What does sustainability in Jordan focus on? 4. What does a comprehensive view for SPWs development in Jordan mean? 5. Why is a comprehensive view for SPWs in Jordan needed? 6. How adequate is the current planning process for making a comprehensive view for SPWs development in Jordan?
	Sustainability assessment process	Subsequent questions	<u>Open and axial coding questions</u> 7. Why do you think that the development of PWs should be assessed against sustainability terms? 8. What happens if the development of PWs development is not assessed against sustainability? 9. What is the starting point for assessing PWs development in Jordan against sustainability? 10. In which process do you think the assessment should be integrated for SPWs?

			<p>Open and axial coding questions</p> <p>11. From the following, what do you think is the most appropriate process for SA to assess PWs development in Jordan? From policy making to select individual projects.</p>														
		Fixed question	<table border="1"> <thead> <tr> <th>SA process</th> <th>George (2001)</th> <th>Gibson et al. (2013)</th> <th>Bond et al. (2013)</th> <th>Sala et al. (2015)</th> <th>England (2016)</th> <th>Jordan</th> </tr> </thead> <tbody> <tr> <td>Stages</td> <td> <ul style="list-style-type: none"> - Definition of sustainable development objectives - Expansion into targets and indicators - Baseline studies - Scoping the appraisal - Appraisal of spatial strategy options and comparison of alternatives - Appraisal of policy statements - Reporting - Monitoring </td> <td> <ul style="list-style-type: none"> - Identifying appropriate purposes and options - Assessing purposes, options - Choosing option - Monitoring, - Learning from the results </td> <td> <ul style="list-style-type: none"> - Screening - Scoping - Baseline studies - Analysis - International and national commitment objectives concerned with sustainability - Description of the choice of alternatives - Description of comparison measures and monitoring - Description and appraisal of the environmental, social and economic effect of the final draft - Decision-making - Implementation - Monitoring and evaluation </td> <td> <ul style="list-style-type: none"> - Sustainability principles - Sustainability targets - Decision-making context - Choices and assessment </td> <td> <ul style="list-style-type: none"> - Screening - Scoping - Developing plan options, refining alternatives and assessing likely effects - Undertaking the assessment stage - Publication, consultation and adoption - Monitoring </td> <td></td> </tr> </tbody> </table>	SA process	George (2001)	Gibson et al. (2013)	Bond et al. (2013)	Sala et al. (2015)	England (2016)	Jordan	Stages	<ul style="list-style-type: none"> - Definition of sustainable development objectives - Expansion into targets and indicators - Baseline studies - Scoping the appraisal - Appraisal of spatial strategy options and comparison of alternatives - Appraisal of policy statements - Reporting - Monitoring 	<ul style="list-style-type: none"> - Identifying appropriate purposes and options - Assessing purposes, options - Choosing option - Monitoring, - Learning from the results 	<ul style="list-style-type: none"> - Screening - Scoping - Baseline studies - Analysis - International and national commitment objectives concerned with sustainability - Description of the choice of alternatives - Description of comparison measures and monitoring - Description and appraisal of the environmental, social and economic effect of the final draft - Decision-making - Implementation - Monitoring and evaluation 	<ul style="list-style-type: none"> - Sustainability principles - Sustainability targets - Decision-making context - Choices and assessment 	<ul style="list-style-type: none"> - Screening - Scoping - Developing plan options, refining alternatives and assessing likely effects - Undertaking the assessment stage - Publication, consultation and adoption - Monitoring 	
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	Development levels	Subsequent questions	<p>12. How do you see the Jordan vision 2025 which is currently one of the inputs for public works development in Jordan?</p> <p>13. What is needed in your opinion to make the Jordan vision more effective in addressing incorporating sustainability into public works development?</p> <p>14. Do you think the existing public works development levels are robust? Why?</p> <p>15. How to make these levels robust so that they can be linked by each other?</p> <p>16. From what level do you think that sustainability assessment should be integrated into public works development levels?</p> <p>17. What are the outputs that can be gained from assessing each level of public works development against sustainability objectives?</p>
Sustainability enablers	Institutional governance	Fixed question	<p><u>Open and axial coding question</u></p> <p>18. Could you please confirm the following enabling environment or not?</p> <ul style="list-style-type: none"> - Institutional governance - Regulatory frameworks, - Technical support - Public funding
		Subsequent questions	<p><u>Open and axial coding questions</u></p> <p>19. Do you think an enabling environment for assessing sustainable public works development is needed? Why? Is there any more enablers? If Yes, what they are?</p> <p>20. What improvements are needed to make the existing enablers more effective for SPWs development?</p> <p>21. Why is there a need to create effective institutional governance for sustainable public works development in Jordan? Who will be engaged?</p> <p>22. What is the needed institutional governance system at each level of development?</p> <p><u>Selective coding question</u></p> <p>23. What are the roles for each of these committees?</p> <p><u>Open and axial coding questions</u></p> <p>24. From which parties do you think these committees should be constituted?</p> <p>25. Why is engagement needed? Could you please identify the level of engagement from different groups of stakeholders?</p>
		Fixed question	<p><u>Open and axial coding question</u></p> <p>26. Could you please classify groups of stakeholders who need to be engaged in the institutional governance and at each level of development?</p>
	Regulatory frameworks	Subsequent questions	<p><u>Open and axial coding questions</u></p> <p>27. What do you think can make the regulatory framework effective?</p> <p>28. How can each sector then be affected by another sector's regulations?</p>
		Fixed question	<p><u>Open and axial coding question</u></p> <p>29. Could you please classify the regulations that need to be comprehensive for SPWs at each level of development?</p>

	Technical support	Subsequent questions	<p><u>Open and axial coding questions</u></p> <p>30. Why do you think there is a need to assess the technical support needed from stakeholders? 31. What is needed to conduct capacity development? 32. Why do you think the early assessment of stakeholders' capability against sustainability is needed?</p> <p><u>Selective coding questions</u></p> <p>33. What are the proposed methods to define each programme of capacity development? 34. What types of programmes are needed?</p> <p><u>Open and axial coding question</u></p> <p>35. What tools are needed to conduct these programmes, and by who?</p>
		Fixed questions	<p><u>Open and axial coding question</u></p> <p>36. What is the technical support needed at each level of SPWs development?</p>
	Public Funding	Subsequent questions	<p><u>Open and axial coding questions</u></p> <p>37. How is the existing process of public funding effective to enable sustainable public works development? 38. Why do you think the existing practices need to be improved? 39. Where are the improvements needed towards sustainable public works development in Jordan?</p> <p><u>Selective coding questions</u></p> <p>40. Why do you think this proposed mechanism is more appropriate? 41. How do you think we can secure public funding towards SPWs?</p>

Structuring policymaking to select individual PWs	Process	Fixed questions	<p><u>Open and axial coding question</u></p> <p>42. Which of the following do you think is appropriate to be incorporated into the existing practices of the policymaking process to select individual projects?</p> <table border="1"> <thead> <tr> <th>Levels</th> <th>Stages</th> <th>Interviewees</th> </tr> </thead> <tbody> <tr> <td>National</td> <td rowspan="5"> <ul style="list-style-type: none"> • National vision of sustainability in Jordan • Create a comprehensive vision of SPWs • Assessment and problem identification • Formulate strategic sustainable objectives • Identify alternative options • Evaluate and select the right sustainable alternative options • Implementation under 'sustainable procurement' • Monitoring and evaluation </td> <td rowspan="5"></td> </tr> <tr> <td>Sub-national</td> </tr> <tr> <td>Local</td> </tr> <tr> <td>Project</td> </tr> <tr> <td>All levels</td> </tr> </tbody> </table>	Levels	Stages	Interviewees	National	<ul style="list-style-type: none"> • National vision of sustainability in Jordan • Create a comprehensive vision of SPWs • Assessment and problem identification • Formulate strategic sustainable objectives • Identify alternative options • Evaluate and select the right sustainable alternative options • Implementation under 'sustainable procurement' • Monitoring and evaluation 		Sub-national	Local	Project	All levels
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Project													
All levels													
Integrating sustainability assessment into PWs Policymaking	National level	Subsequent questions	<p><u>Selective coding question</u></p> <p>43. Could you please clarify the ideal process to identify a baseline line for sustainability assessment and at each level of development?</p> <p><u>Open and axial coding question</u></p> <p>44. What are the barriers that hinder policy implementation in Jordan? Fixed question</p> <p><u>Selective coding question</u></p> <p>45. At which level do you think the barriers should be overcome?</p> <p><u>Open and axial coding questions</u></p> <p>46. Tell me what improvements are needed through the policy formulation at the sub-national level? 47. Tell me that why the assessment is needed and based on what it is conducted?</p> <p><u>Selective coding question</u></p> <p>48. What are the outcomes from the assessment of sustainability of PWs development?</p> <p><u>Open and axial coding question</u></p> <p>49. How to ensure the sustainable strategic objectives then become followed at local level?</p> <p><u>Selective coding questions</u></p> <p>50. How do you think we can identify the most sustainable option? 51. What tools can be used to evaluate each SPWs option?</p>										

			<p>52. What are the outputs from the local development plan?</p> <p>53. Could you provide an appropriate definition for the outputs from the local development plan?</p> <p>54. What do you think the most appropriate procurement option that can ensure SPWs is implemented?</p> <p><u>Open and axial coding questions</u></p> <p>55. How do you see the existing practices of the monitoring system on each level of PWs development?</p> <p>56. What is the difference between the evaluation and monitoring?</p> <p>57. Where do you think the monitoring and evaluation should be carried out throughout the process of SPWs development in Jordan?</p> <p>58. Why do you think the evaluation of each level is needed?</p> <p>59. Do you agree with updating the comprehensive policy for SPWs?</p> <p>60. How do you think the monitoring and evaluation can be carried out at each level of SPWs development?</p> <p>61. Do you agree that there is a need for gateway approvals between the development levels?</p> <p><u>Selective coding questions</u></p> <p>62. By who should the monitoring and evaluation be carried out?</p> <p>63. Where do you think the gateway approval should be allocated?</p> <p>64. Do you think the capacity development should be allocated after the comprehensive policy is formulated?</p>
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Appendix D

MGT Interviewees' Profile

Interviewees	Position and Job Tasks	Sector	Qualification	Experience	Interview conducted type
IR1	Mayor advisor: carryout the large consultancy roles in public infrastructure, environmental and traffic impact assessments. In addition, he leads the process for auditing and managing the delivery of large public infrastructure and their impacts upon the environment, society and economy.	Public	BSc	+20	Face-to-face
IR2	Senior PM: Delivering large scale projects that concern with environmental, social and economic impacts. He conducts consultancy roles in engineering studies and management.	Non-public	MSc	+20	Face-to-face
IR3	Director: Lead a planning and policymaking role in public infrastructure development. He conducts consultation to manage sustainable development goals into the delivered policies, and strategies.	Public	BSc	+20	Face-to-face
IR4	Expert in the UN: Working at the UN for consultancy to manage the role of sustainable development goals and integrate them in practice.	Non-public	PhD	+20	Skype
IR5	Secretary general: Working at the strategic level to lead the process of strategy development of MPWH. He ensures the SDGs for Jordan are being followed into the ministry.	Public	BSc	+20	Face-to-face
IR6	The director of National Building Council: His role in managing, auditing and leading the process of issuing PWs codes, regulations and Jordan Green Building Guide.	Public	PhD	+20	Face-to-face
IR7	Director of Strategic planning directorate at the MPWH: His role in preparing the main objectives of PWs strategic and ensure it is consistent with the national vision of Jordan 2025 to achieve sustainable development.	Public	BSc	+20	Face-to-face
IR8	Director at the Housing and Upran planning foundation: His role in planning for public housing and ensures it is in the line of socioeconomic growth with respect to sustainability. In addition, he takes the role for leading the upran planning process for section the most sustainable siting for development.	Public	PhD	+20	Face-to-face
IR9	Senior PM: Delivering sustainability studies at both MPIC and Jordan River Foundation. His role can be classified in conducting environmental and socioeconomic impacts studies which affect achieving of sustainable development.	Public	MSc	+20	Face-to-face
IR10	Senior project leader: Wide experiences in consulting and conducting engineering studies for large scale public and private	Non-public	PhD	+20	Face-to-face

	projects in respect to environmental impacts, and feasibility studies.				
IR11	Former Minister of the MPWH: His role in conducting policymaking and lead the overall the ministry, collaborate with the intentional agencies and ensure the funds are available for these feasible and environmental projects which have less negative impacts.	Public	BSc	+20	Face-to-face
IR12	Associate Professor: His role in teaching studies in project management discipline. The justification for selecting hem, that he got wide experiences prior his academic role in planning and implementing major environmental projects and lead the process in Jordan Valley Authority for conducting major environmental impacts and engineering studies that affect the progression of sustainable development.	Academician	PhD	+20	Face-to-face
IR13	Director of planning and project management directorate at the MPWH: Her role is to lead the process of conducting such environmental consultations and feasibility studies against the planned PWs in Jordan. In addition, she leads the process of testing the projects of PWs in which their impacts are in the line of national trend of the government.	Public	BSc	+15	Face-to-face
IR14	Professor: he has got more than 20-year experiences in teaching, planning and delivering major public projects in Jordan and in the region. He works more than 7 years with the UNESCO in Egypt in water, and environmental projects. In addition, he is freelancer in conducting environmental and social studies for public projects. He prepared the EISA report for the state of Kuwait with participation of the UN.	Academician	PhD	+20	Face-to-face
IR15	Municipality Mayor: His role in lead the process of developing the municipality. He has got more than 20-years in delivering major public projects in Jordan. He became a mayor and then working in achieving sustainable development in the line of the government's trend. He honoured the government price in the best municipality in Jordan for achieving sustainable development.	Public	MSc	+20	Face-to-face
IR16	Expert in planning: A freelancer expert in planning and policymaking process. He conducts consultations, capacity development and sustainability studies in achieving sustainable development in Jordan with international agencies such as the USAID, UNDP and UNISCOO.	Non-public	PhD	+20	Face-to-face
IR17	Senior PM: Works extensively with directorate and senior managers of large organizations and pioneers to develop sustainable solutions for the built environment. His role in working collaboratively with private sectors as he works at the MPCIC enable him to become effective for most sustainability issues in the country.	Public	PhD	+20	Face-to-face

IR18	Director at the Nuclear Power Company: NPP Project Director at Jordan Nuclear Power Company and Jordan Atomic Energy Commission. Principle in Renewable energy planning, legislations and policymaking towards sustainable energy sector in Jordan.	Public	PhD	+20	Face-to-face
IR19	Sustainability Engineer: Working in planning and implementing the sustainable development goals with the SAVE CHILDREN Jordan. His role to lead the process of conducting the environmental scanning on the areas that are less developed in contrast with others in Jordan.	Non-public	BSc	+10	Face-to-face
IR20	Professor in Planning and intellectual sustainable development: His role in teaching and participating in developing Jordan Vision 2025. This role seeks to ensure Jordan is in the line of sustainable development.	Academician	PhD	+20	Face-to-face
IR21	Expert and Chairman of the Green Building Committee for Sustainable Urban Development and Resource Efficiency Project for the City of Amman (SURE): His role aims to develop a systematic approach to the city of Amman to implement standard and specific tools and methodologies for measuring and reporting urban city development, implemented by the Greater Amman Municipality and administered by the United Nations Development Program (UNDP).	Non-public	BSc	+20	Face-to-face
IR22	Senior Consultant in sustainability: Environmental and sustainability consultant. His role is in planning and policymaking with both the UNDP Jordan and the MPIC. His role seeks to achieve sustainable development in the country to align them with sustainability goals.	Non-public	PhD	+20	Face-to-face
IR23	Green Building and Consultant Engineer at Greater Amman Municipality: She spent more than ten year in consulting and monitoring public projects at the municipality that seeks sustainable and green innovation. She is working collaboratively with the internal agencies in Jordan such as GIZ, USAID, UNDP in renewable and green projects as well.	Public	BSc	+10	Face-to-face
IR24	Expert in sustainability is a recognized leader and expert in environmental policies, governance and planning in the field of sustainable development and is a real inspiration for young people in Jordan and beyond. She is currently the Executive Director of EDAMA, a Jordanian non-profit organization representing one of the first business associations to find innovative solutions in the energy, water and environmental sectors and stimulate the green economy. Her role is a Global Resolutions Ambassador in Jordan and a member of the Social Plus Network, which seeks to raise awareness and disseminate success stories related to the global goals of sustainable development in the Middle East and North Africa (MENA) region.	Non-public	MSc	+15	Face-to-face

Appendix E

Interviewees' response for MGT interview questions

Categories	Questions	Interviewee																								
		IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10	IR11	IR12	IR13	IR14	IR15	IR16	IR17	IR18	IR19	IR20	IR21	IR22	IR23	IR24	
Sustainability concepts and goals	Q1	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	Q2	√	√	√	√	√																				
	Q3						√	√	√	√	√	√														
	Q4	√	√	√	√	√	√	√	√																	
	Q5					√	√	√	√	√	√															
	Q6											√	√	√	√	√	√									
Sustainability assessment process	Q7	√	√	√	√	√																				
	Q8						√	√	√																	
	Q9	√	√	√	√	√	√	√	√	√	√	√														
	Q10													√	√	√										
	Q11	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Development levels	Q12	√	√	√	√	√	√	√	√																	
	Q13							√	√	√																
	Q14	√	√	√	√	√	√	√																		
	Q15									√	√	√	√													
	Q16										√	√	√	√	√											
	Q17																√	√	√	√	√					
Enabling Environment	Q18	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	Q19	√	√	√	√	√	√	√	√																	
	Q20									√	√	√	√	√												
	Q21						√	√	√	√	√	√	√	√	√											
	Q22																									
	Q23																									
	Q24																√	√	√	√	√	√	√	√	√	√
	Q25																√	√	√	√	√	√	√	√	√	√
	Q26	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Q27	√	√	√	√	√	√	√	√																	
	Q28																									
	Q29	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Q30	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						√	√	√	√	√
	Q31																√	√	√	√						
	Q32																	√	√	√	√					
Q33																					√	√	√	√	√	

	Q34																							√	√	√	
	Q35																								√	√	√
	Q36	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Q37	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Q38													√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Q39																	√	√	√	√	√	√	√	√	√	√
	Q40																							√	√	√	√
Q41																								√	√	√	
Polycymaking process to select individual SPWs projects	Q42	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
Integrating SA into PWs development	Q43																							√	√	√	
	Q44	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	Q45																							√	√	√	
	Q46										√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	Q47																	√	√	√	√	√	√	√	√	√	
	Q48																							√	√	√	
	Q49																	√	√	√	√	√	√	√	√	√	
	Q50																								√	√	
	Q51																		√	√	√	√	√	√	√	√	
	Q52																		√	√	√	√	√	√	√	√	
	Q53																			√	√	√	√	√	√	√	
	Q54																							√	√	√	
	Q55	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
	Q56																										
	Q57																										
	Q58																										
	Q59																								√	√	
Q60																								√	√		
Q61																								√	√		
Q62																								√	√		
Q63																								√	√		
Q64																								√	√		

Appendix F

CONSENT FORM

Consent to take part in the research titled: Integrating sustainability assessment into public works development in Jordan

Name of researcher: Moawiah Alnsour

Add your initials next to the statement if you agree

I confirm that I have read and understand the information sheet explaining the above research project and I have had the opportunity to ask questions about the project.	
I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. I understand that once the data/information has been written up it would preserve my identity such that I cannot be identified individually. At this point of write-up/submission I would no longer be able to withdraw my data.	
I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research. I understand that my responses will be kept strictly confidential.	
I agree for the data collected from me to be stored and used in relevant future research.	
I agree to participate in the above research project and will inform the lead researcher should my contact details change.	
I would like to receive a copy of the results of the above study	

Name of participant	
Type of interview	
Location	
Date and Time	
Participant's signature	

When completed: One copy for participant and original copy for research file.

Thank you for agreeing to take part in this study.

Appendix G

Information Sheet for Conducting MGT Interviews with Jordanian Experts

The title of the research

Integrating sustainability assessment into public works development in Jordan.

Dear Sir/Madam

I am undertaking PhD research in the School of Civil Engineering at the University of Leeds, which aims to show how to integrate sustainability assessment into public works development in Jordan. The MGT strategy is used throughout semi-structured interview questions.

It is entirely up to you to decide whether to take part in the research or not. If you agree to take part in this research, you give me permission to use the information you provided for the research purposes only. The interview will be tape-recorded; however, that is up to you. In addition, the information provided you can keep, and your participation is voluntary, and you are free to withdraw at any time without giving any reason, up until the point of write-up/submission. If you would like to participate, please use the attached consent form to inform me that you agree to take part in the research.

Thank you very much for taking the time to read the information, and please do not hesitate to contact me if you require further information.

Yours sincerely,

PhD Candidate

Moawiah Alnsour

cnmama@leeds.ac.uk

+ (962) 777383759

Appendix H

Jordanian Experts' Profile for Conducting Delphi Validation

Experts	Position, Job Tasks, and the criteria for selection	Sector	Qualification	Experience	Interview type
E1	Position: Senior Project Manager Action Planning Expert – Consultant at Global Green Growth Institute. Former Head of Environment and Climate Change Portfolio at UNDP	Public	PhD	+20	Face-to-face
	Why to choose (Justification): Her role concerns with environmental, social, and economic impacts and conducts consultancy roles in sustainability studies.				
	What Criteria: Those who have experience of more than 10, 15, and 20 years and considered seniors in sustainability field. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.				
E2	Position: Director – Clean Tech Development Alternatives Incorporated. Director – Jordan Environment Fund at the Ministry of Environment	Public	BSc	+15	Face-to-face
	Why to choose (Justification): Her role is in managing and coordinating foreign funded projects in a variety of development sectors including: Water, Energy, Agriculture, and Environment.				
	What Criteria: Those who have experience of more than 10, 15, and 20 years and considered seniors in sustainability field. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.				
E3	Position: CEO of NGO concerns with sustainability	Non-public	MSc	+20	Face-to-face
	Why to choose (Justification): His role in an NGO in Jordan is to assist policymakers in integrating sustainability into practice.				
	What Criteria: Those who have worked with international and/or national bodies in sustainability in Jordan such as Western non-profit organisations (NGOs) (e.g. EDAMA, USAID, UNDP, and GIZ), who were not considered from the MGT interviewees.				
E4	Position: Director of Strategic planning at the Ministry of Planning	Public	PhD	+20	Face-to-face
	Why to choose (Justification): His role is as expert in planning- Consultant in Sustainability planning.				
	What Criteria: Those who have experience of more than 10, 15, and 20 years and considered seniors in sustainability field. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.				

E5	Position: Expert at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).	Non-public	BSc	+15	Face-to-face
	Why to choose (Justification): His role concerns in working as a consultant for sustainability consultation at the policy and project levels.				
	What Criteria: Those who have worked with international and/or national bodies in sustainability in Jordan such as Western non-profit organisations (NGOs) (e.g. EDAMA, USAID, UNDP, and GIZ), who were not considered from the MGT interviewees.				
E6	Position: Technical advisor for the Minister of Environment, Director of Green Economy Unit at the Ministry of Environment.	Public	PhD	+20	Face-to-face
	Why to choose (Justification): His role is in assisting the Minter and carry out the responsibilities for planning and policymaking to manage the global SDGs into the delivered policies, and strategies.				
	What Criteria: Those who have worked with international and/or national bodies in sustainability in Jordan such as Western non-profit organisations (NGOs) (e.g. EDAMA, USAID, UNDP, and GIZ), who were not considered from the MGT interviewees.				
E7	Position: Jordan Representative at Global Green Growth Institute. Former advisor to the Minister of Environment.	Public	BSc	+10	Face-to-face
	Why to choose (Justification): His role is to lead and direct the operational day to day activities of the country programs in achieving sustainable Green Growth. He is responsible for the strategic leadership and direction of the country program to achieve GGGI's vision.				
	What Criteria: Those who have experience of more than 10, 15, and 20 years and considered seniors in sustainability field. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.				
E8	Position: Senior Consultant as a specialist in Water, Energy and Environmental issues	Non-Public	BSc	+15	Face-to-Face
	Why to choose (Justification): He conducts consultations, capacity development and sustainability studies in achieving sustainable development in Jordan and to align them with the national SDGs.				
	What Criteria: Those who have been honoured by professional international and/or national societies and certified awards in sustainability.				

Appendix I

Delphi Validation Interview Questions

Experts' information		
Name:	Organisation:	Academic qualified:
Major speciality:	Position:	Experience () years.

Category	Levels	Delphi validation interview questions (First Round)
Integrating SA into PWs Development in Jordan	National level	1. Do you believe that the proposed SDGs in the context of Jordan are appropriate to ensure the balance between the environment, society and economy? <u>If Yes</u> , which of them do you believe that should have the higher/lower weight of importance? <u>If No</u> , could you please consider more goals? 2. Do you believe that the national vision of sustainability in Jordan should be driven by the government itself? <u>If No</u> , do you believe that the country should be assessed against sustainability goals (to see where Jordan is living up to these goals)? Why?
	Sub-national level	3. Do you believe the policy for SPWs at the sub-national level is linked with the national vision of sustainability in Jordan? <u>If No</u> , what is linked between the national vision and ministerial policy of SPWs? 4. Do you think the proposed actions at each stage of the proposed stages are clear in their detailed presentation? <u>If No</u> , what changes/additional information need to be included?
	Local level	5. Do you think the proposed local development plan is linked with the policy of SPWs at the sub-national level? <u>If No</u> , what is linked between the ministerial policy and local plan of SPWs? 6. Do you think the proposed actions at each stage of the proposed stages are clear in their detailed presentation? <u>If No</u> , what changes/additional information need to be included?
	Project implementation level	7. Do you believe that the selected SPWs projects at the local level should be implemented under (sustainable procurement)? <u>If Yes</u> , what assessment tools and/or schemes are needed to ensure the detailed sustainable objectives are embedded? <u>If No</u> , what are the barriers behind not considering (sustainable procurement)?
	All levels	8. Do you believe that the proposed integrated approach embeds (integrates) SA into PWs development in Jordan? <u>If Yes</u> , to what extent do the potential outcomes from the emerging policies, plans and projects of PWs achieve sustainable development? <u>If No</u> , Why? 9. Do you believe that the proposed enabling environment (enablers) can facilitate the integration of SA into PWs development?

		<p>If No, could you please consider further enablers?</p> <p>10. Do you believe the enablers should be considered at each level from national to project levels can ensure the only SPWs projects are delivered? If Yes, Why? If No, what changes are needed?</p> <p>11. Do you believe the monitoring and evaluation are needed at each level of SPWs development? If Yes: To what extent this can ensure the strategic alignment of SPWs development is remain consistent with the national vision of sustainability? If No, Why?</p> <p>12. Do you believe that public and non-public stakeholders should be engaged in developing the emerging national vision of sustainability in Jordan, policies, plans and projects? If Yes, could you please classify them at what level they are appropriate If No, consider further.</p>
	All levels	Delphi Validation Interview Questions (Second Round)
	Interview Questions	<p>1. Do you agree that all of the changes/additional information which have been carried out on the integrated approach are appropriate to:</p> <ul style="list-style-type: none"> - Ensure the emerging policies, plans and projects of SPWs which only achieve sustainable development for the country are delivered? - Reduce the negative impacts on the environment, improve the society and enhance the economy of the country? - Ensure equality in opportunities across the country? - Ensure the strategic link between the national vision of SA and on-the-ground reality in Jordan? <p>If Yes, How? Why If No, what changes still need to be carried out?</p> <p>2. What are the barriers behind not applying and integrated approach to the emerging national vision of Jordan, PWs policies, plans and projects in Jordan?</p>

Appendix J

Information Sheet for Conducting Delphi Validation Interviews with Jordanian Experts

The title of the research

Integrating sustainability assessment into public works development in Jordan.

Dear Sir/Madam

I am undertaking PhD research in the School of Civil Engineering at the University of Leeds, which aims to show how to integrate sustainability assessment into public works development in Jordan. Therefore, MGT interview was used in the development of the integrated approach for SA into PWs development in Jordan.

At this phase, you are being invited to be part in this research to validate the integrated approach. You will be contacted for Round 1 and Round 2. The interview in Round 1 will take approximately 1 hour and in Round 2 will take approximately 20-30 minutes.

It is entirely up to you to decide whether to take part in the research or not. If you agree to take part in this research, you give me permission to use the information you provided for the research purposes only. The interview will be tape-recorded; however, that is up to you. In addition, the information provided you can keep, and your participation is voluntary, and you are free to withdraw at any time without giving any reason, up until the point of write-up/submission. If you would like to participate, please use the attached consent form to inform me that you agree to take part in the research.

Thank you very much for taking the time to read the information, and please do not hesitate to contact me if you require information.

PhD Candidate

Moawiah Alnsour

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+ (962) 777383759

Appendix K

Non-Jordanian Experts' Profile for Conducting Validation Interviews

Experts	Position/ tasks	Sector	Qualification	Experience	Interview type
P1	<p>Position: He is the Managing Director of the Middle East business. With over 17 years of experience, he is a specialist in Environmental & Social Impact Assessment, Strategic Environmental Assessment, the provision of master planning advice and the development of planning controls from an environmental perspective.</p> <p>Why to choose (Justification): He has extensive experience working on a wide range of projects and other environmental assessment projects in the Middle East, Africa, the UK, and Australia. He has wide-ranging experience in undertaking environmental assessments in accordance with international best practice, including to World Bank and IFC standards. He contributes to projects in both a technical and project management capacity and has significant experience of environmental planning and sustainability issues, working closely with statutory and non-statutory organisations, planners, architects, construction staff, and non-specialists.</p> <p>What Criteria: Those with solid and relevant years of experience above 10 years in the field of SA. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels.</p>	Non-Public	BSc	+17	Skype
P2	<p>Position: He is a Senior Lecturer in Environmental Management at the University of East Anglia, has over 20 years' experience in Environmental Impact Assessment (EIA) and he is currently a Course Director of a full-time MSc programme on Environmental Assessment and Management.</p> <p>Why to choose (Justification): He has conducted research on improving the consideration of health in planning for the Welsh Assembly Government and has been involved in HIA research projects for the UK Environment Agency, Health Development Agency, Health Protection Agency and World Health Organization. Of his research, he has focussed particularly on the application of environmental assessment at a project and strategic levels. He is currently a member of the SA Group. He is the chair of the publications committee of the International Association for Impact Assessment and he is on the editorial boards of both Environmental Impact Assessment Review and Impact Assessment and Project Appraisal. On the professional side, he works with the Institute of Environmental Management and Assessment (IEMA) as a member of their Technical Sub-committee.</p>	Public	MSc	+20	Skype

	<p>What Criteria: Those with solid and relevant years of experience above 10 years in the field of SA. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels. Those who work in academia and have got solid base of research in SA practices, approaches and rating systems at both strategic and project levels.</p>				
P3	<p>Position: She is an architectural engineer. She is a registered architect with the Board of Architects of Queensland (Australia). She worked in architectural design and documentation on various projects across Europe, Africa, and Australia.</p> <p>Why to choose (Justification): She lived and worked in the United Arab Emirates (UAE) for a decade, where she specialized in sustainable buildings through academic education and projects exposure. She was the third-party consultant for the Cleveland Clinic Abu Dhabi project (UAE), to lead the construction phase of the green building rating certification. She joined Cleveland Clinic Abu Dhabi operations team for five years as a sustainability manager to design, develop and implement the sustainability strategy where she identified gaps in the local water reuse standards. She won, the Middle East North Africa (MENA) Green Building of the Year 2017 by Emirates Green Building Council and she was awarded Sustainability Manager of the year by Abu Dhabi Sustainability Group (ADSG) in 2017. She has relocated back to Australia in 2018. She is currently a principal engineer of sustainability for Aecom and a casual academic staff for the University of Technology Sydney.</p> <p>What Criteria: Those with solid and relevant years of experience above 10 years in the field of SA. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels. She was honoured by professional international societies and certified awards in sustainability.</p>	Non-Public	PhD	+15	MS Teams
P4	<p>Position: She is a member of the Environmental Protection Authority of Western Australia and Director of the Western Australian consultancy firm Integral Sustainability.</p> <p>Why to choose (Justification): She provides consultancy services to Government and industry on the integration of sustainability concepts into decision-making processes, with a focus on delivering positive sustainability outcomes from major projects. She is also Senior Lecturer in Environmental Management at Edith Cowan University in Australia, and Associate Professor in Environmental Management at North-West University in South Africa. A chemical engineer by training, her practice builds upon her practical early career experience in industrial and corporate environmental management, particularly in the wastewater and the oil industries, in Australia and internationally.</p> <p>She is a PhD holder from Murdoch University for her research into the evolution of processes for the SA of complex and strategic projects, and she is now recognised internationally as a leader in the field of sustainability assessment. She continues to combine her consultancy practice with academic roles. She has been a tutor on CISL's Master of Studies in Sustainability Leadership since its inception in 2010, and currently is Senior Lecturer in environmental management at Edith Cowan university in Western Australia, also holding a position at North-West University in</p>	Public	PhD	+20	MS Teams

	<p>South Africa where she contributes to a Master's programme in environmental management. Her current areas of research interest include strategic-level planning and assessment; social impact assessment and management; corporate social responsibility and the contribution of the resource sector to sustainable development; systems and resilience-based approaches to sustainability planning and assessment; and participatory sustainability.</p> <p>What Criteria: Those with solid and relevant years of experience above 10 years in the field of SA. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels. Those who work in academia and have got solid base of research in SA practices, approaches and rating systems at both strategic and project levels.</p>				
P5	<p>Position: She is a Professor in the School for the Built Environment, University of Pretoria, South Africa. She was formerly Principal Researcher at Council for Scientific and Industrial Research (CSIR) in Pretoria, South Africa.</p> <p>Why to choose (Justification): Her work focuses on sustainable human settlement and the application of sustainability science in the built environment. She is known for her work on the evaluation of policy and research strategy for sustainable building and construction in developing countries and is currently concentrating on urban sustainability science at both theoretical and technical levels. She studied architecture at the University of Pretoria, South Africa, obtained a PhD in Urban Sustainability from the University of Salford, UK, and was awarded an honorary doctorate in technology from Chalmers University of Technology in Gothenburg. She was the lead author of the United Nations Environment Program's Agenda 21 for Sustainable Construction in Developing Countries and is Theme Coordinator: Sustainable Construction for the International Council on Research and Innovation in Building and Construction.</p> <p>What Criteria: Those with solid and relevant years of experience above 10 years in the field of SA. They must be highly qualified and occupy high positions in their organisations at both the planning and implementation levels. Those who work in academia and have got solid base of research in SA practices, approaches and rating systems at both strategic and project levels.</p>	Public	PhD	+20	Ms Teams
P6	<p>Position: Director of sustainability office at the University of Sharjah.</p> <p>Why to choose (Justification): He is the Director of the University Sustainability Office at the University of Sharjah, UAE. In 2015, he was the founder and Coordinator of Sustainable Engineering Asset Management (SEAM). In addition, he worked in a Research Group, Research Institute of Science and Engineering, University of Sharjah, UAE. He worked in a project concerns with the Impact of Condition Based Maintenance (CBM) and Intelligent Machine Monitoring on Engineering Asset Sustainability: A Case Study on Dubai Public Transport Agency. In addition, most of his publications concern sustainability in infrastructure projects.</p> <p>What Criteria: Those who work in academia and have got solid base of research in SA practices, approaches and rating systems at both strategic and project levels.</p>	Public	PhD	+20	MS Teams

Appendix L

Validation Interview Questions with Non-Jordanian Experts

Category	Levels	Validation interview questions									
Integrating SA into PWs Development in Jordan	All levels	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3" style="text-align: left;">Experts' information</td> </tr> <tr> <td style="width: 33%;">Name:</td> <td style="width: 33%;">Organisation:</td> <td style="width: 33%;">Academic qualified:</td> </tr> <tr> <td>Major speciality:</td> <td>Position and tasks:</td> <td>Experience () years.</td> </tr> </table> <ol style="list-style-type: none"> 1. How do you find the maturity of the proposed approach in which it integrates SA into each level of PWs development in Jordan? 2. From your experience, explain in-depth, what can you reflect to improve maturity, and competency of the integrated approach? 3. What do you think is needed to enhance the proposed integrated approach? 4. Looking to the proposed integrated approach, how do you find the system works both in top-down and bottom-up? 5. From your experience how do you think the proposed approach can reflect the outcomes from the emerging policies, plans and projects to achieve sustainable development? 6. How do you think the integrated approach can influence the policymakers to assess the emerging policies, plans, and projects of PWs against sustainability? 7. How do you believe that the proposed enabling environment (enablers) can facilitate the integration of SA into each level of PWs development? 8. How realistic is the proposed integrated approach ensures the strategic link between the national level to project implementation level of PWs development in Jordan? 9. From your experience of the proposed approach is applied in practice, what issues, barriers behind not applying it to the emerging policies, plans, and PWs projects? 10. How the monitoring and controlling can enhance the outcomes of the proposed approach? 	Experts' information			Name:	Organisation:	Academic qualified:	Major speciality:	Position and tasks:	Experience () years.
Experts' information											
Name:	Organisation:	Academic qualified:									
Major speciality:	Position and tasks:	Experience () years.									

Appendix M

Information Sheet for Conducting Validation Interviews with Non-Jordanian Experts

The title of the research

Integrating sustainability assessment (SA) into public works (PWs) development in Jordan.

Dear Sir/Madam

I am undertaking PhD research in the School of Civil Engineering at the University of Leeds, which aims to show how to integrate sustainability assessment into public works development in Jordan. Therefore, the MGT interview was used in the development, and the Delphi technique was used to validate the proposed integrated approach of SA into PWs development with Jordanian experts.

At this phase, Non-Jordanian Experts are needed. As a result, you are being invited to be part of this research to provide insights into the approach for improvements. You are being contacted only to participate in answering semi-structured interviews. The proposed approach will be attached to the interview questions, and you would be able to answer directly on the approach. The interview will take approximately 40 minutes.

It is entirely up to you to decide whether to take part in the research or not. If you agree to take part in this research, you give me permission to use the information you provided for the research purposes only. The interview will be conducted using Skype or any other methods you prefer and will be voice-recorded; however, that is up to you. In addition, the information provided you can keep, and your participation is voluntary, and you are free to withdraw at any time without giving any reason, up until the point of write-up/submission. If you would like to participate, please use the attached consent form to inform me that you agree to take part in the research.

Thank you very much for taking the time to read the information, and please do not hesitate to contact me if you require information.

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