ROLE OF PROJECT MANAGEMENT IN SUSTAINABLE DEVELOPMENT SELF-EFFICACY AS MEDIATING VARIABLE IN OIL AND GAS INDUSTRY

By

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Chairman : Professor Ir. Mohd Khairol Anuar bin Mohd Ariffin, PhD
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The study explores sustainable development's importance since the 1960s, driven by concerns about environmental degradation and resource depletion. Recognized as a competitive advantage, sustainability is crucial for organizational success, preventing negative consequences like damaged reputation, financial losses, and reduced competitiveness. However, research has predominantly focused on developed countries, neglecting developing nations like Yemen. Poor project management practices in Yemen negatively impact sustainability, with limited public access hindering the establishment of good sustainability practices.

To bridge this gap, the study investigates the impact of project management and self-efficacy on sustainable development in Yemen's oil and gas sector. Drawing from Sustainable Project Management Theory, Transformational Leadership Theory, and Self-Efficacy Theory, data from 342 PetroMasila Co. respondents undergoes analysis using partial least squares structural equation modeling (PLS-SEM). Qualitative research supplements this, assessing model applicability through interviews with project experts.

Results revealed project management and self-efficacy as significant predictors of sustainable development. Self-efficacy mediates the relationship between project management and sustainability, with planning and time management positively impacting sustainable development. Cost and risk management positively influence self-efficacy. Recommendations include improving project management practices and fostering self-efficacy through training and support.

The study validates the developed model, aligning well with data and demonstrating reliability, with R^2 values of 0.481 and 0.334 for sustainable development and self-efficacy, respectively. Self-efficacy's mediation and moderation roles in project

management and sustainable development are affirmed, providing insights into PetroMasila's context in Yemen.

Interviews with industry participants emphasize the role of project management and self-efficacy in achieving sustainable development. Strategic activities enhancing self-efficacy contribute significantly, with initiatives like employee wellness and environmental management systems proving effective. The study's findings underscore the critical connection between project management, self-efficacy, and sustainable development, offering valuable insights for global project managers implementing sustainability programs. The self-efficacy mediator model emerges as a beneficial tool for integrating sustainability into project management techniques, fostering a culture of sustainability and strengthening positive relationships globally.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PERANAN PENGURUSAN PROJEK DALAM PEMBANGUNAN MAMPUAN KENDIRI KE ARAH INDUSTRI MINYAK DAN GAS YANG MAMPU BERKESAN

Oleh

RAZI HADI AL-ZUBAIDI

Ogos 2023

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Kajian ini menyelidiki kepentingan pembangunan mampan sejak tahun 1960-an, dipacu oleh kebimbangan mengenai degradasi alam sekitar dan pengekangan sumber. Dikenali sebagai kelebihan bersaing, kelestarian adalah penting untuk kejayaan organisasi, mencegah akibat negatif seperti reputasi tercemar, kerugian kewangan, dan kekurangan daya saing. Walau bagaimanapun, penyelidikan terutamanya tertumpu kepada negara maju, mengabaikan negara membangun seperti Yemen. Amalan pengurusan projek yang lemah di Yemen memberi impak negatif kepada kelestarian, dengan akses awam yang terhad menghalang pembentukan amalan kelestarian yang baik.

Untuk menyelesaikan kesenjangan ini, kajian menyiasat impak pengurusan projek dan keberkesanan kendiri terhadap pembangunan mampan dalam sektor minyak dan gas di Yemen. Berdasarkan Teori Pengurusan Projek Mampan, Teori Kepemimpinan Transformasional, dan Teori Keberkesanan Kendiri, data dari 342 responden PetroMasila Co. dianalisis menggunakan pemodelan persamaan struktur separa sepenuhnya (PLS-SEM). Penyelidikan kualitatif melengkapkan ini, menilai aplikasi model melalui temu ramah dengan pakar projek.

Hasil menunjukkan pengurusan projek dan keberkesanan kendiri sebagai petanda penting pembangunan mampan. Keberkesanan kendiri menjadi pengantara hubungan antara pengurusan projek dan kelestarian, dengan perancangan dan pengurusan waktu memberi impak positif kepada pembangunan mampan. Pengurusan kos dan risiko memberi kesan positif kepada keberkesanan kendiri. Cadangan termasuk peningkatan amalan pengurusan projek dan memupuk keberkesanan kendiri melalui latihan dan sokongan.

Kajian ini mengesahkan model yang dibangunkan, sejajar dengan data dan menunjukkan kebolehpercayaan, dengan nilai R^2 masing-masing sebanyak 0.481 dan 0.334 untuk pembangunan mampan dan keberkesanan kendiri. Peranan pengantara dan moderasi keberkesanan kendiri dalam pengurusan projek dan pembangunan mampan disahkan, memberikan wawasan tentang konteks PetroMasila di Yemen.

Temu ramah dengan peserta industri menekankan peranan pengurusan projek dan keberkesanan kendiri dalam mencapai pembangunan mampan. Aktiviti strategik yang meningkatkan keberkesanan kendiri memberi sumbangan yang besar, dengan inisiatif seperti kesejahteraan pekerja dan sistem pengurusan alam sekitar terbukti berkesan. Temuan kajian ini menegaskan hubungan penting antara pengurusan projek, keberkesanan kendiri, dan pembangunan mampan, memberikan wawasan berharga untuk pengurus projek global yang melaksanakan program kelestarian. Model perantara keberkesanan kendiri muncul sebagai alat yang berkesan untuk mengintegrasikan kelestarian ke dalam teknik pengurusan projek, membina budaya kelestarian dan mengukuhkan hubungan positif secara global.

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This piece is dedicated to the soul of my mum. I hope that she will be proud of me. My wife Marya is indebted to me forever for her help in achieving my aim. I would want to express my appreciation to my father, who has always pushed me to pursue achievement. Your prayers and well-wishes have given me the fortitude to persevere during difficult times. My sincere thanks also goes to my brother Abdullah for always being there and given me unconditional love and support throughout this thesis. I would also want to recognise and thank my daughters and sons Rahf, Khaelda, Rital, Malaysia, Ali, and Hadi, whose lives were most influenced by this effort. This research would not have been completed without your assistance and support. Thank you.

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LIST OF ABBREVIATIONS

AVE	Average Extracted Variance
CBT	Cognitive Behavioral Theory
CR	Composite Reliability
CV	Convergent Validity
BM	Cost Management
CCPM	Critical Chain Project Management
CPM	Critical Path Method
DV	Discriminant Validity
CA	Economical Aspect
EC	Emotional Cues
EA	Environmental Aspect
LMX	Leader-Member Exchange Theory
PLS-SEM	Partial Least Squares-Structural Equation Model
PP	Past performance
PM	Planning Management
PM	Project Management
PMBOK	Project Management Body of Knowledge
PMT	Project Management Theory
PRINCE2	Projects in Controlled Environments
PRiSM	Projects Integrating Sustainable Methodologies
RA	Risk Management
RMT	Risk Management Theory

SDT	Self-Determination Theory
SA	Social Aspect
SPM	Sustainable Project Management Theory
TA	Technological Aspect
TM	TM: Time Management
VP	Verbal Persuasion
VE	Vicarious Experience

CHAPTER 1

INTRODUCTION

In the subject of management, project management and sustainability have risen to the forefront of examined themes. This is due to the growing interest in the creation and deployment of new managerial methods for project management (PM), as well as the sustainability concepts that are at the forefront of managers' minds (Armenia, 2019). Therefore, the merger of these two domains reflects the future and long-term outlook of project-based companies. In this regard, the environment in which projects are done naturally influences the projects themselves, while also contributing to environmental changes. From the standpoint of sustainability, the phase defining the delivery of the project and the final deliverable generate impacts that might be advantageous to the current condition of the entity, but cause disadvantages for stakeholders in the future (Wojewnik-Filipkowska, 2019). Clearly stated, every project uses energy to produce impacts, notably social, economic, and environmental (SEE) consequences, and this offers a description of the whole project's sustainability level. In this context, sustainability realises the community's goal by assuring the efficient use of natural resources, which in turn provides economic stability for future generations, and by fostering democracy and community engagement in the preservation of ecological system and life integrity (Opoku, 2019).

Sustainable development refers, on the basis of principle, to a change process characterised by harmonious resource exploitation, provision of investments, and technological development orientation, as well as institutional changes aimed at enhancing the present and future needs and aspirations of humanity. As indicated by Opoku (2019), there is a growing emphasis on the development of sustainability in academic and practical sectors. However, there is no widespread recognition of sustainable development consequences, since the management, assessment, and reporting of projects fail to represent the various facets of its effective accomplishment (Kerzner, 2011). A. Silvestre et al. (2019) described the notion of sustainable development. As the individual's efforts toward creating an economically, ecologically, and socially harmonious society in which future generations can flourish. This contributes to raising awareness of the visible and unseen cycle influenced by daily decisions that contribute to the equilibrium of the systems (society, economy and environment).

Integrating project management and sustainability principles streamlines processes, enhances resource utilization, and boosts overall efficiency. Adopting sustainable practices reduces resource consumption and energy costs, contributing to long-term cost optimization. Efficient project management, guided by sustainability, minimizes delays and improves collaboration, enhancing productivity. Demonstrating a commitment to sustainability enhances PetroMasila's reputation, attracting stakeholders and customers. Cost savings and a positive reputation contribute to increased profits, fostering a financially sustainable business. Embracing sustainability fosters community engagement, aligning with global expectations, and improving employee performance

through enhanced self-efficacy. This integration ensures PetroMasila's long-term success and responsible corporate citizenship.

According to Haddad & Taleb (2016), self-efficacy is essential in determining an employee's ability to function in an organisation given the aforementioned context. It is classified to permit workplace verbal persuasion and emotional signals. In addition, the employee's earlier performance helps pave the way for new chances for new employees at Yemeni PetroMasila Co. This chapter explores the importance of self-efficacy in the interaction between project management and sustainable development in the context of PetroMasila, Yemen.

1.1 Background of the Study

The importance of sustainable development has permeated the entire organization of PetroMasila, particularly in light of the projects undertaken. The intersection of project management and sustainable development is pivotal for achieving environmentally friendly structures and organizational survival globally (Ivanov et al., 2020; Magano, Silvius, et al., 2021). Sustainable Project Management, emphasizing waste elimination and environmentally conscious resource management, ensures project success aligned with sustainability objectives (Silvius, 2021; Omer, 2008). However, challenges arise when project management prioritizes commercial goals over environmental and social considerations, potentially conflicting with sustainable development (Alex, 2002; Sabini & Alderman, 2021). Nuanced understanding, considering sector-specific variations, is crucial for overcoming these challenges (Analia Sánchez & Schneider, 2014; Kurganov, 2020).

In parallel, self-efficacy emerges as a significant driver of sustainable development efforts, influencing environmentally sustainable behavior, technology attitudes, and engagement in pro-environmental activities (Schutte & Bhullar, 2017; Wai et al., 2018; Han et al., 2021). Understanding and leveraging self-efficacy in both project management and individual behavior are essential for fostering sustainability in diverse contexts, from project initiatives to technology usage.

PetroMasila, a key player in the Yemeni oil market, has successfully achieved its output goals, collaborating closely with the Yemeni government, notably the Ministries of Oil and Finance. The company's resilience and prosperity extend to the development of new production sources, ongoing well drilling projects, and comprehensive surveys. Notably, PetroMasila is making strides in transitioning from diesel to natural gas, demonstrating a commitment to environmental responsibility. The recent solicitation of bids for a large-scale energy project in Hadhramaut's Block 14 reflects PetroMasila's dedication to providing essential energy to nearby districts and villages.

In alignment with the principles of sustainability proposed by Magano and Silvius (2021), PetroMasila is not only focused on economic growth but also on environmental and social considerations. The company's commitment to replacing diesel with natural

gas aligns with the environmental aspect, while its initiatives to supply energy to communities demonstrate a commitment to social well-being.

Moreover, PetroMasila's upcoming projects for the year ahead underscore its dedication to improving the lives of local residents. These projects will specifically target medical support and healthcare needs, with a commitment to employing local contractors for implementation. The corporation's multifaceted approach not only includes providing electricity infrastructure for a substantial region but also actively contributing to the local economy (Almohamadi et al., 2021).

In the realm of project management, PetroMasila recognizes the importance of sustainability in avoiding risks and ensuring successful project outcomes. The company's commitment to using local contractors aligns with the sustainability principle of community engagement, contributing to the overall success of its projects.

1.2 Problem Statement

The oil and gas industry, critical for global energy needs, relies heavily on efficient project management to meet key criteria like scope, schedule, cost, and quality (Kassem et al., 2019; Abdulla et al., 2019). Standardized project management practices are essential for energy firms to achieve cost reduction, process improvement, and staff support (Faghihi, 2021). Effective decision-making in the oil pipeline sector hinges on various project management criteria and metrics (Fadhl et al., 2020), offering a beneficial framework for informed decision-making.

Moreover, inadequate risk identification and assessment in Yemen's oil and gas construction projects lead to poor decision-making and financial losses (Kassem et al., 2020). Aligning risk assessments with industry best practices is essential for enhancing project success rates and fostering sustainable development.

Additionally, Yemen's oil and gas corporations face a notable gap between corporate social responsibility (CSR) initiatives and actual commitment to corporate performance, resulting in decreased employee engagement and hindering long-term growth (Alsamawi et al., 2019). Bridging this gap is crucial for nurturing a positive organizational culture and ensuring sustained employee commitment and innovation.

The challenge of project failures is significant across industries, particularly in construction, engineering, and technology sectors, with failure rates reaching up to 75% due to management or planning issues (Mladenova, 2019). Traditional project management methods often fall short, with only 44% completing on time and 30% remaining unrealized (Greenslade & Salmon, 2017). Adoption of alternative approaches like Critical Chain Project Management (CCPM) offers prospects for improving success rates.

For example, The Standish Group's report highlights alarming statistics, with a cancellation rate of 31.1% and 52.7% of projects exceeding original estimates by over 189% (Manello, 2021). Such figures underscore the urgency of addressing project management challenges to avoid detrimental impacts on organizational performance.

Furthermore, integrating sustainability principles into project management practices is imperative for achieving long-term environmental, economic, and social objectives (Magano, Silvius, et al., 2021). However, inadequate research on this integration results in missed opportunities to enhance resource management and service delivery.

Moreover, understanding psychological factors like self-efficacy beliefs and transformational leadership is critical for fostering employee well-being and organizational productivity (Beck & Schmidt, 2018; Djourova et al., 2020). Addressing these gaps in knowledge is essential for informed decision-making and sustainable development in Yemen's oil and gas sector.

Yemen's underutilization of renewable energy resources poses environmental and economic challenges, including increased carbon emissions and high electricity costs (Hashim Alkipsy et al., 2020). Multiple barriers exist for adopting renewable energy, including political, technical, managerial, and information-related obstacles. Economic efficiency is also low in comparison to other countries (Al Asbahi et al., 2020). Closing the gap between renewable energy awareness and adoption is crucial for mitigating climate change risks and promoting sustainable energy practices.

1.3 Research Questions

Based on the above statement of the problem, this study enumerates the following research questions:

1. What are the effects of project management on sustainable development?

2. What are the effects of project management on self-efficacy of employees?

3. What are the effects of self-efficacy of employees on sustainable development?

4. Does self-efficacy mediate the relationship between project management and sustainable development?

1.4 Research Objectives

The aim of this research is to study and understand the impact of project management on the sustainable development through self-efficacy in PetroMasila Co. Yemen. This

objective will be achieved by examining the consequences of antecedents on the focus which will ultimately lead to the outcome that is the project management. In accordance with the questions mentioned above, the specific objectives of this study are articulated below:

1. To determine the direct effects relationship of project management and self-efficacy of employees on sustainable development.

2. To examine the mediating role and indirect effects of self-efficacy in the relationship between project management and sustainable development.

3. To develop model of self-efficacy in the relationship between project management on sustainable development.

4. To evaluate the model of self-efficacy in the relationship between project management on sustainable development.

1.5 Hypotheses Development

In this section, it were introduced four primary hypotheses, three direct hypotheses, and one indirect hypothesis with a mediating influence. The primary hypotheses are underpinned the relationships by related theories, and the sub-hypotheses, which were explained in Appendix 1, also employed the same theories used in the primary hypotheses.

1.5.1 Relationship between Project Management and sustainable development

Project management and sustainable development are the subjects of the first hypothesis. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Several studies have demonstrated that project management may play an essential role in ensuring sustainable development results (Ivanov et al., 2020; Magano et al., 2021; Silvius & Schipper, 2016; Silvius & Schipper, 2019). To design environmentally friendly structures, sustainable project management is crucial (Abdullah et al., 2021). Project management assists businesses in aligning their initiatives with sustainable development objectives and measuring and reporting their performance in a transparent and responsible way (PMI, 2017). The basic purpose of project management is to optimise resource usage, including financial, human, and material assets (Schwalbe, 2009).

Yet, there is evidence that project management can occasionally clash with sustainable development objectives, particularly when it prioritises commercial objectives above

social and environmental ones (Alex, 2002; PMI, 2017; Sabini & Alderman, 2021). The conventional emphasis of project management on efficiency, money, and time can occasionally conflict with the wider and more holistic objectives of sustainable development (Fm, 2015; Labuschagne et al., 2005).

Yet, several writers decided, based on their findings, that project management influenced the sustainable growth of programmes. The above dialogue proposes the following hypothesis:

Hypothesis 1 (H1)

There is a positive relationship between project management and sustainable development in PetroMasila in Yemen. (Direct relationship)

1.5.2 Relationship between Project Management and employees' self-efficacy

The second hypothesis examines the link between project management and employee self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Project Management may significantly influence employee self-efficacy, according to several research. Blomquist et al. (2016) discovered that measures of project management self-efficacy are a strong predictor of project performance. The quality of employee performance is positively impacted by project management assets, according to Nusari et al. (2018). PMO functions have a beneficial impact on project performance, according to Dai and Wells (2004). Emil Berg and Terje Karlsen (2014) found that project management tools promote pleasant feelings and enhance overall project success. Jepson et al. (2017) discovered that project management strategies help lower stress. According to Tang et al. (2020), employing emotional intelligence in project management might encourage innovative behaviour among employees, hence enhancing job performance. Project teams' abilities can be improved via transformational leadership in project management (Leban & Zulauf, 2004). By the mediation of self-efficacy, Nielsen and Munir (2009) discovered a favourable association between transformational leadership and employee well-being.

Nonetheless, it was found by several writers that project management affected the self-efficacy of personnel in projects. The above dialogue proposes the following hypothesis:

Hypothesis 2 (H2)

There is a positive relationship between employees' self-efficacy and sustainable development of PetroMasila in Yemen. (Direct relationship)

1.5.3 Relationship between employees' self-efficacy and sustainable development

The third hypothesis examines the connection between employee self-efficacy and sustainable growth. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Several studies have demonstrated that an individual's self-efficacy can impact their participation in sustainable development initiatives. Self-efficacy and the conviction that conduct is malleable, for instance, are essential motivators for ecologically friendly behaviour (Schutte & Bhullar, 2017). Hanss & Böhm (2010) discovered that the best predictor of sustainable consumption behaviour was self-efficacy with regard to influencing others. According to Wai et al., perceived self-efficacy influences pro-environmental behaviour positively (2018). Self-efficacy may be a crucial incentive for motivating individuals to engage in more difficult pro-environmental behaviours (Lauren et al., 2016).

The above dialogue proposes the following hypothesis:

Hypothesis 3 (H3)

There is a positive relationship between employees' self-efficacy and sustainable development of PetroMasila in Yemen. (Direct relationship)

1.5.4 Self-Efficacy mediated on the relationship project management and sustainable development (Indirectly hypothesis)

The twelve hypothesis examines the link between project management and employee self-efficacy in the context of sustainable development. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Many studies have demonstrated a link between project management and sustainable development, demonstrating that project management may significantly contribute to fostering sustainable development outcomes (Ivanov et al., 2020; Magano, Silvius, et al., 2021; Silvius & Schipper, 2016; Silvius & Schipper, 2019). By strengthening the skills and competencies of project teams, integrating self-efficacy with project management may help to the success of projects (Blomquist et al., 2016). Project management self-efficacy is a powerful predictor of project performance, and project management assets have a beneficial influence on employee performance quality (Nusari et al., 2018; Dai & Wells, 2004). Both implicit and explicit learning contribute to the success of projects, with implicit learning facilitating the acquisition of knowledge and skills, while explicit learning enhances self-efficacy. Self-efficacy in real-world education as a mediator between learning and sustainable development (Ho, 2021). In conjunction with self-efficacy, project management may assist in mitigating the negative effects of projects on

social, economic, and environmental issues while enhancing their overall sustainability. The relationship between occupational stress and depression and anxiety in young Chinese nurses is primarily mediated by emotional exhaustion and social support (Chen et al., 2020). In the tourist business, employee self-efficacy was found to moderate the link between cognitive capital and client pleasure (Alyahya et al., 2020). Self-efficacy modulates the connection between perceived organisational support and work engagement in primary school teachers (Macinati et al., 2017).

Studies found that project management has a strong indirect effect on sustainable development through self-efficacy as a mediator. These results imply that a successful project management system at PetroMasila may promote long-term growth by fostering employee autonomy. The following notion is suggested by prior discourse:

Hypothesis 4 (H4)

There is a positive relationship between project management and sustainable development through employees' self-efficacy as mediator in PetroMasila Yemen. (Indirect relationship)

1.6 Significance of the Study

This study explores the empirical and theoretical aspects of self-efficacy in mediating between project management and sustainable development in PetroMasila, Yemen. Subsections elaborate on empirical findings and theoretical insights.

1.6.1 Empirical Contribution

The relevance of a study may be classified into two categories based on its contribution to empirical and theoretical elements. The contributions to each category are discussed in the subsections that follow:

This study contributes empirically by identifying the function of self-efficacy as a mediator between project management and sustainable development in the context of PetroMasila in Yemen. In addition, this research adds by evaluating the function of project management in achieving economic sustainability, with an emphasis on its role in professional vocation and the development of a stable economy and society. This issue is significant due to the technical skills, competencies, and knowledge required to execute sustainability initiatives via project management. Similar to how accountants immerse themselves in the development of sustainability reporting tools and engineers explore sustainable green technology, project managers must create and disseminate sustainable practises.

Due to the rising tendency towards precertification of project tasks and activities in modern times, project managers are likely to be at the forefront of this issue.

1.6.2 Theoretical Contribution

Theoretically, this study contributes in two ways: first, it provides an understanding of the theory of sustainable development and the issues associated with it in the context of PetroMasila, Yemen. In addition, the study contributes by demonstrating the significance of self-efficacy as a mediator between project management and sustainable development. Notably, project managers are accountable for a broader institutional role in accomplishing a radical shift for the welfare of society and the environment, in addition to their functional tasks of implementing sustainable and technically sound solutions. This is vital for sustainable delivery since it requires questioning deeply institutionalised ideas and behaviours, necessitating the development of organisational models and unique arrangements. This research also adds to theory by providing a knowledge of the significance of the topic of sustainable development, since it focuses on how project management contributes to creating, adopting, adapting, and sifting through sustainability's principles and practices.

1.7 Scope of the Study

The fundamental objective of this study is to investigate self-efficacy as a mediator between project management and sustainable development in PetroMasila Co., Yemen. It includes an in-depth analysis of historical and categorical aspects of self-efficacy theory, aiming for a comprehensive understanding. The study's novel hypothesis holds crucial consequences for researchers. Focused on PetroMasila's project management, the research analyzes the company's projects for their impact on sustainable growth. It is important to note that this study does not explicitly explore cultural behavior, which serves as a defined limitation.

1.8 The Limitation of the Study

The shortcomings of this study can be addressed in future research:

Firstly, the focus on a limited set of project management elements in sustainable development through self-efficacy neglects crucial variables such as risk management strategies, organizational readiness, internal control, government support, and cultural influences. A more comprehensive understanding of sustainable development adoption in organizations requires the inclusion of these factors.

Secondly, the study's narrow focus on Yemeni workers at PetroMasila Corporation raises concerns about generalizability to other sectors in Yemen. The reliance on a specific set of firms and employees also questions the typicality of the characteristics analyzed. To improve credibility, future research should include a broader range of organizations and industries.

Lastly, the omission of cultural considerations, especially in a society like Yemen characterized as individualistic, is a notable gap. Future research should explore behavioral differences in individualistic and collectivist societies, examining businesses in individualistic countries (e.g., the United States) and industries in collectivist nations (e.g., Japan) for a more comprehensive understanding of cultural dynamics in sustainable development.

1.9 Organization of the Thesis

The present thesis consists of five chapters, the first of which is devoted to the study's context, research challenge, aims, and importance. This is followed by a review of relevant research about the effects of project management on sustainable development in the second chapter. The third chapter gives an overview of the chosen research methodology, sampling techniques, research tools, methods of data collecting, analytic procedures, and statistical tests applied to the data. The statistical analysis results are given and discussed in the fourth chapter, followed by the study's conclusion and recommendations for further research in the last chapter.

CHAPTER 2

LITERATURE REVIEW

This chapter provides an overview and critical analysis of the literature on project management, self-efficacy, and sustainable development. The literature review is divided into five sections. The first section covers the nature and definition of projects, fundamentals of project management, and the importance of project management practices in the oil & gas industry. It also presents project management dimensions and their relationships, with specific evidence linking project management, self-efficacy, and sustainability.

The second section defines self-efficacy, discusses different dimensions of self-efficacy, and explores their impact on performance and sustainability. The third section provides an overview and definition of sustainable development, covering various dimensions of sustainability.

The fourth section evaluates the underlying theories relevant to the study variables. The fifth section presents the sixteenth hypothesis that support variables and sub-variables relationships, and analyzes gaps in the literature related to project management, self-efficacy, and sustainability. It identifies areas that have not been well-researched in these fields. Overall, this chapter provides a schematic view of issues related to project management, self-efficacy, and sustainable development, and reviews relevant literature to support the research in these areas.

2.1 Project Management

According to the Project Management Institute (PMI), a project is a temporary undertaking undertaken to produce a unique product, service, or outcome. According to the definition, a project is transitory; temporary indicates that a project has a beginning and an end. The project is terminated when the objectives have been accomplished or when they can no longer be met. A project is a temporary undertaking with a specified beginning and finish, normally time-bound, and frequently confined by money or deliverables (Xie & Zhang, 2013), undertaken to fulfil specific aims and objectives (Ofori, 2013), typically to bring about positive change or additional value. Contrast the transient character of projects with business as usual or operations (Thacker et al., 2019), which are recurring, permanent, or semi-permanent functional activities that create goods. In practise, the administration of these two systems is typically highly separate, necessitating the development of distinct technical competencies and management tactics.

In contrast to the PMI definition of a project as an undertaking, Lindner and Wald (2011) define projects as transient entities within companies. PMI also acknowledges this aspect of projects, recognising that project teams rarely outlast the project. It is a temporary organisation required to generate a unique and preset end or result at a certain time

utilising predetermined resources. OGC is the Office of Government Commerce (Parker et al., 2013)

Irfan et al. (2019) assert that there is no universal definition for projects, despite the prevalence of certain underlying elements in the majority of its conceptualizations. They include the originality of the projects (no projects before or after will be precisely the same), the employment of innovative methods (no projects before or later will use the same method), and the temporary character of the initiatives (all the projects have a definite beginning and an end). In addition, the conception incorporates risk management and organisational objectives.

The definitions of project that are essential to all projects, such as the uniqueness of tasks or activities conducted, the transient nature of projects, and the logic of cost constraints. The definition that will be utilised in this study is the most recent one provided by PMI (2017), which defines a project as a limited-time, limited-cost endeavour to achieve organisational objectives

2.1.1 Project Performance Challenges

Many reasons contribute to poor project performance in the construction business, including late delivery of money, inadequate contract information, and inadequate performance evaluation (Al-Fadhali, 2019; Kassem, 2019). The Constituency Development Fund (CDF) projects are also notorious for their high failure rates, with the late disbursement of cash regarded as a significant disadvantage for World Bank-funded projects (Kassem, 2019). In the construction sector, delays, cost overruns, and building collapses are typical occurrences (Kanter, 2019). To solve these difficulties, prior performance information in the construction sector should be used as a predictor of future performance (Akkermans, 2020). Contractor performance is also essential to the success of a building project, as contractors are responsible for bringing plans to life (Ghansah, 2020).

The effect of project management techniques on organisational performance must be carefully evaluated, since disregarding them can result in poor project performance, which can lead to dissatisfied customers, lost business, and bad organisational performance (Al-Fadhali, 2019). Thus, it is crucial to evaluate the consequences of project management methods and their contribution to project success, especially in the construction business. Effective project management procedures, including proper contract information, performance evaluation, and timely distribution of money, can contribute to the success of construction projects and organisational performance (Al-Fadhali, 2019; Kassem, 2019).

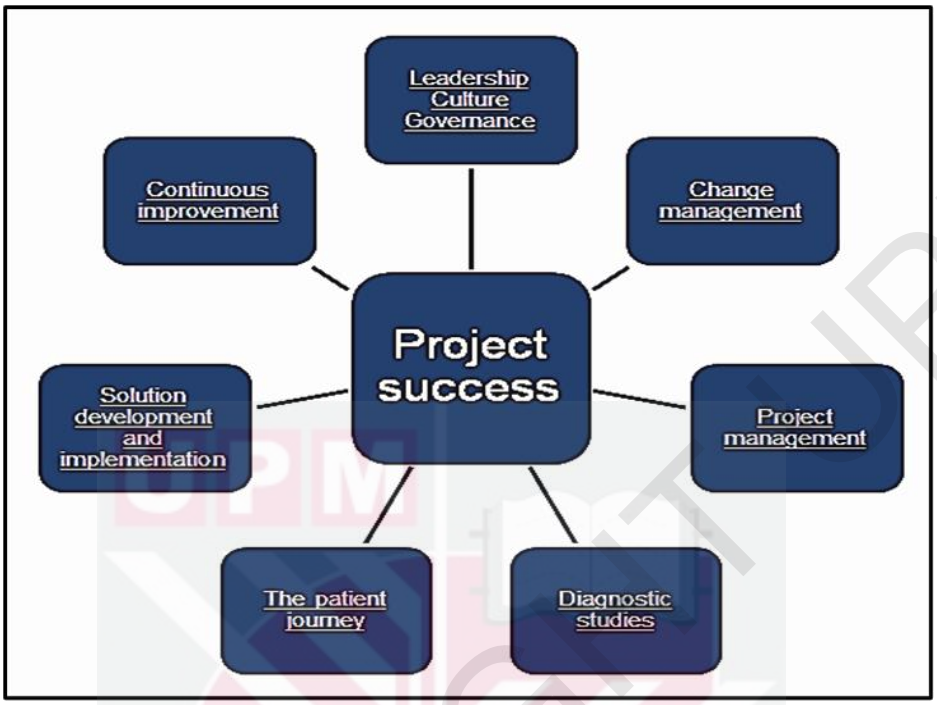

Figure 2.1: Key tools for project success
(Source: Schwalbe, 2009)

2.1.2 Project Management Concept

Project management is the process of planning, organizing, and managing resources to achieve specific objectives within a specified budget and timeframe while maintaining the required quality (Too & Weaver, 2014). This involves establishing objectives, specifying tasks, and allocating responsibilities to ensure timely completion of the project. Effective coordination and communication among various departments and teams are required to achieve the desired results (Jain, 2021). Good risk management is also necessary for predicting and mitigating any unforeseen events that may impact the project schedule and budget (Yunofri & Kurniawan, 2018). Adequate documentation is essential for maintaining an audit trail and granting greater visibility over the entire process (Jain, 2021; Too & Weaver, 2014; Yunofri & Kurniawan, 2018).

Project management methodologies and styles encompass various approaches utilized in managing projects effectively. A mix of these methodologies is often considered the optimal approach for project teams, as it allows flexibility and adaptability to different project requirements. Hybrid approaches, combining elements of incremental and process-based project management, have emerged as particularly effective in ensuring project success. Table 2.1 offers an overview of diverse project management methodologies, encompassing traditional, process-based, and unique approaches. From

Kanban to PRiSM, each methodology brings distinct principles and techniques to the table, contributing to efficient project execution.

Table 2.1: List of Project Management Methodologies

The traditional, sequential methodologies	Kanban project management (1940)	Adapted for software development by Taiichi Ohno, an industrial engineer at Toyota in the 1940s. Kanban breaks projects into smaller tasks, allowing team members to focus on one actionable job at a time. Using a Kanban board with columns like "to do," "in progress," and "complete," managers can visualize and coordinate the team's workflow effectively.
	Critical path method (CPM) (1950)	The method was established in the 1950s on the premise that certain activities cannot be started until the preceding one is completed. As you link these dependent tasks from beginning to conclusion, you create your critical route. By identifying and focusing on the key route, project managers are able to allocate resources and establish priorities.
	Waterfall project management (1970)	First introduced by Dr. Winston W. Royce in 1970. It is a linear system in which a project is separated into different stages, each of which cannot begin until the previous phase is complete. The Waterfall approach is suited for large, linear projects with a set purpose and scope that require phased completion.
	Scrum project management (1993)	Scrum, an Agile framework introduced by Ken Schwaber and Jeff Sutherland in early 1993, accelerates project completion without compromising quality or adaptability. Emphasizing short cycles called "sprints," Scrum includes daily standups for brief team meetings to discuss task progress and address challenges.
	Critical chain project management (CCPM) (1997)	Proposed by Eliyahu M. Goldratt in his book "Critical Chain" in 1997. It is an approach that emphasises the resources required to execute a project's tasks by including resource availability into the critical path. CCPM constructs time buffers around these jobs to guarantee that the project fulfils its deadlines.
	Agile project management (2001)	Published in 2001 by a group of software developers, Agile project management is an iterative methodology, differing from the sequential approach of Waterfall project management. It breaks down the overall objective into smaller, manageable pieces, embodying a set of guiding principles rather than a specific step-by-step process.
	Adaptive Project Framework (APF) (2008)	Introduced by Robert K. Wysocki in 2008, the Adaptive Project Framework (APF) addresses challenges in managing IT projects with shifting needs. It starts with a requirements breakdown structure (RBS) to define objectives and progresses iteratively, with teams evaluating outcomes at each stage for continuous improvement.

Table 2.1: Continued

The process-based methodologies	Lean project management (1940)	Lean project management was introduced in the late 1940s by Toyota. It is a philosophy that emphasises enhancing process efficiency. According to Lean principles, project managers must first define what customer value entails. Finally, they must identify the project's value stream and remove non-value-adding actions and procedures. This review process is ongoing, allowing for constant development and client input.
	Six Sigma project management (1980)	Developed by Motorola in the 1980s. The method emphasises on comprehending client requirements and avoiding waste. Six Sigma also considers a project's four constraints: scope, time, money, and quality. This has the apparent benefit of enhancing productivity and organisation. Yet, the planned nature of the procedure necessitates greater caution.
	Process-based project management	This method integrates all project objectives with the organization's overarching mission and core values. Objectives and responsibilities must align strategically with corporate goals. The process involves creating, measuring, revising unstable objectives, and planning and implementing changes as necessary.
Other methodologies	PRINCE2 project management (1989)	PRINCE2, originating in the UK through the Central Computer and Telecommunications Agency (CCTA) in 1989, is a project management methodology emphasizing organization and structure. It mandates a comprehensive business rationale, including cost estimates, before commencing a project. The approach blends a methodical and regulated process with flexibility for necessary adaptations.
	PMBOK (1996)	Established by the Project Management Institute (PMI) in 1996, the PMBOK Guide outlines ten knowledge domains and five project management phases. It compiles industry-acknowledged standards, encompassing methods, best practices, terminologies, and guidelines for effective project management.
	PRiSM (2013)	PRiSM, or Projects Integrating Sustainable Methodologies was developed in 2013 by GPM Global and focuses on incorporating environmental sustainability into operations to manage transformation. Its goal is to fulfill tasks while minimizing an organization's negative environmental and social impact—essentially embodying sustainable project management principles.

(Source: Kerzner, 2011; PMI, 2017)

2.1.3 Project Management Aspects

Project management is the process of planning, coordinating, and managing resources to accomplish a certain objective. It entails establishing goals, defining tasks, and allocating responsibility for each job so that the project may be completed on time. It focuses on four primary areas: project planning management, project cost management, project time management, and project risk management (Lester, 2007; PMI, 2017; Badiru et al., 2021)

2.1.3.1 Planning Management

2.1.3.1.1 Planning Management Concept

Project management involves addressing both planned responsibilities and unexpected situations during the planning phase. This phase is crucial for organizations as it provides direction, establishes objectives, and actions required for achievement, and measures success (Munoz-Raskin et al., 2018; Preprints, 2021). Comprehensive project management planning encompasses initiation, planning, execution, control, and closure processes, considering scope, time, resources, cost, quality, risk, and benefit across all project types, including Agile projects (Pulido et al., 2018). Scholars categorize planning into different types, such as emergency, single-use, standing (Botraba, 2020). Ingram (2021) discusses three planning approaches: management by objectives (MBO), programme evaluation and review technique (PERT), and planning-programming-budgeting system (PPBS). Stuart (2013) presents a conceptual model analyzing planning behavior, including developmental, adaptive, allocative, innovative modes, planning-relevant thought forms, institutions for guidance, conflict resolution, and implementation procedures. This model provides a framework for understanding planning behavior.

2.1.3.1.2 Planning and Performance

Scholars emphasize diverse planning styles as critical for enhanced performance in small businesses (Malaquias & Hwang, 2016; Wijetunge & Pushpakumari, 2014). While strategic planning correlates with superior performance compared to operational planning (Wijetunge & Pushpakumari, 2014), operational planning also improves performance in small businesses (Malaquias & Hwang, 2016), necessitating further research for the most effective planning form (Marn et al., 2016). Effective project management planning is crucial for success, aiding in objective establishment, resource allocation, and risk identification during execution (Thacker, 2019; Al-Fadhali, 2019).

Empirical investigations establish planning as a significant factor in project success (Alaghbari, 2019). Comprehensive project plans influenced by project contract, type, and human personalities are vital for successful initiatives (Castor, 2020; Gunduz, 2020). Project success encompasses both project management success and the success of the final product (Gharleghi, 2020). Fostering a positive organizational culture significantly influences project management planning for success (Prashar, 2020; Winkler, 2020). Despite the vital role of project planning and risk management, further research is needed to explore the impact of project risk management and the influence of organizational culture on the relationship between project planning, performance, and success (Roos, 2020). Establishing project planning and risk management capabilities within an organizational culture is crucial for overall project success (Owusu, 2020).

In the oil and gas industry, effective planning management is crucial, given the sector's capital intensity and price volatility. Financial planning and forecasting are essential tools for resource management, risk mitigation, and strategic alignment (Sualihu et al., 2023). Nigerian oil and gas service firms benefit from planning flexibility to navigate

uncertainties, enhancing profitability and growth (Asikhia & Arokodare, 2019). In response to climate concerns, the industry must adapt and align with evolving norms. Cherepovitsyn & Rutenko (2022). study emphasizes strategic planning for sustainability, addressing global energy transition challenges and proposing a climate adaptation strategy. Khabriev & Bakhtizina (2020) focus on enhancing Russia's oil and gas complex strategic management through optimized planning methods, improving coordination and monitoring.

2.1.3.1.3 The Relationship between Planning Management, Self-Efficacy, and Sustainability

Azizli et al. (2015) highlight a connection between self-efficacy, future planning tendencies, and overall life happiness. Planning management significantly enhances employee self-efficacy by setting realistic goals and providing necessary resources, reducing uncertainty and tension while boosting confidence in their abilities (Howard & Gould, 2000; Luszczynska et al., 2010). Jankowtcz (2007) asserts that planning management creates a framework for workers to operate freely and be accountable, contributing to enhanced self-efficacy. Thomas et al. (2008) argue that a planned management approach boosts self-efficacy by simplifying complex tasks into achievable milestones, providing a clear structure for success throughout the project schedule. Efficient task completion is facilitated by planning management, offering guidance on effective resource utilization (Kovacic & Filzmoser, 2014). Stanfield (2018) finds that self-efficacy and project work experience influence the application of project management approaches in higher education. Autonomous projects in undergraduate degrees can develop self-management and self-regulation skills (Dong et al., 2022). These studies suggest a connection between self-efficacy, planning, and behavior.

Strategic planning is crucial for sustainable development, enhancing governance, agricultural development, local competitiveness models, and overall sustainability (Dyachenko, 2021; Narang & Reutersward, 2006; Harikrishnan & Mahendra, 2021; Timofeeva, 2020; Ioppolo et al., 2016). Incorporating technical breakthroughs through project management is essential for businesses to stay competitive (Placet et al., 2005). Sustainable project management becomes crucial, emphasizing the organization's capabilities, financial status, skills, resources, and sustainability concerns (M. Yu et al., 2018; Silvius et al., 2014). Wang et al. (2017) stress project management's role in fostering sustainable growth in technology-based businesses, enhancing the economic impact of innovations (Pletnyova et al., 2021) and integrating sustainability into building engineering projects (Yu et al., 2010, 2018). Strategies for incorporating sustainability into project planning are vital for sustainable technology in building projects (Alias et al., 2014).

2.1.3.2 Time Management

2.1.3.2.1 Time Management Concept

The idea of time and its management has been defined differently in various studies. Time is measured and numbered in seconds, minutes, days, weeks, months, and years, and can be categorized into quantitative and qualitative categories (Becker & Mustric, 2008; Wu, 2009). Effective time management involves proactively assuming control and not avoiding challenges while confronting them, and it is a means to an end, not an end in itself (Kristan, 2010; Forsyth, 2010). Although some researchers disagree with the term "time management," it is vital to guarantee that goals are reached, and it is not about creating more time, but rather making the most of the time that already exists (Marquis & Huston, 2017; Forsyth, 2010). Successful time management also requires identifying priorities and a well-developed set of procedures (Felton & Sims, 2009; Zeller, 2009).

2.1.3.2.2 Time management and performance

According to research, an effective time management approach requires identifying the proper activities, utilizing the necessary tools and techniques, defining priorities, assessing, filtering, scheduling, and executing them (Fleming, 2011; Downs, 2008). Successful time management also involves considering the order and length of changes and the classification and presentation of environmental elements impacting time consumption (U.B. Singh, 2008; Claessens et al., 2007). Successful time management practices are essential for improving performance in various settings, including academic and work-related settings (Mazur, 2020; Triguero et al., 2020). Effective time management can reduce stress, increase productivity, and improve overall job satisfaction (Jovanovic, 2019; Liu & Huang, 2019). Therefore, understanding time management concepts and implementing effective time management practices is crucial for individuals and organizations to achieve their goals and enhance their performance.

Time management is a critical factor in project completion, with delays often attributed to various factors. Owusu (2020) emphasizes its significance in project timeframes, while Warinda (2020) attributes delays in 63% of commercial and industrial projects to unreasonable customer expectations during the preconstruction phase. Consumer time expectations, as highlighted by Jahanshahi (2020), stem from personal experience or expert recommendations, influencing project success. Delayed progress payments emerge as a significant contributor to construction schedule overruns, according to Owusu (2020).

In the oil and gas sector, effective time management is pivotal, demonstrated by concentrated well drilling before lease expiration, countering delays influenced by royalties for enhanced revenue (Herrnstadt et al., 2020). Time management is critical for safety and loss prevention in drilling operations (Eso & Eseosa, 2022). PETRONAS employs PRiME-IO to manage safety in real-time across installations, enhancing operational efficiency amidst OT/IT convergence, cybersecurity challenges, and human factors (Rashdan Mahmood & Tan, 2020). The oil–electric–hydraulic hybrid power

system, with its energy management strategy, underscores efficient time management's role in reducing fuel consumption costs by 32.14% (Yang et al., 2020).

Roos (2020) identifies the client's representative team, construction management team, and scope of work as key determinants of performance time. Emphasizing the expertise and abilities of project management team members is crucial. Chase et al. (2013) suggest researchers enhance time management skills by setting attainable objectives, establishing priorities, and refining planning processes.

Addressing time-related challenges in construction projects, Shehu identifies 31 factors affecting successful project execution through effective time management (Memon et al., 2014). Despite common strategies, building projects often face delays, prompting Nasir et al. (2016) to advocate for value management as a systematic approach to enhance time performance.

2.1.3.2.3 The Relationship between Time management, Self-Efficacy, and Sustainability

Numerous studies establish a link between time management, self-efficacy, academic success, and work satisfaction. Osman (2018) indicates that self-efficacy plays a partial role in the connection between time management and student achievement. Kim et al. (2011) find significant impacts of time management skills on nursing students' behavior and self-efficacy, while Salk et al. (2021) reveal associations between time management skills, academic success, and self-efficacy levels. Enhancing time management and self-efficacy, as demonstrated by Garcia (2020), correlates with improved mood and productivity.

Perceptions of time management abilities influence actual time management skills (Rapp et al., 2013). However, Abbasnejad et al. (2013) indicate that time-management training might not significantly alter work performance, suggesting that perceived skills may not reflect real capabilities.

Studies connect social and time orientation to stress levels (Geisler and Allwood, 2018), while career decision-making self-efficacy mediates the relationship between time management attitude and decision-making anxiety (Minghui et al., 2021). Golabli et al. (2013) reveal correlations between time management, job stress, and job performance, emphasizing the need to reduce employee stress for optimal productivity.

Effective time management is crucial for businesses pursuing sustainable development goals (Kim et al., 2019). Mussbacher & Nuttall (2014) emphasize time management's role in resource efficiency, while Kharkheli (2020) associates it with lasting success. Various sustainable governance methods, such as shorter workdays, proposed by Devetter & Rousseau (2011), not only conserve resources but also enhance concentration and production.

Calp (2020) underscores the importance of timely technology acquisition and utilization for effective project activities, while Gehani (1995) sees time-based management as a valuable resource for technology management. Berkel & Curtin (2000) suggest that sustainable technology goals can be achieved through effective time management strategies, and Sartorius (2006) highlights the impact of timing on the market success of innovative operations.

2.1.3.3 Cost Management

2.1.3.3.1 Cost Management Concept

Cost management refers to the procedures and actions done to ensure a project is completed within an established budget, such as resource planning, cost estimate, cost budgeting, cost assigning, and cost controlling. It encompasses all expenditures incurred from project initiation to completion and it is vital to give weight to each project management activity carried out during each step of the project's development up until its conclusion (Nousheen et al., 2020).

2.1.3.3.2 Cost Management and Performance

Project cost management is integral to an organization's cost-effectiveness, addressing true cost drivers and aiming for improved customer value while reducing costs (Langfield-Roos, 2020; Todorovic et al., 2013; Prashar & Sunder M, 2020; Miri & Khaksefidi, 2015; Mashwama, 2020). Financially successful firms, relying on precise project cost control, experience enhanced organization performance, leading to higher profitability, better resource control, increased transparency, and reduced risks (Demirkesen & Ozorhon, 2017; Ollows, 2012).

In the oil and gas sector, especially in Nigeria, optimal cost management is imperative for prudent investment, particularly in natural gas pipeline construction. This study delves into cost control intricacies in oil and gas exploration, highlighting the significance of construction unit management and performance evaluation in long-distance pipeline projects (Jing, 2022; Henry Okpo et al., 2023). In the face of challenges like renewable energy competition and supply chain complexity, effective cost management becomes crucial for growth and profitability, demanding strategic levers and innovative technologies (Atolagbe & Mohammed, 2022). Lidija Leskur's (2017) definition of Cost Management as achieving management goals through optimal cost engagement underscores its unique role in business management.

Predicting the performance of projects involves considering variables like the number of repetitive elements, design completion levels, contractor capital, client attitudes, and contractor selection (Nousheen et al., 2020; Ollows, 2012). Inadequate management and control processes, weak responsibility systems, insufficient construction equipment management, diverse organizational and economic forms, lack of management support, poor project communications, external economic factors, and underutilization of project

management tools pose challenges (Miaoting & Ni, 2019; Borovskikh et al., 2021; Okereke et al., 2022).

2.1.3.3.3 The Relationship between Cost management, Self-Efficacy, and Sustainability

Research suggests that self-efficacy impacts cost management, sometimes leading to increased neuroendocrine and psychological stress responses and decreased performance (Schonfeld et al., 2017). Higher self-efficacy increases the likelihood of becoming an entrepreneur, investing personal wealth in the initiative, and dedicating more hours per week to the enterprise (Cassar & Friedman, 2011). Managerial knowledge of cost management moderates the impact of budget involvement on self-perceived managerial performance and influences individual self-efficacy (Agbejule & Saarikoski, 2006; Kristiani, 2021).

Cost management, according to Yun (2007), Duman et al. (2013), Le (2018), and Wanass & Shahazad (2009), contributes to achieving sustainable development by reducing expenses. It improves financial and environmental outcomes by detecting, measuring, analyzing, and reporting costs associated with environmental activities, aiding in decisions to minimize environmental effects and enhance efficiency (Le, 2018). Innovative practices in building cost evaluation and minimizing environmental consequences during material transformation are recommended (Yun, 2007; Duman et al., 2013). Adopting target cost methodologies is suggested for achieving sustainable development (Wanass & Shahaza, 2020), while sustainable business practices can lower operational costs and enhance productivity, influencing market value and enterprise profitability (Bello, 2020).

However, research indicates conflicting effects of cost management on innovation and sustainability. Eco-innovation requires proactive environmental policies driven by market demand, innovation intensity, and government subsidies (Tsai and Liao, 2017). Reducing operational costs for energy, water, and materials is identified as a crucial factor driving eco-innovation (Hrabynskyi et al., 2017). Cost management is considered vital for value-driven information technology management (Van Maanen and Berghout, 2002; Grytz and Krohn-Grimberghe, 2018). Resource-constrained innovation has various strategic consequences, necessitating changes in management philosophies and the incorporation of technical components for intelligent decision-making to encourage sustainable growth (Zeschky et al., 2014; Su & Wu, 2020).

2.1.3.4 Risk Management

2.1.3.4.1 Risk Management Concept

Project risk management, outlined by El-Sayegh (2015), is vital for identifying, assessing, and responding to potential issues, aiming to reduce unfavorable impacts. Alhawari et al. (2012) define risk management as a systematic process to enhance

positive outcomes and mitigate adverse events, aligning with project objectives. In an era of heightened globalization and competitiveness, Rodrigues-da-Silva and Crispim (2014) stress the significance of risk assessment in project management. Gharleghi and Jahanshahi (2020) highlight key processes within risk management, emphasizing continual improvement in decision-making. Mhetre et al. (2016) suggest risk management involves transferring financial loss, maintaining minor risks, minimizing and avoiding risks. Various methodologies, such as risk-based, precaution-based, and discourse-based, offer diverse approaches (Klinke & Renn, 2002).

2.1.3.4.2 Risk Management and Performance

Peckiene et al. (2013) emphasize equitable risk distribution in construction projects, acknowledging universal impacts on stakeholders. Robust risk management is imperative in major enterprises, like energy companies, for sustained competitiveness (Musumali & Qutieshat, 2022). SME owners engage in risk assessments for enterprise risk management (Akkermans et al., 2020). Effective risk management is crucial for project success, customer satisfaction, and financial performance (Al-Fadhali et al., 2019). Positive associations link risk management with individual performance indicators, inversely related to factors like return on assets (Moradi Shahdadi & Sedghi, 2017; Jakaa et al., 2008). Enterprise Risk Management (ERM) variables significantly correlate with organizational performance (Obalola et al., 2014). Return on assets (ROA) and return on equity (ROE) exhibit positive associations with organizational performance (Agyemang et al., 2020).

Akindele (2012) underscores risk management and corporate governance's role in enhancing banking sector profitability. Derivatives may impact measured performance negatively, while hedging significantly influences oil and gas companies (Savas et al., 2020). In the oil and gas sector, risk management positively influences business performance (K. Shad & Lai, 2019). Regulatory uncertainty and strategic attitudes impact internal uncertainties, affecting risk mitigation and performance management (Butterworth et al., 2015). Despite these positives, various construction sectors face challenges in effective risk management, attributed to knowledge gaps, cultural barriers, poor planning, inadequate infrastructure, and a lack of systematic approaches (Kang et al., 2015; Salleh et al., 2020; Ali et al., 2007; Mhdawi et al., 2020; El-Sayegh, 2015; Twigg, 2015).

2.1.3.4.3 Risk Management in Oil & Gas Companies

Risk management in the oil and gas sector is critical, offering benefits such as identifying unforeseen events during drilling projects (Tufail et al., 2022). It enhances decision-making and project planning, ensuring employee safety (Shanmugam et al., 2022). Benny & Renjith (2023) emphasize risk management's role in preventing major incidents, with significant economic and social impacts. Karami et al. (2020) stress its importance in addressing operational challenges in large-scale oil projects. For the Iranian upstream oil and gas sector, effective risk assessment is crucial given its complexities (Karami et al., 2020).

Enterprise Risk Management (ERM) is integral, impacting firm performance and risk exposure. Branch (2019) explores ERM's influence, emphasizing safety, reputation protection, and addressing operational risks for sustainable growth. Shad et al. (2019) underscores risk management's positive impact in a supportive internal environment, objective setting, and control and monitoring activities. Kadam (2021) identifies key industry risk factors, highlighting risk management's mitigating role. Annamalah et al. (2018) emphasizes risks in Malaysian oil and gas companies, supporting risk management implementation. ERM demonstrates a positive relationship with various risks and business performance.

The aging infrastructure in the oil and gas sector poses challenges amid growing energy demand and environmental concerns. Sustainable development requires a holistic approach integrating risk, reliability, and resilience for long-term viability (Mahmood et al., 2023). Rajan et al. (2022) advocate for a comprehensive risk assessment register and matrix in oil and gas operations to address carbon emissions, aligning with Sustainable Development Goals for a responsible transition to net zero emissions. Human-induced climate change intensifies extreme weather events, impacting oil and gas sectors. Implementing robust mitigation strategies is vital for environmental resilience and sustainability (Singhal et al., 2021).

2.1.3.4.4 The Relationship between Risk management, Self-Efficacy, and Sustainability

Numerous studies underscore self-efficacy's pivotal role in risk management. Rimal (2001) notes its impact on risk perception and individuals' willingness to engage with information. Training and clinical guidance enhance self-efficacy in risk assessment (Delgadillo et al., 2014). Emotional responses and information preferences connect to self-efficacy and institutional trust (Ter Huurne & Gutteling, 2009). Stakeholders view risk management as a tool for influencing behavior and synchronizing perceptions (De Bakker et al., 2011). Comprehensive awareness aids risk assessment in risky decisions (Bruhin et al., 2018). Project managers' negative approaches impact perceived risk management efficacy (Kutsch & Hall, 2005). Risk management aids sustainable development by addressing systemic risks (Gheorghe, 2012; Bakhtiari, 2014). Holistic integration of ecological, socioeconomic, and corporate variables is vital for sustainable risk management (Ayse & Triant, 2010). Long-term practices are essential for sustainability, as short-term methods may be inadequate (Gheorghe, 2012). Traditional risk management often overlooks climate change risks (Dyer et al., 2017.

2.1.4 Mega and Small to Medium-Sized Project

Project management methods and their benefits can vary depending on project size and complexity. Li Zhai et al. (2009) note the potential for leveraging social network strategies to manage stakeholder interrelationships in very large projects. However, the definition of "mega projects" lacks consensus (Jager & Zakharova, 2014). Small and medium-sized businesses (SMEs) contribute significantly to national economies through projects, constituting a substantial portion of turnover and GDP in some cases (Akkermans et al., 2020). McCollum (2015) argues for the necessity of project

management software and systems engineering for large projects, emphasizing their complexity, risks, duration, and broad impact. In contrast, traditional stakeholder analysis methods persist in big building projects. For SMEs, conventional project management may not be universally applicable due to their distinct characteristics, such as limited resources and informal structures (Papachristos et al., 2020). Understanding the unique challenges and opportunities in SME project management is crucial for their success.

2.1.5 Project Management in Energy Industries

The application of project management methods is becoming fundamental for enhancing organizational performance in the oil and gas industry, particularly in executing complex and competitive projects (Kassem et al., 2019). Success in this sector depends on fulfilling scope, schedule, cost, and quality requirements through efficient project management techniques (Abdulla et al., 2019; Joslin et al., 2016). Knowledge management-based systems and Bayesian techniques enhance project operations, while procurement relationship management and tactics significantly influence project success (Handfield et al., 2015; Ochieng et al., 2018; Caron et al., 2014).

Understanding how strategy, structure, procedures, and project management methods interact is crucial for the success of oil and gas companies (Faghihi, 2021). Efficient project management, based on industry best practices like the Project Management Body of Knowledge, is vital for improving sector performance (Faghihi, 2021). Early project completion estimation is essential for proactive management, especially in complex projects like oil and gas endeavors (Caron et al., 2014). However, rising capital expenditure alone cannot guarantee success, as formal project management techniques must align with organizational and technological capabilities (Walkup Jr. & Ligon, 2006).

To stay competitive, energy firms need cost reduction, process improvement, and staff support, aligning systems through a comprehensive evaluation and standardization of corporate architecture, including project management (Habib et al., 2011). In the oil pipeline sector, decision-making is critical, requiring choices based on various project management criteria and metrics (Fadhl et al., 2020). Adopting project management tools and techniques proves effective for success in the oil and gas industry, offering a beneficial framework for informed decision-making.

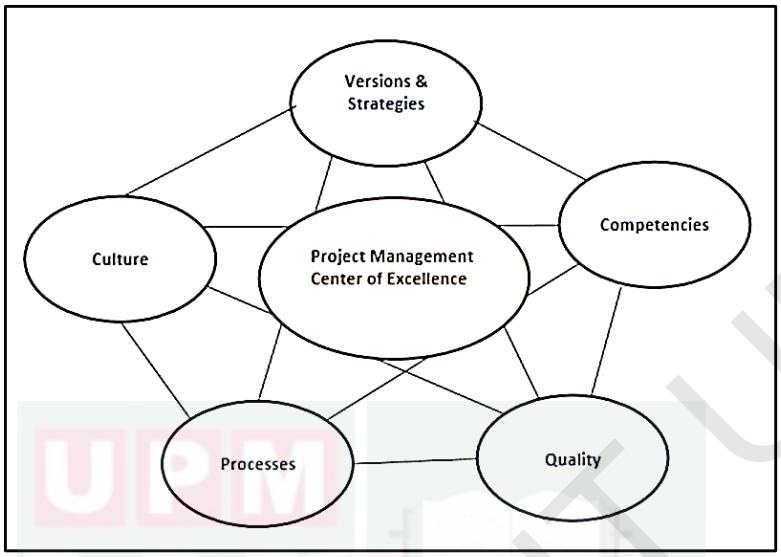

Figure 2.2: Five Critical Elements to Creating a Project Management Center of Excellence
(Source : Rothwell et al., 2021)

2.1.6 Project Management Practices

The Project Management Body of Knowledge (PMBOK) provides nine knowledge domains, including project integration, scope, schedule, cost, quality, human resource, communication, and risk management (Liu et al., 2020; PMI, 2017). PMBOK is a globally acknowledged standard that outlines the principles of project management (Jamali & Oveisi, 2016). Its significance stems from its application to a wide variety of projects, certification of project managers, accreditation of training courses, and ongoing professional growth (Bassi, 2017). The PMBOK is positively associated with project success, and it must be frequently updated to reflect the changing nature of project management (Shepherd & Atkinson, 2011; Morris, 2002). PMBOK is applicable in Australia, which contributes to the success of projects (Bolooki & Bridge, 2007).

In addition, good project management methods include the use of tools such as scheduling software, project planning templates, and excellent communication between team members to ensure that tasks are accomplished quickly and within budget and timeline constraints (Braglia & Frosolini, 2014). The systems development cycle consists of planning, network scheduling, cost estimation and budgeting, risk management, project control, project evaluation, reporting, and closure (Nicholas, 2003).

Good project management methods play a vital role in enhancing organisational processes, particularly in the oil and gas business, where complex and competitive projects must be executed successfully to assure sustainability (Abdulla et al., 2019; Kassem et al., 2020). Using project management methods is a crucial approach for

enhancing organisational performance because it enables businesses to efficiently plan, organise, and manage resources to meet particular objectives (Al-Fadhali et al., 2019). Dai and Wells (2004) identified and evaluated a variety of project management office (PMO) roles and services and their impact on reported project performance.

2.1.7 Relationship between Project management and employees' Self-efficacy

Self-efficacy beliefs, highlighted by Blomquist et al. (2016), stand out as a robust predictor of individual success across diverse fields. In the realm of project management, self-efficacy emerges as a potent predictor of project performance (Nusari et al., 2018). Project managers can leverage techniques like leadership strategies to cultivate positive emotions among team members, contributing to project success (Berg & Karlsen, 2014). Stressors for project managers, identified by Jepson et al. (2017), include resource scarcity, lack of control, and increased accountability, with stress alleviated through effective project management strategies such as teamwork and research.

Emotional intelligence, explored by Tang et al. (2020), plays a crucial role in project management, influencing creative behavior and work performance. Transformational leadership, integrated with emotional intelligence, enhances project success by strengthening team skills (Leban & Zulauf, 2004). Nielsen and Munir (2009) link transformative leadership to employee well-being, with self-efficacy mediating this relationship. Ho (2021) emphasizes the impact of learning processes and self-efficacy on sustainable development education, where both implicit and explicit learning contribute to project management success by facilitating knowledge acquisition and boosting self-efficacy.

2.1.8 Relationship between Project management and sustainable development

A substantial Research has extensively explored the intersection of project management and sustainable development, highlighting its crucial role in achieving environmentally friendly structures and fostering sustainable outcomes (Ivanov et al., 2020; Magano, Silvius, et al., 2021; Silvius & Schipper, 2016; Silvius & Schipper, 2019). Sustainable Project Management, a global trend, is vital for both project success and long-term organizational survival, promoting waste elimination, efficiency, and environmentally conscious resource management (Silvius, 2021; Omer, 2008).

Project management enables businesses to align initiatives with sustainability objectives, measuring and reporting performance transparently (PMI, 2017). Organizations set environmental goals like carbon emission reduction, utilizing project management to plan and execute actions such as deploying energy-efficient equipment (Dadzie et al., 2018). The synergy between project management and sustainability defines the future of project-based organizations, influencing and being influenced by the environment (Elkington, 1997).

However, challenges arise when project management prioritizes commercial goals over social and environmental ones, potentially conflicting with sustainable development objectives (Alex, 2002; PMI, 2017; Sabini & Alderman, 2021). Some argue that project management's emphasis on efficiency, money, and time can clash with broader sustainable development goals (Fm, 2015; Labuschagne et al., 2005). Others stress the need for a nuanced understanding, considering sector-specific, regional, and cultural variations (Analia Sánchez & Schneider, 2014; Kurganov, 2020).

2.2 Self-efficacy

Self-efficacy is the confidence in one's capacity to complete a task or accomplish a goal. It may be viewed as a person's confidence and faith in their ability to perform activities, get desired objectives, and overcome any potential barriers. Self-efficacy was initially presented by the psychologist Albert Bandura, who stated that it plays a vital part in deciding how much effort and perseverance a person will exert to attain their goals.

It has been shown that self-efficacy has good benefits on motivation, performance, and general well-being; it motivates individuals to take chances even when confronted with problems or disappointments by giving them with confidence in their ability to succeed despite potential obstacles. Research indicates that higher levels of self-efficacy lead to stronger success objectives as opposed to avoidance goals, which strengthens this idea in our daily lives.

2.2.1 Self-efficacy Concept

Self-efficacy, a central concept in Bandura's Social Cognitive Theory, profoundly influences individuals' thoughts, emotions, motivations, and behaviors (Mathews, 2005; Barbaranelli et al., 2019; Bourne et al., 2021). It refers to a person's belief in their capability to perform tasks under specific conditions (Liu et al., 2020), affecting goal selection, decision-making, effort, and perseverance (Alghamdi et al., 2020). It also shapes workers' abilities, knowledge, skills, and expectations (Cattelino et al., 2019). Research indicates that teacher self-efficacy is linked to collectivism, humility, and extremity scores, with cultural variations in its association with grades or IQ scores (Vieluf et al., 2013; Jurecska et al., 2011).

High self-efficacy manifests as confidence, perceived capacity, and persistence (Robb, 2012), influencing task effort, perseverance, reported interest, and chosen goal difficulty for performance (Gist, 1987). While self-efficacy doesn't significantly affect anxiety, poor self-efficacy correlates with heightened anxiety levels (Trisnaningati, 2016; Muris, 2002). Measurement methods include questionnaires, performance assessments, and surveys (Bateman et al., 2022).

Managers can enhance staff productivity by fostering personal mastery and progression from simple to complex tasks (Huang et al., 2019; Etehadi et al., 2018). Self-efficacy development is intricately linked to experiences, skills, and developmental tasks across

various life domains, with enactive accomplishment, vicarious experiences, imaginal experiences, and social persuasion contributing to its enhancement (Tsang et al., 2012).

2.2.2 Self-Efficacy Practices in Energy Industries

Cherian and Jacob (2013) explored the influence of self-efficacy on performance in the energy business, finding negative impacts under situations of high ambiguity and favourable effects under conditions of low ambiguity. Schmidt and DeShon (2010) discovered that self-efficacy negatively impacts performance in the energy business under conditions of significant ambiguity, with performance judgements and effort allocation serving as mediators. Yeo & Neal (2006) discovered a negative intra-individual association but a positive inter-individual link between task-specific self-efficacy and performance in air traffic control tasks.

Whyte and Saks (2007) performed two studies on petroleum geologists and discovered that self-efficacy beliefs had a substantial effect on the likelihood of escalating in reaction to negative feedback. Saaeda et al. (2020) investigated managing directors at an Oil Products Distribution Company in Baghdad and found a favourable association between self-efficacy and work-life quality. Cretu & Burcas (2014) examined counterproductive work behaviours in a sample of employees from a Romanian oil & gas company and discovered that emotional dissonance, self-efficacy, and self-monitoring are significant predictors, with self-efficacy moderating the relationship between emotional dissonance and counterproductive behaviours.

Zhang et al. (2020) did a study on Chinese energy sector personnel and reported beneficial impacts of creative self-efficacy and perceived usefulness on the usage of new media, offering managerial implications. Drescher et al. (2012) investigate the effect of the Gulf Oil Spill on the quality of life of 361 persons seeking therapeutic care along the Mississippi Gulf Coast. It was discovered that perceived significance in life and self-efficacy were more predictive of life satisfaction than reported oil spill consequences. In the aftermath of ecological disasters, the study underscores the significance of coping strategies and therapies that build a feeling of perceived meaning in life and self-efficacy.

2.2.3 Self-Efficacy and Performance

Self-efficacy, a critical factor in human resource management, significantly influences employee performance and organizational success (Robb, 2012; Bourne et al., 2021). It motivates employees to enhance their capabilities, fostering notable performance improvements (Liu et al., 2020). Representing an individual's belief in their job-related task performance ability (Artino Jr, 2012), self-efficacy is associated with high goals, task accomplishment, perseverance, and also correlates with anxiety and stress when low (Kim, 2019; Jánoová, 2014). The impact of self-efficacy on employee performance varies across corporate cultures (Ilyas, 2020). Schonfeld et al. (2017) highlight its role in boosting performance, reducing stress, and psychopathological symptoms, enhancing organizational commitment, and decreasing turnover likelihood (Gutiérrez, 2019). Despite its positive aspects, elevated self-efficacy may lead to increased stress and

performance decline (Schonfeld et al., 2017; Isa et al., 2017). Leveraging self-efficacy is crucial in strategic management for achieving organizational goals, necessitating alignment between plans and human resource policies (Diaconu-Gherasim et al., 2019). It plays a pivotal role in the Jordanian labor market, positively influencing staff commitment (Chen, 2020).

2.2.4 Self-Efficacy as Meditator

In Q fever fatigue syndrome, reduced self-efficacy intensifies fatigue post-cognitive-behavioral treatment (Barbaranelli et al., 2019). Young Chinese nurses show emotional exhaustion and social support mediating occupational stress and depression/anxiety (Chen et al., 2020). Italian employees' self-efficacy mediates optimism's impact on work behaviors (Barbaranelli et al., 2019). For Indonesian hotel workers, work engagement mediates self-efficacy's link with career identity, work environment, and job embeddedness (Bahri et al., 2020). Employee self-efficacy mediates relationships, guiding hotel managers to enhance cognitive capital for staff efficacy and customer satisfaction (Alyahya et al., 2020). Teachers' self-efficacy mediates organizational support's impact on work engagement (Macinati et al., 2017). It also fully mediates budgetary involvement's effect on performance (Macinati et al., 2017).

Self-efficacy mediates work uncertainty's impact on absenteeism, service recovery performance, and service innovation behavior (Etehadi et al., 2018). It also mediates supervisor incivility's effect on cynicism (Alola et al., 2020) and moderates empowering leadership's link to positive/negative employee behavior (Kim & Beehr, 2017). Entrepreneurial self-efficacy's connection with nascent behavior in Zambian universities is mediated by entrepreneurial purpose (Mwiya et al., 2019). Empowering leadership positively affects self-efficacy and psychological ownership, reducing deviant behavior among U.S. employees (Kim & Beehr, 2017). A formative evaluation intervention in mathematics training enhances students' attention and self-efficacy, indirectly influencing learning progression (Rakoczy et al., 2019). Self-efficacy, identified as a crucial mediator/moderator, is essential for effective treatments, policies, and achieving desired results.

2.2.5 The Relationship between Self-Efficacy and Sustainability

Several research have investigated the influence of self-efficacy on sustainable development efforts. Self-efficacy is a significant driver of environmentally sustainable behaviour and has a beneficial impact on pro-environmental conduct (Schutte & Bhullar, 2017; Wai et al., 2018). According to Han et al. (2021), self-efficacy moderated the influence of student cohesion and participation on behavioural engagement, emotional engagement, and satisfaction. Married women with high financial uncertainty self-efficacy are less likely to start a new business than women with low financial uncertainty self-efficacy (Pushkarskaya & Usher, 2010). In addition, self-efficacy is highly connected with the capacity to concentrate on solutions and attitudes regarding education for sustainable development (Akca, 2019). Hanss and Bohm (2010) discovered that self-efficacy towards persuading others is the most accurate predictor of sustainable consumption behaviour. According to Lauren et al. (2016), self-efficacy might be a

crucial motivator for environmental spillover and promote involvement in difficult pro-environmental behaviours. Self-efficacy can impact information acquisition and attitude, enabling individuals to engage in pro-environmental conduct (Han et al., 2021; Wai et al., 2018)

Kulviwat et al. (2014) discovered that self-efficacy significantly influences individuals' cognitive and emotional attitudes towards technology. Al-Haderi (2013) discovered that self-efficacy positively affected the intention to utilise and actual utilisation of technology via perceived utility and simplicity of use. Suur-Inkeroinen and Seppanen (2011) constructed a model for predicting habitual technology usage and discovered a substantial association between self-efficacy and technology usage level. Good emotions were also shown to boost the use of technology.

According to studies, self-efficacy is a key driver of sustainable development and technology adoption. It influences attitude, the acquisition of information, and behaviour, allowing individuals to engage in pro-environmental actions.

2.2.6 Self-efficacy Aspects

Wallenborn (2019) states that self-efficacy beliefs are an individual's perceptions of his or her capability to tackle a novel and specialised task. These beliefs are founded on the success expectation of the individual. Four sources can contribute to self-efficacy beliefs: prior performance, vicarious experience, verbal persuasion, and emotional states (Li et al., 2019; Tsang et al., 2012; Wang et al., 2019; Hou et al., 2019).

2.2.6.1 Past Performance

Past performance, as assessed through metrics like quality and quantity, evaluates an individual's or organization's historical outcomes. It informs future decisions by reviewing work history, accomplishments, and customer satisfaction. Supervisors use this data to assess present performance, predict future contributions, and determine overall value. Employers rely on past performance for making informed decisions on promotions, wage increases, and other relevant matters, ensuring choices are based on actual data rather than arbitrary judgments (Diao et al., 2019; M. Khan & Jabbar, 2013).

2.2.6.1.1 Past Performance Concept

Self-efficacy, rooted in prior performance, significantly influences workers' confidence in future job-related tasks (Bandura, 2012). Employee performance, once unidimensional, now encompasses multidimensional aspects like Task, Contextual, and Counterproductive performance (Patnaik, 2020). Job satisfaction, linked to work motivation, positively correlates with employee performance (Lestari & Riyanto, 2021). Various factors, including knowledge management, technology, empowerment, innovation, and corporate culture, impact employee performance (Tuffaha, 2020).

Pradhan (2017) identifies key performance factors: task, adaptive, and contextual performance. Examining employee performance is crucial for assessing their value (Prof & Gaikwad, 2020). Performance management, an amalgamation of art and science, involves continuous communication, feedback, coaching, counseling, and training (McConnell, 2004).

2.2.6.1.2 Past Performance and Future Performance

Studies reveal the impact of previous performance on future behavior. Shergadwala et al. (2022) find individuals invest more effort in competition when previous opponents excel. Critcher (2014) notes people overestimate future performance improvement based on past achievements. Arnold et al. (2022) show work type influences organizational target differentiation. Cognitive and emotional conflicts vary in associations with previous performance (Amason, 1999). Liao et al. (2022) find top management team success moderates the link between customer focus and environmental innovation. Research explores the use of past performance assessments in federal procurement (Snider & Walkner, 2011) and predicts employee improvement areas based on prior knowledge ratings (Prof & Gaikwad, 2020). While Gray et al. (2001) caution past performance may not always predict the future accurately, these studies emphasize leveraging past performance for better predictions and improvements.

2.2.6.1.3 Self-Efficacy and Academic Qualifications

Managers enhance employee self-efficacy through recruitment, challenging tasks, development, coaching, and rewards (Puente-Diaz et al., 2020). Self-efficacy, reflecting confidence in specific tasks, predicts behavior accurately, influencing actions, effort, resilience, thought patterns, stress, achievements, and success (Green, 2020). Academic achievement is impacted by attitude, aptitude, and motivation, with gender and attitude moderating self-efficacy's influence (Breukers et al., 2019). Studies link self-efficacy to prior performance, influenced by mastery experience, vicarious experience, verbal persuasion, and psychological arousal (Mwiya et al., 2019). Academic credentials increasingly impact job success, providing a foundation, diverse experiences, self-worth, task confidence, loyalty, and eagerness for performance improvement (Mwiya et al., 2019; Green, 2020). Employers view credentials as evidence of qualifications, studying disposition, and eagerness, correlating with improved performance, quality, productivity, competitiveness, multi-skilling, compliance, and workplace transformation (Green, 2020).

2.2.6.1.4 The Relationship between Past Performance and Sustainability

Studies emphasize the importance of employee performance, training, leadership, and engagement for sustainable growth (Liu et al., 2014; Wolf, 2013; Soenanto et al., 2020; Jalloh, 2020; Olowookere et al., 2020). Corporate environmental commitment positively correlates with sustainable development performance, strengthened by increased staff training (Liu et al., 2014). Staff integration moderates this relationship (Wolf, 2013). Leadership significantly enhances overall performance, and active leader participation

is crucial for sustainable development (Soenanto et al., 2020). Personnel training fosters successful employer-employee relationships, improving performance (Jalloh, 2020). Olowookere et al. (2020) argue that high-performance personnel and effective staff management, supported by Industrial and Organizational Psychology, are vital for twenty-first-century sustainable development. Understanding past performance aids technology and innovation by revealing skill sets, adaptability, and learning capabilities, facilitating effective task distribution (Saleh, 2018).

2.2.6.2 Vicarious Experience

Vicarious experience is learning by watching others. People can obtain knowledge, attitudes, and skills from the experiences of others (Puente-Diaz et al., 2020); It can be utilised as a source of information to boost one's self-efficacy (Kelley et al., 2020); to learn about and evaluate one's own capabilities. It can be an excellent instrument for promoting sustainability-relevant values and competencies. (Walker & Moscardo, 2014; Molderez & Fonseca, 2018) Through seeing the actions and results of others, one might learn through vicarious experience. It can reveal how well employees can adapt and learn new procedures, which is crucial for the successful implementation of technological change inside businesses (Saleh, 2018).

2.2.6.2.1 Vicarious Experiences Concept

Observational experiences, or vicarious experiences, serve as a source of self-efficacy. Kim et al. (2020) note that individuals can enhance their self-efficacy by witnessing someone in a comparable position succeed. In workplace mentoring programs, matching individuals on similar career paths proves beneficial (Bayraktar & Jiménez, 2020). Knowles et al. (2020) suggest that children can learn about their skills by observing classmates, providing valuable comparison opportunities. Wang et al. (2019) highlight the significant impact of vicarious experiences on self-efficacy, especially when observing a model with high similarity. Self-modeling, where individuals witness their own successes, also positively influences self-efficacy (Li et al., 2019). Mentorship programs, fostering similarity and success, contribute to boosting self-efficacy beliefs (Wallenborn et al., 2019).

2.2.6.2.2 Vicarious Experience and Performance

Vicarious experiences, learning from others' actions and outcomes, prove valuable in various contexts. In international business, studying the investment strategies of other companies provides insights, reducing obstacles in host countries and facilitating new market entry (Conle et al., 2002; Jiang et al., 2014). Vicarious experiences, even within the same industry, offer decision-making insights. In entertainment, vicarious experiences positively impact viewers' mental health by eliciting similar emotions to on-screen actors (Tannenbaum, 2014). Observational learning through vicarious experiences enhances career identity, motivating individuals in their jobs (Otengei et al., 2017). In online education, individuals with high self-efficacy benefit more from vicarious experiences by ignoring negative information, while those with low self-

efficacy limit its potential (Wilde & Hsu, 2019). Vicarious experiences contribute to job interview performance, allowing candidates to present themselves as competent professionals through narrative storytelling (Van De Mieroop, 2019). Among indigenous hospitality graduates, vicarious experiences encompass professional functional excellence and social welfare construction, significantly influencing job identity for Ugandan graduates (Otengei et al., 2017).

2.2.6.2.3 The Relationship between Vicarious Experience and Sustainability

It has been determined that vicarious experience is an effective strategy for encouraging sustainable development. According to studies, good vicarious experiences can help individuals develop self-assurance and a positive sense of professional identity, as well as capabilities for sustained growth. According to Walker & Moscardo (2014) and Molderez & Fonseca (2018), vicarious experience may activate or alter values related to sustainable development, and merging real-world experiences and service learning can successfully foster sustainable development competencies. Steenekamp et al. (2018) discovered that positive vicarious experiences during debriefing activities on educational trips can assist persons in developing a sense of teacher professional identity that is characterised by optimism and agency.

In addition, learners can gain confidence in utilising technology through vicarious experiences, which can be assisted through educational technology courses and goal setting (Willis et al., 2016; Ertmer et al., 2004; Achterkamp et al., 2016). By giving feedback through films or visual media, vicarious experience may also enhance the usage of sustainable technology, boosting users' confidence in their capacity to accomplish comparable activities

2.2.6.3 Verbal Persuasion

Verbal persuasion is the practise of using words or writing to persuade or influence another to adopt specific views, attitudes, or behaviours. It is one of the four basic sources of self-efficacy, which is the conviction that one can effectively do a certain job (Hinyard & Kreuter, 2007). Verbal persuasion is frequently used to urge people to do particular activities or improve their performance in numerous situations, such as education, marketing, and leadership. It has been discovered to be a useful strategy for boosting self-efficacy and fostering improved outcomes in a variety of contexts (Puente-Daz, 2016).

2.2.6.3.1 Verbal Persuasion Concept

Verbal persuasion is a powerful tool influencing enthusiasm to learn and self-efficacy (Li et al., 2019). It proves beneficial in rehabilitation after stroke, reducing anxiety, and enhancing performance through encouragement (Jones1 & Riazi, 2011; Puente-Diaz et al., 2020; Knowles et al., 2020). Managers in the foodservice industry often use verbal persuasion to motivate staff and boost productivity (Reynolds, 2014). As a form of

psychotherapy, it promotes mental health and self-efficacy in conditions like Q fever fatigue syndrome QFS (Breukers et al., 2019). Positive verbal persuasion buffers parental self-efficacy in the face of failure, offering potential in parenting therapies (Y. Wang et al., 2019). Extending beyond, it finds applications in politics, marketing, and education, impacting student achievement by influencing motivation levels and attitudes towards learning activities (Kirbulut & Uzuntiryaki-Kondakci, 2019).

2.2.6.3.2 The Relationship between Verbal Persuasion with Sustainability

Verbal persuasion emerges as a potent strategy for fostering pro-environmental actions and sustainability. Studies show that persuasive language, encompassing rhetoric and argumentation, effectively convinces individuals that their actions positively contribute to environmental concerns (Brynjarsdóttir et al., 2012). Proven effective in establishing an emotional connection with the audience, verbal persuasion motivates action, playing a crucial role in promoting sustainability goals, such as reducing carbon footprints or conserving energy (Bator & Cialdini, 2000; Knowles & Davis, 2017; Nkwo, 2019). By highlighting the personal and societal benefits of individual actions, verbal persuasion establishes an emotional bond, enhancing its impact (Nkwo, 2019). Additionally, it aids in advocating policy changes for climate change mitigation and adaptation strategies. In the context of sustainable technology acceptance, verbal persuasion shapes attitudes toward emerging energy technologies, influencing their societal acceptance (Huijts et al., 2012). Despite some limitations, verbal persuasion remains a valuable tool for instigating positive behavioral changes and promoting sustainability.

2.2.6.4 Emotional cues

The term "emotional cues" refers to facial expressions, voice tone, body language, and physical actions. These cues express emotions such as happiness, sorrow, anger, fear, and surprise and play a crucial part in human communication (Estrada et al., 2021). Emotional cues are particularly important in social interactions because they enable people detect and respond to other people's emotions. Understanding emotional cues is a crucial component of emotional intelligence that may aid in the development of more effective communication skills and the formation of healthier relationships (Tang et al., 2020).

2.2.6.4.1 Emotional Cues and Performance

Significant consequences might result from the influence of emotional cues on self-efficacy, trust, and decision-making processes on performance. Feelings defined by other-person control, such as wrath or thankfulness, have a major influence on trust, as do judgements of weak control, such as happiness (Dunn & Schweitzer, 2005). Positive feedback and fear can impact an individual's degree of self-efficacy, resulting to diminished or enhanced confidence (Putwain et al., 2016; Robinson & Clore, 2002; Paulus & Yu, 2012). Expecting to fail can cause physiological symptoms associated with poor performance, highlighting the necessity of controlling negative emotions (Mwiya et al., 2019). Creating tough objectives can result in greater personal goals, enhanced

performance, and increased self-performance (Breukers et al., 2019; Mufu, 2015). Emotion plays a vital role in affecting performance, with cognitive-motivational-relational theory emphasising the relevance of assessment, coping methods, and relational meaning (Lazarus, 2000). Emotional intelligence and competences also play an important role in collective decision-making, task skill, interest, and effort, which can moderate pleasant emotional states and boost performance (Salim & Safitri, 2020; Ashkanasy, 2004). Positive emotions like excitement can boost motivation levels and increase productivity during prolonged effort activities (Beal et al., 2005). Overall, emotions have a big role in performance and can influence a person's success in a variety of contexts, underscoring the need of emotional control.

2.2.6.4.2 The Relationship between Emotional Cues and Sustainability

Emotions significantly shape responsible conduct and decision-making, playing a vital role in sustainability across various contexts. Moral feelings like anger, and emotions such as pride and guilt, predict enduring conduct (Kals & Maes, 2002). In education, participatory approaches and environmental emotions impact students' sustainable behavior positively (Robina-Ramrez et al., 2020). Emotional management, like detaching from negative feelings, aids climate change adaptation. Pluralistic Environmental and Sustainability Education (ESD) fosters faith in programs by involving various actors in classrooms (Sarazin, 2013). Emotions influence sustainable consumption, with pride being particularly impactful (J. Wang & Wu, 2016). In the realm of sustainable technology adoption, positive emotions like enthusiasm enhance willingness, while negative emotions act as barriers (L. Mohammed et al., 2020). Emotional responses play a role in cryptocurrency decisions, such as Bitcoin Green (BITG) (Mnif et al., 2021). Emotional dissonance signals unproductive job practices (Cretu & Burcas, 2014). For sustainable development, fostering emotional resilience through self-efficacy, self-monitoring, and social support is crucial for well-informed decisions benefiting individuals and the environment.

2.3 Sustainable Development

The Sustainability requires the integration of economic and environmental considerations to prevent crises, emphasizing the unity of economic activity and ecological foundations (Schwaninger, 2015). Studies by Rolstadås et al. (2014), Bohne et al. (2015), Hannan & Sutherland (2014), Sánchez (2015), and Albrecht et al. (2007) highlight the crucial role of sustainability in economic activities, particularly in project implementation. Aksorn & Chotchai (2015) stress projects' significance in community development, contributing to economic growth and sustainable practices in planning and execution.

Sustainability, evolving since the Brundtland Commission's introduction in 1987, encompasses environmental, economic, political, social, and cultural aspects (Fisher & McAdams, 2015). Elleuch et al. (2018) define sustainable development as meeting current needs without compromising future generations' ability, emphasizing the balance of activities for a pollution-controlled environment (Morelli, 2011; Elleuch et al., 2018; Basiago D., 1995).

Project sustainability, highlighted by Warda (2014) and Grevelman and Kluiwstra (2010), involves project managers' responsibility and links to competencies. Opoku (2019) stresses considering environmental, social, and economic perspectives in project sustainability, balancing resource conservation, social advancement, and economic growth. Sánchez (2015) underscores evaluating projects aligned with organizational goals, recognizing their lasting repercussions on society, the economy, and the environment.

Table 2.2: indicates that writers have defined sustainability and project sustainability in a variety of ways, so expanding the scope of both practise and academics

Sustainability	
Johnston, (2007)	Sustainability necessitates ways of living, working, and being that enable all people on the earth to have healthy, meaningful, and economically secure lives without damaging the environment or jeopardising the future of humanity and the planet.
Opoku (2019)	The modification of human behaviour to fulfil current demands without jeopardising future generations' ability to meet their own wants.
Project Sustainability	
Khan, (2000)	Throughout a project's economic life, its capacity to sustain an appropriate level of benefit is essential.
Grevelman and Kluiwstra, (2010)	Planning, managing, and coordinating resources, time, and quality to effectively finish a project.

2.3.1 Sustainable Development Aspects

Sustainability, commonly depicted through the three-pillar paradigm of environment, economy, and society, emphasizes the interdependence of business goals with societal and environmental factors (Kajikawa, 2008; Elkington, 1998). Organizational integration of social and environmental sustainability poses challenges, requiring consideration of economic, social, and environmental aspects in project evaluations (Sánchez, 2015). Schwaninger (2015) and Quinn & Baltes (2007) explore the interconnected ecological, social, and economic facets of sustainability. Sustainable practices extend beyond individual actions, reflecting the interplay between businesses and society (Hoffmann, 2020). A holistic approach includes human rights, labor practices, environmental conservation, fair operations, consumer concerns, and community engagement (Hoffmann, 2020).

Sustainable development encompasses ecological, social, economic, and technical dimensions (Cabezas et al., 2003; Drejeris & Oelien, 2019). The International Commission on Environment and Development's concept may be better defined through Place, Permanence, and People (Seghezzo, 2009). Sustainable development must

preserve an economy's productive base relative to its population (Dasgupta, 2007). Interdisciplinary approaches are crucial for sustainable development in aquaculture (Eler & Millani, 2007; Oelien D., 2017). Sustainable technology emerges as a potential fourth pillar in manufacturing, contributing to environmental reduction and societal benefit (Vacchi et al., 2021). Future research should focus on methodologies and indicators for defining, evaluating, and quantifying adaptive capacity within economic, environmental, and technological dimensions of sustainability (Spiller, 2016). Sustainability is intricate, requiring integration into organizational strategies, with adaptive capacity essential for societal long-term viability.

2.3.1.1 Environmental Aspects

Shen & Wang (2014) argue that the way global natural resources have been exploited in the past has severely stressed the ecosystem, depleting natural resources, damaging the environment, causing global warming, rising sea levels, and harming biodiversity.

Environmental sustainability has become a top priority for many sectors and businesses when designing projects and products (see, for example, Bohne et al., 2015; Froch, 2015; Hannan & Sutherland, 2014). According to Chang and Tsai (2015), projects have increasingly prioritised environmental sustainability in recent years. Yet, practitioners continue to struggle with incorporating sustainability into their practise.

Aksorn and Chotchai (2015) recommend that management should employ community knowledge to economically and effectively utilise scarce natural resources for long-term optimal benefits. In a similar vein, Hannan and Sutherland (2014) assert in their study that sustainability or sustainable development has become a standard idea for solving the environmental issue.

2.3.1.2 Economic aspect

The economic facet of sustainability has received extensive attention in the literature, evident in works by Schwaninger (2015), Zhong and Wu (2015), and Shen and Wang (2014). Kapogiannis et al. (2015) define the economic domain as activities and meanings related to the production, use, and management of resources, emphasizing the broader context of the term "resources." They argue that economic uncertainty in organizations and governance may result from openness and administration. Schwaninger (2015) advocates for the harmonization of economic activity with its sustainable foundation, asserting that ecological integrity enhances the health of a social system, contributing to economic success. Aksorn and Chotchai (2015) support this perspective, highlighting the need to evaluate the integration of economic, environmental, and local cultural aspects for sustainable projects.

To achieve economic sustainability, projects should transition from nonrenewable to renewable resources, shift from waste production to reuse and recycling, and prioritize life cycle costs and full-cost accounting over initial costs (Kibert, 2016). While

traditional cost-accounting approaches like internal rate of return and return on investment remain feasible, criticisms have been raised regarding their accuracy in assessing environmental costs (Hamner & Stinson, 1995).

Economic feasibility is crucial for project sustainability (Bohne et al., 2015). The European Commission (2008) emphasizes the use of specialized economic evaluation methods to determine if a proposed course of action aligns with sustainable objectives within certain constraints. Assessing economic, environmental, and cultural integration is essential for the comprehensive evaluation of a project's sustainability.

2.3.1.3 Social Aspect

The social dimension of sustainability holds equal importance in both academic discourse and practical applications. Scholars like Hannan & Sutherland (2014) and Silvius et al. (2014) stress the growing significance of sustainability, especially concerning initiatives aimed at meeting social development criteria. Shen et al. (2014) underline the crucial role of metro projects in the economic and social growth of nations, asserting that their implementation significantly contributes to sustainable urbanization in China. Notably, investments in such projects, like the Chongqing metro, yield positive outcomes, such as increased GDP and job creation (Shen et al., 2014), reinforcing the idea that social and economic sustainability enhances the reputation of public sector institutions and the overall nation.

Shen and Wang (2014) assert that people are the primary focus of initiatives, particularly those enhancing living conditions. To analyze social implications, demographic trends, family structures, community changes, and the needs of vulnerable groups must be thoroughly explored. Chan & Lee (2008) identify critical factors for enhancing social sustainability, including meeting welfare needs, conserving resources, creating a harmonious living environment, providing daily life facilities, the form of development, and open space availability.

Litman (2007) emphasizes that initiatives can improve the social standing of a country's population. This study, after defining sustainability characteristics, focuses on incorporating sustainability into project management for achieving project success, evaluating literature that establishes a connection between sustainability and project management.

2.3.1.4 Technological Aspect

A Sustainable technology, marked by the development of lithic technology in human evolution, constitutes a sociohistorical phenomenon that aims to meet societal demands (Carvalho & Beardmore-Herd, 2019; Griffen & Ryzheva, 2021). Sustainable technology, as a dynamic and transdisciplinary field, focuses on creating environmentally beneficial, economically viable, and socially acceptable technologies (Devon & Devon, 1991; Akbari et al., 2020). While complete environmental neutrality

is technically unattainable, sustainable technology seeks to establish policies limiting pollution to socially acceptable levels (Lanfranchi, 2010).

Characterized by low natural resource intensity, humanized scale of operations, stakeholder efficacy, and controlled intergenerational hazards, sustainable technology offers benefits like reduced environmental damage, improved social and economic conditions, and cleaner production (Shrivastava, 2008). Green technology, a subset of sustainable technology, utilizes renewable resources, innovative energy generation, and cleaner industrial processes, contributing to waste reduction and environmental preservation (Ghanshyam D, 2015; Mohammed, 2021).

Green technology, encompassing areas like renewable energy, energy-efficient technologies, and green nanotechnology, can enhance city livability, minimize energy consumption and waste, and promote renewable energy sources (Marinova, 2017; M. & M., 2020; Tonn & Carpenter, 2008). Emerging technologies, including hydrogen fuel cells and fusion energy attempts, hold promise for sustainable advancements (Davenport, 2019). Application of green technology in civil engineering and nano construction can reduce environmental impacts of building projects, energy consumption, and carbon dioxide emissions (Alhashimi, 2018; Farid et al., 2019).

European Union member states employ diverse waste management strategies, emphasizing organic waste incineration, recycling, and composting for sustainable growth (Hoareau et al., 2021). Constructive Technology Assessment (CTA) is a valuable tool to scrutinize global and local technology implications, enhancing positive outcomes (Sotoudeh, 2005). Recognizing and addressing sustainability challenges are fundamental for the viability of corporate firms, necessitating a reevaluation of industrial processes and goods (Bakshi & Fiksel, 2003).

2.3.2 Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs), a set of 17 objectives succeeding the Millennium Development Goals, constitute the global agenda for assessing countries' progress. Encompassing economic, social, environmental, human rights, and governance concerns, these goals advocate an integrated development approach, with a commitment to leaving no one behind (Mariosa et al., 2022).

In the energy industry, SDG 7 holds particular significance, emphasizing universal access to affordable, reliable, sustainable, and modern energy. This involves promoting clean and renewable energy sources, as well as enhancing energy efficiency. Additionally, SDG 12 addresses sustainable consumption and production, encouraging resource efficiency and a reduction in environmental impact. Furthermore, SDG 13 emphasizes the urgent need for climate action, a pivotal aspect for the energy industry's transition toward low-carbon and resilient systems (Jayasooria, 2023; Marika, 2023).

The specific SDGs cover a broad spectrum, including eradicating poverty, achieving food security (Zero Hunger), ensuring good health, quality education, gender equality, clean water, affordable and clean energy access, promoting decent work, resilient infrastructure, and fostering innovation. Other objectives target reduced inequalities, sustainable cities, responsible consumption, climate action, marine and terrestrial conservation, peace, justice, and strong institutions. The 17th goal focuses on partnerships to implement and revitalize the global alliance for sustainable development.

Oil and gas industries, crucial for the global economy, grapple with rising demand and environmental risks. Workforce regulations ensure safety, but exploration poses threats. Sustainable development relies on complex analysis, with data challenges. Artificial intelligence and advanced technologies aids incident prevention, fostering environmental responsibility. Policy implementation is influenced by financial stability, waning during economic downturns (Mojarad, 2018).

2.4 Yemen Energy Sector

The Marib and Hadhramaut areas contain the majority of Yemen's oil and natural gas deposits. Providing job opportunities and adding to the nation's gross domestic product, the oil and gas sector has been a substantial contributor to the economy. In recent years, however, Yemen's oil output has dropped due to a decline in reserves, political instability, and security concerns, while the natural gas sector has been hampered by a lack of infrastructure and investment (SUFIAN et al., 2016).

The Yemen Petroleum Corporation (YPC) and foreign oil firms such as Total, ExxonMobil, and Chevron are the major actors in the country's oil and gas business, engaging in exploration, production, and marketing of oil and natural gas (SUFIAN et al., 2016). Nevertheless, the business has been hampered by attacks on infrastructure, sabotage of pipelines, and the continuous violence in the nation, which has led to a decline in sector income (Sowers et al., 2017). There are efforts to develop the sector despite these obstacles by boosting output and discovering new resources.

Table 2.3: Yemen Oil Production Status

Basin	Block	Operator	Output in 2014 ('000 b/year)	Production Status (March 2019)	Production Status (December 2019)
Marib-Shabwa	18	SAFER	13,720	Halted	Active
	4	YICOM	60	Halted	In progress
	S1	Petsec (formerly Occidental/TransGlobe)	310	Halted	Active
	5	Jannah Hunt	9,660	Halted	In progress
	43	Jannah Hunt	440	Halted	Halted
	S2	OMV	5,740	Active	Active
Masila (Hadramout)	14	PetroMasila	10,040	Active	Active
	10	PetroMasila (Conceded from TOTAL in 2016)	13,240	Active	Active
	32	DNO / Conceded to Government of Yemen in 2016	560	Halted	Unknown
	53	PetroMasila (Conceded from DOVE in 2016)	1,450	Halted	Active
	9	Calvalley	1,120	Halted	In progress
	51	Nexen	680	Halted	Halted

Note: Output is based on estimated net state's share in 2014 (production share + taxes + royalties).
Source: Ministry of Oil and Minerals.

2.4.1 PetroMasila Energy Co.

PetroMasila, established in 1991 by Canadian Nexen Co. and Yemen Oil and Gas Company, operates in Block 14 of the Masila Basin, Yemen, a hydrocarbon-rich region with proven crude oil and natural gas deposits (Saied et al., 2022). As the operator of Block 14, PetroMasila has achieved commercial-scale extraction of oil and gas, extending its operations to other regions like Shabwah and Marib. The company is actively involved in community development programs and has invested in power plants, including a 75 MW gas power plant on Block 10 and a 264 MW power plant in Aden, contributing to Yemen's energy sector (Saied et al., 2022).

PetroMasila manages the Ash-Shihr Terminal on the Arabian Sea, facilitating the storage and export of crude oil from its blocks. Despite challenges in Yemen's oil and gas industry, PetroMasila, with 8,000 employees, has maintained production levels and operational efficiency across all sectors and sites, navigating through issues like assaults on infrastructure and political instability (World Bank Yemen, 2020).

In 2019, PetroMasila, under the Yemeni government's operation, produced an average of 33,000 barrels per day, contributing to the country's oil exports. However, challenges like production halts and sabotage actions impacted export predictions, with Yemen exporting around 6.7 million barrels in the first half of 2019. While this marked an increase from the same period in 2018, achieving the predicted 20 million barrels in the 2019 State Budget remained doubtful due to ongoing challenges (World Bank Yemen, 2020).

PetroMasila's commitment to sustainable energy practices and community development, combined with its operational resilience in a challenging environment, underscores its significance in Yemen's energy landscape, making substantial contributions to both regional development and the national economy. (From PetroMasila's LinkedIn page)

2.4.2 Energy industry sustainability challenges

Yemen faces economic and technical challenges in its oil and gas industry due to political instability. While the sector is vital for the economy, it raises sustainability concerns, including environmental degradation and social consequences (Al-Sakkaf, 2021). To address this, prioritizing national security, anti-corruption efforts, and minimizing negative impacts on the environment and communities is crucial. Sustainable practices involve community engagement, reduced greenhouse gas emissions, cleaner technology, and investments in renewable energy like solar and wind (Yemen Embassy, 2021). The industry can contribute to social and economic growth by providing jobs and infrastructure, simultaneously addressing environmental issues caused by oil spills and pollution disasters (Al-Masirah, 2018).

Several incidents of environmental contamination in Yemen have had severe effects on the ecosystem and local inhabitants. Such instances include:

- Oil spills (2015-2020): Numerous incidents occurred in Yemen's Red Sea due to oil tanker leaks and a broken shipping pipeline, leading to contamination of local fishing grounds and financial losses for communities.
- Industrial trash (2016): A factory in Yemen's capital, Sana'a, faced accusations of dumping hazardous waste into a nearby river, resulting in severe health issues among local residents.
- Agricultural pollution (2018): The Taiz Governorate witnessed agricultural pollution causing water source poisoning and the death of aquatic species.
- Oil refinery fires (2015-2019): Multiple incidents, including one at the Aden Refinery Company, released harmful compounds into the air, exacerbating health concerns for nearby residents

Successfully managing projects in Yemen requires strategic planning, flexibility, and collaboration with local partners (CIO, 2021). Overcoming challenges in the oil and gas industry involves a multifaceted approach, incorporating regulatory measures, technological innovations, and community engagement (Al-Sakkaf, 2021). Despite obstacles like political instability, limited resources, and security concerns, effective project management is achievable through careful planning and collaboration. In the oil and gas sector, challenges affecting employee self-efficacy include resource limitations, security issues, economic constraints, cultural expectations, and limited access to education. However, companies can still enhance employee self-efficacy through strategic initiatives.

2.5 Underlying Theories of the Study

In this phase of the literature review, several theories will be examined from a variety of angles in order to ensure that they provide a relevant analytical framework. The rationale for the hypothesised linkages between and among components in project management, self-efficacy, and sustainable development is based on various factors and supporting theories, which are described below.

2.5.1 Sustainable Project Management (SPM) Theory

The Sustainable Project Management (SPM) Theory, originating from the World Commission on Environment and Development's 1987 report, aims to integrate sustainability into all aspects of project management. Focused on economically viable, socially responsible, and ecologically mindful decision-making, SPM encourages businesses to consider long-term repercussions rather than just short-term financial gains (Nawaz & Koc, 2019; Armenia et al., 2019). Developed in the early 2000s, SPM has evolved to incorporate sustainability principles into project management methodologies, emphasizing responsible resource use, ethical considerations, and adherence to environmental requirements (Stanitsas et al., 2021). SPM supports green supply chain management, stakeholder engagement-based corporate governance, and other sustainable practices, offering a novel approach to project management that enhances outcomes with fewer resources (Salama, 2018; Luetz & Walid, 2019; Godschalk & Malizia, 2017).

Table 2.4: Other Project Management Theories: Their Advantages and Limitation

Organizational Sustainability Theory	Sustainable Development, defined in the 1987 WCED report, involves meeting present needs without compromising the future. Elkington's triple bottom line expands it to economic, environmental, and social aspects. This theory aids organizations in understanding long-term performance impacts within a dynamic context, fostering continuous improvement and environmental reduction. However, it lacks specific project management guidance (Nawaz & Koç, 2019; Latapí Agudelo et al., 2019).
Traditional Project Management Theory	Henry Gantt introduced the project management theory in the 1950s with a charting technique for visualizing project progress. It evolved over time, incorporating processes like Earned Value Analysis and Critical Path Method. This systematic approach plans, organizes, and manages project operations, best suited for well-defined projects with clear scopes, timelines, and budgets. While praised for predictability and stability, it may lack flexibility for changes or unexpected events (Salama, 2018).

Table 2.4: Continued

Triple Bottom Line (TBL) theory	John Elkington's Triple Bottom Line (TBL) theory, introduced in 1994, holds businesses accountable for economic, environmental, and social repercussions. It has led to concepts like Corporate Social Responsibility (CSR) and Sustainable Business Modeling, emphasizing sustainability and ethical considerations. The theory encourages firms to assess their implications on these three aspects when allocating resources in project execution, contributing to the development of more sustainable business models. However, it may lack specific guidance on effective project management (Salama, 2018; Stanitsas et al., 2021).
Agile Project Management Theory	The Agile Project Management theory, introduced in the early 2000s, offers an alternative to traditional frameworks. Emphasizing iterative and incremental development, it enhances flexibility during execution, allowing teams to quickly adapt to changes or new requirements. Suited for uncertain, complex projects, it prioritizes adaptability, collaboration, and continuous improvement. Positively, it fosters adaptability, value delivery, and stakeholder engagement, but it may not be suitable for projects with well-defined scopes and budgets (Noteboom et al., 2021).

Yet, implementing SPM necessitates considerable changes in organisational procedures and culture, which can be difficult for certain businesses. There is little study on how to successfully integrate sustainability into project management frameworks, which may result in poor effects if handled improperly. The ultimate objective of SPM is to guarantee that all stakeholders receive equal present and future benefits (Chofreh et al., 2019; Godschalk & Malizia, 2017)

Thus, Sustainable Project Management (SPM) Theory is the ideal theory to employ for project management and all of its elements. By merging traditional project management methods and fields of expertise with sustainable practises, it offers a complete and practical approach to managing projects. At the project execution phase, this enables businesses to make optimal use of their resources while simultaneously taking into account ethical considerations linked to environmental protection and human rights. SPM may be a helpful strategy for managing resources effectively and delivering greater results with less resources in a cost-effective way. Nevertheless, its adoption may necessitate considerable modifications, which may take time depending on the organization's size and complexity (Salama, 2018; Godschalk & Malizia, 2017).

Consequently, based on this premise of the Sustainable Project Management (SPM) Theory, it can be concluded that project management had an impact on sustainable development.

2.5.2 Transformational Leadership Theory

Transformational Leadership Theory, rooted in James MacGregor Burns' 1978 work, aims to inspire and motivate followers by transforming them into active contributors with shared goals. Leaders, acting as role models, utilize charisma, excitement, and a passion for work to drive change within organizations (Bass, 1985; Kotter, 1990).

Effective transformational leadership builds trust, establishes clear expectations, maintains open communication, and implements reward systems, fostering positive behavior changes among team members. While positive outcomes include increased motivation, job satisfaction, and productivity, negative aspects may arise from potential power abuse, leading to reduced morale and commitment. In project management, transformational leadership provides meaningful direction, encourages cross departmental collaboration, and enhances staff self-efficacy, facilitating successful project completion and achieving desired results faster (Bass, 1985; Kotter, 1990).

Table 2.5: Other Leadership Theories for Project Management and Employee Empowerment: Their Advantages and Limitation

Charismatic Leadership Theory	Max Weber introduced the Charismatic Leadership theory in 1947 as an alternative to traditional leadership concepts, emphasizing a leader's ability to inspire through charisma, zeal, and vision. Positively, the theory enhances employee motivation, engagement, work happiness, and productivity, fostering a sense of purpose in uncertain times. However, if not managed properly, it can lead to authority misuse, causing a lasting decline in worker morale and dedication (Bass, 1985; Kotter, 1990).
Leader-Member Exchange (LMX) Theory	Blake and Mouton introduced the Leadership Grid theory in 1964, shifting from power-centric leadership models and emphasizing the development of strong leader-follower bonds. Positively, the theory enhances employee motivation, engagement, work happiness, and productivity, fostering a sense of purpose in unpredictable times. However, a potential negative is that some individuals may overly rely on a leader's guidance, stifling creative thought and unique problem-solving (Bass, 1985; Kotter, 1990).
Servant Leadership Theory	Robert Greenleaf introduced the Servant Leadership theory in 1970, emphasizing follower needs and goals, with subsequent enhancements by scholars like Larry Spears and James Laub. Positively, the theory encourages employee motivation, engagement, job satisfaction, and productivity, while emphasizing cooperation and teamwork. However, a potential drawback is that some individuals may overly rely on the leader's direction, inhibiting creative thinking and novel problem-solving (Spears, 1995; Laub, 1999).
Self-Determination Theory	Edward Deci and Richard Ryan introduced the Self-Determination Theory in 1985, challenging traditional motivation theories by emphasizing internal motivations like autonomy, competence, and relatedness. Positively, the theory enhances employee motivation, engagement, work happiness, productivity, and a sense of purpose during uncertain times. However, a potential drawback is that some individuals may overly depend on the leader, hindering creative thinking and novel problem-solving (Deci & Ryan, 1985).
Authentic Leadership Theory	Bill George introduced the Authentic Leadership theory in 2003 as a departure from traditional leadership theories, emphasizing honest and trustworthy communication between leaders and followers. Positively, the theory enhances trust, transparency, job satisfaction, motivation, and fosters a positive work environment where employees feel valued (George, 2003). However, there's a potential for power abuse if not managed properly, which may result in decreased morale and commitment from workers over time.

(Source:Northouse, 2021)

Because it emphasises inspiring and encouraging followers to achieve at higher levels, Transformational Leadership Theory is a popular option for project management. Transformational leaders are visionary, charismatic, and empowering, and they foster a

pleasant work atmosphere for their team. The theory increases employee motivation, job satisfaction, and productivity by making work meaningful. Also, it gives a sense of direction during uncertain times and boosts employees' self-efficacy through support, guidance, and skill development.

Consequently, based on this premise of the Transformational Leadership Theory, it might be concluded that project management had an impact on employees' self-efficacy.

2.5.3 The Self-Efficacy Theory

Self-efficacy theory, proposed by Albert Bandura, explores individuals' beliefs in their ability to succeed in tasks or achieve goals, impacting their thoughts and actions across various domains like education and health promotion. Originating from Bandura's social learning theory in 1977, it focuses on how individuals learn through observation, imitation, and direct experience. Positive aspects include assisting in skill development, while negatives involve overconfidence leading to risks. Research indicates that efficacy-based interventions enhance motivation and academic performance. In the context of sustainability, self-efficacy approaches should promote personal and communal progress, ensuring equal benefits for all to achieve goals and leave a lasting legacy for future generations, emphasizing a thorough analysis of potential impacts (Bandura, 1977; Zimmerman, 2000).

Table 2.6: Other Related Theories Improve Self-efficacy

Social Learning Theory	In the 1930s, Albert Bandura introduced theory. It is based on his research on how people learn through observation, imitation, and personal experience. According to this hypothesis, an individual's environment influences their behaviour by providing feedback on their successes and reinforcing their failures. It can help people learn from their failures, so increasing their sense of self-efficacy.
Cognitive Behavioral Theory (CBT)	In the 1960s, Aaron Beck introduced Cognitive Behavioral Therapy (CBT), focusing on the interplay between thoughts, emotions, and behaviors. CBT helps individuals identify and change negative thinking patterns through cognitive restructuring and problem-solving, fostering self-efficacy (Beck, 1960s).
Self-Determination Theory (SDT)	Introduced by Deci and Ryan in the 1980s, Self-Determination Theory (SDT) focuses on human motivation, emphasizing intrinsic motivation, autonomy, and promoting competence, relatedness, and purpose. It positively impacts success-related skills but poses risks if tasks are not adequately assessed, potentially leading to overconfidence (Deci & Ryan, 1980s)..
Positive Psychology Theory	In the late 1990s, Martin Seligman introduced Positive Psychology, focusing on increasing happiness and well-being through positive emotions, virtues, and strengths. It emphasizes strengths rather than weaknesses, helping individuals build on what works well for them and boosting their confidence over time. Positive Psychology aids in recognizing talents, achieving goals, and enhancing self-efficacy.

(Source: Schwarzer, 2014)

Self-efficacy and Self-Determination Theory (SDT) both focus on an individual's belief in their abilities. While self-efficacy is quicker to implement, SDT requires more commitment for competence, relatedness, and purpose. Self-efficacy boosts confidence through achievable steps, while SDT holds promise for long-term sustainability. Many opt for self-efficacy for its historical growth and widespread use, making it ideal for employee development and sustainable initiatives. Interventions emphasizing individual beliefs can lead to positive changes and a lasting legacy. However, potential negative effects, such as overconfidence, should be considered. Understanding efficacy theories is crucial for fostering sustainable development (Bandura, 1977; Deci & Ryan, 1985).

2.5.4 Theories Influence Positively Sustainability

The three theories presented - Sustainable Project Management (SPM) Theory, Transformational Leadership Theory, and Self-Efficacy Theory - all have the potential to positively influence sustainable development through project management. SPM is a comprehensive and practical strategy that integrates sustainability into all parts of project management, encouraging ethical concerns and effective resource utilisation. In order to promote work happiness, productivity, and self-efficacy, transformational leadership theory stresses inspiring and encouraging team members to perform at greater levels. Self-Efficacy Theory aids in the development of success-related abilities and leaves a legacy of beneficial behaviour modifications for future generations.

Nevertheless, the application of these theories necessitates considerable changes in organisational procedures and culture, and it is necessary to evaluate the possible negative effects of overconfidence or inadequate assessment. To effectively integrate sustainability into project management frameworks and guarantee that all stakeholders benefit equitably in the present and future, further research is required. To attain the greatest results, a thorough grasp of these theories and their role in fostering sustainable development is required. Hence, companies should evaluate the possible benefits of incorporating these theories into their project management methods in order to favourably effect sustainable development.

2.6 Research Gap

Several gaps have been identified in the literature related to sustainable development, project management, and self-efficacy. The most obvious one is the lack of empirical studies for factors of project management and their impacts on sustainable development through mediating of self-efficacy of oil & gas sector organizations in developing economies such as Yemen. The majority of the reviewed studies discuss and provide conceptual frameworks and the significance of the antecedents. Thus, this study has taken the challenge and empirically test if factors such as project managements, and self-efficacy can improve sustainable development.

The lack of integration between conventional project management and sustainable development can lead to inconsistencies and inefficiencies in achieving sustainable development goals. The researchers suggested to explore ways to bridge this gap, such

as exploring how sustainable materials and construction planning practices can be implemented in developing countries (Abdullah et al., 2021), finding ways to overcome barriers to adoption of sustainable technologies for energy efficiency upgrade in existing buildings (Dadzie et al., 2018), explore how the concept of sustainable project management impacts the responsibilities and tasks of a PMO in an organization (Magano, Silvius, et al., 2021), and developing practical tools and frameworks to guide project managers in integrating sustainability principles into their projects (Silvius & Schipper, 2019).

Studies have not explored several important areas of project management that could impact employee performance and self-efficacy. Studies should fill this gap by examining the intervening effect of organizational culture on self-efficacy levels and performance quality, taking into account different aspects of organizational culture (Nusari et al., 2018), examining the correlations between positive emotions, relationships, and project success, and how to develop a successful team environment (Emil Berg & Terje Karlsen, 2014), exploring coping techniques, organizational culture, and potential long-term effects on physical and mental health (Jepson et al., 2017), exploring the effects of different network types, culture, and leadership style (Tang et al., 2020), exploring techniques for increasing competency in project management, approaches to hiring based on competencies within HRM, and examining the intervening effect of organizational culture between organizational excellence and performance, (Blomquist et al., 2016).

Further exploration is needed on interventions that aim to increase self-efficacy and belief in changeability for sustainable behavior. Therefore, some researchers suggested to fill this gap, to examine other potential moderators of environmentally friendly behavior and consider whether similar results can be obtained across different cultural contexts (Schutte & Bhullar, 2017), to investigate additional factors such as intrinsic motivation or social norms (Wai et al., 2018), to track students' actions after real-world engagement in environmentally friendly activities to understand how their citizenship development led to actual actions (Ho, 2021), and should use multiple methods and consider more representative samples to better interpret results (Han et al., 2021), to test experimentally the role of self-efficacy in promoting pro-environmental behaviors, such as installing water-efficient appliances or reducing energy consumption (Lauren et al., 2016).

To further investigate the role of self-efficacy as a mediator, future studies could explore its effects on different types and levels of positivity in relation to various performance outcomes. Researchers should also examine self-efficacy as a mediator of employee loyalty, exploring how it influences work environment, career identity, and job embeddedness for diverse workers in various sectors (Bahri et al., 2020), focusing on enhancing self-efficacy to reduce supervisor incivility and cynicism in the workplace (Alola et al., 2020), exploring the role of self-efficacy in organizational change, including its impact on changes related to technology or culture (Barbaranelli et al., 2019), and potential moderating factors such as job satisfaction and perceived fairness should be investigated, along with potential differences in outcomes based on gender or age in the moderated mediation model (Bayraktar & Jiménez, 2020).

This study identified a significant gap in the literature regarding the lack of antecedents for sustainable development in Yemen's oil and gas sector organizations, as well as the determinants of sustainability success. Additionally, while self-efficacy has been used as a mediator in many studies, there is a gap in its utilization as a mediator for the impact of project management on sustainable development. It is crucial to address these research gaps. The next chapter will analyze the proposed research framework, associated hypotheses, and key variables, while the subsequent chapter will develop a model representing the constructs.

Table 2.7: Summary of the Research Gaps

Gap	Source
1. The lack of integration between conventional project management and sustainable development can lead to inconsistencies inefficiencies in achieving sustainable development goals. Further research is necessary to investigate sustainable materials and construction planning practices in developing countries, overcome barriers to adoption of sustainable technologies for energy efficiency upgrade, examine how sustainable project management affects PMO responsibilities, and provide practical tools for project managers to integrate sustainability into projects.	• Abdullah et al. (2021) • Dadzie et al. (2018) • Magano, Silvius, et al. (2021) • Silvius & Schipper (2019)
2. Studies have not explored several important areas of project management that could impact employee performance and self-efficacy. Future studies should examine the effects of organizational culture on performance, explore the correlations between positive emotions and project success, investigate coping techniques and long-term effects, examine different network types and leadership styles, explore project management competency and HRM hiring approaches, and investigate the impact of organizational culture on performance excellence.	• Nusari et al. (2018) • Emil Berg & Terje Karlsen (2014) • Jepson et al. (2017) • Tang et al. (2020) • Blomquist et al. (2016).
3. Further exploration is needed on interventions that aim to increase self-efficacy and belief in changeability for sustainable behavior. Researchers suggest exploring potential moderators and factors influencing environmentally friendly behavior, using representative samples and multiple methods to better interpret results. Additionally, tracking students' actions after engagement in pro-environmental activities and experimentally testing the role of self-efficacy in promoting pro-environmental behaviors is suggested.	• Schutte & Bhullar (2017) • Wai et al. (2018) • Ho (2021) • Han et al. (2021), • Lauren et al. (2016)

Table 2.7: Continued

Gap	Source
4. To further investigate the role of self-efficacy as a mediator, future studies could explore its effects on different types and levels of positivity in relation to various performance outcomes. Researchers should explore self-efficacy as a mediator of employee loyalty and examine its impact on work environment, career identity, and job embeddedness in various sectors. They should also focus on enhancing self-efficacy to reduce supervisor incivility and cynicism, explore its role in organizational change, and investigate potential moderating factors like job satisfaction, perceived fairness, gender or age.	• (Barbaranelli et al. (2019) • Bahri et al. (2020) • Alola et al. (2020) • Bayraktar & Jiménez (2020)

2.7 Summary

This chapter examines the intricate connections among project management, sustainable development, and employee outcomes in Yemen's oil and gas sector. It emphasizes challenges and underscores the necessity for sustainable practices. Identified gaps underscore the call for integrating project management and sustainability, exploring uncharted dimensions in project management's influence, and proposing interventions to strengthen self-efficacy for sustainable behavior. The role of self-efficacy as a mediator is highlighted, offering valuable insights for practitioners and researchers. Research gaps include a scarcity of empirical studies on sustainable development, a disconnect between project management and sustainability, and insufficient exploration of interventions for self-efficacy. The chapter urges future investigations into self-efficacy's diverse impacts, organizational change, and moderating factors, addressing voids in sustainable development determinants and the underutilization of self-efficacy as a mediator in project management's impact on sustainability.

CHAPTER 3

METHODOLOGY

This chapter details the research design, methodology, and analysis procedures for investigating the relationship between project management and sustainable development, with self-efficacy as a moderating variable at PetrolMasila oil & gas Company in Yemen. Utilizing both quantitative and qualitative methods, it transparently outlines study design, research methodologies, sampling, questionnaire creation, and data analysis procedures. The objective is to empirically examine the specified relationship, considering the study's subject and research question. A comprehensive description of statistical analysis procedures covers demographic details, sampling techniques, variable measurements, pre-testing, pilot studies, data collection, and preparation. The chapter concludes with an overview of statistical tests using Partial Least Squares-Structural Equation Model (PLS-SEM). In the subsequent stage, project specialists evaluate the model through interviews, revealing direct and indirect relationships between project management, self-efficacy, and sustainable development. The study's outcomes suggest the model's success and applicability across various countries.

3.1 Research Design and Paradigm

The study employs a mixed methods research design to explore the moderating influence of self-efficacy on the relationship between project management and sustainable development in the PetroMasila scenario in Yemen. This approach integrates qualitative and quantitative techniques, constructing a model quantitatively and evaluating it qualitatively for a more comprehensive understanding of the phenomena under investigation (Creswell, 2014). Utilizing a questionnaire survey, the quantitative aspect assesses risks' relative relevance and allocation based on contractors' perspectives (Lin et al., 2022). Simultaneously, qualitative research employs in-depth, unstructured interviews, facilitating participants to freely share insights and contributing to a more extensive and synergistic use of data (Creswell, 2014).

The blended methodology flowchart, shown in Figure 3.1, aligns with the mixed methods approach, enhancing knowledge in sectors such as project management and sustainable development that have greatly benefited from the creation and refinement of mixed methods research processes. However, conducting high-quality mixed-methods studies necessitates a multidisciplinary team comfortable with methods beyond their expertise, introducing challenges in finding individuals versed in both qualitative and quantitative discussions. Each method has distinct rigor criteria, making it challenging to ensure the quality of every component in a mixed-methods study (Creswell, 2014). Successful execution involves thorough preparation, detailing components like study samples, scheduling, and data integration plans (Vogt et al., 2014). Despite challenges, the multidimensional insights derived from mixed methods significantly contribute to understanding complex relationships in research areas such as project management and sustainable development.

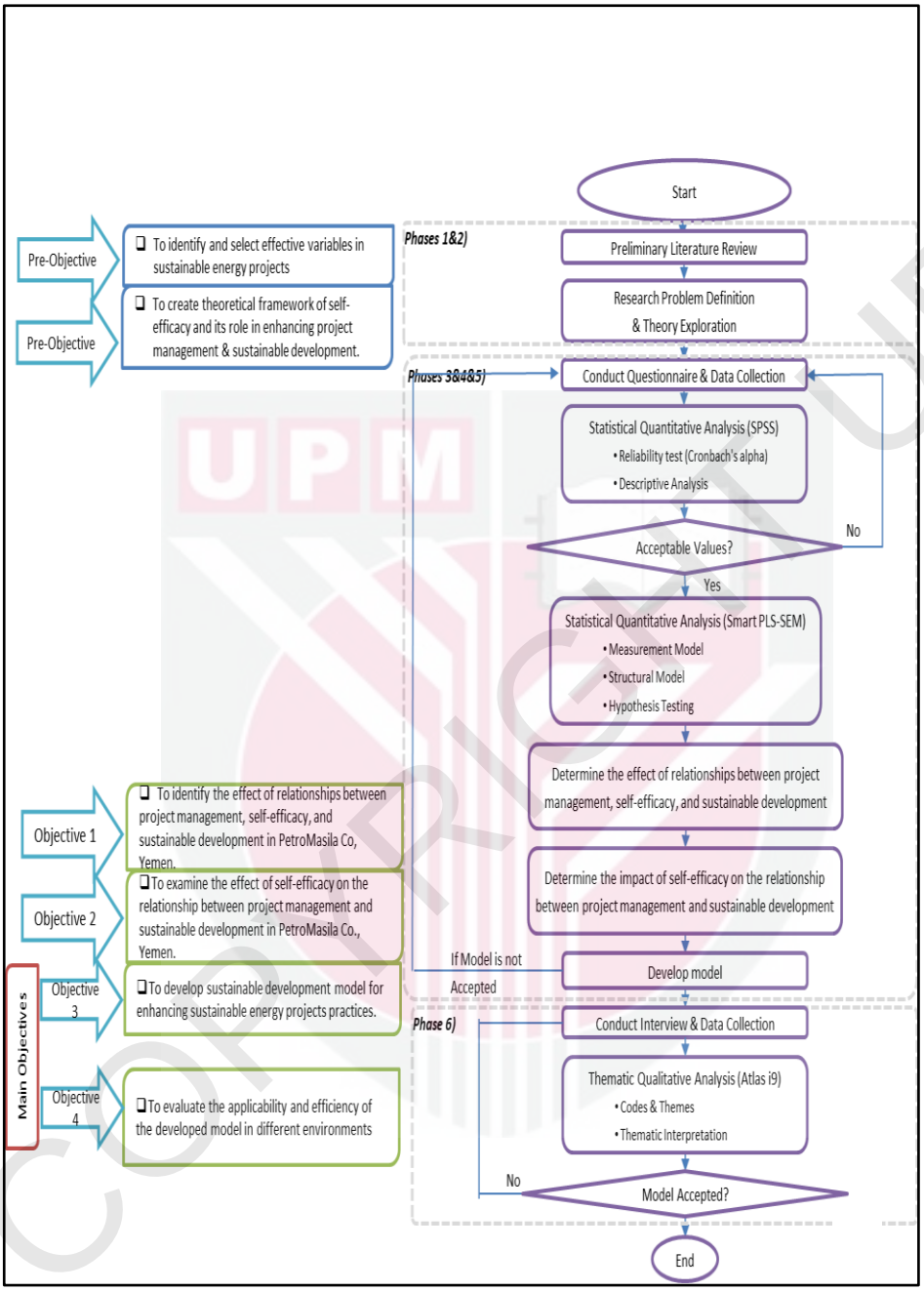

Figure 3.1: Research Flow Chart

3.2 Quantitative Research Approach

Research methodology employs scientific techniques for systematic knowledge pursuit, with statistical analysis playing a crucial role (Yardley & Bishop, 2011). Selection of the right research technique is essential for addressing study questions effectively (Daneil, 2016). This investigation utilizes a quantitative approach, focusing on cause-and-effect relationships through statistical analysis of observational and empirical data (Park et al., 2021). Employing a quantitative descriptive survey method, the study addresses well-defined phenomena and tests hypotheses (Sekaran & Bougie, 2016). The questionnaire, meticulously constructed and validated with the Cronbach Alpha coefficient, assesses item acceptability across various axes. Population classification and detailed variable measurement methods ensure reliability and validity (Taber, 2018; Vogt et al., 2014). Illustrated in the quantitative research flow chart (Figure 3.2), achieving objectives 1, 2, and 3 involves executing key stages, administering the questionnaire, and implementing Statistical Quantitative Analysis using tools such as SPSS and smart-PLS. Progression criteria rely on reaching satisfactory benchmarks for reliability (Cronbach Alpha), convergent validity, path coefficient, coefficient of determination (R^2), and effect size (f^2) (Figure 3.2). Successful alignment with predetermined standards marks the culmination of this process.

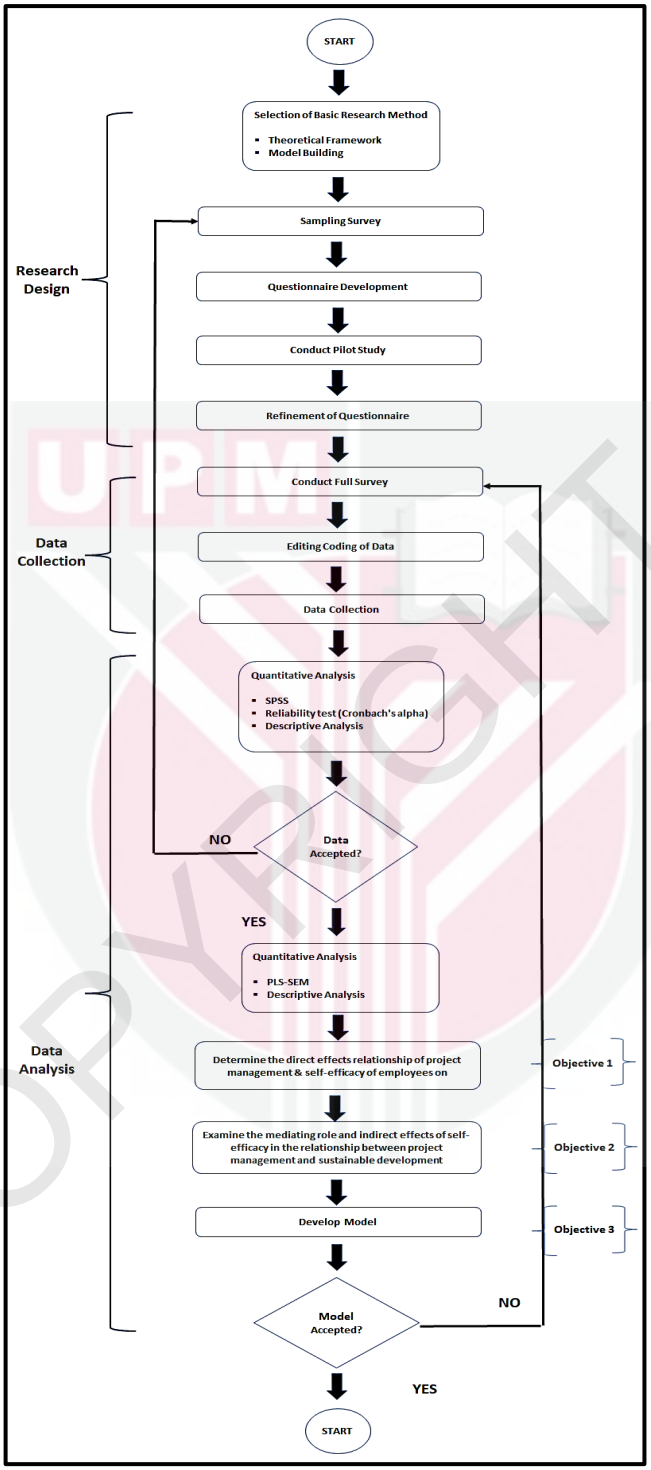

Figure 3.2: Quantitative Research Flow Chart

3.2.1 Research Stance

In the present study, positivism was chosen as the research paradigm following a full knowledge of social science assumptions. Positivism was chosen because the study's ontology posits that this research would reveal and quantify the status of project management and business reputation, and that this reality among these components is factual. In accordance with the study's epistemology, the researcher and the studied object are independent beings, and the researcher cannot affect or be influenced by the investigated matter. Vogt et al. (2014) argue that quantitative analysis should be used to assess hypotheses stated within the positivist paradigm. Thus, the next section describes in detail the technique, methodologies, and instruments utilised to test the assumptions.

3.2.2 Population and Sampling

In this part, the methods used to determine the study's population and sample size was explained. The debate divided into three sections, with the first one focused on the study's population determination. The second section elaborated on the sampling frame employed for the investigation, while the third section offered a detailed examination of the sample size used for the study.

3.2.2.1 Population

A research study's population is the group of persons who share the qualities of interest to the researcher (Sekaran & Bougie, 2016). Sampling is a vital stage in research that facilitates the selection of a representative sample size from the community for study (Lohr, 2019).

Population of interest for this study is the project management department of PetroMasila, a prominent national Yemeni firm engaged in the exploration and production of oil and gas in Blocks 10, 14, 51, 53, and 63 as well as allied energy projects. There are 900 people in the department who engage in project-related tasks and attend project management meetings. PetroMasila has established high-quality technical and operational processes and procedures that adhere to the worldwide oil and gas industry's standards, as well as Health, Safety, and Environment (HSE) regulations. In addition, PetroMasila is devoted to the development of local communities, in accordance with the Yemeni government's plan for the expansion of the country's energy industry.

3.2.2.2 Sampling Frame

The researchers used the "Key Informant Approach" to pick the right sample from the sampling frame, which is a representation of all the components in the population from which the sample is obtained, in order to analyse the topic described in the paper (Sekaran & Bougie, 2016). The study's sampling frame comprises five blocks of 900 workers involved in PetroMasila Company's projects. The key informants selected for

the study were project engineers and above, based on their expertise and experience, consistent with previous research (Joslin & Müller, 2016; Khan et al., 2013; Müller & Lecoeuvre, 2014; Turner et al., 2013). The study focused on individuals with appropriate credentials and knowledge, excluding low-level project employees and workers. This method is typical in research related to products and services (Marshall, 1996) and is appropriate for this study's objective, which aims to examine all personnel involved in PetroMasila Co.'s project activities.

3.2.2.3 Sample Size

Sample size was defined by Sekaran & Bougie (2016) as "a subset or portion of a larger population". In this study, the sample consists of the project managers picked from the sampling frame to complete the questionnaire survey.

Several researchers have utilised power analysis to determine the optimal sample size for their investigations. Cohen (2013) argues that it is essential to consider the statistical test's power when selecting a representative sample for a research. Faul et al. (2007) define the power of a statistical test as "the chance that the null hypothesis will be rejected if it is wrong". They noted that the validity of a statistical test depended on three factors:

(i) the significance level (x) of the test

(ii) the sample size

(iii) the population size effect

Cohen (2013) emphasizes the importance of balancing statistical test power with significance level, sample size considerations, and population effect size to determine an optimal sample size, often set at 95% power and 5% alpha level. Power analysis, crucial for social science investigations, helps identify the impact of varying sample sizes.

In this study, G*Power software (V3.1.9.2) facilitated a priori power analysis for sample size determination. Effect size, measured through Cohen's d, Pearson's r, or odds ratio, signifies the strength of relationships or differences. Power, conventionally set at 0.80 or 0.90, reflects the likelihood of detecting a true effect and necessitates larger samples (Annamalah et al., 2018).

For multiple regression analyses, where predictors increase complexity, maintaining adequate power becomes pivotal. In the present investigation, entry data selected a medium effect size (0.15), a significance level of 0.05, and a probability of rejecting the null hypothesis of 0.95 (Annamalah et al., 2018). With two major predictor variables, the G*Power analysis yielded a necessary total sample size of 107 as shown in Table 3.1 below.

Utilizing power analysis not only aids in calculating an appropriate sample size but also offers insights into the influence of varying sample sizes. In addition to G*Power, alternative methods were explored to ensure the robustness of the selected sample size for this study.

Table 3.1: G-Power Analysis for Medium Size Effect

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero		
Analysis:	A priori: Compute required sample size	
Input:		
	Effect size f^2	= 0.15
	α err prob	= 0.05
	Power (1-β err prob)	= 0.95
	Number of predictors	= 2
Output:		
	No centrality parameter λ	= 16.0500000
	Critical F	= 3.0837059
	Numerator df	= 2
	Denominator df	= 104
	Total sample size	= 107
	Actual power	= 0.9518556

Instead, the sample size is calculated using the method presented by Sekaran & Bougie (2016). The sample size for a population or sample frame of 900 looks to be 265 in this instance (Sekaran & Bougie, 2010). Next, Hair et al. (2010) recommend a minimum sample size of 100 samples for the Structural Equation Modeling (SEM) approach when there are five or fewer latent constructs and more than three items for each latent construct in the suggested theoretical framework.

As a result, it was recommend that an acceptable sample size range for this study is between 100 and 265 participants. Cohen (2013) argues that a greater sample size minimises sampling error and enhances the precision of research results, allowing the findings to be extrapolated to the entire population (Sekaran & Bougie, 2010).

3.2.3 Research Instrument

This section detailed how the instrument for this study was designed.

3.2.3.1 Questionnaire Preparation

A questionnaire is a collection of pre-written, printed questions to which respondents record their responses, typically with clearly defined alternatives (Sekaran & Bougie,

2016). The type of questionnaire utilised is significantly dependant on the nature of the study being undertaken. The research variables for this study are operationalized using well-established scales from the social sciences. The scales to be utilised in this study are a composite of scales obtained from a comprehensive literature review.

The questionnaire as shown in Table 3.2 is made up of fours (4) components. Part one (1) documented the demographic profile of the participating companies and project-related personnel. It also assessed the respondent's awareness of the problems under examination in the research to ensure that they have adequate information to react appropriately (Slater & Atuahene-Gima, 2004).

The second section of the questionnaire investigates respondents in order to determine the extent to which project management is performed. Adapted with modest adjustments from numerous research (Lorenz, 2016; Adetola, 2021; Shehu et al., 2020; Shehu et al., 2019; MBURU, 2017; Azis et al., 2012; Ahrony et al., 2003; Benedict, 2018; Michael & Raz, 2001; Roque & Marly, 2013) are questions for project management. The project management component paradigms were chosen because they have been utilised successfully in previous project management-related studies. These elements illustrate the project management methods pertaining to (1) planning management, (2) time management, (3) cost management, and (4) risk management. The incorporation of these four dimensions establishes the construct as a reflective modelled higher-order construct, showcasing a reflective mode within each aspect and a reflective mode between the construct and its related items.

The third section of the questionnaire investigates the respondent's perspective on the self-efficacy of employees. The questionnaire is based on work by Haddad and Taleb (2016). The questionnaire is adjusted with minor adjustments pertinent to the study's setting. This instrument has been successfully evaluated by the authors for measuring the self-efficacy of employees in their research and is recommended as a trustworthy tool. The concept is measured by four reflecting aspects in the context of (1) previous performance, (2) vicarious experience, (3) verbal persuasion, and (4) emotional cue, with the items being interchangeable. The incorporation of these four dimensions establishes the construct as a reflective modelled higher-order construct, showcasing a reflective mode within each aspect and a reflective mode between the construct and its related items.

Part four (4) of the questionnaire investigates respondents' professional opinions regarding the sustainability of projects. In this study, the questionnaire created by Martnez et al. (2013), Irfan (2018), Corsi et al. (2020) and Fallah (2014) is modified to quantify sustainability. Four dimensions are used to measure the construct: (1) social, (2) environmental, (3) economic, and (4) technology. The incorporation of these four dimensions establishes the construct as a reflective modelled higher-order construct, showcasing a reflective mode within each aspect and a reflective mode between the construct and its related items.

Questionnaire variables, dimensions, and items are shown in Table 3.2. Survey Questionnaire form for the study is attached in the Appendix.

Table 3.2: Variables, Dimensions, Items and Sources of Measurement for the Present Study

Variable	Measurement Mode	Dimension	Measurement Mode	Items	Source
Project Management	Reflective	Planning Management	Reflective	1. Sustainable practices are considered during the establishment of the project scope, project charter, drawing, and detailed project plan. 2. The team is brought together as early as possible during the planning process. 3. Planning doesn't reflect all project stakeholders. 4. Project activities are achieved as planned, while meeting quality standards and utilizing the allocated budget and resources. 5. Planning strategies and tools such as SWOT, GanttPRO, and MS Project are utilized for effective planning and management.	(Lorenz, 2016; Adetola, 2021; Shehu et al., 2020; Shehu et al., 2019; MBURU, 2017; Azis et al., 2012; Ahrony et al., 2003; Benedict, 2018; Michael & Raz, 2001; Roque & Marly, 2013)
		Time Management	Reflective	1. The company efficiently manages and updates project time estimates and schedules to ensure that the project stays within the timeline. 2. Time management tools and techniques such as calendars, time-tracers, and project managers are used to organize time management and monitor and control the project schedule. 3. Based on company strategies, project goals, and task priorities, the project manager divides the limited time effectively between activities. 4. The project does not fall behind schedule as the nature of the project allows for time organization. 5. Project managers negotiate with staff to identify and attribute time limitations to activities based on their perspectives.	
		Cost Management	Reflective	1. The company efficiently manages and updates project cost estimates and budgets to ensure that the project stays within budget. 2. The company uses project management tools and techniques to optimize cost management and conduct cost variance analysis. 3. The company closely monitors and controls project costs, including tracking expenses, estimating future costs, and identifying cost savings opportunities. 4. The company prioritizes the benefits of cost management, such as improving value for money, client satisfaction, and overall financial health. 5. The company implements and maintains effective cost management practices, such as accurate cost reporting, solid financial planning, and knowledgeable cost estimation.	

Table 3.2: Continued

Variable	Measurement Mode	Dimension	Measurement Mode	Items	Source
Project Management	Reflective	Risk Management	Reflective	1. The company identifies, categorizes, and reviews risks on a regular basis, including physical and environmental factors, and adjusts risk assessments when necessary. 2. The company provides risk management training and courses to increase employee awareness and perception of risk. 3. The company uses techniques and tools to conduct qualitative and quantitative risk analysis, as well as crisis meetings and disaster recovery plans to prevent worse scenarios. 4. The implementation of projects has reduced overall costs to the company. 5. The company monitors and evaluates the effectiveness of risk response plans regularly with the participation of other project stakeholders.	
Variable	**MeasurementMode**	**Dimension**	**Measurement Mode**	**Items**	**Source**
Self-Efficacy	Reflective	Vicarious Experience	Reflective	1. I acknowledge that some project members may be more skilled than me in certain tasks. 2. When I observe successful department members, I use them as inspiration to improve my own skills. 3. I am deterred by the failure of my project colleagues and couldn't remain focused on achieving my goals. 4. I have a growth mindset and believe that if others can accomplish a task, I can too with hard work and dedication. 5. I value the opportunity to learn from my colleagues and gain experience through collaboration.	Haddad & Taleb (2016)
		Verbal Persuasion	Reflective	1. I possess the ability and motivation to encourage my project colleagues to raise their achievements. 2. I have the ability to boost the self-esteem of my project colleagues and inspire confidence in them. 3. I can encourage my project colleagues to behave appropriately and fairly, without resorting to punishment that could undermine their self-confidence. 4. I am capable of helping my project colleagues gain a better understanding of themselves and their abilities. 5. I can establish a strong and positive relationship with my project colleagues to offer them individual counseling and support.	

Table 3.2: Continued

Variable	Measurement Mode	Dimension	Measurement Mode	Items	Source
Self-Efficacy	Reflective	Past Performance	Reflective	1. I can recognize how my academic and scientific background has shaped my way of thinking. 2. I can identify how my personal experiences have influenced my way of thinking. 3. Through my experiences, I have been able to enhance my self-confidence and develop skills to handle unexpected situations. 4. My experiences have led to an improvement in my approach and work style. 5. I have gained the ability to teach conflict resolution skills through my experiences	Haddad & Taleb (2016)
		Emotional Cues	Reflective	1. I can stay composed when encountering challenges, as I trust in my ability to cope. 2. Despite physical discomfort or lack of sleep, I can continue working on project tasks. 3. My performance on project tasks remains consistent even when feeling anxious, depressed, or hopeless. 4. I am not able to manage my project tasks effectively in times of stress. 5. I am able to control my emotions and maintain a neutral expression during project work.	
Variable	**MeasurementMode**	**Dimension**	**Measurement Mode**	**Items**	**Source**
Sustainable Development	Reflective	Environmental Aspect	Reflective	1. Reducing resource consumption, gas emissions, and preserving nature conservation and energy are crucial in achieving sustainable development. 2. The company adheres to ISO 14001 code and implements strict legal requirements and regulations in all project phases to protect the environment. 3. The company has developed a structured action plan and waste management strategy to reduce all types of project waste, both organic and non-organic. 4. The company is committed to the preservation of various natural species during project implementation. 5. The government incentive policies are effective in encouraging sustainable development projects.	(Irfan, 2018; Fallah, 2014; Corsi et al., 2020)

Table 3.2: Continued

Variable	Measurement Mode	Dimension	Measurement Mode		Source
Sustainable Development	Reflective	Economical Aspect	Reflective	1. The company's economic goals are not aligned with the interests of its stakeholders. 2. The company has implemented strategies to increase profitability and maintain a competitive edge in the market. 3. The company consistently strives to optimize its use of resources and reduce costs while maintaining high-quality performance. 4. The company has established clear financial targets and regularly assesses progress towards achieving them. 5. The company places high value on ethical business practices and is committed to conducting its operations in a socially responsible manner	Irfan, 2018; Fallah, 2014; Corsi et al., 2020
		Social Aspect	Reflective	1. The company prioritizes the health of its project employees and offers incentive programs to promote a good quality of life. 2. The company promotes a culture where conflicts are resolved peacefully through discussion. 3. The company provides equal opportunities for training and employment to both men and women during all phases of the project. 4. The company respects human rights and provides opportunities for employees to engage in labor union elections, and social issues and express their opinions. 5. The company involves local community representatives in supporting their projects.	
		Technological Aspect	Reflective	1. The company regularly explores and invests in new sustainable technologies to reduce environmental impact. 2. Using modern technology has helped the company improve work efficiency and reduce the risk of human error and work-related stress. 3. The company frequently ongoing training to its employees to ensure they are knowledgeable about and able to implement sustainable technologies. 4. The government incentivizes the company to transition towards green technology, as it is a cost-effective measure and promotes environmental preservation. 5. The company partners with sub-contractors companies to develop and share sustainable technologies and best practice.	

3.2.4 Scale Type Used

The Likert Scale is a popular approach for gauging responder attitudes, and its results are recognised to be trustworthy and valid (Jebb et al., 2021). Using a five (5) point Likert scale (1 = "strongly Disagree," 5 = "Strongly Agree"), each section's items were measured.

3.2.5 Pre-test Procedure

To ensure a high standard, this study used a questionnaire subjected to two levels of pre-testing. In the first phase, academic members examined the questionnaire design for face and content validity. The second phase involved a small group of academics and 30 PetroMasila Co. project employees to test the validity of measurement items. The pre-testing phase evaluated content and face validity, as well as concept and questionnaire relevance. Content validity ensured proper measurement of the construct, while face validity ensured logical alignment with underlying constructs. Pre-testing feedback, following Geisen & Bergstrom's (2017) suggestions, facilitated obstacle identification, error correction, and survey enhancement.

3.2.6 Pilot Study

A pilot study, an essential part of the research process, is crucial for identifying discrepancies and modifying instruments before data collection, enhancing the study's success (Teijlingen & Hundley, 2002). It also ensures the instrument's dependability, crucial for investigation viability (Creswell, 2014). A reliability test before full-scale data collection is necessary to reduce response analysis errors. The study adhered to Malterud et al.'s (2016) recommendation of a sample size between 25 and 40 participants for instrument reliability. Conducting both a pre-test and a pilot trial with 30 participants from PetroMasila, the study eliminated survey items based on low reliability and feedback, improving questionnaire efficiency. The changes, reducing the questionnaire to 60 questions, aimed to enhance completion efficiency while maintaining relevance (Malterud et al., 2016).

Respondents suggested translating the instrument into Arabic for better comprehension and reducing questions for quicker completion. A reliability study, using SPSS, confirmed strong reliability. Table 3.4 demonstrates that all variables have strong reliability, with Cronbach's alpha values ranging between 0.83 and 0.707 and all exceeding 0.70.

Table 3.3: Summary of dropped and final Items based on the Pilot Study

Variables	Sub-Variable	Original Items	Dropped Items	Remaining Items
Project Management	Planning Management	7	2	5
	Time Management	5	0	5
	Cost Management	6	1	5
	Risk Management	5	0	5
Self-efficacy	Vicarious Experience	5	0	5
	Verbal Persuasion	5	0	5
	Past performance	5	0	5
	Emotional Cues	5	0	5
Sustainable Development	Environmental Aspect	7	2	5
	Economical Aspect	6	1	5
	Social Aspect	6	1	5
	Technological Aspect	5	0	5
	Total Items	**67**	**7**	**60**

Table 3.4: Pilot-Test and Reliability of Variables

Variable	Sub Variable	Numbers of Items	Cronbach Alpha Coefficient
Project Management	Planning Management	5	0.757
	Time Management	5	0.830
	Cost Management	5	0.707
	Risk Management	5	0.772
Self-efficacy	Vicarious Experience	5	0.750
	Verbal Persuasion	5	0.764
	Past performance	5	0.774
	Emotional Cues	5	0.707
Sustainable Development	Environmental Aspect	5	0.720
	Economical Aspect	5	0.752
	Social Aspect	5	0.790
	Technological Aspect	5	0.765

3.2.7 Data Collection Procedures

In the context of structural equation modeling (SEM), social scientists commonly employ questionnaires for primary data collection. Self-administered questionnaires were chosen for this quantitative study, aligned with Bouchard et al.'s (2021) recommendation. The study spanned four months, requiring 265 samples to represent a population of 900. 342 usable questionnaires were returned out of an original distribution of 420 for an 81% response rate. Data cleansing and coding procedures were diligently applied to address concerns like missing data and outliers, ensuring the reliability of the collected data. Secondary data from various sources, including books, journals, and conference proceedings, complemented the primary data. SPSS Version 26 facilitated statistical analysis, supporting the validity and accuracy of the results (Leeuw & Hox, 2018; Schensul & LeCompte, 2013).

3.2.8 Missing Data

In social science research, missing data is typically a concern, notably when the data is acquired via a survey approach. The issue of missing data happens when a responder either purposely or inadvertently does not answer one or more question(s) (s). If the proportion of missing data on a questionnaire surpasses 15 percent, Hair et al. (2017) propose that the observation should be deleted from the data file. They also recommend that if the majority of the replies are absent for a single construct, then the entire observation must be eliminated.

To ensure reliable measurements and accurate results, Hair et al. (2017) propose discarding questionnaires with missing data over a particular threshold. According to the guidelines of Hair et al. (2017), surveys with missing data over a particular threshold should be rejected. In accordance with Hair et al. 2017, recommendation's these missing data are replaced with the mean. The study distributed 420 questionnaires, and 69 of them were not returned. However, there is no missing data in the questionnaires that were returned, as shown in Table 3.5, so there is no need to take any action to remedy missing data.

Table 3.5: Missing data Result

Variable	Sub-Variable	N. of Items	Missing %
Project Management	Planning Management	5	0
	Time Management	5	0
	Cost Management	5	0
	Risk Management	5	0
Self-efficacy	Vicarious Experience	5	0
	Verbal Persuasion	5	0
	Past performance	5	0
	Emotional Cues	5	0
Sustainable Development	Environmental Aspect	5	0
	Economical Aspect	5	0
	Social Aspect	5	0
	Technological Aspect	5	0

3.2.9 Outliers

Tabachnick & Fidell (2019) define an outlier as a case with an extreme value on one variable or a strange combination of scores on multiple variables. Hair et al. (2010) also suggest that an outlier is a distinct observation with either low or high scores. Researchers generally agree that outliers can cause non-normality in data and negatively influence statistical results (Hair et al., 2010; Tabachnick & Fidell, 2019).

To detect outliers, multiple methods and techniques have been proposed in the literature. Some widely accepted rules of thumb for univariate outliers are a standard score of 2.5 or above for small sample sizes (80 or fewer) and 3.0 standard deviations away from the mean for larger sample sizes (Hair et al., 2010). However, Hair et al. (2013) suggest that outliers of less than 5% of the total cases can be retained without distorting statistical results. In the current study, 5% outliers were identified, but no cases were removed (Hair et al., 2013).

3.2.10 Suspicious Response Patterns

Before analyzing data, researchers must scrutinize response patterns to ensure reliability. Recognizing and eliminating the straight-line pattern, where respondents consistently choose the same answer, is essential. Hair et al. (2017) suggest excluding respondents who exclusively pick extreme replies (1s or 7s). Suspicious patterns like diagonal lines or excessive replies should be addressed. A visual review or analyzing descriptive statistics can identify these issues. In this study, nine respondents exhibiting a straight-

line pattern, marking only 1s or 5s throughout, were removed from the final dataset following Hair et al.'s (2017) guideline.

3.2.11 Data Analysis

Following the collection of data, it is next examined for relevant findings. Data analysis is conducted using Structural Equation Modelling (SEM). According to Hair et al. (2010), SEM refers to "a family of statistical models that attempts to explain the link between numerous variables." SEM studies the structure of interrelationships portrayed in a sequence of equations that indicate the link between constructs offered within a theoretical framework (Hair, 2010). SEM is based on two prevalent multivariate analytic techniques, namely factor analysis and multiple regression analysis (Hair, 2010).

A study conducted by Podaskoff and Shen (2006) on the studies published in the Academy of Management Journal (AMJ), Administrative Science Quarterly (ASQ), and International Journal of Project Management (IJPM) reveals that project management researchers have increasingly employed the SEM technique in their analyses because of its robustness.

3.2.11.1 Justification of Using Structural Equation Modelling (SEM)

First, Hair et al. (2010) offered various explanations for why SEM is preferable to other multivariate methodologies when doing analysis. Secondly, SEM enables the estimate of numerous interdependent dependency connections (Hair et al., 2010), i.e., it can represent the interdependencies between many outcomes and their causative components. This is accomplished by describing the structural model employed by the statistical program, so enabling SEM to concurrently estimate a sequence of distinct but interconnected multiple regression equations (Hair et al. 2010).

Second, SEM may simultaneously give a global test of model fit and individual parameter estimate tests. This is one of the benefits of SEM over standard multivariate data analysis approaches, which attempt to explain correlations using a single equation. The objective of SEM is to test a collection of connections represented by several equations. SEM focuses on the overall suggested model or framework as opposed to a specific relationship. A measure of fit or prediction accuracy that represents an entire suggested model or framework is the primary motivation for employing SEM analysis techniques. This statistic provided by SEM allows a researcher to evaluate how well a hypothesis explains the supplied data (Hair et al., 2010).

SEM may also quantify latent constructs in statistical analysis. A latent construct is "an unobserved hypothesis that can be expressed by observable or measurable variables" (Hair et al., 2010). Using numerous measurements of a topic helps a researcher to accurately portray a theoretical concept, which is one advantage of latent constructs. In the end, this decreases measurement error. In addition, utilising a latent construct improves the statistical estimate of the link between ideas by taking measurement error

for the concept into account. A statistical estimate is enhanced by SEM's incorporation of measurement mistakes.

3.2.11.2 Data Analysis Using Partial Least Squares Structural Equation Modelling (PLS-SEM)

Covariance based structural equation modelling (CB-SEM) and variance based structural equation modelling (PLS-SEM) are the two well-known techniques used to estimate the connections in a structural equation model in the social sciences at present (Hair et al., 2017). The aims of the investigation dictate the methodology chosen. Each approach serves a distinct purpose in statistical analysis.

PLS-SEM is utilised to analyse the data in this study. PLS-SEM is favoured over CB-SEM since the major purpose of the structural model in this study is to predict and explain target variables (Hair Jr. et al., 2017). Similar to CB-SEM, PLS-SEM is favoured over CB-SEM when there is limited evidence of structural model linkages in the past (Hair et al., 2017). In addition, reflective measurement models are effectively estimated using PLS-SEM in this work.

In addition, PLS-SEM is preferred over CB-SEM because of its greater statistical power, which means it is more likely to identify a significant association in a population when one exists. PLS-SEM permits the assessment and evaluation of models with single items for constructs and does not need the normality assumption (Hair et al., 2017).

Unfortunately, PLS-SEM lacks an accepted global measure of goodness-of-fit, restricting its usefulness. In general, neither strategy is appropriate for all circumstances. The advantages of one approach are the disadvantages of another. Thus, it might be said that both techniques complement one another. Table 3.6 provided guidelines for deciding between PLS-SEM and CB-SEM.

Table 3.6: Rule of Thumb for Choosing Between PLS-SEM & CB-SEM

USE PLS-SEM WHEN...
• Predicting key target constructs or discovering important causal links is the purpose. • The model includes constructs that are measured formatively. • The structural model is intricate. • The sample size is tiny, and the data distribution is not normal. • It is planned to employ scores for latent variables in the upcoming.
USE CB SEM WHEN...
• The objective is to test hypotheses, confirm hypotheses, or compare different hypotheses. • Error phrases need further elaboration, such as the covariation • The structural model is circular in nature. • The study necessitates a global goodness-of-fit criteria.

(Source: Hair et al., 2017)

3.2.11.2.1 Hierarchical Component Model in PLS-SEM

Hierarchical component models (HCM) are constructed when the structures that researchers intend to explore are highly complicated and may also be operationalized at higher levels of abstraction. These models are also called higher- order models in the context of PLS-SEM and entail testing of higher-order structures that incorporate layers of constructs (Lohmoeller, 1988). The major reasons for including HCM are:

- The researcher can reduce the number of relationships in the structural model, making the path model more parsimonious and easier to understand,
- HCM's prove valuable if the first order constructs are highly correlated, and
- Establishing HCM's can prove valuable if formative indicators exhibit high levels of collinearity

HCM consists of two levels of constructs: the higher order constructs/components (HOC), which represent the more abstract higher-order notion, and the lower order constructs/components (LOC), which represent the entity's dimensions. The link between (1) the HOC and the LOC and (2) the constructs and their indicators can be used to classify HCMs.

In the current study, the HOCs (project management) are characterised as reflective, as well as their subdimensions (planning management, time management, costs management, and risk management) are characterised as reflective.

The higher-order mediating concept of self-efficacy is defined as a reflecting concept. The construct's subdimensions (past performance, vicarious experience, verbal

persuation, and emotion cue) have also been classified as reflecting constructs. On the other hand, the endogenous HOC construct, i.e., sustainable development, is classified as a reflective construct in the current study. Additionally, the constructs are categorised as formative or reflective according to the criteria presented by Hair et al. (2017). Table 3.7 provides the selection criteria for reflective and formative modes.

Table 3.7: Criteria for Choosing the Measurement Model Mode

Criterion	Decision	Reference
Priority of causation between the indicator and the concept	• From the construct to the indicators: **Reflective** • From the indicators to the construct: **Formative**	Diamantopoulos and Winklhofer,(2001)
Do the indicators indicate the causes or effects of the concept?	• If consequence: **Reflective** • If causes: **Formative**	Rossiter (2002)
Are the items interchangeable with one another?	• If yes: **Reflective** • If no: **Formative**	Jarvis, Mackenzie, and Podsakoff (2003)

(Source: Hair et al., 2017)

3.2.11.2.2 Assessing the Hierarchical Component Model (HCM)

In the current study, the HCM is assessed following the recommendations published by Hair et al. (2017) & Wetzels et al. (2009). Using hierarchical latent variable models has enabled researchers to expand the applicability of PLS-SEM to increasingly complicated and sophisticated models. Additionally, the measurement difficulties of HCM in PLS-SEM may be solved by two distinct techniques. Namely, the Repeated Indicator Approach and (ii) the Two-Stage Approach.

In the first strategy, the indicators of lower-order constructs are allocated to the measurement model of higher-order constructs. The indications are utilised two times \si.e. once for the lower order structures and again for the higher level constructs. To prevent model-induced biases in parameter estimations, the repeated indicator technique necessitates that the amount of indicators for lower order structures be comparable (Hair et al., 2017). In addition, Hair et al. (2017) contend that it is disputed if the model examined using this method has discriminant validity.

However, our present work applies the two-stage strategy to alleviate those abovementioned drawbacks. In the first step, the lower order construct (LOC) scores are obtained using the repeated indicator method. The latent variable scores of the LOC's are then transferred to the original data file as new variables for further analysis in the second step. The LOC scores serve as the manifest variables in the HOC's measurement model during the second stage. In addition, the evaluation of the HOC's second-stage measurement model may now be based on well-established criteria for reflective and formative measurement models.

Similarly, Hair et al. (2017) show that the two-stage method is appropriate to all HCM subtypes (i.e., reflective-formative, reflective-reflective, formative-reflective, and formative-formative). In this study, three HCMs consist only of reflective-reflective structure and a variety of indicators for the LOCs. In the next part, the evaluation of the measurement model for reflective LOCs, and reflective-reflective HOCs is described in depth.

3.2.12 Measurement Model Analysis Using Partial Least Squares Structural Equation Modelling

PLS-SEM findings are reviewed and evaluated using a systematic method. The purpose of the PLS path model is to maximise the explained variance (R^2) of the latent endogenous variable. The measurement model is initially evaluated using the PLS-SEM model.

In the first stage of PLS-SEM analysis, a measurement model is created, and then the LOCs inside that model is assessed. The purpose of the measurement model analysis is to evaluate the link between constructs and items. Additionally, this assessment of the PLS-SEM estimates helps the researcher to determine the reliability and validity of the constructs. The comprehensive examination of the reflective and formative measuring approaches is illustrated in Table 3.8.

Before analysing the measurement model, Hair et al. (2017) advise that the researcher should differentiate between reflectively and formatively assessed constructs. In this work, the LOCs of the exogenous constructions are assessed reflectively, whereas the HOC of the endogenous construct is measured reflectively.

Table 3.8: Systematic Evaluation of PLS-SEM Measurement Models

Reflective Measurement Model	Formative Measurement Model
▪ Internal consistency (Cronbach's Alpha &Composite Reliability) ▪ Convergent Validity (Factor loading &Average Variance Extracted) ▪ Discriminant Validity	▪ Collinearity between indicators ▪ Significance and relevance of outerweights

3.2.12.1 Assessment of the Internal Consistency Reliability

When all elements within a subdimension can produce consistent results, an instrument is deemed dependable (Litwin, 1995). Hair et al. (2010) define dependability as the "degree to which a variable or group of variables consistently measures what they are designed to measure." In SEM, the reliability of a construct may be evaluated using the below criteria.

(i) Internal consistency - The internal consistency of a construct is deemed accomplished when Cronbach's Alpha is 0.6 or more (Urbach Frederik & Ahlemann, 2010)

(ii) Composite Reliability is "the measure of dependability and internal consistency of the measured variables that constitute a hidden concept" (Hair et al., 2010). The composite dependability score ranges from 0 to 1, with higher values representing greater levels of reliability. If other measures of a model's construct validity are positive, a reliability score between 0.6 and 0.7 may be an accurate representation of construct dependability.

3.2.12.2 Assessment of Convergent Validity

Hair et al. (2010) describe convergent validity as "a set of variables (items) that are intended to measure a concept. In contrast, Hair et al. (2017) define convergent validity as "the degree to which indicators of a particular concept converge or share a large proportion of characteristics." In addition, they argue that convergent validity may be explained using the subsequent analysis:

(i) Average Variance Extracted It is the average proportion of variation explained by a construct's components. If the AVE is at least 0.5, convergent validity is presumed to exist for a concept.

(ii) Factor Loadings - Items inside a construct are strongly converged when factor loadings are high. Hair et al. (2017) suggest a standardised loading estimate of 0.4 or higher and 0.7 or higher, if possible.

3.2.12.3 Assessment of Discriminant Validity

Hair et al. (2010) defines discriminant validity as “the extent to which a notion is actually different from other constructs.” Each construct in a measuring model should have a high level of discriminant validity to demonstrate that each construct is distinct and possesses characteristics that the others do not.

There are three distinct SEM procedures for assessing the discriminant validity of a notion (i.e., cross loadings, Fornell and Larcker criteria, and Heterotrait-monotrait ratio). The first technique to examine the discriminant validity of a concept is by comparing the cross loadings between constructs. Using cross loadings to test discriminant validity, it is vital to emphasise that each scale item should load high on its own construct but low on other constructs (Hair et al., 2017).

The second condition is suggested by Fornell and Larcker (1981). They propose that in SEM, discriminant validity of a construct may be reached if the square root of the Average Variance Extracted (AVE) value for each construct is larger than its strongest correlation (r) with any other construct. This criteria is based on the assumption that a

given construct shares a bigger variance with its associated indicators than the other constructs.

In the recent literature, the latter approaches have come under severe criticism due to their deficiency in explanation of the discriminant validity (Henseler et al., 2015). Hence, Henseler et al. (2015) advises that the heterotrait-monotrait ratio (HTMT) of the correlations should be analysed to establish the discriminant validity of constructs. HTMT is an estimate of what the real correlation between two constructs would be if they were assessed precisely (i.e., if they were perfectly reliable). This connection is often referred to as the disattenuated correlation. Moreover, if this disattenuated correlation between two constructs is near 1, the constructs lack discriminant validity. According to Hair et al. (2017), an HTMT score greater than 0.90 indicates a lack of discriminant validity. It is nonetheless stated by them that if a building has an HTMT score nearing 1 should, therefore not be instantly eliminated. Instead, to minimise the HTMT score, the indicators that have low correlations with other items assessing the same construct should be deleted. Table 3.9 provides an overview of the PLS-SEM evaluation of reflecting components in a measurement model.

Table 3.9: Indices for Measurement Model Analysis using Partial Least Squares SEM (PLS-SEM)

Assessment Method	Name of the Index	Acceptance Criterion	Reference
Reliability	Internal Consistency Reliability	Cronbach Alpha > 0.6	Nunnally and Bernstein, (1994)
		Composite Reliability > 0.7	Hair et al. (2017)
Convergent Validity	Average Variance Explained	AVE > 0.5	Hair et al. (2017)
	Factor Loadings	0.4 – 0.7 and above	Hair et al. (2017)
Discriminant Validity	Cross Loadings	Loadings scores differ by 0.1	Vinzi, Chin, Henseler, & Wang (2010)
	Fornell & Larcker (1981)	Squared correlation of AVE > r	Fornell & Larcker (1981)
	HTMT	$HTMT_{0.90}$	Henseler et al., (2015)

3.2.13 Structural Model Analysis using Partial Least Square Structural Equation Modelling

After assessing and validating the measurement model, the structural model's performance were examined and validated. Examining the model's prediction skills and the links between the components constitutes this stage. Hair et al. (2017) provide a five-step process for evaluating our structural model. Table 3.10 is a summary of the method.

Table 3.10: Structural Model Assessment Procedure

Step 1	Assessment of Structural Model for Collinearity
Step 2	Assessment of Structural Model for Cross Loading
Step 3	Assess the path coefficients and their significance
Step 4	Assess the level of R^2
Step 5	Assess the effect size (f^2)
Step 6	Assess the predictive relevance (Q^2)

3.2.13.1 Assessment of Structural Model for Collinearity

Traditionally, collinearity in multiple regression models has been described as a phenomenon between predictors (items). This means that two or more predictors are considered collinear if they measure the same underlying concept or component (LOC) of that construct. However, this definition is limited to vertical or classic collinearity, as defined by Kock and Lynn (2012). The outer variance inflation factor (VIF) is used to measure the degree of correlation between items within a concept, as explained by Myers (1990) and Bowerman & O'Connell (1992). If the VIF value is higher than 10 or 5, this is generally considered a cause for concern, according to Hair et al. (2013).

3.2.13.2 Assessment of Structural Model for Cross Loading

Cross-loading of observed variables in structural equation modelling is a statistical problem that can occur when an item or variable loads heavily on more than one latent construct, which may make it challenging to understand the results (Hair et al., 2017).

Cross-loading may occur for a variety of reasons, such as poor measurement quality, overlapping constructs, and insufficient sample size. When using SEM analysis, researchers should carefully develop their measurements to ensure they are valid and trustworthy in order to avoid this issue (Hair et al., 2017).

3.2.13.3 Assessment of Structural Model Path Coefficients

In the subsequent phase of structural model analysis, the model path coefficients derived by the PLS-SEM technique are evaluated. Hypothesized connections between the constructs are represented by these route coefficients. Path coefficients often have values between -1 and +1 (Hair et al., 2017). Scores around +1 indicate a strong positive association between the constructs, whereas path coefficient values near -1 indicate a significant negative relationship. Variables that are close to 0 are not regarded as meaningfully distinct from zero.

The Bootstrapping process enables the researcher to determine if the links between the constructs are significant or not. The bootstrapping also generates t-values, which are

deemed significant if they exceed the critical value, which in this case is 1.96 (significance threshold = 0.05 or 5%) (Hair et al., 2017).

3.2.13.4 Assessment of Coefficient of Determination

The third stage involves reporting the coefficient of determination, commonly known as R^2. This coefficient enables us to assess the degree of variance in the endogenous construct that may be attributed to exogenous constructions. Hair et al. (2017) describe it as a measure of the model's predictive ability. This coefficient represents the cumulative influence of exogenous constructs on the endogenous latent variable. The range of values for R^2 ranges between 0 and 1. Numbers nearing 1 suggest a better level of forecasting accuracy. In general, the criterion for the R^2 is that 0.75 implies considerable, 0.5 moderate, and 0.25 poor predictive power (Hair et al., 2017; Henseler et al., 2009).

3.2.13.5 Assessment of effect size (f^2)

The next phase is determining the impact magnitude of the exogenous constructions. Effect size, or f^2, is the variance in R^2 when a particular exogenous variable is eliminated from the overall model (Hair et al., 2017). In addition to R^2, it is used to analyse the effect of the external construct on the endogenous construct. Effect size values below 0.02 are regarded tiny, suggesting no influence, whereas 0.15 and 0.35 are considered medium and high, respectively (Cohen, 2013).

3.2.13.6 Assessment of Predictive Relevance (Q^2)

Additionally, after assessing the R^2 value as a measure of prediction accuracy, Hair et al. (2017) advise examining Stone-Q^2 Geisser's value (Geisser, 1974; Stone, 1974). The value of Q^2 is regarded the predictive strength or predictive relevance of the model outside of the sample. According to Hair et al. (2017), when a PLS path model exhibits predictive relevance, it accurately predicts data that were not utilised in the model estimate. The predictive significance of the route model is shown by a Q^2 score larger than zero for a certain reflecting endogenous concept. Path model is subjected to the blindfolding technique to ascertain the value of Q^2. The Table 3.11 provides a summary of the evaluation methodology, acceptance criteria, and references.

3.2.13.7 The Standardized Root Mean Square Residual (SRMR) – Model Fit

The standard residuals between the observed and hypothesised covariance matrices are averaged to form the SRMR (Chen, 2007). The estimated model fit is represented by the SRMR. The research model fits the data well with SRMR = 0.08 (Hu and Bentler, 1998), with a lower SRMR suggesting a better match.

3.2.13.8 Importance-Performance Map Analysis (IPMA)

The Importance-Performance Map Analysis (IPMA) is a useful tool for investigating the primary drivers of a specific construct (Ringle and Sarstedt, 2016). This technique can aid managers and decision-makers in prioritizing their actions (Hair et al., 2013). The outcomes can highlight determinants that perform relatively poorly (i.e., low average scores for hidden variables) despite their high relevance (i.e., constructs with a strong overall effect) (Ringle & Sarstedt, 2016).

In general, if you discover that your map has a lot of high-importance but underperforming areas, this signals that there is a lot of space for development. On the other hand, if the majority of the items fall into the "low importance" category regardless of how well they perform, it might not be worthwhile to devote resources to improving them (Hair et al., 2017).

Table 3.11: Summary of the Indices for Structural Model Analysis using PLS- SEM

Assessment Index	Acceptance Criterion	Reference
Collinearity (VIF)	VIF <3.3/ VIF> 5.0 VIF>5 or >10	Diamantopoulos & Siguaw (2006) Hair et al., (2017)
Path Coefficient	P value < 0.05, t value < 1.96	Hair et al., (2017)
Coefficient of Determination (R^2)	0.75 – Substantial 0.50 – Moderate 0.25 – Weak	Hair et al. (2017)
Effect Size (F^2)	0.35 – Large Effect Size 0.15 – Medium Effect Size 0.02 – Small Effect Size	Hair et al. (2017)
Predictive Relevance (Q^2)	Q2 > 0 indicates that the exogenousconstructs have predictive relevance over endogenous variable	Hair et al. (2017), Stone (1974), & Geisser (1974)
Standardized Root Mean Square Residual (SRMR)	SRMR<0.08	Hu and Bentler, (1998)

3.3 Qualitative Research Approach

Qualitative research, as outlined by Creswell (2014) and Bryman et al. (2022), focuses on understanding the significance and experiences of events from individuals' perspectives, using methods like interviews and observations. Case study methodology, a qualitative approach (Yin, 2009), is particularly suitable for exploring complex phenomena in their natural settings and gaining insights from various viewpoints. It is effective in examining human behavior across different levels, offering in-depth descriptions and capturing nuances that quantitative methods may miss (Stake, 1995; Creswell, 2014). In organizational culture evaluation, case studies can provide a more

precise understanding of how individuals interact compared to quantitative indicators alone (Creswell, 2014).

The proposed research utilizes case study methodology to assess a model's real-world applicability, drawing insights from experienced project managers who have handled comparable projects (Yin, 2009). This approach, commonly used in psychology, sociology, and anthropology, allows for the discovery of patterns not evident in surveys and contributes to understanding behavior at various levels (Bryman et al., 2022; Creswell, 2014). The chosen method aims to evaluate the model's effectiveness, usability, and applicability across diverse projects, contributing to its refinement and successful application (Yin, 2009).

3.3.1 Research Design

The research design of this study is primarily qualitative, employing interviews to collect data and focusing on evaluating a quantitative model developed through a survey of oil company personnel. The study aims to explore the mediator role of self-efficacy in project management and its influence on sustainable development. A qualitative research flow chart, as illustrated in Figure 3.3, outlines the step-by-step process to achieve the study's fourth objective.

To accomplish this, interviews were conducted with experienced personnel sharing similar factors as the model, particularly focusing on major projects in organizations with over 500 employees and a capital exceeding one billion dollars. The participants were project management specialists with extensive knowledge and experience.

The research approach involved identifying distinct actions leading to a qualitative shift in self-efficacy and a noticeable increase in sustainable development ideas and activities. These actions, with a budget not exceeding five million dollars and unplanned beforehand, were documented. A questionnaire was emailed to approximately 15 large corporations, with responses lacking qualitative actions in self-efficacy management or sustainable growth being discarded.

The study's design relied on semi-structured interviews, offering flexibility while ensuring coverage of subjects related to research objectives. With participant consent, interviews were recorded and transcribed for thematic analysis, aiming to identify recurring themes and patterns.

Ethical considerations, encompassing informed consent, confidentiality, and participant anonymity, were integrated into the study's design. Participants provided signed informed consent, and all identifying information was removed from the transcripts. The study took precautions to prevent participants from experiencing any harm or discomfort during the interview process.

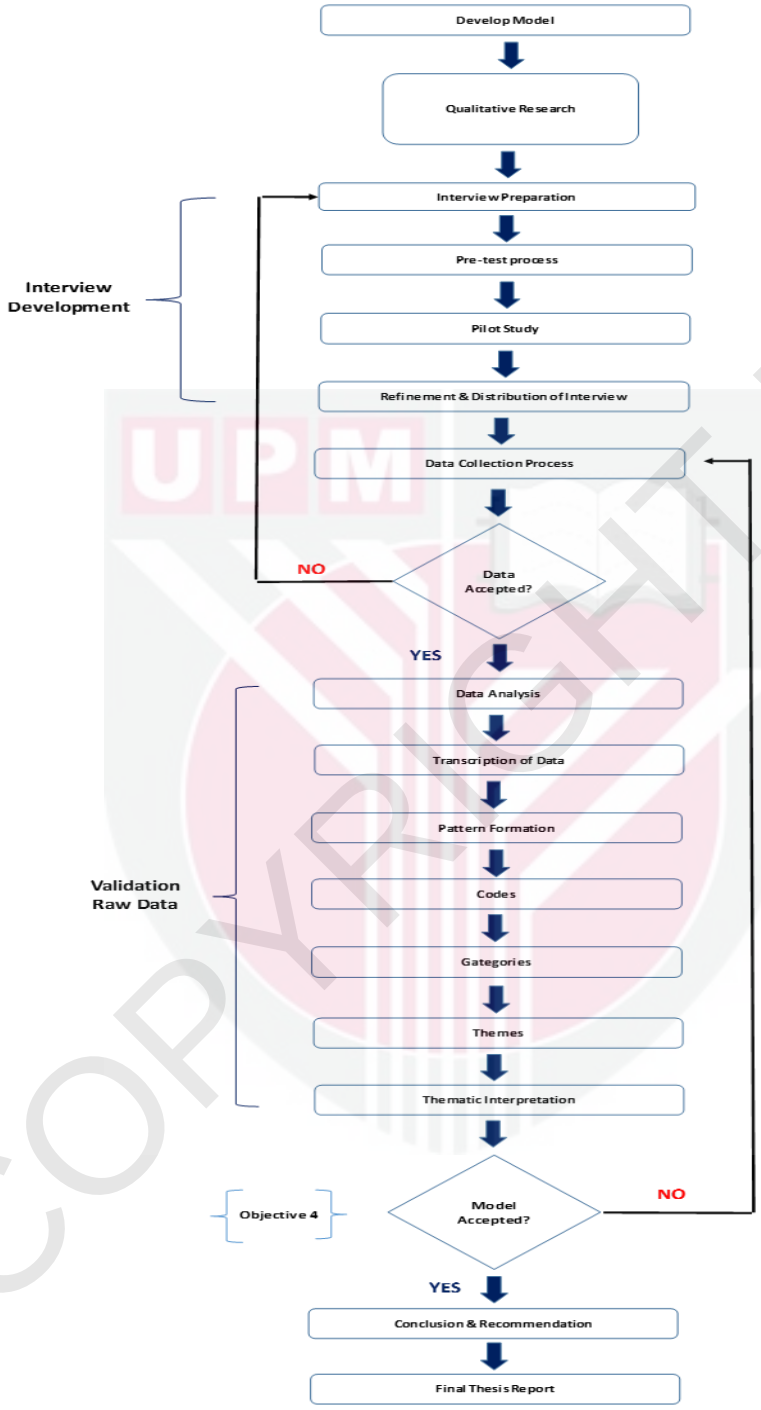

Figure 3.3: Qualitative Research Flow Chart (Objective 4)

3.3.2 Sampling Methodology

Several strategies, including snowball sampling, purposive selection, and quota sampling, can be used to choose an acceptable interview population while doing qualitative research (Flick, 2009). Purposeful selection includes selecting participants based on specified traits, whereas quota sampling utilises predefined proportions to represent subgroups of a community (Denzin & Lincoln, 2006).

Participants were selected using a method of purposeful sampling based on their occupation and experience in project-related domains (Bryman & Bell, 2015). This strategy allowed researchers to choose participants with the necessary knowledge, experience, and skill for the study. The research was able to collect useful insights and viewpoints on the implementation of project management in major corporations by selecting persons with project expertise.

This research employed a method of purposive sampling to identify people who satisfy the specified criteria. Purposeful sampling is a non-probability sampling method that involves selecting research participants based on certain features or criteria (Patton, 2015). In this instance, the participants, their firms, and their projects are chosen, and they demonstrate the model's efficacy by adhering to a set of parameters and criteria.

3.3.3 Research Instrument

This section describes the instrument design for this investigation.

Interview Preparation

Structured interviews, according to Merriam (2009), are conventional interviews in which the questions and their sequence are predefined. To maintain uniformity, respondents in this study were asked questions based on a prepared questionnaire. In order to collect the essential data, structured interviews were employed to elicit detailed and organised information on finished projects. A predetermined list of closed-ended questions was used to evaluate the dependability of prior expert interview results and to collect particular information (Bryman et al., 2022). This methodology guaranteed consistency and yielded trustworthy data for the investigation.

This study's interview procedure has been divided into five sections.

The first step focuses on validating the participants' eligibility. It requires a comprehensive selection procedure, as seen in Figure 3.3. Those who do not satisfy the qualifications for the interview were disqualified. To assure the legitimacy of the participant, the selection requirements include at least 15 years of experience in project management, possession of a Project Management Professional (PMP) certification, and being a project manager or higher within his or her organisation. In addition, the

participant's firm must have a minimum capitalization of $500 million, and the experiment's project must have a minimum capitalization of $50 million and a lifespan of at least two years.

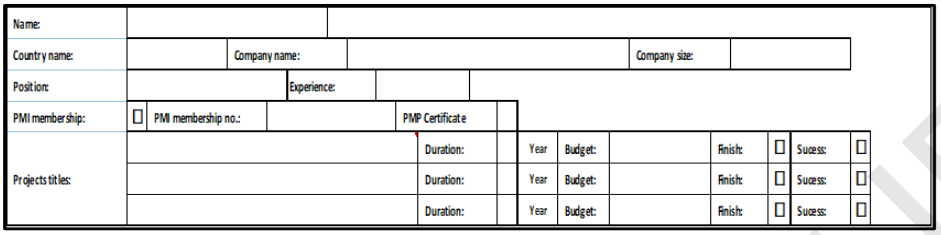

Figure 3.4: Demographic Data

After the selection criteria have been satisfied, the second portion of the interview consists of a list of questions pertaining to each model variable. Each variable is comprised of five questions chosen from the questionnaire given in Table 3.12. Each sub-variable inside the model is likewise comprised of five questions, identical to those used in the Likert scale questionnaire. Each question is graded on a scale of 1 to 10. When a question obtains equal or fewer than six points, the answer is declared unavailable. If two assertions score equal or fewer than six points, the participant's form is disregarded and they are not deemed eligible for the interview.

In the third step of the interview process, participant information on the project is gathered. This information consists of the project's general details, location, length, budget, and any other pertinent information.

In the fourth phase of the interview procedure, participants who meet the experiment's basic requirements are questioned about any exceptional self-efficacy or action that produced a key step and boosted their self-efficacy, as indicated in Table 3.12. This activity should occur throughout the duration of the project and should not be a standard training or routine activity done by HR to enhance work conditions. In the absence of a substantial change in self-efficacy, the participant's answer was deemed insufficient for the experiment. Another question designed as shown in Table 3.12 to know the influence of self-efficacy on performance and sustainability based on the participants' experiences and perspectives.

In the last portion of the interview, participants are questioned about any outstanding sustainable development activities that happened within two months of completing the exceptional self-efficacy exercise (Table 3.12). If the behaviour happened beyond this time frame, it is disregarded because of other variables. The sustainable development activity should occur outside the initial project scope, largely as a result of self-efficacy modifications. Additional semi-constructed questions intended to confirm the influence of sustainability on the organisation and the self-efficacy of the proposed model based on the participants' experiences and opinions.

The purpose of the interviews was to assess the created model that gives evidence of self-role efficacy's as a mediator between project management and sustainable development results. The framework of questions was intended to match the study objectives and was organised around the central phenomena, causal condition, and outcomes.

Table 3.12: Interview Questions

	Self-Efficacy Questions	Themes
1.	Can you provide one example of the most effective activities (non-routine) related to the variable of self-efficacy that were implemented and resulted in a significant increase in employee self-efficacy?	Core Phenomenon
2.	Based on your experience, how would you describe the relationship between employee self-efficacy and project performance?	Consequences
	Sustainable Development Questions	**Themes**
3.	Can you provide a few examples of any outstanding sustainable development activities that occurred within two months of the significant changes in employee self-efficacy? SD activities must be previously unplanned, non-routine, and outside the project scope.	Core Phenomenon
4.	Can you elaborate on the factors that influenced the project's approval of sustainable development activities?	Causal Condition
5.	Can you describe the extent of the impact such outstanding sustainable development activities have had on the project and the organization?	Consequences
6.	In your opinion, how effective was the self-efficacy model in improving the sustainability outcomes of the project?	Causal Condition

Participants manually completed the five steps of the MS Excel sheet as shown in Appendix 4. Following receiving the replies through email, a virtual phone interview was done to validate the data's veracity.

3.3.4 Sample Characteristics

In qualitative research, selecting the proper demographic for an interview is a vital step (Bryman et al., 2022). This includes determining who should be included or excluded from the study based on certain criteria, such as age, gender, occupation, and other aspects, in order to assure the gathering of pertinent data that may be utilised to form meaningful conclusions about the studied phenomena (Creswell, 2014). This study's minimal requirements for participants and the experiment, as well as the rationale for their selection, are detailed in Table 3.13 below.

Table 3.13: Participants and the experiment minimum requirements & justifications

Minimum Requirement	Requirement Justifications
Participants must have a minimum of 15 years of experience in projects.	The experts' practical insights into implementing the model in diverse real-world projects, drawing from varied project contexts, offer valuable perspectives. Their broad experience allows informed decisions on the model's applicability, incorporating lessons from both successes and failures across different situations.
Participants must have PMP certification.	Possessing a PMP certification showcases commitment and expertise in project management, endorsed by PMI (2021). The rigorous examination process covers comprehensive project management aspects, ensuring a robust academic foundation and practical proficiency. Continuous updates align the certification with industry standards, keeping participants informed on the latest techniques for improved quality and reliability (PMI, 2017).
The project employed in the experiment must have a budget of at least $10 million and a duration of at least two years.	Real-world initiatives assess the model's effectiveness, affirming its applicability across diverse projects. Large organizations benefit from the model's sophisticated project and operations management techniques. These projects offer flexibility in adding activities and expenses, efficiently managed through the model's approach (Bryman, 2016).
Participants must be a project manager or above.	Participants must be project managers or higher in their respective organisations since they possess decision-making authority and project control. Project managers have the requisite abilities and experience to handle complicated projects, making them great candidates for giving clear and accurate information regarding the experiment's requirements and the model's implementation in real-world projects.
Participants' projects must be located in different countries to ensure model applicability.	This method permits the evaluation of the model in various cultural and economic situations, hence influencing project management methods. It will also give a greater spectrum of opinions, resulting in a more thorough review of the model's efficacy. In addition, the outcomes will be representative of a variety of project situations, making them relevant to a wider range of scenarios.
Participants in the study should be accessible, communicative, willing to share comprehensive information, offer feedback, and provide accurate data for research purposes	Communication issues or inaccessibility may result in inadequate or delayed data collection, jeopardising the trustworthiness of the study. A strong rapport with participants may result in higher-quality data and an enjoyable research experience. The team's dedication to the participants and the study is seen by its rapid responses to questions and concerns.

3.3.5 Pre-test Procedure

Important indicators, such as content validity and dependability, must be examined to guarantee the interview instrument's high quality (Geisen & Bergstrom, 2017). In this study, the interview tool was subjected to two phases of preliminary testing. In the first phase (1), a direct supervisor from the Faculty of Engineering at Universiti Putra Malaysia evaluated the face and content validity of the interview design. The second phase (2) involved the recruitment of two project managers from PetroMasila Company in order to assess the validity of the measuring. During the pre-testing phase, content and face validity, along with the idea and interview relevance, were analysed. Face validity guaranteed that the measures constituting the instrument were logically connected to the study's underlying components and appropriate for evaluating the generated model.

3.3.6 Pilot Study

To establish proper research procedures, a pilot study should be undertaken before the main study (Teijlingen & Hundley, 2002). A pilot study, also known as a feasibility study, is a small-scale test that prepares researchers for the major study (Teijlingen & Hundley, 2002). In particular, a pilot study may include pre-testing research instruments such as interviews (Taylor et al., 2003). In the case of a case study interview, a pilot study is necessary to ensure the questions' efficacy, practicality, and suitability, as well as their conformity with the research objectives.

In this research, a pilot study was undertaken to ensure that all participants understood the interview questions. Experts evaluated the proposed questions, and the first interview was performed with the project manager to produce open-ended questions and assure excellent data (Fellows & Liu, 2015). Feedback from the pilot interviews was utilised to improve the quality of the interviews and to identify any gaps and time needs.

3.3.7 Data Collection Method

A number of actions and processes must be performed to acquire high-quality data for an investigation. The first phase, according to Creswell (2014), is to choose the place or person for the research, followed by developing rapport and securing access to participants. Typically, purposeful sampling is employed for this purpose, and snowball sampling might be implemented depending on interviewee recommendations. Determine the most relevant and practicable data gathering techniques, such as fieldwork, semi-structured interviews, and study of project documents. In addition, it is essential to anticipate future data gathering challenges and choose the proper data storage strategy.

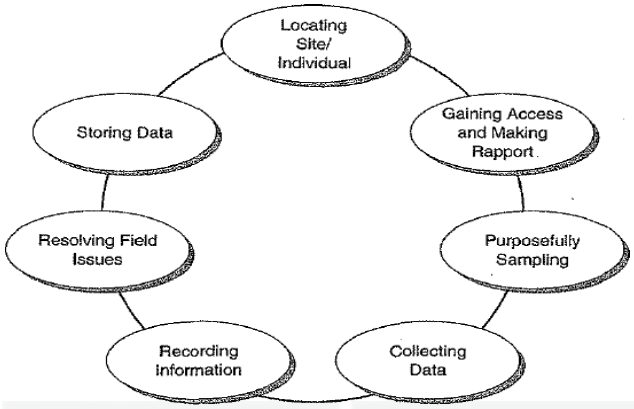

Figure 3.5: Fieldwork Data Collection Activities
(Source: Creswell, 2014)

It might be difficult to find acceptable volunteers for a research project, particularly in terms of contacting them and convincing them to join. Traditional communication techniques may not be adequate in this regard, especially if participants are geographically and organizationally distant. To solve this difficulty, one strategy would be to harness personal networks and connect with project managers in executive positions at larger companies. By tapping into these networks, researchers may be able to get access to a larger pool of qualified individuals with relevant expertise and authority over their decisions. This method can increase the chance of acquiring an adequate sample size and improve the precision of the collected data (Fusch & Ness, 2015).

From September 2022 to February 2023, 15 project managers were contacted from various projects who were nominated by well-known administrative authorities, such as PMI board members and close friends holding top positions at large corporations. Just 10 of them matched the basic requirements and advanced to the 3rd step, supplying the remaining data. As shown in Table 3.14, just 5 of these 10 cases were chosen because they had a strong impact on increasing employee self-efficacy and led to sustainable development activities within two months of these improvements. Changes in self-efficacy that occur after two months may not be connected to improvements in sustainability. The remaining three managers failed to achieve the original requirements or submitted inappropriate self-efficacy or sustainable development-related actions. 2 managers have not yet provided replies.

Table 3.14: List of the selected project managers, companies, and projects

no.	Project Manager Information	Company Name	Project Title
P1	The name and contact information kept confidential as his request	Royal Dutch Shell	Gamba Southern Integrated Project (GSIP) (Gabon)
P2	The name and contact information kept confidential as his request	Total Energies	Egina Field Development Project (Nigeria)
P3	Name: Zaid Al-Menhali Position: Manager, Production & Facilities Integrity Email: almenhali@mubadalapetroleum.com	Mubadala Petroleum UAE Co.	Pegaga gas field (Malaysia)
P4	Name: AbdulKhaliq Al-Ameri Position: Deputy Project Director -Iraq Abdulkhaliq.alameri@taqaglobal.com	Abu Dhabi National Energy Company (TAQA)	Atrush oil field development project (Iraq)
P5	Name: Omer M.Al-Haiqi Position: General Manger Company: Oil & Gas Consulting Email: Omarconsultant30@gmail.com	PETRONAS Gas Berhad	Terengganu Gas Terminal project. (Malaysia-Thiland)

3.3.8 Data Analysis

To evaluate the model's effectiveness and applicability in real-world applications, a comprehensive data analysis process is necessary. The use of MS Excel Sheet, shown in Appendix 4, as a data analysis tool provides a quick and thorough method for determining the model's relevance to project management criteria and assessing its effectiveness. The software helps analyze participant responses and determine their eligibility for inclusion in the study based on a set of criteria and calculations. Each main study variable has five sub-variables, and each sub-variable has a checklist of five optional questions. The research eliminated participants who lacked a PMP certification

and had small-scale projects. The MS Excel Sheet includes a comparison scale for tested variables, enabling the calculation of the percentage growth relative to a previous time of the project or a similar project. This software provides an efficient and effective means of evaluating data collected from research participants.

Thematic analysis is a widely used method in social science research that involves identifying patterns or themes in a dataset to provide structure and interpretation to the data. The six-phase process developed by Braun and Clarke (2012) is a flexible and accessible method for identifying shared meanings and experiences within a dataset. To ensure the validity, reliability, and trustworthiness of the findings, the analysis was undertaken in a methodical and thorough manner. To analyze the research data, the study used thematic analyses supported by computer research software, with ATLAS.ti 8 being the most appropriate for its features in coding, conceptualization, and data management. The software facilitated the efficient organization, management, and coding of qualitative data, allowing for the reduction of raw data, identification of significant patterns, interpretation of data, and construction of a logical chain of evidence.

The software's ability to code and classify data into sub-themes, store ideas and categories, and import, edit, retrieve, review, and re-code textual data assists in data analysis and research activities management. The thematic analysis was conducted in a systematic and thorough manner to ensure the validity, reliability, and trustworthiness of the findings. The software helped identify patterns and themes in the dataset, bringing structure and interpretation to the data.

Overall, the combination of MS Excel Sheet as a data analysis tool and thematic analysis supported by computer research software enabled a thorough and efficient analysis of the research data, ensuring the validity, reliability, and trustworthiness of the findings. These methods are valuable tools for qualitative researchers in analyzing data and making well-informed decisions based on the research.

3.4 Research Framework

A research framework is a methodically structured network of correlations among pertinent variables, shaped through interviews, observations, and literature review (Sekaran & Bougie, 2016). Its crucial role in guiding decision-making throughout a research project, from defining the problem to data analysis, cannot be overstated (Creswell, 2014). This study's framework emerged from diverse methodologies used by researchers, aiming to explore the impact of project management and self-efficacy on sustainable growth in Yemen's PetroMasila. The framework suggests direct impacts of project management and self-efficacy on sustainability, with self-efficacy mediating the relationship between project management and sustainable growth (Figure 2.3).

Incorporating insights from various models, scholars argue direct connections between project management, sustainable development, and self-efficacy, updating the model to include self-efficacy as a mediator. The research begins with a focused delineation of the problem, emphasizing relationships between project management, self-efficacy, and

sustainable development in the oil & gas industry. Scope, limitations, and research objectives are outlined, followed by a literature review extracting theories related to key variables. Relationships among project management, self-efficacy, and sustainable growth are explored. The resulting framework, visually represented through diagrams, integrates supporting models and introduces mediating variables, aligning with research objectives. Peer feedback refines the final framework for application in the oil & gas industry.

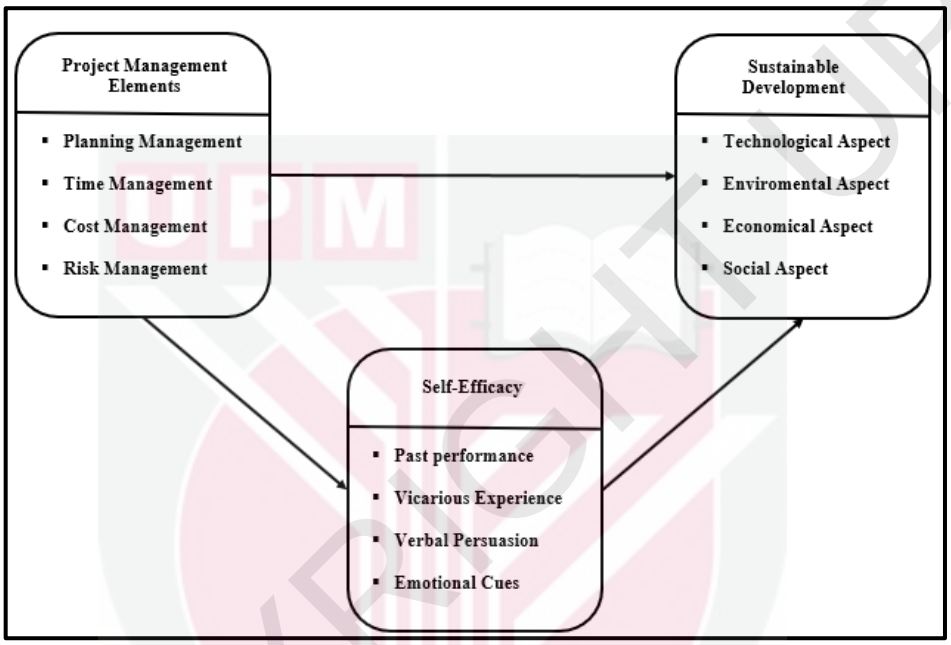

Figure 3.6: Research Conceptual Framework

Chapter 2 delved into the foundational theories underpinning the study, subsequently applied in the illustrative framework presented in Figure 2.4. This framework serves to validate the identified theories by affirming the relationship between project management and sustainable development, aligning with the Sustainable Project Management Theory. Furthermore, it substantiates the link between project management and self-efficacy, drawing support from the Transformational Leadership Theory. The Self-Efficacy Theory is also instrumental in reinforcing the association between self-efficacy and sustainable development. Additionally, the Sustainable Project Management Theory enhances the understanding of the indirect relationship (represented by dotted lines) between project management and sustainable development, with self-efficacy serving as a mediator.

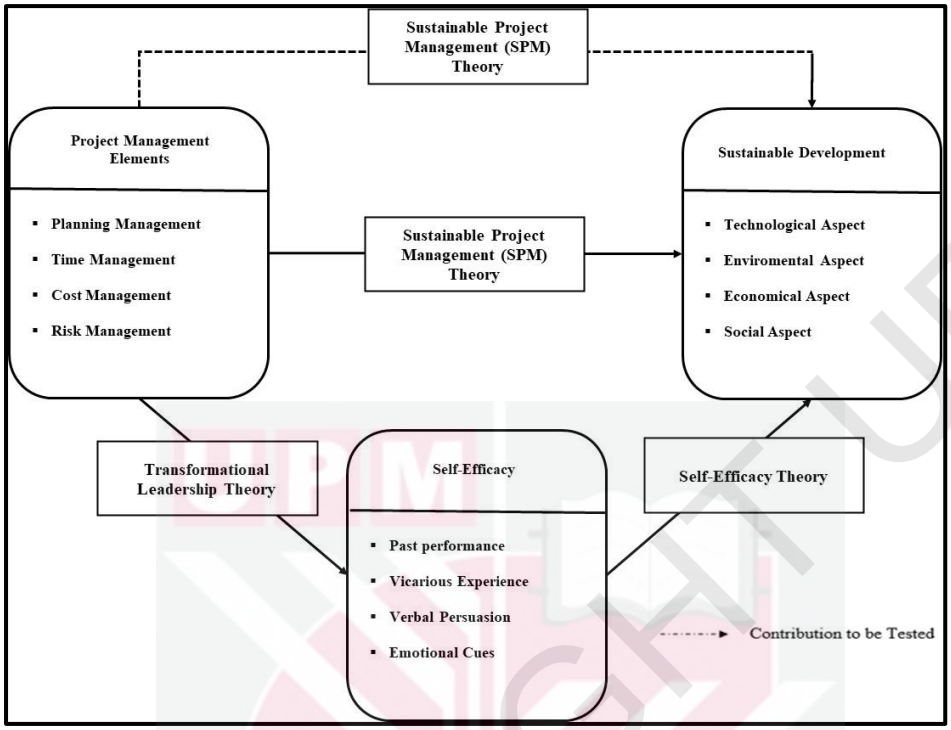

Figure 3.7: Conceptual Framework with Supporting Theories

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CHAPTER 4

RESULTS AND DISCUSSION

The chapter is divided into two primary phases: quantitative and qualitative. In Section 4.2, the quantitative phase is presented, which includes the respondents' demographics, descriptive statistics, and an assessment of the structural model. The main and sub-hypotheses are explained, and the structural model is evaluated. In Section 4.3, the qualitative phase is presented, which includes expert interviews, company and project information, and a discussion of the data collected through open-ended questions during the semi-structured interviews. Lastly, Section 4.4 provides a summary of the chapter.

4.1 Introduction

The fourth chapter summarises the study's conclusions based on data analysis. After data collection, it was analysed using a multi-step procedure. First, SPSS (Statistical Program for the Social Sciences, Version 25) was utilised for data coding, screening, checking for missing data, normality, Linearity, and multicollinearity. This stage is frequently used to filter and prepare data for the analytical procedure (Pallant, 2010). This is followed by the second stage, which employs descriptive analysis to analyse demographic data in order to discover the various characteristics of respondents. This chapter describes the method for estimating structural equation modelling using PLS-SEM and SmartPLS-Version 3. This chapter describes the evaluation of the reflective measurement model; the reliability and validity of the constructs were also evaluated using Cronbach's alpha, composite reliability, and average variance extracted (AVE), as suggested by Hair et al. (2017), and convergent and discriminant validity were established. This chapter concludes with the findings of the structural model and hypothesis testing. In particular, this section addresses the testing of hypotheses regarding mediating effects.

4.2 Quantitative Phase

4.2.1 Response Rate

The respondents were Yemeni workers of the PetroMasila corporation, and the study was performed from 15 August to 30 Nov 2021 (approximately 14 weeks).

But, because to the COVID-19 worldwide epidemic that prompted lockdowns everywhere, the researcher decided to employ a postal survey by emailing the questionnaire to each responder. With email becoming pervasive, electronic mail surveys have gained popularity; the instrument is delivered to respondents by email, and they may reply to the questions and mail the researcher their replies (Taherdoost, 2016; Rajudeen et al., 2016; Nayak & Narayan, 2019). Both sending and receiving have grown more efficient and economical (Evans & Mathur, 2005; Neuman, 2014). Taherdoost

(2016) and Salkind (2012) highlighted that when surveys are mailed, the sample size increases from 40% to 50% to allow for non-response and mail issues.

Although the researcher cannot guarantee a response rate of 100 percent, 420 questionnaires were delivered to PetroMasila personnel in Yemen. 360 questionnaires were received, representing a response rate of about 85%, while 9 instances were outliers for 342 useable surveys with an 81% response rate. The n=342 sample size was deemed sufficient for this investigation. The research sample size (N=342) met the necessary ratio of 5:1. (Hair et al., 2010). Hair et al. (2010) recommend a minimum of five responders per calculated parameter. In this research (estimating approximately 60 parameters, the studies have a minimum sample size of 300 respondents). Table 4.1 summarises the data collection and response rate.

Table 4.1: Summary of Data Collection and Response Rate

Responses	Total
Distributed questionnaires	420
Unreturned questionnaires	69
Returned questionnaires	351
Outlier	9
Usable questionnaires	342
Response rate	81%

4.2.2 Data Screening

Data screening is the process of verifying that the data are error-free and ready for use before doing statistical analysis. In this work, the missing data analysis, outlier detection, and assessment of normality, linearity, and multicollinearity were employed as data screening processes.

4.2.2.1 Missing data

The researcher used the SPSS program's Expectation Maximization (EM) algorithm. It is regarded as one of the most significant and contemporary statistical techniques for addressing missing data. This strategy estimates the missing data's value and then optimises the likelihood based on the known data. This approach belongs to the compensation group (Single Imputation) and is one of the most effective compensation methods, particularly when the findings indicate that the proportion of missing data does not exceed 5% and was lost totally at random (Hair et al., 2010).

4.2.2.2 Outliers

Inaccurate data entry may result in outliers. There are generally acknowledged rules of thumb that describe how to handle outliers. In general, there are two sorts of outliers: univariate (which represents an extreme value for a single variable) and multivariate (which refers to an uncommon combination of values for many variables) (Hair et al., 2010). According to Hair et al. (2010), an outlier is defined as a score more than 2.5 standard deviations away from the mean and less than 3.0 standard deviations away from the mean.

In the current investigation, items were combined together to represent a single variable in order to identify univariate outliers. Using the descriptive statistics features of SPSS, the data values of each observation were converted to standard scores, often known as z-scores (Hair et al., 2010; Tabachnick & Fidell, 2019). The results indicate that the data set includes nine examples of outliers because their z-scores exceeded 3.0. Eleven (11) examples were identified as outliers, including: (2, 22, 29, 1, 13, 23, 12, 254, and 336). These instances were eliminated from the dataset, leaving (351-9) = 342 datasets remaining for analysis.

4.2.2.3 Normality

If the Z-value skewness is less than 3 and the Z-value kurtosis is less than 7, Chou & Bentler (1995) and Ghozali, Fuad, and Seti (2005) conclude that the data have a normal distribution. In addition, a sample size of around 50 cases or less has a greater impact on normalcy than a larger sample size (200 cases and above). In this study, the researcher followed the Hair et al. (2010) recommendation to adopt a critical value cutoff of 2.58. Table 4.2 demonstrates that the kurtosis and skewness values for all constructs fall within the range (2.58). The descriptive analysis reveals a nearly normal distribution with mean skewness values ranging from -0.523 to -1.150 and kurtosis values ranging from 0.035 to 1.334. Table 4.2 displays the variables' skewness and kurtosis.

Table 4.2: Skewness and Kurtosis for Variables

Variables	Sub-Variables	Code	Skewness	Kurtosis
Project Management	Planning Management	PM	-.747	-.159
	Time Management	TM	-1.150	1.334
	Cost Management	BM	-.898	.181
	Risk Management	RA	-.960	1.168
Self-Efficacy	Past performance	PP	-.610	-.223
	Vicarious Experience	VE	-.523	-.388
	Verbal Persuasion	VP	-.734	.682
	Emotional Cues	EC	-.556	-.147
Sustainable Development	Technological Aspect	TA	-.798	.241
	Economical Aspect	CA	-.934	.561
	Environmental Aspect	EA	-.794	.035
	Social Aspect	SA	-.929	.174

For purposes of multivariate analysis, normalcy is considered significant. With this assumption in mind, it is predicted that the data distribution will be normal (Hair et al., 2010). Tabachnick and Fidell (2019) discovered that a normal distribution exists when both the skewness and kurtosis variables are equal to zero. Nonetheless, Hair et al. (2010) emphasized that the critical values must not exceed 2.58. In addition, they determined that a positive skewness indicates that the distribution shifts to the left and the tails move to the right, whereas a negative skewness indicates the opposite effect. In addition, a positive kurtosis value indicates a peaked distribution, whereas a negative kurtosis value indicates a flatter distribution.

In statistics, the normal distribution is regarded to be the most significant and often used distribution model and is referred to as the "bell curve," despite the fact that the tonal qualities of this type of bell might be less than attractive. In honour of the mathematician Karl Friedrich Gauss, it is sometimes known as the "Gaussian curve." The standard deviation is the measure of the normal distribution of the data; it is a statistic that indicates how closely all of the instances in a collection of data cluster around the mean. A normal distribution's form is determined by the mean and the standard deviation. Figure 4.1 demonstrates that the standard deviation is.0997 close to one; hence the bell curve represents a nearly normal distribution.

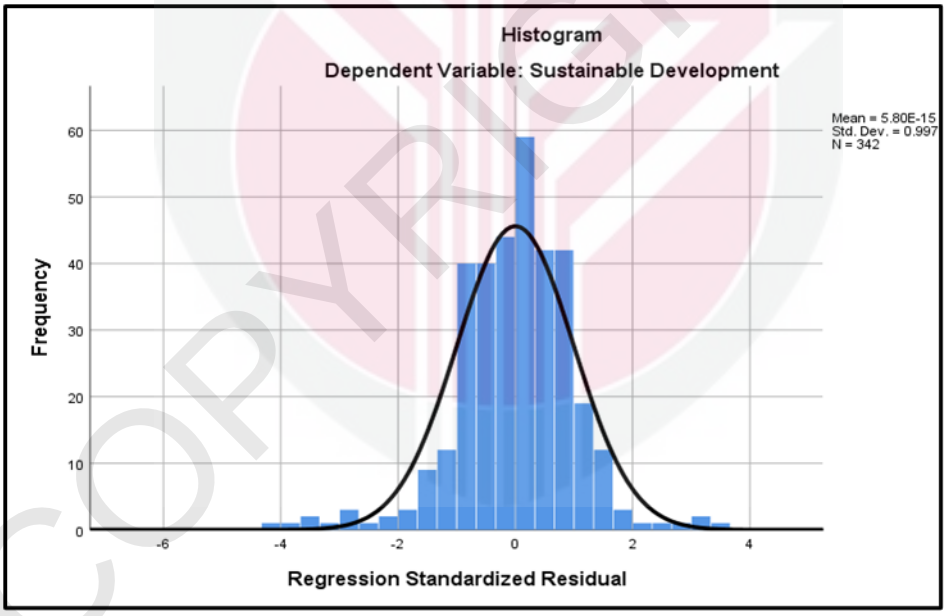

Figure 4.1: Normality Assumption for Sustainable Development

4.2.2.4 Linearity Assumption

The scatter plot illustrates the connection (relationship) between the two variables. So, the goal of a scatter plot is to illustrate a thinner dashed line. After evaluating the remainders of SPSS version.25, it was determined from the results that there is a linear relationship between the one dependent variable scores and the mean of sustainable development among PetroMasila personnel in Yemen. This is the reason why no evidence was available to question the linearity assumption regarding the accuracy of accounting information. Figure 4.2 illustrates the assumption of linearity for the dependent variable sustainable development among PetroMasila personnel in Yemen.

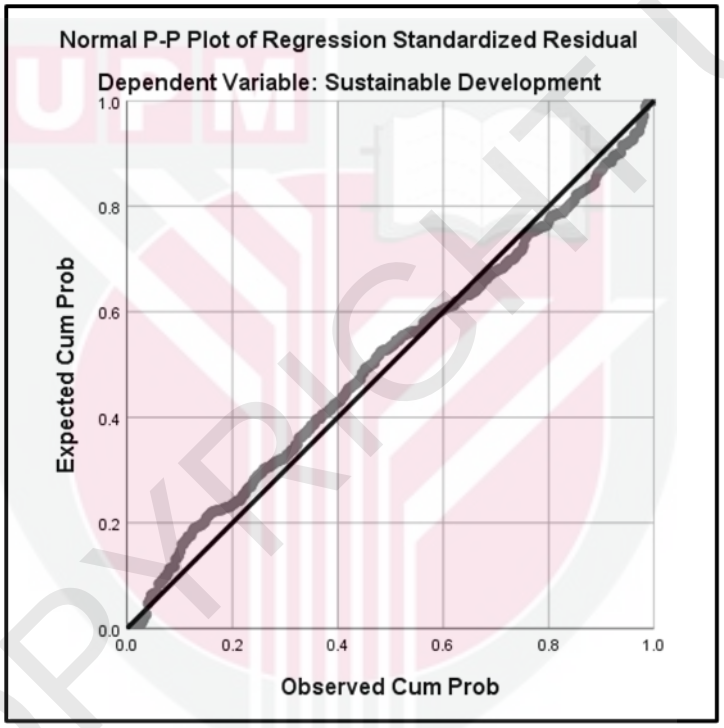

Figure 4.2: Linearity Assumption for Sustainable Development

4.2.2.5 Test of Multicollinearity

Multicollinearity, indicating overlapping variance among independent variables in explaining the dependent variable, is undesirable (O'brien, 2007). To assess multicollinearity, the variance inflation factor (VIF) and tolerance are used (O'brien, 2007). Tolerance represents unexplained variance in one construct's indicator by others in the same block. According to Hair et al. (2010), a VIF under 5 and a tolerance over 0.1 for both variables are optimal. VIF calculates multicollinearity by regressing a variable against others, with a VIF below 5 signaling low multicollinearity and higher

values implying problematic correlation, impacting coefficient reliability (Hair et al., 2010). Striking this balance is crucial for robust regression analysis.

Among the guidelines relevant to the VIF and tolerance are the following:

According to Bowerman & O'Connell (1992) and Myers (1990), when the biggest VIF is larger than 10, it is regarded a reason for worry. In the same context, and according to Hair et al. (2013), if the biggest VIF is greater than 5, it is a cause for worry.

Below 0.10, the tolerance value indicates a true problem, and below 0.20, a potential problem (Menard, 1995; Hair et al., 2013).

In Table 4.3, a multicollinearity diagnostic demonstrates that there is no evidence of significant multicollinearity between the research predictor variables, as all tolerance values are greater than 0.10 and range from 0.111 to 0.462, and all the VIF values are less than 5 and range from 2.166 to 4.304, indicating that the variances of our variables project management (PM, TM, BM, RA) and Self-Efficacy (PP, VE, VP, EC)

Table 4.3: The Tolerance and VIF for Variables

Variables	**Collinearity Statistics**		
	Code	Tolerance	VIF
Project Managment	PM	.301	3.324
	TM	.329	3.036
	BM	.338	2.962
	RA	.224	4.471
Self-Efficacy	PP	.111	4.029
	VE	.189	4.304
	VP	.462	2.166
	EC	.321	3.119

4.2.3 Correlation Matrix between Variables

It was noticed from the study's results that the maximum relation (correlation) between (TA) and (CA) at 0.775, (PP) and (VE) was 0.762 and p-value was 0.000. In contrast, the correlation between (SA) and (TM) was the weakest at 0.293. The correlation matrix demonstrates that the correlation values are less than 0.80 and range between 0.775 to 0.293. The results of the investigation confirmed that multicollinearity between the study model's components is not a concern (Sekaran & Bougie, 2016). The correlation matrix between variables is displayed in Table 4.4 below.

Table 4.4: Pearson Correlation among the Variables

	PM	TM	BM	RA	VE	VP	PP	EC	EA	CA	SA	TA
PM	1											
TM	.689**	1										
BM	.764**	.701**	1									
RA	.637**	.701**	.578**	1								
VE	.394**	.408**	.428**	.340**	1							
VP	.300**	.391**	.311**	.360**	.321**	1						
PP	.460**	.475**	.444**	.392**	.762**	.442**	1					
EC	.358**	.498**	.428**	.427**	.461**	.616**	.529**	1				
EA	.456**	.385**	.376**	.424**	.434**	.394**	.522**	.483**	1			
CA	.521**	.395**	.449**	.357**	.498**	.454**	.516**	.453**	.722**	1		
SA	.396**	.293**	.338**	.354**	.494**	.396**	.563**	.436**	.741**	.668**	1	
TA	.545**	.432**	.507**	.351**	.472**	.404**	.500**	.482**	.694**	.775**	.607**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Note: PM: Planning Management, CA: Economical Aspect, EA: Environmental Aspect, EC: Emotional Cues, BM: Cost Management, PP: Past performance, RA: Risk Management, SA: Social Aspect, TA: Technological Aspect, TM: Time Management, VE: Vicarious Experience, VP: Verbal Persuasion

4.2.4 Demographic Characteristics of the Respondents

The respondents in this study are Yemeni employees of the corporation PetroMasila. The outcome of the occurrence illustrative (frequency descriptive) analysis is displayed in Tables 4.5- 4.11 and Figures 4.3- 4.9 as numerical data on the demographic characteristics of the respondents, including gender, age, position, degree of education, experience, sector type, and block name.

4.2.4.1 Gender

The data related with the gender of the participants is presented in Table 4.5 and Figure 4.3, which indicate that 85 percent of the 342 respondents are male, or 290 individuals. Despite this, 52 responders, or 15%, are female. Table 4.5 and Figure 4.3 illustrate the gender distribution of respondents.

Table 4.5: Distributions of Respondents by Gender

Category	Frequency	Percentage
Male	290	85%
Female	52	15%
Total	**342**	**100 %**

4.2.4.2 Age

In this study, the age of respondents is divided into eight distinct categories. According to Table 4.6 and Figure 4.4, the category consisting of respondents aged 36-40 years has the highest percentage, with 82 respondents representing 24% of the total number of respondents; followed by the 31-35 years category, which represents 17% or 58 participants, and then the 41-46 years category, which represents 27.4% or 55 participants. This conclusion may be refined by considering the fact that the majority of PetroMasila employees in Yemen are between 31 and 40 years old. On the other hand, these data indicate that individuals older than 55 years and younger than 25 years have a lower percentage of respondents, with 10 and 24 respondents, respectively, or (3% and 7%). Table 4.6 illustrate the distribution of participants by age.

Table 4.6: Distributions of Respondents by Age

Category	Frequency	Percentage
<25 years	24	7%
25-30 years	38	11%
31-35 years	58	17%
36-40 years	82	24%
41-45 years	55	16%
46-50 years	44	13%
51-55 years	31	9%
>55 years	10	3%
Total	**342**	**100%**

4.2.4.3 Education Level

The respondents in this research had a Bachelor's degree, which accounts for around 59% (or 201 individuals) of the survey population. Nonetheless, there are also some responses (10 or 3%) with a Doctorate. 72 respondents, or 21%, have a master's degree, and 58 respondents, or 17%, have a diploma as PetroMasila employees in Yemen, according to the findings. The distributions of respondents by degree of education are shown in Table 4.7.

Table 4.7: Distributions of Respondents by Education Level

Category	Frequency	Percentage
Diploma	58	17%
Bachelor	202	59%
Master	72	21%
PhD	10	3%
Total	**342**	**100%**

4.2.4.4 Position

Among the personnel of PetroMasila in Yemen, the majority of respondents (37%) or 127 respondents, hold the position of "Project engineer." In addition, there were 82 'project coordinators,' representing 24% of the total number of responders. Additionally, the 'other' positions had 89 making up 26%, the ‘project head' adds up to a 44 out of 342

making up a 13%. The data also indicate that "managers and directors" were the smallest category of responders, with zero responses; despite limited manager responses, findings offer valuable perspectives within this scope. Moreover, in PetroMasila company, the roles of "project head" and "project manager" are synonymous, holding identical positions and responsibilities. The distribution of these respondents according to the position is presented below in the Table 4.8.

Table 4.8: Distributions of Respondents by Position

Category	Frequency	Percentage
Project director	0	0%
Program manager	0	0%
Portfolio manager	0	0%
Project head	44	13%
Project coordinator	82	24%
Project engineer	127	37%
Other	89	26%
Total	**342**	**100%**

4.2.4.5 Experience Years

In terms of experience years, the majority of respondents have experience ranging from 10 to 15 years, with a total of 140 respondents representing 41% of the sample. As a result, 116 respondents (34%) have experience in excess of 15 years, whereas only 16% and 9%, or 55 and 31 respondents, have experience in the range of 5-10 years and less than 5 years, respectively. Table 4.9 illustrates the distributions of responders by years of experience.

Table 4.9: Distributions of Respondents by Experience Years

Category (By Years)	Frequency	Percentage
<5 years	31	9%
5-10 years	55	16%
10-15 years	140	41%
>15 years	116	34%
Total	**342**	**100%**

4.2.4.6 Sector Type

Although all employees of the PetroMasila industry in Yemen are included in this study, these units were categorised into five primary categories.

The construction industry is represented by 189 respondents out of a total of 342 respondents, which accounts for 55%, and this indicates that only 7 people are involved in research and development (R&D), which accounts for 2%. Additionally, in the engineering industry, it had a 22% response rate (55 out of 342)

The Project and T/Telecom industries made up 5% and 3%, or 17 and 10 responders, respectively.

Hence, it can be observed that the majority of PetroMasila's employees in Yemen work in engineering and construction. Table 4.10 depicts the distributions according to sector type.

Table 4.10: Distribution of Respondents by Sector Type

Category	Frequency	Percentage
Research & Development (R&D)	7	2%
Engineering	75	22%
Construction	189	55%
Project	17	5%
T/Telecom	10	3%
Other	44	13%
Total	**342**	**100%**

4.2.4.7 Block Name

In terms of Block name, "Block 14" received the most votes with (38%) or 130 responses. In addition, "Block 10" comprised 107 respondents, or 31 percent of the total number of respondents. In addition, Block 51 contained 72 respondents, representing 21%, whilst Block 53 included 20 respondents out of a maximum of 342, representing 6%. The statistics also indicate that the 'Block 63' respondents were the smallest group of respondents, with only 14 respondents, or 4%. The distribution of these respondents by Block name is depicted in Table 4.11 below.

Table 4.11: Distributions of Respondents by Block Name

Block Name	Frequency	Percentage
Block 10	107	31%
Block 14	130	38%
Block 51	72	21%
Block 53	20	6%
Block 63	14	4%
Total	**342**	**100%**

4.2.5 Descriptive Analysis of Latent Constructs

Mean and standard deviation (S.D.) were computed for the measurement scales. This research employed a five-point Likert scale ranging from "1" for strongly disagreeing to "5" for strongly agreeing. Table 4.12 indicate that time management, with a mean score of 3.932 out of a maximum of 5, accounted for 78% of the total. The following are the cost management and risk management scores, which account for about 77.3% of the total. Nonetheless, prior performance had the lowest mean with a score of 3.556 out of a possible 5 and (more than 3) comprising nearly 71% of the total. In addition, the aggregate mean of these values was 3.734 out of 5, or 74.68%. In addition, the standard deviations (S.D.) for all variables vary from 0.581 to 0.922, indicating that the data set has a large amount of acceptable variation. Table 4.12 gives descriptive statistics for variables.

Table 4.12: Descriptive Statistics for Study Variables (Mean and S.D)

Variable	Code	Minimum	Maximum	Mean	%	S.D
Planning Management	PM	1.40	5.00	3.7836	75.67	.81119
Time Management	TM	1.60	5.00	3.9322	78.64	.72578
Cost Management	BM	1.40	5.00	3.8690	77.38	.76747
Risk Management	RA	1.50	5.00	3.8662	77.32	.71035
Project Management	**PM**	**1.73**	**4.75**	**3.8628**	**77.25**	**.65713**
Past performance	PP	1.20	5.00	3.5567	71.13	.79441
Vicarious Experience	VE	1.40	5.00	3.5953	71.90	.78563
Verbal Persuasion	VP	1.20	5.00	3.5690	71.38	.76329
Emotional Cues	EC	1.20	5.00	3.5702	71.40	.80434
Self-Efficacy	**SE**	**1.63**	**4.58**	**3.6468**	**72.93**	**.58199**
Technological Aspect	TA	1.20	5.00	3.6965	73.93	.80493
Economical Aspect	CA	1.20	5.00	3.7082	74.16	.82661
Environmental Aspect	EA	1.20	5.00	3.6649	73.29	.87110
Social Aspect	SA	1.00	5.00	3.7006	74.01	.92216
Sustainable Development	**SD**	**1.30**	**4.70**	**3.6925**	**73.85**	**.75393**
Overall		**1.80**	**4.55**	**3.7340**	**74.68**	**.59098**

4.2.6 Assessing Reflective Measurement Model

As stated previously, SEM combines a two-stage process in data analysis that guides the evaluation of the measurement model followed by the estimate of the structural model. The reflective constructs' constructing validity, convergent validity, and discriminant validity are evaluated as part of the assessment of the measuring model. Thus, our study followed the two-stage sequential paradigm by applying PLS-based SEM (Hair et al. 2014). In accordance with Hair et al. (2014), the measurement model was assessed first, followed by the structural model analysis and hypothesis testing.

The measurement model addressed the connections between observed variables and constructs. Constructs were assessed through items that reflected the observed variables. As a result of the examination of the measurement model, the estimations of loadings provided the researcher with an indication of the reliability of the measures. During the measurement model evaluation phase, the links between indicators and their respective constructs were evaluated using convergent and discriminant construct validity.

4.2.6.1 Examining of Outer Loading for items

In Smart-PLS, outer loading figures result from estimating factor loadings for indicator variables in the measurement model, indicating the relationship strength between observed indicators and latent constructs. Input parameters include specifying observed indicators and their latent constructs, reflective or formative. The Partial Least Squares (PLS) algorithm is used for estimation, involving iterative computations for maximizing explained variance (Hair et al., 2019).

Assessing the measurement model by considering the outer loading of each construct item (Hair, et al, 2014 and Hair et al, 2012). According to Hair et al. (2014), objects were maintained if they required more than 0.60 bytes to load. In the current investigation, two out of sixty items were eliminated due to low loading. According to Hair et al. (2014), the only time an indication with outer loadings in the range of 0.40 to 0.70 should be removed from the scale is when CR or AVE will surpass the specified threshold value.

Convergent validity in Smart-PLS is established when indicators exhibit high factor loadings, typically exceeding 0.70 (Hair, Risher, Sarstedt, & Ringle, 2018). As the factor loading fell below this threshold, specific items were excluded from the measurement model, including RA3 (0.639) and VP5 (0.693), as depicted in Figure 4.3. Following the removal of these two items and subsequent rerun of Smart-PLS, improvements in the values of other items within VP and RA were observed. For instance, VP1 increased from 0.694 to 0.723, and RA2 improved from 0.794 to 0.813, as illustrated in Figure 4.4.

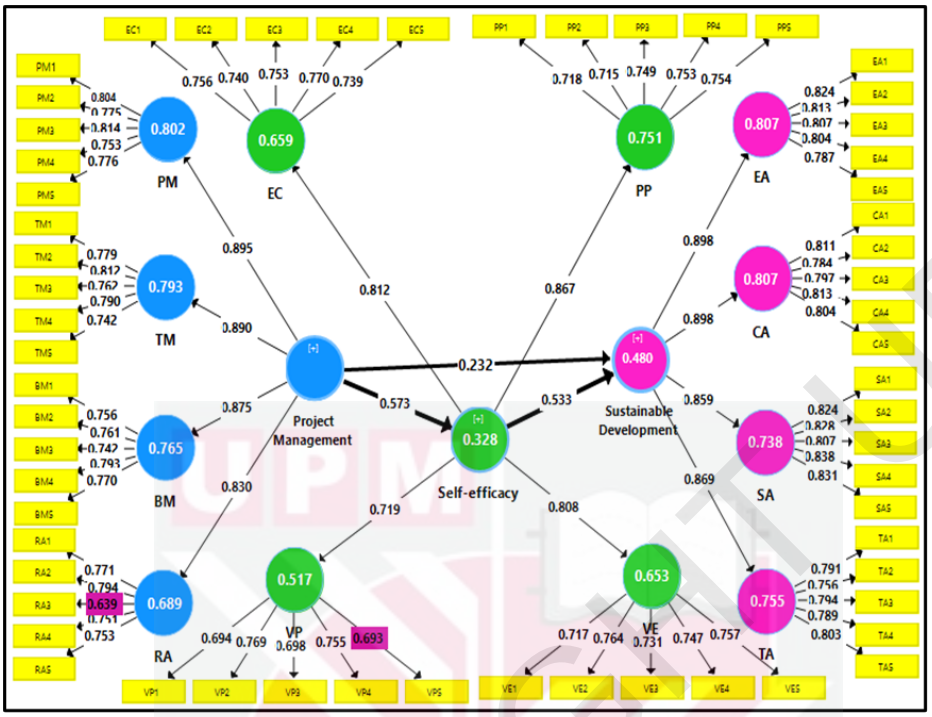

Figure 4.3: Measurement Model/ Outer loading (Hypothesized Model)

As demonstrated in Table 4.13 and Figure 4.4, only 58 out of 60 items were preserved in the revised measurement model because they had loadings between VE (0.717) and SA4 (0.838). All constructs finally met the minimal estimate requirements for updated model values, which are 0.70 for Cronbach Alpha, 0.50 for Average Variance Extracted (AVE), and 0.50 for Composite Reliability (CR).

In addition, the revised model fit the data well, as indicated by the squared multiple correlations (R^2) values for the dependent variables: sustainable development and self-efficacy, which were 0.481 and 0.334, respectively (better than the hypothesised model at 0.480 and 0.328), as shown in Figure 4.3 and Figure 4.4.

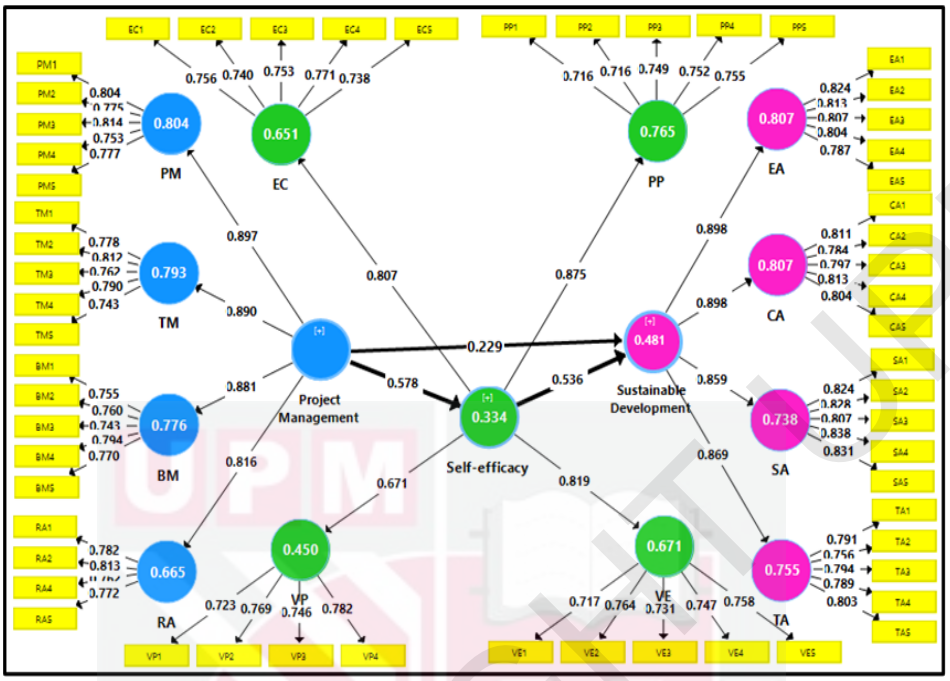

Figure 4.4: Measurement Model/ Outer loading (Revised Model)

4.2.7 Ascertaining Internal Consistency Reliability

4.2.7.1 Reliability (Cronbach's Alpha and Composite Reliability)

After reviewing the descriptive characteristics of respondents' demographic data, it was necessary to analyse how respondents responded to survey questions according to the conceptual framework's stated components. In this study, the word "reliability" refers to the extent to which repeated measurements generate the same findings (Malhotra & Brik, 2003). The dependability measurement ensures internal consistency in the measurement of variables (Kim & Cha, 2002). The dependability of the instrument is more than 0.60, which is satisfactory (Hair et al., 2014; Sekaran & Bougie, 2016). This research included two distinct types of reliability testing. The first is Cronbach's alpha using SPSS 25.0, while the second is composite reliability (CR).

In management and marketing research, Cronbach's alpha and the composite reliability coefficient are most usually employed to measure the internal consistency dependability of items (Peterson & Kim, 2013). Cronbach's alpha coefficient offers a far more accurate indicator of the reliability's bias than the composite reliability coefficient. Internal consistent reliability utilising the composite coefficient was selected for this investigation based on the rule of thumb offered by Bogazzi and Yi (1988), which stipulates that it should be at least 0.70 or more.

Cronbach's alpha values varied from 0.750 to 0.883 for verbal persuasion and from 0.815 to 0.841 for social aspect, as shown in Table 4.13. Composite reliability (CR) values ranged from 0.815 to 0.841 for the same variables. Thus, all reliability and composite reliability values exceeded the acceptable threshold of 0.60. A Cronbach's alpha exceeding 0.60 indicates moderate internal consistency, essential for reliable measurements. Higher values enhance confidence in the instrument's stability and precision. The constructions' reliability (Cronbach's alpha) and composite reliability are presented in Table 4.13.

4.2.7.2 Constructs Validity

This research employs two distinct statistical validity assessments. First, using Smart-PLS analysis, convergent validity was conducted in the measurement model as the first type of validity tests to determine if the indicators in a scale load together on a single construct. The discriminate validity test is the second type of validity to determine if the items designed to measure different constructs are indeed evaluating different constructs.

4.2.7.3 Convergent Validity

Ramayah et al. (2011) defined convergent validity as "the extent to which different items measuring the same variable concur." Assessing convergent validity was a crucial aspect of evaluating the measurement methodology. According to Hair, Risher, Sarstedt, and Ringle (2018), convergent validity in SmartPLS is validated when items load significantly (greater than 0.70). Nevertheless, items with the lowest outer loadings (below 0.70) must be removed from the scale if their removal does not reduce the extracted average variance (AVE) value.

Results demonstrated that item loadings were more than 0.70 and varied from PP1 (0.716) to SA4 (0.838). The average variance extracted (AVE) of the constructs is at least 0.5, and composite reliability (CR) metrics of internal consistency reliability are greater than 0.70. In order to acquire sufficient convergent validity, Chin (1980) suggested that the AVE of each latent component should be more than 0.50 and vary between previous performance (0.545) and social aspect (0.590). (0.682). In the study, convergent validity was therefore demonstrated. (See Table 4.13).

Table 4.13: Items loading, Cronbach's alpha, Composite Reliability (CR) and AVE

Variable	Sub- Variable	Code	Loading	Cronbach 's alpha	CR	AVE
Project Management	Planning Management	PM1	0.804	0.844	0.889	0.616
		PM2	0.775			
		PM3	0.814			
		PM4	0.753			
		PM5	0.777			
	Time Management	TM1	0.778	0.838	0.884	0.604
		TM2	0.812			
		TM3	0.762			
		TM4	0.790			
		TM5	0.743			
	Cost Management	BM1	0.755	0.822	0.875	0.584
		BM2	0.760			
		BM3	0.743			
		BM4	0.794			
		BM5	0.770			
	Risk Management	RA1	0.782	0.789	0.863	0.612
		RA2	0.813			
		RA4	0.762			
		RA5	0.772			
Self-Efficacy	Past performance	PP1	0.716	0.791	0.857	0.545
		PP2	0.716			
		PP3	0.749			
		PP4	0.752			
		PP5	0.755			
	Vicarious Experience	VE1	0.717	0.798	0.861	0.553
		VE2	0.764			
		VE3	0.731			
		VE4	0.747			
		VE5	0.758			
	Verbal Persuasion	VP1	0.723	0.750	0.841	0.570
		VP2	0.769			
		VP3	0.746			
		VP4	0.782			
	Emotional Cues	EC1	0.756	0.808	0.867	0.565
		EC2	0.740			
		EC3	0.753			
		EC4	0.771			
		EC5	0.738			
Sustainable Development	Technological Aspect	TA1	0.791	0.846	0.890	0.619
		TA2	0.756			
		TA3	0.794			
		TA4	0.789			
		TA5	0.803			
	Economical Aspect	CA1	0.811	0.861	0.900	0.643
		CA2	0.784			
		CA3	0.797			
		CA4	0.813			
		CA5	0.804			

Table 4.13: Continued

Variable	Sub- Variable	Code	Loading	Cronbach 's alpha	CR	AVE
Sustainable Development	**Environmental Aspect**	EA1	0.824	0.866	0.903	0.651
		EA2	0.813			
		EA3	0.807			
		EA4	0.804			
		EA5	0.787			
	Social Aspect	SA1	0.824	0.883	0.915	0.682
		SA2	0.828			
		SA3	0.807			
		SA4	0.838			
		SA5	0.831			

4.2.7.4 Discriminant validity

Discriminant validity "is the extent to which a concept is actually distinct from other constructs; it indicates if the measurement is unrelated and how many indications represent only a single construct" (Hair et al. 2013). Fornell and Larcker (1981) provided a method for assessing discriminant validity. If the diagonal elements were seen to be greater than the non-diagonal elements in their respective columns and rows, then they could be compared and their discriminant validity assumed.

As the AVE values are greater than the squared correlations for each set of constructs, discriminant validity was revealed. AVE > correlation square Table 4.14 displays the square root of the AVE for all constructs whose correlations with other constructs in the model are larger than the AVE. In addition, the results indicate that correlation values among independent variables were less than 0.85. (Hair,et al, 2018). The study's findings revealed that multicollinearity among the constructs was not problematic (Sekaran & Bougie, 2016). Table 4.14 demonstrates that the square root of the extracted average variances are all bigger than the correlation between latent components, indicating appropriate discriminant validity. As seen in the table below, the correlation matrix findings validate the discriminant validity.

Table 4.14: Discriminant Validity (Fornell and Larcker ,1981) for Latent Variables

	AVE	BM	CA	EA	EC	PM	PP	RA	SA	TA	TM	VE	VP
BM	**0.584**	**0.765**											
CA	**0.643**	0.450	**0.802**										
EA	**0.651**	0.379	0.723	**0.807**									
EC	**0.565**	0.428	0.452	0.483	**0.752**								
PM	**0.616**	0.764	0.520	0.458	0.359	**0.785**							
PP	**0.545**	0.445	0.516	0.522	0.529	0.463	**0.738**						
RA	**0.612**	0.579	0.358	0.425	0.427	0.639	0.394	**0.782**					
SA	**0.682**	0.339	0.668	0.742	0.436	0.397	0.563	0.355	**0.826**				
TA	**0.619**	0.508	0.776	0.695	0.482	0.546	0.501	0.352	0.608	**0.787**			
TM	**0.604**	0.703	0.396	0.388	0.498	0.691	0.475	0.701	0.293	0.434	**0.777**		
VE	**0.553**	0.428	0.498	0.434	0.463	0.395	0.733	0.341	0.493	0.474	0.408	**0.743**	
VP	**0.574**	0.291	0.444	0.386	0.587	0.300	0.421	0.342	0.391	0.397	0.369	0.296	**0.755**

Note: AVE: Average Variance Extracted, PM: Planning Management, CA: Economical Aspect, EA: Fair Environmental Aspect, EC: Emotional Cues, BM: Cost Management, PP: Past performance, RA: Risk Management, SA: Social Aspect, TA: Technological Aspect, TM: Time Management, VE: Vicarious Experience, VP: Verbal Persuasion

4.2.7.5 Collinearity Test (Variance Inflation Factors -VIF)

In multiple regression models, collinearity has traditionally been characterised as a predictor-predictor phenomena. According to this classical viewpoint, two or more predictors are collinear when they assess the same underlying concept or a component of that construct. This term is limited to vertical or classic collinearity (Kock & Lynn, 2012). The outer VIF indicates the degree of item correlation inside a concept (Hair, et al. 2014).

Myers (1990); Bowerman & O'Connell (1992). According to Hair et al. (2013), if the VIF value is more than 10 or 5, there is grounds for worry. In this study, the highest variance inflation factor (VIF) for each item was between 1.393% (VP1) and 2.361% (SA4). Overall, the item VIF values show that multicollinearity is not a problem in our investigation, as a more stringent VIF criterion could suggest. Table 4.15 displays the outside VIF for each item (Collinearity Test).

Table 4.15: Collinearity Test (VIF)

Items	Outer VIF	Items	Outer VIF	Items	Outer VIF
BM1	1.638	PM1	1.895	TA1	1.789
BM2	1.637	PM2	1.748	TA2	1.634
BM3	1.681	PM3	1.915	TA3	1.802
BM4	1.899	PM4	1.688	TA4	1.811
BM5	1.650	PM5	1.786	TA5	1.839
CA1	1.915	PP1	1.431	TM1	1.684
CA2	1.782	PP2	1.469	TM2	1.932
CA3	1.826	PP3	1.564	TM3	1.688
CA4	1.921	PP4	1.602	TM4	1.793
CA5	1.883	PP5	1.595	TM5	1.613
EA1	2.059	RA1	1.599	VE1	1.447
EA2	1.961	RA2	1.700	VE2	1.553
EA3	1.917	RA3	-	VE3	1.491
EA4	1.926	RA4	1.516	VE4	1.536
EA5	1.743	RA5	1.557	VE5	1.559
EC1	1.538	SA1	2.043	VP1	1.393
EC2	1.506	SA2	2.088	VP2	1.410
EC3	1.570	SA3	1.944	VP3	1.469
EC4	1.626	SA4	2.232	VP4	1.509
EC5	1.516	SA5	2.163	VP5	-

4.2.7.6 Cross Loading of Observed Variables

Table 4.16 demonstrates that the cross-loading of all observed variables exceeded the intercorrelations of the model's construct for all other observed variables. Thus, these results validated the cross-loadings assessment requirements and the discriminant validity of the measuring model to an acceptable level. Thus, the proposed conceptual model was assumed to be acceptable, with confirmation of suitable reliability, convergent validity, and discriminant validity, as well as the validation of the research model. Table 4.16 demonstrates item cross-loading.

Table 4.16: Cross loading for items

Items	BM	CA	EA	EC	PM	PP	RA	SA	TA	TM	VE	VP
BM1	**0.755**	0.368	0.332	0.311	0.584	0.357	0.479	0.338	0.413	0.538	0.296	0.186
BM2	**0.760**	0.374	0.338	0.359	0.597	0.399	0.460	0.325	0.390	0.564	0.355	0.219
BM3	**0.743**	0.350	0.264	0.328	0.569	0.308	0.415	0.207	0.407	0.524	0.343	0.242
BM4	**0.794**	0.342	0.267	0.358	0.603	0.346	0.416	0.227	0.404	0.531	0.345	0.275
BM5	**0.770**	0.284	0.244	0.279	0.566	0.290	0.443	0.197	0.329	0.529	0.297	0.190
CA1	0.347	**0.811**	0.578	0.326	0.422	0.430	0.318	0.567	0.631	0.281	0.401	0.351
CA2	0.323	**0.784**	0.538	0.335	0.365	0.375	0.274	0.507	0.588	0.319	0.375	0.344
CA3	0.350	**0.797**	0.614	0.341	0.442	0.424	0.284	0.543	0.592	0.308	0.382	0.366
CA4	0.377	**0.813**	0.579	0.408	0.428	0.413	0.270	0.552	0.644	0.332	0.405	0.344
CA5	0.404	**0.804**	0.590	0.400	0.427	0.427	0.288	0.507	0.654	0.350	0.434	0.376
EA1	0.310	0.576	**0.824**	0.381	0.342	0.416	0.365	0.584	0.521	0.310	0.341	0.306
EA2	0.299	0.568	**0.813**	0.375	0.376	0.456	0.330	0.593	0.567	0.297	0.379	0.289
EA3	0.301	0.573	**0.807**	0.422	0.337	0.394	0.314	0.592	0.550	0.328	0.314	0.296
EA4	0.240	0.557	**0.804**	0.374	0.345	0.371	0.303	0.581	0.528	0.234	0.312	0.289
EA5	0.371	0.639	**0.787**	0.398	0.441	0.465	0.397	0.641	0.634	0.388	0.402	0.372
EC1	0.350	0.359	0.375	**0.756**	0.272	0.391	0.334	0.357	0.405	0.369	0.410	0.457
EC2	0.265	0.296	0.360	**0.740**	0.241	0.438	0.294	0.302	0.323	0.322	0.343	0.418
EC3	0.274	0.307	0.365	**0.753**	0.241	0.370	0.295	0.335	0.322	0.382	0.312	0.445
EC4	0.393	0.351	0.341	**0.771**	0.322	0.387	0.344	0.287	0.381	0.433	0.353	0.446
EC5	0.323	0.383	0.376	**0.738**	0.271	0.399	0.336	0.357	0.379	0.366	0.316	0.440

Table 4.16: Continued

Items	BM	CA	EA	EC	PM	PP	RA	SA	TA	TM	VE	VP
PM1	0.581	0.424	0.413	0.290	**0.804**	0.375	0.493	0.327	0.453	0.510	0.298	0.254
PM2	0.605	0.434	0.421	0.266	**0.775**	0.304	0.510	0.370	0.459	0.521	0.237	0.259
PM3	0.644	0.415	0.399	0.312	**0.814**	0.415	0.573	0.364	0.481	0.591	0.337	0.180
PM4	0.553	0.351	0.290	0.287	**0.753**	0.359	0.478	0.247	0.360	0.564	0.322	0.241
PM5	0.612	0.417	0.266	0.250	**0.777**	0.360	0.447	0.246	0.384	0.522	0.354	0.249
PP1	0.269	0.350	0.428	0.391	0.282	**0.716**	0.301	0.441	0.357	0.338	0.530	0.310
PP2	0.303	0.419	0.364	0.355	0.322	**0.716**	0.218	0.342	0.389	0.325	0.550	0.304
PP3	0.346	0.410	0.421	0.402	0.391	**0.749**	0.329	0.428	0.404	0.356	0.585	0.370
PP4	0.378	0.374	0.344	0.402	0.367	**0.752**	0.298	0.424	0.369	0.366	0.569	0.282
PP5	0.345	0.353	0.371	0.399	0.342	**0.755**	0.304	0.439	0.332	0.366	0.578	0.286
RA1	0.465	0.307	0.352	0.365	0.506	0.360	**0.782**	0.316	0.271	0.536	0.284	0.318
RA2	0.492	0.311	0.338	0.359	0.548	0.307	**0.813**	0.295	0.317	0.570	0.262	0.275
RA4	0.439	0.276	0.342	0.326	0.463	0.265	**0.762**	0.277	0.263	0.557	0.215	0.235
RA5	0.413	0.221	0.296	0.283	0.480	0.299	**0.772**	0.221	0.245	0.532	0.306	0.242
SA1	0.297	0.578	0.603	0.378	0.389	0.511	0.329	**0.824**	0.523	0.267	0.409	0.346
SA2	0.246	0.544	0.635	0.337	0.316	0.419	0.268	**0.828**	0.503	0.200	0.400	0.250
SA3	0.216	0.544	0.610	0.351	0.276	0.437	0.259	**0.807**	0.471	0.210	0.378	0.345
SA4	0.318	0.550	0.590	0.390	0.342	0.463	0.293	**0.838**	0.509	0.269	0.405	0.357
SA5	0.322	0.540	0.625	0.342	0.316	0.492	0.317	**0.831**	0.503	0.264	0.445	0.318

Table 4.16: Continued

Items	BM	CA	EA	EC	PM	PP	RA	SA	TA	TM	VE	VP
TA1	0.404	0.616	0.560	0.360	0.462	0.422	0.302	0.492	**0.791**	0.367	0.387	0.316
TA2	0.368	0.590	0.548	0.351	0.389	0.326	0.210	0.424	**0.756**	0.263	0.303	0.288
TA3	0.431	0.634	0.575	0.429	0.436	0.443	0.276	0.507	**0.794**	0.373	0.418	0.334
TA4	0.389	0.575	0.497	0.372	0.380	0.400	0.239	0.462	**0.789**	0.305	0.408	0.287
TA5	0.404	0.633	0.554	0.383	0.477	0.377	0.350	0.501	**0.803**	0.391	0.347	0.333
TM1	0.589	0.379	0.376	0.408	0.613	0.368	0.578	0.296	0.394	**0.778**	0.295	0.331
TM2	0.542	0.318	0.357	0.369	0.558	0.364	0.562	0.287	0.353	**0.812**	0.299	0.326
TM3	0.514	0.285	0.261	0.382	0.496	0.346	0.521	0.192	0.300	**0.762**	0.270	0.265
TM4	0.573	0.282	0.252	0.357	0.522	0.377	0.548	0.144	0.319	**0.790**	0.379	0.234
TM5	0.509	0.269	0.252	0.422	0.489	0.392	0.513	0.214	0.316	**0.743**	0.346	0.275
VE1	0.308	0.403	0.361	0.338	0.283	0.545	0.222	0.408	0.363	0.268	**0.717**	0.213
VE2	0.355	0.392	0.337	0.389	0.331	0.597	0.311	0.395	0.380	0.351	**0.764**	0.255
VE3	0.283	0.372	0.336	0.331	0.261	0.549	0.202	0.336	0.382	0.264	**0.731**	0.224
VE4	0.334	0.332	0.286	0.336	0.298	0.558	0.253	0.365	0.311	0.320	**0.747**	0.176
VE5	0.309	0.355	0.296	0.324	0.290	0.583	0.274	0.330	0.325	0.310	**0.758**	0.230
VP1	0.234	0.370	0.310	0.429	0.229	0.289	0.237	0.307	0.318	0.282	0.204	**0.723**
VP2	0.254	0.337	0.338	0.492	0.255	0.408	0.291	0.330	0.366	0.278	0.273	**0.769**
VP3	0.127	0.293	0.222	0.411	0.176	0.251	0.227	0.239	0.226	0.246	0.145	**0.746**
VP4	0.249	0.341	0.282	0.433	0.237	0.302	0.271	0.296	0.275	0.307	0.256	**0.782**

4.2.8 Assessment of the Structural Model

This section summarises the outcomes of the structural model and hypothesis testing. This section focuses specifically on evaluating ideas on moderating and mediating effects.

After confirming the reliability and validity of the measurement model and structural model, the next stage in PLS-SEM route modelling was to evaluate the hypothesised linkages. This study examined the relevance of route coefficients using the PLS algorithm and the conventional bootstrapping process using 2000 bootstrap samples and 342 instances (Hair et al., 2010; Hair et al., 2013; Hair et al., 2017; Henseler et al., 2009). Figure 4.12 displays the path coefficient values and explains the hypothesised correlations between the research variables.

Estimate the path coefficients, t-statistics, standard errors, and R^2 using the PLS method and structural model to assess the study hypotheses' correlations. Path coefficients indicated the strength and direction of the relationships; t-statistics and standard errors indicated the significance of the impact; and R^2 indicated the amount of variance explained. The correlation of variances with dependent variables determined explanatory power of the suggested model. This study utilised bootstrap resampling to generate t-statistics and standard errors.

4.2.8.1 Coefficient of Determination: R^2 value

The R^2 number is the proportion of the dependent variable variation explained by independent variables. Hence, a greater R^2 value boosts the structural model's prediction capacity. It is essential to ensure that R^2 values are sufficient for the model to meet minimal explanatory power (Urbach & Ahlemann, 2010). Falk and Miller (1992) suggested that R^2 values should be equal to or better than 0.10 for the variance of an endogenous concept to be considered satisfactory. Cohen (2013) claimed that R^2 is significant when it is more than 0.26 with an acceptable power above 0.02, whereas Chin (1998) said that R^2 is significant when it is greater than 0.65 with an acceptable power above 0.19. In contrast, Hair et al. (2017) suggested that R^2 must be more than 0.75 to be considered significant, with acceptable power above 0.25. Table 4.17 displays the R^2 values derived from the structural model and reveals that all R^2 values are sufficient for the model to reach an adequate degree of explanatory power.

As indicated by the squared multiple correlations (R^2) values for the dependent variables: Sustainable Development (SD) (R^2=0.481) in Table 4.17 and Figure 4.5, the model matched the data well in this research. Thus, the two latent variables project management aspects and self-efficacy accounted a large 48% of the variation in sustainable development among PetroMasila personnel in Yemen. Furthermore, project management features accounted for 33.4% of self-efficacy among PetroMasila personnel in Yemen (See Figure 4.5).

Table 4.17: Coefficient of determination result R^2

Exogenous Constructs	Endogenous Construct	R^2	Hair et al., (2017)	Cohen, (2013)	Chin (1998)
Project management and Self-Efficacy	Sustainable Development	0.481	Moderate	substantial	Moderate
Project management	Self-Efficacy	0.334	Moderate	substantial	Moderate

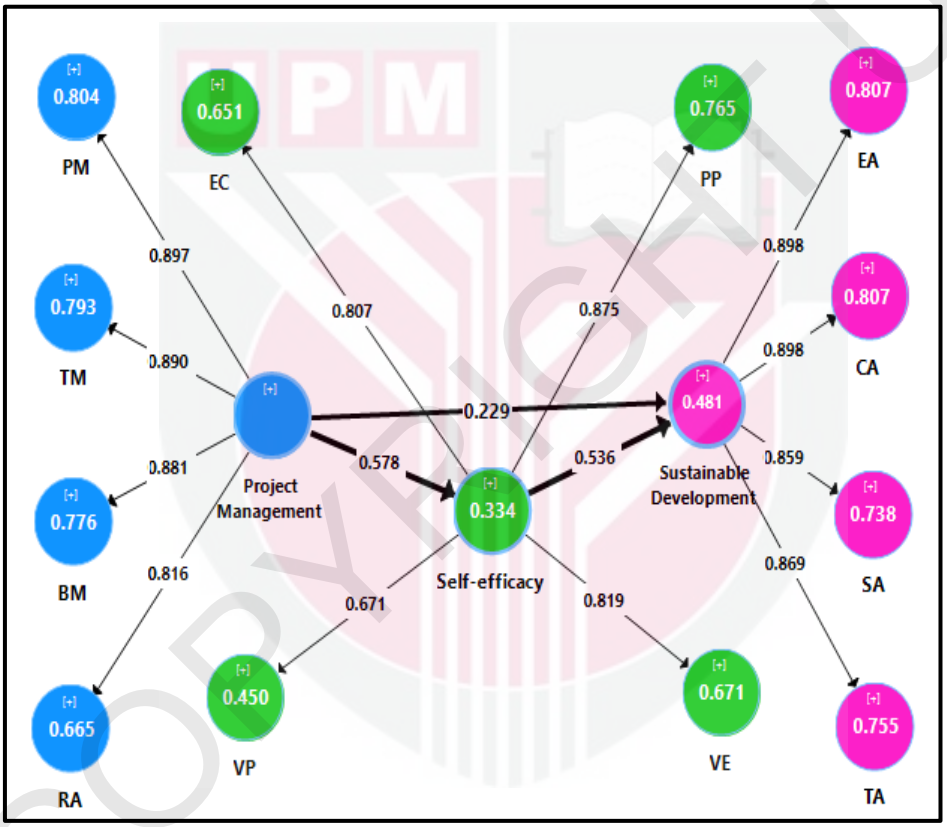

Figure 4.5: Measurement Model with Path coefficient and (R^2)

4.2.8.2 Assessment of Effect Size (f^2)

Using the effect size (f^2) analysis, which complements R^2, it is desirable to specify the impact sizes of individual latent variables' influence on the dependent variables (Chin, 2010). The impact size (f^2) may be calculated using the following method proposed by Cohen (2013):

$$\text{Effect size } (f^2) = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}} \qquad \textbf{Equation 4-1}$$

R^2 is the R-square computed on the endogenous latent variable when the predictor exogenous latent variable is incorporated into the structural model. R^2 eliminated is the R-square for the endogenous latent variab

le when the predictor exogenous latent variable is omitted from the structural model. Cohen (2013) considers an impact size of 0.02 to be minor, 0.15 to be medium, and larger than 0.35 to be big.

The results indicate that project management aspects had the greatest predictive variable impact size on self-efficacy, at 0.496%. (large effect). In addition, self-efficacy had the greatest effect size on sustainable development at 0.369%. (more than 0.35). On the other side, project management had a moderate impact on sustainable development, with an effect size of 0.072. The effects of the independent factors on the dependent variable are shown in Table 4.18 and Figure 4.6.

Table 4.18: Effect Size of predictive Variables

Variable	Effect size (f^2)			
	Self-Efficacy	Rating	Sustainable Development	Rating
Project Management Elements	0.496	Large	0.072	Small
Self-Efficacy	-	-	0.369	Large

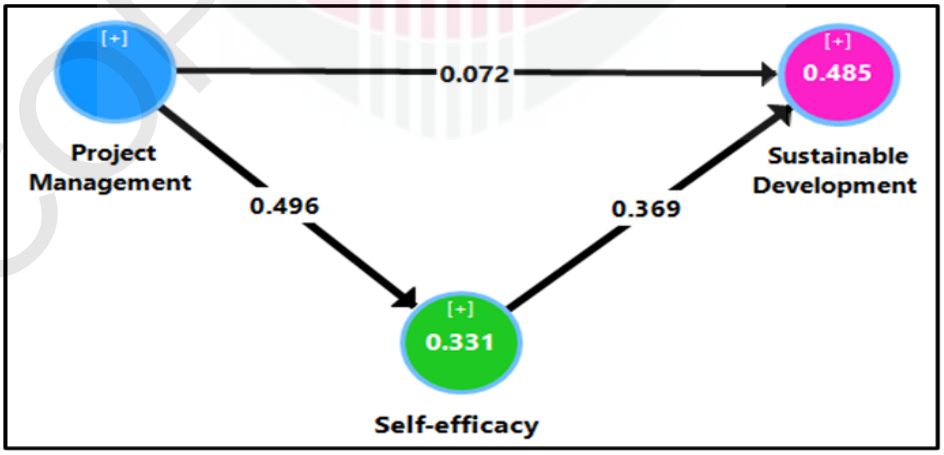

Figure 4.6: Measurement Model with (f^2)

4.2.8.3 Predictive Relevance (Q^2)

This study employed blindfolding to assess the predictive value of the research model. Blindfolding is only used to endogenous latent variables using operationalized reflective measurement models. A cross-validation redundancy metric (Q^2) was used to evaluate the predictive validity of the study model (Hair, et al., 2013). The Q^2 criteria measures how accurately a model predicts omitted case data (Hair, et al., 2014). Considered predictively relevant is a research model with Q^2 statistics larger than zero.

The cross-validation redundancy measure Q^2 for dependent variables sustainable development and self-efficacy was more than zero (0.225 and 0.110, respectively, per the table4.19 below). In this instance, the model possessed predictive value (Henseler et al., 2009). Table 4.19 displays the cross-validated redundancy of the construct.

Table 4.19: Construct Cross validated Redundancy

Variables	SSO	SSE	Q^2 (=1-SSE/SSO)
Sustainable Development	6,840.000	5,303.115	0.225
Self-Efficacy	6,498.000	5,783.211	0.110

4.2.8.4 The Standardized Root Mean Square Residual (SRMR) – Model Fit

The SRMR is the average of the standard residuals between the observed and hypothesised covariance matrices (Chen, 2007). The SRMR represents the estimated model fit. With SRMR = 0.08, the research model is well-fitting (Hu and Bentler, 1998), with a smaller SRMR indicating a better fit. Table 4.20 demonstrates that the SRMR for this research model was 0.0770.08 with the Saturated Model and 0.080 with the Estimated Model, indicating a satisfactory match.

Table 4.20: Model fit summary

Index	Saturated Model	Estimated Model
SRMR	0.077	0.080
d_ULS	39.860	43.421

4.2.8.5 Goodness of Fit (GoF) of the Model

The GoF index has been proposed by Tenenhaus et al. (2005) as the sole measure of goodness of fit for PLS Structural Equation Modelling. A global fit measure (GoF) can be defined as the geometric mean of the average communality and average R^2 for endogenous constructs in PLS path modelling. The primary objective of the measure of

goodness of fit is to explain the variance collected by the measurement and structural models (Chin, 2010). The GoF may be computed using the formula below.

In this study, the GoF value of the model was 0.496, which was obtained as follows:

$(R^{\wedge 2})^{-}$= (0.481+0.334)/2= 0.407

(AVE)=(0.616+0.604+0.584+0.612+0.545+0.553+0.570+0.565+0.619+0.643+0.651+ 0.682)/12= 0.598/0.604

$GoF = \sqrt{0.407 \times 0.598)} = \sqrt{0.}243$=**0.496**

Comparing the GoF value of this study to the threshold values proposed by Wetzels et al. (2009) (0.10 represents small, 0.25 represents medium, and 0.36 represents large), it can be concluded that the model's GoF was large (greater than 0.36), indicating that the global PLS model validity was adequate.

4.2.8.6 Importance-Performance Map Analysis (IPMA)

The Importance-Performance Map Analysis (IPMA) is especially advantageous when the study focuses on investigating a particular construct's major sources of explanation (Ringle and Sarstedt, 2016), such as SME success. IPMA can also assist managers and decision makers with action prioritisation (Hair et al., 2013). For instance, adopting sustainable development as the endogenous goal variable, IPMA calculates the overall impacts of the structural model (importance) with the average values of the latent variable scores (performance) to identify the critical regions for sustainable development. The findings might reveal the determinants with high relevance (those constructs with a significant overall effect) but with comparatively poor performance (low average scores for hidden variables) (Ringle and Sarstedt, 2016). Table 4.21 displays the findings of IPMA for two primary goal constructs of this study, sustainable development, and self-efficacy. For instance, according to the data, Self-Efficacy is the competency with the highest relevance (0.729), and Time Management is the competency with the highest performance (72.252). Table 4.21 and Figures 4.7 demonstrate that cost management and risk management are the least essential factors for sustainable development at 0.003 and -0.012, respectively while planning management is the least important variable for self-efficacy at 0.008.

Table 4.21: IPMA Results

Variables		Sustainable Development	Self-Efficacy	Performance
	Code	Importance	Importance	
Sustainable Development				66.788
Project Management	PMA	0.261		71.599
Self-Efficacy	SE	0.729		63.488
Planning Management	PM	0.320	0.008	68.811
Time Management	TM	-0.198	0.246	72.252
Cost Management	BM	0.003	0.175	70.798
Risk Management	RA	-0.012	0.125	70.664

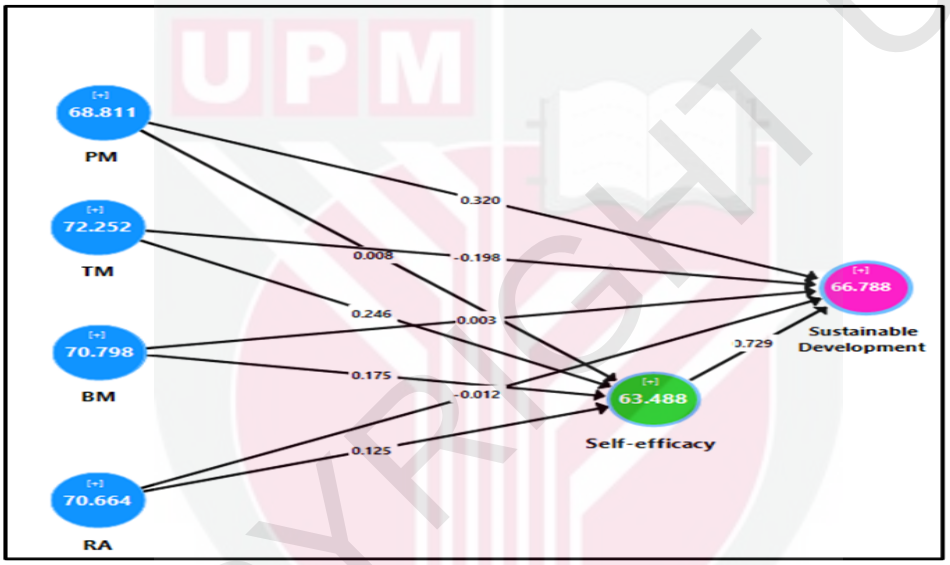

Figure 4.7: IPMA for Dependent Variable

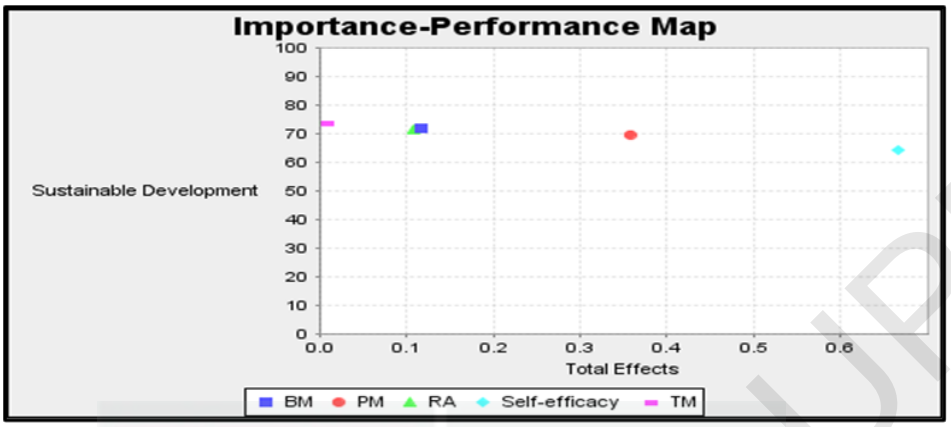

Figure 4.8: Importance-Performance Map Analysis (IPMA)

4.2.9 Main Direct Hypotheses

The three primary direct hypotheses connected to the purpose of this study were experimentally examined. As indicated in Figure 4.9 and Table 4.22, Smart-PLS was used to apply structural equation modelling in the following manner:

H1: Project Management Elements have a significant and positive effect on sustainable development among employees of PetroMasila in Yemen

Table 4.22 and Figure 4.9 demonstrated that aspects of project management had a statistically significant and beneficial impact on sustainable development (t = 2.83; P 0.01). The hypothesis (H1) was therefore supported. The path coefficient was 0.22, showing a favourable association. It indicates that when project management aspects increase by one standard deviation, sustainable development increases by 0.229%.

H2: Project Management elements have a significant and positive effect on Self-efficacy among employees of PetroMasila in Yemen.

As demonstrated in Table 4.22 and Figure 4.9, the results revealed that project management aspects had a statistically significant and favourable impact on self-efficacy (t = 10.331; P 0.01). Thus, the second hypothesis (H2) was supported. Moreover, the path coefficient was 0.578, which indicates a favourable association. It indicates that when features of project management increase by 1 standard deviation, self-efficacy increases by 0.578 standard deviations.

H3: Self-efficacy has a significant and positive effect on sustainable development among employees of PetroMasila in Yemen

According to the study results, the T and p-values of self-efficacy in predicting sustainable development were (6.656) and (0.000), respectively. It indicates that the likelihood of obtaining a T value greater than 6.656 in absolute value is (0.01). In other words, at the 0.01 significance level, the path coefficient for self-efficacy in predicting sustainable development is substantially different from zero. Hence, H3 was supported. In addition, the path coefficient was 0.536, showing a favourable association. As indicated in Table 4.22 and Figure 4.9, when self-efficacy increases by 1 standard deviation, sustainable development increases by 0.53 standard deviations.

Table 4.22: Summary of Structural Model for Main Hypotheses Results

H	Exog.	⇨	Endo.	Original Sample (β)	Standard Deviation (STDEV)	t-value (C.R)	p-value	Result
H1	PMA	⇨	SD	0.229	0.081	2.835	0.000	Supported
H2	PMA	⇨	SE	0.578	0.056	10.331	0.000	Supported
H3	SE	⇨	SD	0.536	0.081	6.656	0.000	Supported

**Significant at p<0.01, *Significant at Bootstrapping p<0.05
Note: PMA: Project Management, SE: Self-Efficacy, SD: Sustainable Development

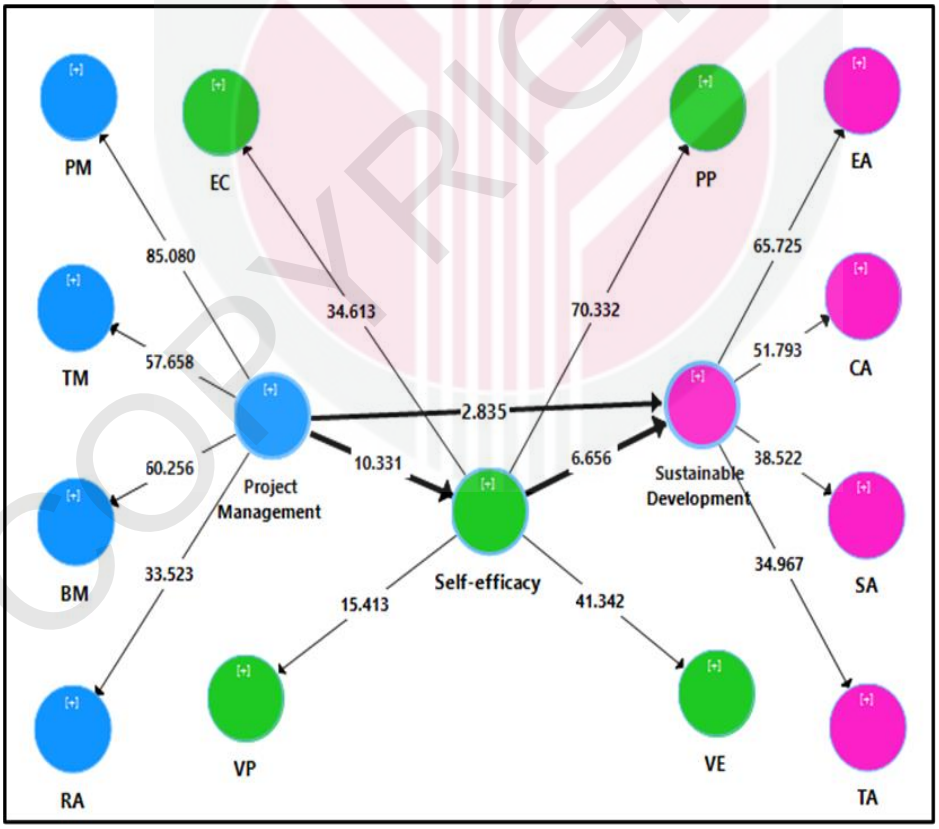

Figure 4.9: Structural Model with Main Hypotheses Results (Bootstrapping

4.2.10 Objective One Achieved

Objective one: To determine the direct effects relationship of project management & self-efficacy of employees on sustainable development of PetroMasila in Yemen.

a) Hypothesis One: The relationship between project management and sustainable development of PetroMasila in Yemen (H1)

The study on the interaction between project management and sustainable development at PetroMasila in Yemen confirms a significantly positive influence, as seen in Figure 4.16 and Table 4.22 (H1 accepted, $\beta = 0.229$, $t = 2.85$, $p = 0.000 < 0.01$). Previous research also supports a strong association between project management and sustainable development (Padalkar and Gopinath, 2016; Turner and Mittra, 2010, 2016; Goedknegt, 2013). PetroMasila employees note project management's impact on sustainability incorporation, emphasizing the need for mature reviews in capital equipment, planning, time, cost, and risk management. Integrating sustainable development in project management is deemed more successful, aligning with literature emphasizing the environmental, social, and economic pillars of sustainability.

b) Hypothesis Two: The relationship between project management and self-efficacy among employees of PetroMasila in Yemen (H2)

The study also finds a substantial positive correlation between project management and self-efficacy at PetroMasila, as seen in Figure 4.16 and Table 4.22 (H2 accepted, $\beta = 0.578$, $t = 10.331$, $p = 0.000 < 0.01$), consistent with prior research (Bayraktar, 2020; Liu, 2020; Cattelino, 2019). Effective self-assessment in changing environments is crucial for project managers, influencing PetroMasila's employees' self-efficacy towards sustainable growth. The study underscores the importance of understanding managers' self-evaluation, self-efficacy, and talents for successful project outcomes at PetroMasila. Overall, project management and self-efficacy serve as significant indicators for predicting performance and sustainable growth at PetroMasila in Yemen.

c) Hypothesis Three: The relationship between self-efficacy of employees and sustainable development of PetroMasila in Yemen (H3)

The study supports the third hypothesis, confirming a significant impact of self-efficacy on PetroMasila's sustainable growth, as seen in Figure 4.9 and Table 4.22 ($\beta = 0.536$, $t = 6.56$, $p = 0.000 < 0.001$), in line with previous research. It underscores self-efficacy's role in strategic management for organizational goal attainment and its correlation with project management. General management studies emphasize self-efficacy as a pivotal predictor of work success. Smart-PLS analysis indicates self-efficacy's importance in cultivating personal characteristics crucial for sustainability in modern environments. The findings underscore self-efficacy as a valuable human resource feature for fostering sustainable development within the organization, with strategic management efforts aligning selection processes with self-efficacy for achieving organizational objectives.

4.2.11 Sub-Hypotheses Results

The eight direct subhypotheses linked to the purpose of this study were experimentally examined. As illustrated in Figure 4.17, Smart-Pls was used to do structural equation modelling.

1. The relationship between Project Management elements (PM, TM, BM, RA) and Sustainable Development

The outcomes of the causal routes are provided in Table 4.23. The (PM) planning management had a positive (=0.355, t=6.569, p=0.000) influence on sustainable development, but (TM) time management had a negative (=-0.161, t=2.210, p=0.000) impact on sustainable development. H1.1 and H1.2 are therefore supported.

Alternatively, neither the (BM) cost management nor the (RA) risk management had any impact on sustainable development (=0.010, t=0.157, p=0.875 and =0.056, t=0.655, p=0.513, respectively). Thus, the researcher rejected these ideas (H1.3 and H1.4). Table 4.23 and Figure 4.10 summarise the direct subhypotheses associated with sustainable development.

Table 4.23: Summary of Direct Sub-Hypotheses with Sustainable Development

H	Relation	Original Sample (β	Standard Deviation (STDEV)	t-value (C.R)	p-value	Result
H1.1	PM ⟶ SD	0.355	0.054	6.569	0.000	Supported
H1.2	TM ⟶ SD	-0.161	0.073	2.210	0.028	Supported
H1.3	BM ⟶ SD	0.010	0.065	0.157	0.875	Not Supported
H1.4	RA ⟶ SD	0.037	0.056	0.655	0.513	Not Supported

2. The relationship between Project Management elements (PM, TM, BM, RA) and Self-Efficacy

Table 4.24 and Figure 4.10 reveal that (TM) time management (=0.300, t=4.362, p=0.000), (BM) cost management (=0.190, t=2.840, p=0.005), and (PP) previous performance (=0.121, t=2.036, p=0.043) had a substantial and favourable impact on self-efficacy. The hypotheses H2.2, H2.3, and H2.4 are therefore supported. On the other hand, (PM) planning management had no effect on self-efficacy. The hypothesis (H2.1) was thus not supported. The self-efficacy subhypotheses are displayed in Table 4.24 and Figure 4.10.

Table 4.24: Summary of Direct Sub-Hypotheses with Sustainable Development

H	Relation	Original Sample (β	Standard Deviation (STDEV)	t-value (C.R)	p-value	Result
H2.1	PM ⟶ SE	0.051	0.063	0.802	0.424	Not Supported
H2.2	TM ⟶ SE	0.300	0.069	4.362	0.000	Supported
H2.3	BM ⟶ SE	0.190	0.067	2.840	0.005	Supported
H2.4	RA ⟶ SE	0.121	0.059	2.036	0.043	Supported

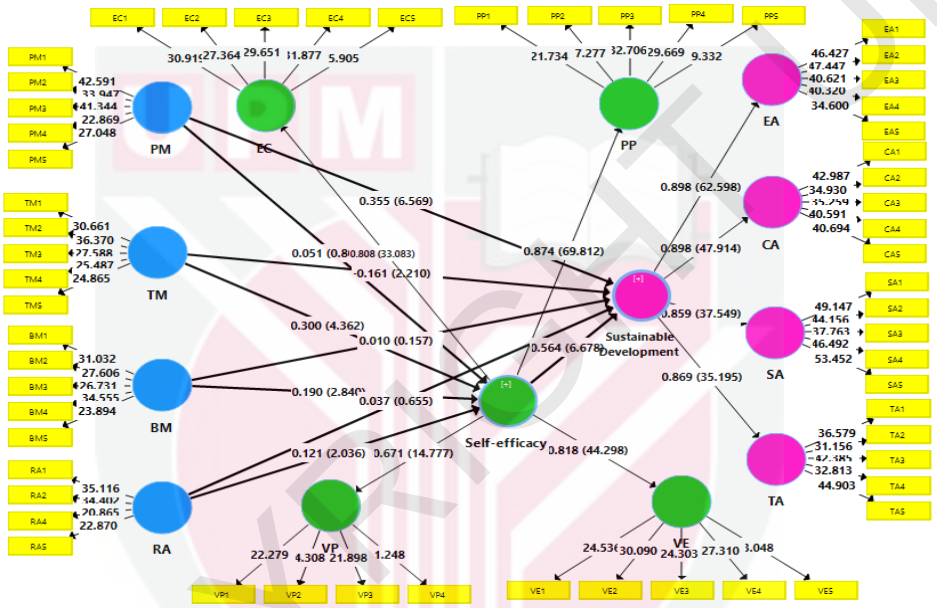

Figure 4.10: Structural Model with Sub-Hypotheses (Bootstrapping)

4.2.12 Mediating Effect (Indirect Hypotheses Results)

The study conducted a mediation analysis using SEM and PLS to find and evaluate the mediating influence of self-efficacy between project management aspects (planning management, time management, cost management, and risk management) and sustainable development.

A mediation test measures the indirect impact of the independent variable on the dependent variable via a mediator. In this work, the mediation test was based on the PLS bootstrapping method; hence, the hypotheses were examined using the PLS method (Wold, 1985). The PLS-SEM method is gaining popularity and acceptance among management and marketing researchers (Abubaker, Mokhtar & Abdulattef, 2014; Hiu Fai, Wong & Lau, 2014). Since it is suited for evaluating complicated multivariate main and indirect effects models (Mediation), such as the model of this study, the bootstrap

PLS approach was employed to determine the statistical significance of important path coefficients (Chin, 2010). In addition, PLS employs route analysis and simultaneously evaluates direct and indirect impacts (Bontis, Booker & Serenko, 2007).

According to Mallinckrodt et al. (2006), "bootstrap approaches are especially beneficial for investigating sample distributions. These methods treat the gathered research sample as a "population reservoir" from which a large number of random samples are pulled with continuous replacement so that the chance of selecting any particular example stays constant across each random draw.

In addition, Hair et al. (2013) recently advocated the use of bootstrapping for mediating analysis, noting that "when testing mediating effects, researchers should rather follow Preacher and Hayes (2008) and bootstrap the sampling distribution of the indicator effect, which works for simple and multiple mediator models" (p. 223). In addition, the bootstrapping method is ideal for PLS-SEM since it makes no assumptions about the shape of the variables' distribution or the sampling distribution of the statistics and may thus be used to small sample sizes (Hair et al., 2013; Preacher & Hayes, 2008).

Self-efficacy (SE) might influence the relationship between project management and sustainable development (=0.310, t=7.420, p=0.000 0.01).

Using self-efficacy as a mediator, project management has a large and beneficial effect on sustainable development (main indirect effect). In addition, the results demonstrated that self-efficacy mediated the relationship between time management (TM), cost management (BM), risk management (RA), and sustainable development (SD). The t and p-values for the variables TM, BM, and RA were (t=3.578, p=0.000), (t=2.618, p=0.010), and (t=2.397, p=0.017), respectively.

The link between time management, cost management, risk management, and sustainable development was therefore mediated by self-efficacy.

In contrast, self-efficacy did not moderate the relationship between planning management (PM) and sustainable development (SD) due to statistically unacceptable T and p-values (t=0.824, p=0.411> 0.05). Table 4.25 and Figure 4.17 summarise the testing of the indirect effect's major and subhypotheses.

Table 4.25: Summary of Hypotheses Testing for the Indirect Effect (Mediating Results)

Hypotheses	Relation	Original Sample (β)	Standard Deviation (STDEV)	T-value	P Value	Result
H4: Main Indirect Hypothesis	PMA->SE-> SD	0.310	0.042	7.420	0.000	Supported
H4.1	PM->SE -> SD	0.026	0.031	0.824	0.411	Not Supported
H4.2	TM->SE-> SD	0.152	0.043	3.578	0.000	Supported
H4.3	BM->SE-> SD	0.096	0.037	2.618	0.010	Supported
H4.4	RA->SE-> SD	0.061	0.025	2.397	0.017	Supported

4.2.13 Objective Two Achieved

Objective Two: To investigate the role of self-efficacy as a mediator on the relationship between project management and sustainable development of PetroMasila in Yemen.

Hypothesis Four: Self-Efficacy mediated on the relationship project management and sustainable development (Indirectly hypothesis) (H4)

The study supports the fourth hypothesis, confirming self-efficacy as a mediator significantly influencing the positive relationship between project management and sustainable development, as seen in Figure 4.10 and Table 4.25 (indirect hypothesis coefficient = 0.310, t = 7.420). Decision-makers commonly use self-efficacy to motivate employees, enhancing their talents and addressing workplace challenges. PetroMasila's workers attribute self-efficacy to overcoming work-related difficulties. Four critical personal competences, including prior performance, vicarious experience, verbal persuasion, and emotional cues, substantially contribute to increased self-efficacy. The study recognizes the context and task-dependent nature of self-efficacy beliefs, emphasizing its multidimensional character across various domains (Bandura, 1997; Schunk & Pajares, 2009).

4.2.14 Objective Three Achieved

Objective Three: Validation the Developed Model

The study aims to propose a framework based on sustainable development and self-efficacy theories to elucidate determinants of sustainable development at PetroMasila in Yemen. The integrated framework includes a feedback function for assessing sustainability in project management. The structural model aligns well with the data, as evidenced by squared multiple correlations (R^2) of 0.481 and 0.334 for sustainable development and self-efficacy, respectively (Table 4.17, Figure 4.5). Reliability measures, including Cronbach's alpha and composite reliability, surpass the acceptable threshold of 0.60. Verbal persuasion's Cronbach's alpha ranges from 0.750 to 0.883, and composite reliability from 0.841 to 0.815 (Table 4.13). Loading values for all items exceed 0.70, ensuring convergent validity. Average Variance Extracted (AVE) values range from 0.545 to 0.682, meeting the criterion of >0.50. Discriminant validity is confirmed through correlation matrix findings (Table 4.14). Variance Inflation Factor (VIF) values under 5 (Table 4.15) indicate the absence of multicollinearity. The Standardized Root Mean Square Residual (SRMR) of 0.077 (Saturated Model) and 0.080 (Estimated Model) signifies a satisfactory fit (Table 4.20). Path coefficient results (Tables 4.22, 4.23, 4.24) affirm a significant positive association between project management, self-efficacy, and sustainable development at PetroMasila. Notably, self-efficacy moderates and mediates these relationships, providing valuable insights into the role of project management in sustainable development, specifically within the context of PetroMasila in Yemen.

4.2.15 Summary of the Findings

Having provided all findings, including hypotheses for the main and secondary effects, in the preceding section, Table 4.26 provides a summary of the outcomes pertaining to all hypotheses investigated.

Table 4.26: Summary of the Hypotheses Results

Variable	**Direct effect with Sustainable Development**		**Direct effect with Self Efficacy**		**Mediating effect via Self-Efficacy**	
	Hyp.no	Results	Hyp.no	Results	Hyp.no	Results
Project Management	H1	√	H2	√	H4	√
Self-Efficacy	H3	√	----	----	----	----
Planning Management	H1.1	√	H2.1	**X**	H4.1	**X**
Time Management	H1.2	√	H2.2	√	H4.2	√
Cost Management	H1.3	**X**	H2.3	√	H4.3	√
Risk Management	H1.4	**X**	H2.4	√	H4.4	√

4.3 Qualitative Phase

This qualitative study analyzes data to explore the impact of self-efficacy as a mediator between project management and sustainable development. Following a thematic analysis approach, six in-depth interviews with major corporations serve as case studies (Basit, 2003; Jones, 2007). Utilizing ATLAS.ti 8, transcribed data undergo coding and categorization to systematically organize and interpret information. Thematic analysis aids in identifying patterns, themes, and connections within the data, contributing to a comprehensive understanding of the relationships between project management, self-efficacy, and sustainable development.

4.3.1 Projects Experts Interview

Six project specialists were interviewed semi-structured to evaluate the project management process. From September 2022 to February 2023, about five months were devoted to collecting data through fieldwork. The average time of the interviews was 120 minutes, ranging from 45 to 200 minutes. To guarantee contextual richness and prevent fragmentation, every interview was done at the interviewee's house (Foster, 2004, p. 230). Each respondent was assigned a unique alphanumeric identifier for identifying purposes, and Table 4.27 contains information about their histories and organisations.

4.3.1.1 Company & Projects Information

This section is intended to collect the company and project information indicated in Table 4.27.

Table 4.27: Company and Projects Information

Interviewer	Company Name	Project Title	Project Description	Project Status
P01	Royal Dutch Shell	Gamba Southern Integrated Project (GSIP) (Gabon)	The Gamba Southern Integrated Project (GSIP) is a project to develop the Gabonese offshore Gamba and Toucan resources, with an emphasis on environmental preservation and sustainability. The overall cost of the project, which began in 2012 and was completed in 2019, was $1.8 billion. Installation of subsea production infrastructure, oil wells, pipelines, and onshore processing facilities with an estimated daily oil production capacity of 70,000 barrels is required.	Duration: 7 Years Budget: $1.85B US ☒ Finish ☒ Success
P02	Total Energies	Egina Field Development Project (Nigeria)	By developing a deep-water oil well in the Niger Delta, the Egina Field Development Project planned to increase Nigeria's oil output and reserves, resulting in an additional 200,000 barrels of oil per day. The project, which comprises a floating production, storage, and offloading vessel and subsea infrastructure, will be spearheaded by Total Energies in partnership with the Nigerian National Petroleum Corporation and other international oil corporations, creating jobs and fostering economic progress in the region.	Duration: 7 Years Budget: $16.55B US ☒ Finish ☒ Success

Table 4.27: Continued

Interviewer	Company Name	Project Title	Project Description	Project Status
P03	Mubadala Petroleum UAE Co.	Pegaga gas field (Malaysia)	Mubadala Petroleum and PETRONAS are collaborating on the Pegaga gas resource project in Block SK320, offshore Sarawak, Malaysia. The initiative involves constructing a gas processing plant, central processing platform, subsea production systems, and pipelines to transfer gas to an onshore facility in Bintulu. INSTEP and Mubadala Petroleum are working together to evaluate offshore employees' skills. Gas production is expected to commence in 2021	Duration: 4 Years Budget: $1.1B US ☐ Finish ☒ Success
P04	Abu Dhabi National Energy Company (TAQA)	Atrush oil field development project (Iraq)	The Atrush oil field development project, which TAQA and the Kurdistan Regional Government are partnering on, seeks to produce up to 30,000 barrels of oil per day. The project started in 2013 and is anticipated to be finished in 2030 at the cost of $1.2 billion. It concerns the development of the Atrush oil field in Iraq's Kurdish area.	Duration: 14 Years Budget: >$1.1B US ☐ Finish ☒ Success
P05	PETRONAS Gas Berhad	Terengganu Gas Terminal project. (Thiland)	The Terengganu Gas Terminal (TGAST) handles 700 million standard cubic feet per day of gas to provide gas supply security and sustainability for Peninsular Malaysia consumers and Petronas facilities. The project was completed in 2017 and represents Petronas' commitment to greener energy, hence assisting Malaysia's environmental goals. PETRONAS Gas Berhad owns and runs the plant, which has the capacity to process 1.2 billion standard cubic feet per day of natural gas and generate 3.8 million tonnes of LNG per year.	Duration: 4 Years Budget: >$1.2B US ☒ Finish ☒ Success

4.3.1.2 Self-Efficacy & Sustainable Development significant activities

This section describes how project managers dealt with qualitative conflicts, which eventually increased employee self-efficacy in project management and led to considerable sustainable development success. Importantly, these sustainable development activities must lie outside the scope of the project and take place within two months following the self-efficacy activity outlined in Table 4.28.

The first participant from Royal Dutch Shell highlighted the positive impact of virtual reality training on employee skills and confidence. Implementation of fungi-based bioremediation reduced accidents in oil pond cleanup. Integrating environmental management systems demonstrated a commitment to sustainability through non-routine actions, emphasizing staff development.

The second participant from Total Energies described how staff wellness initiatives raised employee self-efficacy and enhanced sustainability results. The company's wellness services included health education and coaching, fitness activities, and approaches for stress management. In addition, the firm built greywater recycling systems to minimise portable water usage and employed fuel additives and smart charging systems to improve energy consumption.

The third participant from Mubadala Petroleum UAE Co. described the company's reassessment programme, which evaluated staff competencies in project management, coping with risks and uncertainties, leadership, and influence. This initiative resulted in employment rotations, with top roles within projects being filled by people with extensive experience. The switch to biosurfactants, an ecologically friendly alternative, and collaboration with local schools for educational initiatives also helped to sustainability efforts.

The fourth participant from Abu Dhabi National Energy Company (TAQA) highlighted HR's use of Smart goal-setting software, boosting employee confidence and productivity. The activation of a sewage sludge process for water recovery, exploring vehicle upgrades, underlines their commitment to sustainability.

The fifth participant from PETRONAS Gas Berhad detailed the Local Workforce Development Program, which entailed the training and integration of 30 personnel into the project team. This programme increased self-efficacy and led to advances in sustainability, such as converting diesel engines to run on natural gas and remediating an old pond with novel technology to remove salt and sludge.

The remarks of the five participants indicate the effect of self-efficacy implementation on sustainability and emphasise the need of enhancing employee abilities and confidence via training and evaluations in order to promote sustainable development.

Table 4.28: Self-Efficacy & Sustainable Development significant activities

Interviewer	Q1. Can you provide one examples of the most effective activities (non-routine) related to the variable of self-efficacy that were implemented and resulted in a significant increase in employee self-efficacy?	Self-Efficacy Program	Q3. Provide Examples of unplanned, non-routine sustainable development activities, post-significant employee self-efficacy changes, are sought	SD Action
P01	The company has utilized virtual reality training systems, incorporating advanced technologies to create a hands-on, risk-free training experience. Utilizing virtual reality headsets and other hardware, these systems can simulate emergency response scenarios, hazardous work conditions, and equipment operation, improving employees' skills and confidence. This approach provides a safe and controlled environment for training while reducing costs and risks associated with traditional training methods.	Virtual reality training systems	▪ Substituting harsh chemicals with fungi-based bioremediation in oil pond treatment accelerates hydrocarbon breakdown, promoting sustainability through a natural approach. ▪ The company achieved success in implementing a $100k environmental management system for the gas processing plant, monitoring and mitigating environmental impacts, ensuring a sustainable approach. ▪ The Health and Safety Department's reports indicate that there has been a notable reduction of over 30% in the monthly rate of worker accidents. Additionally, the percentage of errors in the proper response to such incidents has decreased by 50%.	▪ Oil Pond bioremediation techniques ▪ integrate environmental management system

Table 4.28: Continued

Interviewer	Q1. Can you provide one examples of the most effective activities (non-routine) related to the variable of self-efficacy that were implemented and resulted in a significant increase in employee self-efficacy?	Self-Efficacy Program	Q3. Provide Examples of unplanned, non-routine sustainable development activities, post-significant employee self-efficacy changes, are sought	SD Action
P02	The company has implemented employee wellness programs with the aim of enhancing the overall health and well-being of employees within the workplace. These programs consist of health education and coaching, healthy food options, fitness programs with wearable fitness trackers, stress management techniques, and sports coaching classes. This is to reduce employee stress levels, improve focus, ensure from their safety and increase performance.	Employee wellness programs	▪ Fuel additives (Lubricity Enhancers) enhance diesel engine efficiency, achieving a 6% improvement by optimizing combustion or minimizing friction between moving parts ▪ Smart charging systems optimize electric vehicle battery charging, extending battery life by 15% through algorithm-based optimal charging rates, reducing time and energy consumption ▪ Greywater recycling captures and treats water from sinks, showers, and washing machines, reducing portable water consumption by 35% through non-potable reuse in applications like irrigation.	▪ Fuel additives ▪ Smart charging systems ▪ Greywater recycling systems

Table 4.28: Continued

Interviewer	Q1. Can you provide one examples of the most effective activities (non-routine) related to the variable of self-efficacy that were implemented and resulted in a significant increase in employee self-efficacy?	Self-Efficacy Program	Q3. Provide Examples of unplanned, non-routine sustainable development activities, post-significant employee self-efficacy changes, are sought	SD Action
P03	The company has established an employee reassessment program to evaluate the competency of employees in the projects department, focusing on their knowledge and proficiency in managing projects, dealing with uncertainties and risks, demonstrating leadership skills, and ability to influence their colleagues. The evaluation process involves written and oral examinations, using a comparative scale to assess each employee's performance against their peers. After the evaluation, job rotations were implemented, with more experienced and influential individuals appointed to senior administrative positions within the projects.	Employees reassessment program	▪ Company enhances their community involvement is to provide support for education by collaborating with local schools or community organizations to offer educational programs (Providing equipment,Offering internships,coaching) focused on career development, environmental sustainability, and energy conservation. (program cost around $1M US) ▪ Company has transitioned their oil emulsion to biosurfactants, which are biodegradable emulsifiers that do not harm aquatic life. This approach is sustainable and environmentally friendly. Furthermore, the expense of biosurfactants decreased as production methods improve and become more efficient by 5%.	▪ Offer educational programs for local schools or community ▪ Oil emulsion replacement

Table 4.28: Continued

Interviewer	Q1. Can you provide one examples of the most effective activities (non-routine) related to the variable of self-efficacy that were implemented and resulted in a significant increase in employee self-efficacy?	Self-Efficacy Program	Q3. Provide Examples of unplanned, non-routine sustainable development activities, post-significant employee self-efficacy changes, are sought	SD Action
P04	The HR department has implemented a Smart goal-setting software to assist employees in establishing specific, measurable, achievable, relevant, and trackable individual and team goals in the areas of sustainability, safety, and performance. This software enables managers to monitor their team's progress, provide feedback, and offer coaching as required. This program has contributed to the enhancement of employees' self-efficacy, resulting in an increase in their confidence and productivity (2 months from extensive training)	Smart goal-setting software	▪ The company implemented a sewage sludge process, where aeration and agitation facilitated microorganisms breaking down wastewater organic matter, reducing biological oxygen demand. Achieving an 85% recycle rate, treated water at $350/gallon of capacity was successfully reused in agriculture and irrigation. ▪ The company contemplates improving heavy loading trucks by substituting heavy metal tanks with corrosion-resistant aluminum or high-strength composites. This $200K modification enhances fuel efficiency, eases transportation, and mitigates environmental risks from potential fuel leakage during transit.	▪ Sewage system treatment ▪ Truck tank modification

Table 4.28: Continued

Interviewer	Q1. Can you provide one examples of the most effective activities (non-routine) related to the variable of self-efficacy that were implemented and resulted in a significant increase in employee self-efficacy?	Self-Efficacy Program	Q3. Provide Examples of unplanned, non-routine sustainable development activities, post-significant employee self-efficacy changes, are sought	SD Action
P05	Local Workforce Development Program conducted to involve local staff in the project's phase during the 3-year implementation phase. Provide 30 employees with extensive theoretical and technical training, including 6 months of on-the-job training at liquefied gas plants in Egypt, Indonesia, and Oman. After training, they were integrated into the projects team.	Local Workforce Development Program	▪ Companies can optimize diesel engines by replacing select parts with those designed for natural gas compatibility, including fuel injectors and spark plugs. Converting to a dedicated natural gas engine, along with ECU modifications, yields a 90% cost saving, equivalent to $6M US/Month ▪ The company revitalized an aging pond using advanced techniques, including skimming, heating, and water circulation, effectively removing sludges and eliminating water salinity. This $1M project resulted in $3M cost savings, with around 70% of pond oil successfully recovered.	▪ Diesel engines modification ▪ Aging pond remediation by advanced Technology

4.3.1.3 Self-efficacy Impact on Performance

Participants were asked an open-ended question on their perceptions of the relationship between their self-efficacy and work performance in this section. All replies emphasised a favourable link between self-efficacy and work performance, as seen in Table 4.29. Participants thought that strengthening their self-efficacy would allow them to better manage problem-solving, stimulate creativity, develop resilience to adversities, and increase their dedication to their profession by enhancing the quality and safety of their output.

Table 4.29: Self-efficacy Impact on Performance

Interviewer	Q2. Based on your experience, how would you describe the relationship between employee self-efficacy and project performance?	Self-Efficacy Influence on Performance
P01	When employees have confidence in their ability to complete a task, they are more likely to take the initiative, be proactive, and address problems.	Positive
P02	When employees have confidence in their ability to complete a task, they are more motivated to exert effort and persevere despite obstacles.	Positive
P03	When employees have confidence in their talents and abilities, they are more inclined to accept responsibility for their job, collaborate with others, and strive for greatness.	Positive
P04	When employees have confidence in their talents, they are more likely to be engaged and devoted to the project, which may result in increased quality, productivity, and safety.	Positive
P05	When people have confidence in their talents, they are more inclined to take measured chances, think creatively, and innovate, which may result in an improvement in productivity, quality, and resource utilisation efficiency.	Positive

4.3.1.4 Sustainable Projects' Approval Requirement

In this section, participants were asked an open-ended question on the motivating elements for managers to approve requests for sustainability initiatives. According to the replies in Table 4.30, the potential benefits to society and the environment affected the management's decision to approve a project. In addition, having a clear timeline and monitoring tools to prevent delays, sufficient resources, a clear contract with the contractor to reduce costs over time, a precise Work Breakdown Structure (WBS), well-

defined risk mitigation, and the participation of all stakeholders were all important factors in gaining management's approval.

The participants' comments emphasized the need for strong self-efficacy and a well-defined work plan for the effective completion of sustainability activities, especially in terms of project management factors such as time, money, risk, and planning. These results highlight the link between the model's major components and the relevance of project management and self-efficacy in attaining sustainable development.

Table 4.30: Factors Impact on Sustainability

Interviewer	**Q4. Can you elaborate on the factors that influenced the management project's approval of sustainable development activities?**	**Positive Relationship with SD**
P01, P02, P03	Employees beliefs, employee's motivation to participate, commitment to environment and local communities, friendly communication plan, and achievable goals.	Self-Efficacy
P02, P04, P05	Time commitments, specific and accurate tasks deadlines, and effective time tracking tools.	Time Management
P02, P04, P03, P05	Additional resources commitments, long-term costs, effective contractor negotiating, and detailed budget plan.	Cost Management
P02, P03, P05	Additional resources and time commitments, obvious risk mitigation strategies, and effective risk audits.	Risk Management
P01, P03	Specific milestones, stakeholder involvement scheme, and precise breakdown structure (WBS).	Planning Management

4.3.1.5 Sustainability Impact on Company

During the session of open-ended questions, participants were questioned as hwon in Table 4.31 about the impact of sustainable refining operations on the project and the organisation.

By lowering environmental effects and increasing health and safety, one participant demonstrated its commitment to sustainability and good business practises. These activities have helped enhance the company's ties with the surrounding community. The second respondent emphasised the importance of preserving employee safety and comfort, which might increase their productivity and attract qualified workers. The third respondent stressed the significance of lowering risks, enhancing ties with the local community, and developing a better sense of duty towards them. The fourth participant emphasised the advantages of cutting expenses, preserving and enhancing the company's reputation, and increasing market competitiveness. The fifth participant proposed investing in technical projects that are consistent with the company's image and retain its market competitiveness.

These results illustrate the numerous benefits of sustainable development initiatives for both the projects and the organization.

Table 4.31: Sustainability Impact on Projects & Organization

Interviewer	Q5. Can you describe the extent of the impact such outstanding sustainable development activities have had on the project and the organization?	Influence of SD Activities
P01	Doing social and environmental impact assessments can aid businesses in identifying and mitigating possible hazards. In addition, it may enhance stakeholder involvement and help them to develop solid partnerships with local communities and governments.	Mitigate potential risks Improve stakeholder engagement
P02	By implementing health and safety measures and fostering the well-being of their employees, businesses may increase their performance and output. It also enhances their reputation as a company that cares for its employees, which may assist them in attracting and retaining top personnel.	Enhance employees' productivity. Attraction of talents.
P03	Sustainable development efforts may assist businesses with regulatory compliance and risk mitigation. Also, it can improve their relationship with local communities, as they will be viewed as environmentally attentive and responsible.	Mitigate risk. Relationship with local communities

Table 4.31: Continued

Interviewer	Q5. Can you describe the extent of the impact such outstanding sustainable development activities have had on the project and the organization?	Influence of SD Activities
P04	By implementing sustainable development initiatives, businesses may save money in the long term while simultaneously enhancing their reputation as a socially responsible organisation, therefore attracting more clients and investors.	Save cost Enhance reputation Market Competition
P05	Investing in the research and development of new technologies and techniques may assist businesses in remaining competitive and ahead of the curve. It can also enhance their reputation as a forward-thinking organisation concerned with sustainability and the environment.	Remain competitive Improve Reputation.

4.3.1.6 Model Effectiveness

Participants' replies to the open-ended question as shown in Table 4.32, evaluating the usefulness of the self-efficacy mediator model in enhancing sustainability results were unequivocal in their recognition of the model's major impact on project success.

Specifically, the participant emphasized that the model provided a framework for integrating sustainability considerations into project management practises, enabling the identification of potential sustainability-related risks and opportunities and the implementation of appropriate actions to address them. The second participant emphasised that the model empowered employees to take ownership of sustainability outcomes and take proactive steps to achieve them, while the third participant emphasised that the model empowered employees to take ownership of their actions and decisions, resulting in a greater sense of accountability and responsibility. The fourth participant mentioned the model's capacity to foster strong partnerships with local communities and other stakeholders. The fifth participant highlighted the relevance of the model in fostering a culture of sustainability inside the firm.

Their cumulative response highlights the importance of the self-efficacy model in enhancing the beneficial link between project management and sustainability results and fostering a culture of sustainability inside businesses.

Table 4.32: Model Effectiveness

Interviewer	Q6. In your opinion, how effective was the self-efficacy model in improving the sustainability outcomes of the project?	Effectiveness
P1	The self-efficacy model provides a framework for incorporating sustainability issues into project management techniques, therefore assisting us in achieving our sustainability objectives. Capable of identifying possible risks and opportunities associated with sustainability and taking the necessary measures to address them.	Positive Active
P2	The self-efficacy paradigm was extremely helpful in enhancing the project's sustainability outcomes. Self-efficacy played a vital part in this process, as it enabled employees to assume responsibility for sustainability goals and take proactive measures to attain them.	Positive Active
P3	The self-efficacy paradigm improved the project's sustainability results by encouraging employees to accept responsibility for their actions and decisions. This resulted in a higher sense of duty and accountability.	Positive Active
P4	It was discovered that the self-efficacy approach significantly improved the sustainability outcomes of our initiatives. It was capable of establishing solid relationships with local communities and other stakeholders.	Positive Active
P5	The self-efficacy paradigm was crucial to our strategy for integrating sustainability into project management methods. Model contributes to the development of a culture of sustainability within a business.	Positive Active

4.3.2 Objective Four Achieved

Objective Four: To Evaluate the Developed Model

The interviews with Royal Dutch Shell, Total Energies, Mubadala Petroleum UAE Co., Abu Dhabi National Energy Company (TAQA), and PETRONAS Gas Berhad participants revealed that enhancing employees' self-efficacy through strategic activities in project management significantly contributed to sustainable development success. Initiatives such as employee wellness, staff development, environmental management systems, reassessment programs, and Smart goal-setting software were identified as

effective strategies for boosting employee abilities and confidence in promoting sustainability. Participants emphasized that increased self-efficacy improves problem-solving, creativity, resilience, and commitment to their profession. Clear timelines, monitoring tools, adequate resources, a well-defined work breakdown structure, risk mitigation, and stakeholder participation were essential for management approval of sustainability initiatives. The findings underscore the crucial role of project management and self-efficacy in achieving sustainable development, providing valuable insights for project managers implementing sustainability programs worldwide. The self-efficacy mediator model proved beneficial in integrating sustainability concerns into project management techniques, fostering a culture of sustainability and strengthening the positive relationship between project management and sustainability outcomes across different countries.

4.4 Implementing SDG 7 in Oil & Gas Industry

Implementing SDG 7, Affordable and Clean Energy, is crucial in the oil & gas industry, encouraging a shift towards sustainable practices and renewable energy sources. Companies can contribute by investing in technologies like solar and wind power, reducing carbon footprints, and promoting clean energy generation. This aligns with two study objectives: enhancing and supporting renewable energy and green technology. The research confirms positive relationships between project management and sustainable development, project management and employee self-efficacy, and employee self-efficacy and sustainable growth at PetroMasila. Notably, technology is a key sustainable development dimension in the study. Applying project management and enhancing self-efficacy are identified as crucial factors contributing to the advancement of green technology (Jayasooria, 2023; Arena, 2023).

4.5 Summary

The chapter employs a mixed-methods approach, starting with a quantitative phase assessing the links between project management, self-efficacy, and sustainable growth. Outlier tests and univariate analysis reveal a positive association between project management, self-efficacy, and sustainable development. Features like planning and time management significantly impact sustainable growth, while cost and risk management show no substantial effect. Self-efficacy mediates the relationship between time management, cost management, past performance, and sustainable growth. Interviews with oil and gas project managers in the qualitative phase affirm a direct and indirect connection between project management, self-efficacy, and sustainability. Implementation of self-efficacy events leads to exceptional sustainable actions, emphasizing project management's role in gaining managerial support for sustainability initiatives. The study suggests that enhancing employee self-efficacy through diverse project management approaches can significantly enhance sustainability, aiding firms in achieving their sustainable development goals and demonstrating commitment to ethical practices.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

This chapter explores the empirical link between project management, self-efficacy, and sustainable development at PetroMasila in Yemen. Section 5.1 introduces the study's purpose, emphasizing self-efficacy as a mediator. Section 5.2 discusses objectives, confirming positive influences on sustainable development. Section 5.3 introduces novelty, integrating technology and utilizing Smar-PLS. Sections 5.4 and 5.5 explore theoretical and practical implications, recommending actions for industry leaders. Section 5.6 concludes this argument with closing observations.

5.1 Introduction

This chapter explains in depth the primary purpose of this study, which is to establish the empirical link between project management, self-efficacy, and sustainable development. In addition, the function of self-efficacy as a mediator in the link between project management and sustainable development among PetroMasila personnel in Yemen was investigated. It also describes the major and minor self-efficacy characteristics that have a favourable impact on Petromasilain personnel in Yemen who work in sustainable development.

In addition, this chapter explains why sustainable development theory and self-efficacy theory (underlying theories) are the most appropriate model for this study of the influence of Project Management on Sustainable Development and the role of self-efficacy as a mediating effect between Project Management and Sustainable Development among PetroMasila employees in Yemen. In addition, this chapter evaluates and develops a model of a project management element that impacts sustainable development through self-efficacy for the PetroMasila Corporation in Yemen. The chapter also analyses the consequences of the findings for academics, practitioners, and policymakers. In addition, it describes the study's shortcomings and makes suggestions for further research.

5.2 Conclusion

The chapter discusses findings related to sustainable development factors, project management elements, and self-efficacy. Eight of eleven direct hypotheses are significant, indicating a positive influence of project management, self-efficacy, planning management, and time management on sustainable development. However, cost management and risk management show no direct effect on sustainable development, while planning management has no impact on self-efficacy. Employees emphasize the importance of project management, self-efficacy, planning management, and time management for sustainable development.

Objective one is achieved by exploring the direct relationships between project management, self-efficacy, and sustainable development. Hypothesis One confirms a positive influence of project management on sustainable development, aligning with existing research. Hypothesis Two establishes a significant correlation between project management and self-efficacy among PetroMasila employees. Hypothesis Three affirms the impact of self-efficacy on sustainable growth at PetroMasila, emphasizing its importance for organizational success.

Objective Two is achieved as Hypothesis Four confirms self-efficacy as a mediator between project management and sustainable development.

Objective Three involves validating the developed model. The study proposes a framework integrating sustainable development and self-efficacy theories. Validation indicates a satisfactory fit, with reliability and validity measures meeting acceptable thresholds. The study highlights the multidimensional nature of self-efficacy and its role in PetroMasila's sustainable development.

Objective Four is to evaluate the developed model through interviews with industry participants. The findings underscore the strategic role of project management and self-efficacy in achieving sustainable development. Strategic activities, employee wellness, and effective management practices contribute to sustainability success.

The study successfully achieves its objectives, providing insights into the relationships between project management, self-efficacy, and sustainable development within PetroMasila. The integrated model offers valuable implications for academia and industry, emphasizing the importance of self-efficacy as a mediator and the strategic role of project management in fostering sustainability

5.3 Novelty of the Study

1. This study introduces a novel investigation into the direct effects relationship between project management strategies and the self-efficacy of employees on sustainable development initiatives, offering a comprehensive understanding of their interconnectedness in the context of PetroMasila, Yemen.

2. By examining the mediating role and indirect effects of self-efficacy within the relationship between project management practices and sustainable development outcomes, this study unveils a nuanced understanding of the mechanisms driving sustainable growth in the oil, gas, and energy sectors of developing nations.

3. The development of a model delineating the intricate relationship between self-efficacy, project management methodologies, and sustainable development represents a significant contribution to the field, providing a structured

framework for analyzing and fostering sustainable development efforts in similar contexts.

4. This study undertakes a rigorous evaluation and validation of the proposed model, elucidating its efficacy in explaining the dynamics between project management strategies and sustainable development outcomes. This evaluative process not only enhances the robustness of the study but also contributes to methodological advancements, particularly in the application of the Smar-PLS approach within the Yemeni research landscape.

5.4 Recommendation of the Study

The study underscores the necessity for industry leaders, policymakers, and government officials to grasp the reasons behind the lacking self-efficacy among PetroMasila employees in Yemen, hindering interpretations of decreasing sustainable development. The insights provided by this study can offer valuable information for these stakeholders. It emphasizes the need for policymakers to prioritize the impact of project management components and self-efficacy factors on sustainable development at PetroMasila.

In light of the findings, the study advocates for the Yemeni government to promote project management aspects and enhance self-efficacy features within oil and gas industry companies, facilitating progress and sustainable growth. A noteworthy potential lies in altering the perspectives of organizational leaders who believe that employees can more effectively engage with operational technology, enhancing the likelihood of success in adopting sustainable development.

Additionally, the study recommends attention from policymakers, organization managers, and practitioners to maximize project management factors such as planning, time, cost, and risk management. These factors have been empirically shown to influence and enhance employees' self-efficacy towards sustainable development in PetroMasila in Yemen.

The study proposes several recommendations to ensure sustainable development. The government is advised to create rules and regulations to facilitate the adoption of sustainable development, enhancing project management efficiency. A staff sustainability action plan aligned with the study's ideas is recommended, and PetroMasila is urged to enhance system quality, especially in policy, objectives, audit results, and data analysis domains, before adopting sustainable project management.

To achieve sustainable development, the study suggests integrating awareness into strategic decision-making processes and implementing labor standards, health and safety measures, and equitable opportunities within the PetroMasila corporation. Decision-makers across industries are urged to prioritize self-efficacy for organizational goal attainment. Offering staff development opportunities based on the study's findings is proposed to improve project management application at PetroMasila. The study

concludes by advocating for a continuous examination of global technical progress to identify trends promoting project sustainability, emphasizing the need for current and inclusive sustainable development practices that involve both front-end and back-end stakeholder participation.

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APPENDICES

Appendix 1

Relationship between project planning management and sustainable development

The fifth hypothesis examines the connection between project planning management and sustainable development. The subsequent investigations provided a conceptual model that explains why such a link occurs.

In several domains, including governance (Narang & Reutersward, 2006; Harikrishnan & Mahendra, 2021), agriculture (Timofeeva, 2020), and local competitiveness, strategic planning has been determined to be a vital component of sustainable development (Ioppolo et al., 2016). Moreover, Dyachenko (2021) discovered that strategic planning is essential for sustainable growth. This indicates that companies with a well-defined strategy for the future are more likely to produce sustainable outcomes in terms of economic, social, and environmental impact. Strategic planning is a key component of sustainable development, and companies with a well-defined strategy for the future are more likely to achieve sustainable results in terms of economic, social, and environmental impact (Narang & Reutersward, 2006; Harikrishnan & Mahendra, 2021; Timofeeva, 2020). Hence, including strategic planning into project planning management may significantly help to the sustainable growth of PetroMasila. The prior dialogue proposes the following hypothesis:

Hypothesis 1.1 (H1.1)

There is a positive relationship between project planning management and sustainable development of PetroMasila in Yemen. (Direct relationship)

Relationship between project time management and sustainable development

The sixth hypothesis examines the connection between project time management and sustainable growth. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Mussbacher & Nuttall (2014) discovered that time helps individuals use resources more efficiently and lower the time required for certain activities connected with meeting those demands, which will result in returns over time in the form of saved time and/or resources. FM (2015) revealed that project management is vital for organisational performance and taking care of the environment and sustainable development goals. Kharkheli (2020) discovered that time management is essential for establishing lasting success and properly managing resources. Bornemann & Strassheim (2019) discovered that there are several methods to sustainability governance that interact with time in a variety of ways, highlighting the need of good time management in sustainable development. Devetter & Rousseau (2011) claimed that shortening working hours can reduce environmental effect, boost productivity, and save natural resources. Focus levels promote waste reduction during manufacturing while leisure activities decrease consumption.

Thus, to promote sustainable development in PetroMasila, project managers is recommended to integrate sustainable time management methods into their project planning and administration. The following notion is suggested by prior discourse:

Hypothesis 1.2 (H1.2)

There is a positive relationship between project time management and sustainable development of PetroMasila in Yemen. (Direct relationship)

Relationship between project cost management and sustainable development

The seventh hypothesis examines the connection between project cost management and sustainable development. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Several academics have discovered that cost management is vital to accomplishing sustainable development objectives. Yun (2007) proposes that it is feasible to cut costs and promote sustainable development by enhancing independent innovation in the building cost evaluation business. Duman et al. (2013) believe that decreasing costs may be accomplished by minimising detrimental environmental impacts throughout the transformation of raw materials into finished goods. Similarly, Wanass and Shahaza (2020) discovered that using the target cost approach to assess product costs can contribute to sustainable development. Le (2018) stated that cost management is a technique that improves both financial and environmental outcomes. While Bello (2020) argues that sustainable business practises have the ability to cut operational costs, boost productivity, and raise enterprises' market value and revenue.

Cost management is essential to accomplishing sustainable development objectives, and firms may lower costs by implementing sustainable business practises, fostering independent innovation, and employing contemporary management accounting methodologies. In order to assist sustainable development, PetroMasila may use the cost management practices. The previous dialogue proposes the following hypothesis:

Hypothesis 1.3 (H1.3)

There is a positive relationship between project cost management and sustainable development of PetroMasila in Yemen. (Direct relationship)

Relationship between project risk management and sustainable development

The eighth hypothesis examines the relationship between project risk management and sustainable development. The subsequent investigations provided a conceptual model that explains why such a link occurs.

By minimising the challenges provided by climate change, desertification, land degradation, and food insecurity, the application of risk management measures has been proved to be a crucial component in fostering sustainable development (Hurlbert, M., Krishnaswamy et al., 2019). Bakhtiari (2014) concludes that risk management is a potent tool for sustainable development and that the management of significant systematic risks and natural hazards is vital for sustainable development. In addition, the incorporation of ecological, socioeconomic, and corporate risk elements into company management,

as proposed by Ayse & Triant (2010), can provide economic and financial value while simultaneously boosting environmental and social responsibility awareness. Krysiak (2009) discovered that defining sustainability as the requirement to reduce the risk of injuring future persons offers a framework in which risk management methods, such as mean-variance analysis, may be used to examine planning decisions and to compute a risk-minimizing policy mix.

It is crucial to emphasise, however, that short-term risk management methods alone may not be adequate for effective sustainable growth. Gheorghe (2012). (2012). The effects of climate change may potentially be overlooked or understated by conventional risk management techniques. Dyer et al (2017). Therefore, PetroMasila adopting appropriate risk management techniques may assist the organisation in achieving its sustainable development objectives while simultaneously generating economic and financial value. The prior dialogue proposes the following hypothesis:

Hypothesis 1.4 (H1.4)

There is a positive relationship between project risk management and sustainable development of PetroMasila in Yemen. (Direct relationship)

Relationship between project planning management and employees' self-efficacity

The ninth hypothesis examines the link between project planning management and employee self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Studies by Azizli et al. (2015) and Luszczynska et al. (2010) suggest that planned management may enhance employees' self-efficacy by defining attainable objectives and providing the necessary tools to achieve those goals. This helps to lessen emotions of uncertainty and worry (Howard & Gould, 2000). Planned management increases self-efficacy by giving a framework for managers and workers to operate within, which enables individuals the liberty they require (Jankowtcz, 2007). In addition, Stanfield (2018) emphasises the significance of self-efficacy and work experience in the adoption and efficient use of project management methodologies. Thomas et al. (2008) argued that implementing a planned management approach can boost self-efficacy because it provides structure that simplifies the completion of difficult activities by breaking them down into smaller segments with attainable milestones along the way. This helps employees feel motivated and confident over the full project timeline. According to Kovacic and Filzmoser (2014), planning management can help individuals develop confidence in their abilities and increased self-efficacy by providing structure within which they can work efficiently and successfully complete projects with greater ease than if left without guidance or support from others.

These results imply that an effective project planning management system at PetroMasila may increase employees' feeling of self-efficacy, which can then lead to more effective and successful planning and behaviour. The following notion is suggested by prior discourse:

Hypothesis 2.1 (H2.1)

There is a positive relationship between project planning management and self-efficacy among PetroMasila employees in Yemen. (Direct relationship)

Relationship between project time management and employees' self-efficacity

The tenth hypothesis examines the link between project time management and employee self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Based on the findings of Osman (2018), Kim et al. (2011), Salk et al. (2021), Geisler & Allwood (2018), and Garcia (2020), it can be anticipated that there is a favourable association between project time management and the employees' self-efficacy. It has been demonstrated that self-efficacy mediates the link between time management and student achievement (Osman, 2018). In addition, Kim et al. (2011) revealed that time management abilities are crucial in boosting nursing students' behaviour and self-efficacy. The research done by Salk et al. (2021) revealed a favourable association between time management skills, average academic accomplishment, and self-efficacy levels. Garcia (2020) also proved that improvements in time management and self-efficacy can enhance happiness and productivity. According to Minghui et al. (2021), professional decision-making self-efficacy mediates the relationship between college students' time management orientation and career decision-making anxiety. Geisler and Allwood (2018) discovered that by managing time well, this enhanced confidence immediately leads to greater levels of self-efficacy since you know what has to be done within certain deadlines without feeling overwhelmed by stresses associated with procrastination, etc.

These results imply that an efficient project time management system at PetroMasila can increase employees' feeling of self-efficacy, which can then lead to more effective and successful planning and behaviour. The following notion is suggested by prior discourse:

Hypothesis 2.2 (H2.2)

There is a positive relationship between project time management and self-efficacy among PetroMasila employees in Yemen. (Direct relationship)

Relationship between project cost management and employees' self-efficacity

The eleventh hypothesis examines the link between project cost management and employee self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

On the basis of the following data, it is possible to predict that there is a positive association between project cost management and the self-efficacy. Higher levels of self-efficacy are associated with better cost management techniques and a greater chance of entrepreneurial success, according to studies (Schonfeld et al., 2017; Cassar & Friedman, 2011). Moreover, managers' knowledge of cost management can attenuate the effect of budget involvement on self-perceptions of managerial performance, and cost management knowledge influences people's self-efficacy (Agbejule & Saarikoski, 2006; Kristiani, 2021).

These results imply that an efficient project cost management system at PetroMasila may boost the employees' feeling of self-efficacy, which can then result in more

effective and successful planning and behaviour. The following notion is suggested by prior discourse:

Hypothesis 2.3 (H2.3)

There is a positive relationship between project cost management and self-efficacy among PetroMasila employees in Yemen. (Direct relationship)

Relationship between project risk management and employees' self-efficacity

The twelve hypothesis examines the link between project risk management and employee self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

On the basis of the following data, it is possible to predict that there is a positive association between project cost management and the self-efficacy. Self-efficacy is a crucial component of risk management. Delgadillo et al. (2014) suggest that exposure to training and clinical guidelines enhances self-efficacy in risk assessment and management. Ter Huurne & Gutteling, (2009) demonstrate the relationship between self-efficacy and institutional trust with emotional reactions to risk, information needs, and preferences. Risk management is viewed as a technique to affect behaviour and perception by bringing stakeholders' obligations to light (De Bakker et al., 2011). Bruhin et al. (2018) discovered that discovered that Individuals are better able to assess and manage the risks involved in risky decisions when they have a comprehensive awareness of the possible consequences, which helps people develop confidence in their talents and faith in their ability to make decisions. The perceived efficacy of risk management is significantly impacted by project managers that ignore, deny, avoid, or postpone handling hazards (Kutsch & Hall, 2005).

Our findings imply that an effective project risk management system at PetroMasila may increase employees' feeling of self-efficacy, which can enhance employee confidence and commitment. The following notion is suggested by prior discourse:

Hypothesis 2.4 (H2.4)

There is a positive relationship between project risk management and self-efficacy among PetroMasila employees in Yemen. (Direct relationship)

Self-Efficacy mediated on the relationship project planning management and sustainable development (Indirectly hypothesis)

The thirteenth hypothesis examines the link between project planning management and sustainable development via mediating influence of employees' self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Azizli et al. (2015) discovered a favourable association between self-efficacy, inclination to prepare for the future, and overall life happiness. Planned management may boost employees' self-efficacy by creating realistic goals and giving the necessary resources to reach those goals, minimising uncertainty and stress, and boosting confidence in their skills (Howard & Gould, 2000; Luszczynska et al., 2010). Planning

management may increase self-efficacy by establishing a framework within which individuals can operate independently while yet being responsible for their actions (Jankowtcz, 2007). Using a planned management approach can boost self-efficacy because it gives a structure that makes accomplishing difficult tasks more achievable (Thomas et al., 2008) Numerous studies have determined that strategic planning is a vital component of sustainable development (Dyachenko, 2021; Narang & Reutersward, 2006; Harikrishnan & Mahendra, 2021; Timofeeva, 2020; Ioppolo et al., 2016). To manage projects sustainably, a transition from traditional project management to sustainable project management is required (M. Yu et al., 2018; Silvius et al., 2014). Incorporating sustainability into building engineering projects is another benefit of project management for technology-based businesses (Wang et al., 2017; Pletnyova et al., 2021; Yu et al., 2018). Sustainable technology in building projects requires strategies to include sustainability throughout project design (Alias et al., 2014) Self-efficacy influences the association between Q fever fatigue syndrome and increasing tiredness severity following first cognitive behavioural treatment (Breukers et al., 2019). Budgetary involvement and performance are mediated by management self-efficacy and role clarity (Macinati et al., 2017).

These findings imply that an efficient project planning management system at PetroMasila can promote sustainable growth through enhancing employee self-efficacy. The following notion is suggested by prior discourse:

Hypothesis 4.1 (H4.1)

There is a positive relationship between project planning management and sustainable development through employees' self-efficacy as mediator in PetroMasila Yemen. (Indirect relationship)

Self-Efficacy mediated on the relationship project time management and sustainable development (Indirectly hypothesis)

The fourteenth hypothesis examines the link between project time management and sustainable development via mediating influence of employees' self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Several studies indicate that time management is essential for firms to promote individual self-efficacy and accomplish sustainable development objectives. Self-efficacy partially affects the association between time management and student performance (Osman, 2018; Salk et al., 2021). Time management skills are important for boosting nursing students' behaviour and self-efficacy (Kim et al., 2011); they also minimise job stress and boost performance (Golabli et al., 2013). Plans for time management and organising can increase productivity and quality of life (A. Kim et al., 2019; Jackson, 2009). Time management is crucial to sustainable development because it enables individuals to use resources more effectively and reduces the time required for particular tasks connected with meeting those demands (Mussbacher & Nuttall, 2014). Time management is essential for sustaining achievement (Kharkheli) (2020; Devetter & Rousseau, 2011). Various approaches to sustainable governance connect with time in various ways. Bornemann & Strassheim (2019) Time-based management is a valuable resource for technology management, and sustainable technological goals

may be attained by utilising time management strategies (Gehani, 1995; Berkel & Curtin, 2000; Sartorius, 2006; Calp, 2020).

These findings imply that an efficient project time management system at PetroMasila can promote sustainable growth by bolstering employee self-efficacy. The following notion is suggested by prior discourse:

Hypothesis 4.2 (H4.2)

There is a positive relationship between project time management and sustainable development through employees' self-efficacy as mediator in PetroMasila Yemen. (Indirect relationship)

Self-Efficacy mediated on the relationship project cost management and sustainable development (Indirectly hypothesis)

The fifteenth hypothesis examines the link between project cost management and sustainable development via mediating influence of employees' self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Studies suggest that taking measures to reduce costs through cost management can help achieve sustainable development (Yun, 2007; Duman et al., 2013; Wanass & Shahaza, 2020). Additionally, self-efficacy has been found to affect cost management, with higher levels sometimes leading to decreases in performance (Schönfeld et al., 2017). Self-efficacy is also a crucial motivator for environmentally sustainable behaviour and has a positive effect on pro-environmental behaviour (Schutte & Bhullar, 2017; Wai et al., 2018). Furthermore, self-efficacy can mediate the relationship between variables such as job stress and depression and anxiety (Chen et al., 2020), budgetary participation and performance (Macinati et al., 2017), and supervisor incivility and cynicism (Alola et al., 2020).

These findings imply that an efficient project cost management system at PetroMasila can promote sustainable growth by bolstering employee self-efficacy. The following notion is suggested by prior discourse:

Hypothesis 4.3 (H4.3)

There is a positive relationship between project cost management and sustainable development through employees' self-efficacy as mediator in PetroMasila Yemen. (Indirect relationship)

Self-Efficacy mediated on the relationship project risk management and sustainable development (Indirectly hypothesis)

The sixteenth hypothesis examines the link between project risk management and sustainable development via mediating influence of employees' self-efficacy. The subsequent investigations provided a conceptual model that explains why such a link occurs.

Risk management is a powerful tool for sustainable development, especially in managing large systematic risks and natural hazards (Gheorghe, 2012; Bakhtiari, 2014). However, neglecting uncertainty and future generations' costs contradicts the main tenet of sustainable development Krysiak (2009). Exposure to training and clinical guidelines can improve self-efficacy in risk assessment and management (Delgadillo et al., 2014), and self-efficacy and institutional trust are associated with emotional responses to risk, as well as with information needs and preferences regarding risk (Ter Huurne & Gutteling, 2009). Reducing emotional exhaustion and enhancing social support can prevent depression and anxiety among young nurses, where emotional exhaustion and social support mediate the link between job stress and depression and anxiety (Chen et al., 2020). Self-efficacy beliefs mediate the relationship between positivity and behaviors in Italian employees and university students. (Barbaranelli et al., 2019). It has been associated with the ability to focus on solutions and beliefs about education for sustainable development (Akça, 2019), and has been shown to affect knowledge acquisition and influence attitudes towards pursuing pro-environmental behaviors (Han et al., 2021; Wai et al., 2018).

These findings imply that an efficient project risk management system at PetroMasila can promote sustainable growth by bolstering employee self-efficacy. The following notion is suggested by prior discourse:

Hypothesis 4.4 (H4.4)

There is a positive relationship between project risk management and sustainable development through employees' self-efficacy as mediator in PetroMasila Yemen. (Indirect relationship)

Appendix 3

Survey Questionnaire

Universiti Putra Malaysia
Faculty of Engineering

Serial No.

ROLE OF PROJECT MANAGEMENT IN SUSTAINABLE DEVELOPMENT SELF-EFFICACY AS MEDIATING VARIABLE IN OIL AND GAS INDUSTRY

General Instructions and Information

1. This questionnaire is divided into fourth parts. Section 1 consists of questions related to demographic information, Section 2 consist of questions related to project management practiced in PetroMasila, Yemen, Section 3 consist of questions related to Self-efficacy practiced in PetroMasila, Yemen, Section 4 consist of questions related to sustainable development practiced in PetroMasila, Yemen. The questions have been designed to be as concise as possible and will probably take 30 minutes to be answered..

2. Individual responses to this questionnaire will be kept **STRICTLY CONFIDENTIAL**, and no individual answers will be identified. When you return your completed questionnaire, your name will be deleted from the mailing and will have no connection whatsoever with your answers.

3. If you are not sure of the answer to a question, please provide your best estimate. There is no right or wrong answer.

4. If you would like a summary of the results of this study, please provide your name and address or attach a business card here.

Name: _____

E-mail Address: _____

Mailing Address: _____

I. DEMOGRAPHIC INFORMATION

1. Gender:

Male ☐ Female ☐

2. Age:

☐ < 25 ☐ 25- 30 ☐ 30-35 ☐ 35- 40 ☐ 40-45 ☐ 45-50

☐ 50-55 ☐ 55 and above

3. Qualification:

Diploma ☐ Bachelors ☐ Masters ☐ PhD. ☐

4. Position held:

Project Director ☐ Program Manager ☐ Portfolio Manager ☐

Project Head ☐ Project Coordinator ☐ Project Engineer ☐

Other (Please Specify): ……... ☐

5. Sector:

Research and Development ☐ Engineering ☐ Construction

Project ☐ T/Telecom ☐ Other (Please Specify): …….. ☐

6. Project-related experience:

1 to 5 years ☐ 5 to 10 years ☐ 10 to 15 years ☐ 15 years plus ☐

7. Block Name:

Block 10 ☐ Block 14 ☐ Block 51 ☐ Block 53 ☐ Block 63

II. PROJECT MANAGEMENT

Please encircle one number for each question that reflects your opinion about Project Management in PetroMasila, Yemen.

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

1.0	**Planning Management (PM)**					
1.1	sustainable practices are considered during the establishment of the project scope, project charter, drawing, and detailed project plan.	1	2	3	4	5
1.2	the team is brought together as early as possible during the planning process.	1	2	3	4	5
1.3	planning doesn't reflect all project stakeholders.	1	2	3	4	5
1.4	project activities are achieved as planned, while meeting quality standards and utilizing the allocated budget and resources.	1	2	3	4	5
1.5	planning strategies and tools such as SWOT, GanttPRO, and MS Project are utilized for effective planning and management.	1	2	3	4	5
2.0	**Time Management (TM)**					
2.1	the company efficiently manages and updates project time estimates and schedules to ensure that the project stays within the timeline.	1	2	3	4	5
2.2	time management tools and techniques such as calendars, time-tracers, and project managers are used to organize time management and monitor and control the project schedule.	1	2	3	4	5
2.3	based on company strategies, project goals, and task priorities, the project manager divides the limited time effectively between activities.	1	2	3	4	5
2.4	the project does not fall behind schedule as the nature of the project allows for time organization.	1	2	3	4	5
2.5	project managers negotiate with staff to identify and attribute time limitations to activities based on their perspectives.	1	2	3	4	5
3.0	**Cost Management (CM)**					
3.1	the company efficiently manages and updates project cost estimates and budgets to ensure that the project stays within budget.	1	2	3	4	5
3.2	the company uses project management tools and techniques to optimize cost management and conduct cost variance analysis.	1	2	3	4	5
3.3	the company closely monitors and controls project costs, including tracking expenses, estimating future costs, and identifying cost savings opportunities.	1	2	3	4	5
3.4	the company prioritizes the benefits of cost management, such as improving value for money, client satisfaction, and overall financial health.	1	2	3	4	5
3.5	the company implements and maintains effective cost management practices, such as accurate cost reporting, solid financial planning, and knowledgeable cost estimation	1	2	3	4	5
4.0	**Risk Management (RA)**					

4.1	the company identifies, categorizes, and reviews risks on a regular basis, including physical and environmental factors, and adjusts risk assessments when necessary.	1	2	3	4	5
4.2	the company provides risk management training and courses to increase employee awareness and perception of risk.	1	2	3	4	5
4.3	the company uses techniques and tools to conduct qualitative and quantitative risk analysis, as well as crisis meetings and disaster recovery plans to prevent worse scenarios.	1	2	3	4	5
4.4	the implementation of projects has reduced overall costs to the company.	1	2	3	4	5
4.5	the company monitors and evaluates the effectiveness of risk response plans regularly with the participation of other project stakeholders.	1	2	3	4	5

III. SELF-EFFICACY

Please encircle one number for each question that reflects your opinion about Self efficacy in PetroMasila, Yemen.

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

1.0	**Vicarious Experience (VE)**					
1.1	i acknowledge that some project members may be more skilled than me in certain tasks.	1	2	3	4	5
1.2	when I observe successful department members, I use them as inspiration to improve my own skills.	1	2	3	4	5
1.3	i am deterred by the failure of my project colleagues and couldn't remain focused on achieving my goals.	1	2	3	4	5
1.4	i have a growth mindset and believe that if others can accomplish a task, I can too with hard work and dedication.	1	2	3	4	5
1.5	i value the opportunity to learn from my colleagues and gain experience through collaboration.	1	2	3	4	5
2.0	**Verbal Persuasion (VP)**					
2.1	i possess the ability and motivation to encourage my project colleagues to raise their achievements.	1	2	3	4	5
2.2	i have the ability to boost the self-esteem of my project colleagues and inspire confidence in them.	1	2	3	4	5
2.3	i can encourage my project colleagues to behave appropriately and fairly, without resorting to punishment that could undermine their self-confidence.	1	2	3	4	5
2.4	i am capable of helping my project colleagues gain a better understanding of themselves and their abilities.	1	2	3	4	5
2.5	i can establish a strong and positive relationship with my project colleagues to offer them individual counseling and support.	1	2	3	4	5
3.0	**Past performance (PP)**					
3.1	i can recognize how my academic and scientific background has shaped my way of thinking.	1	2	3	4	5
3.2	i can identify how my personal experiences have influenced my way of thinking.	1	2	3	4	5
3.3	through my experiences, I have been able to enhance my self-confidence and develop skills to handle unexpected situations.	1	2	3	4	5
3.4	my experiences have led to an improvement in my approach and work style.	1	2	3	4	5
3.5	i have gained the ability to teach conflict resolution skills through my experiences	1	2	3	4	5
4.0	**Emotional Cues (EC)**					
4.1	i can stay composed when encountering challenges, as I trust in my ability to cope.	1	2	3	4	5
4.2	despite physical discomfort or lack of sleep, I can continue	1	2	3	4	5

	working on project tasks.					
4.3	my performance on project tasks remains consistent even when feeling anxious, depressed, or hopeless.	1	2	3	4	5
4.4	i am not able to manage my project tasks effectively in times of stress.	1	2	3	4	5
4.5	i am able to control my emotions and maintain a neutral expression during project work.	1	2	3	4	5

IV. SUSTAINABLE DEVELOPMENT

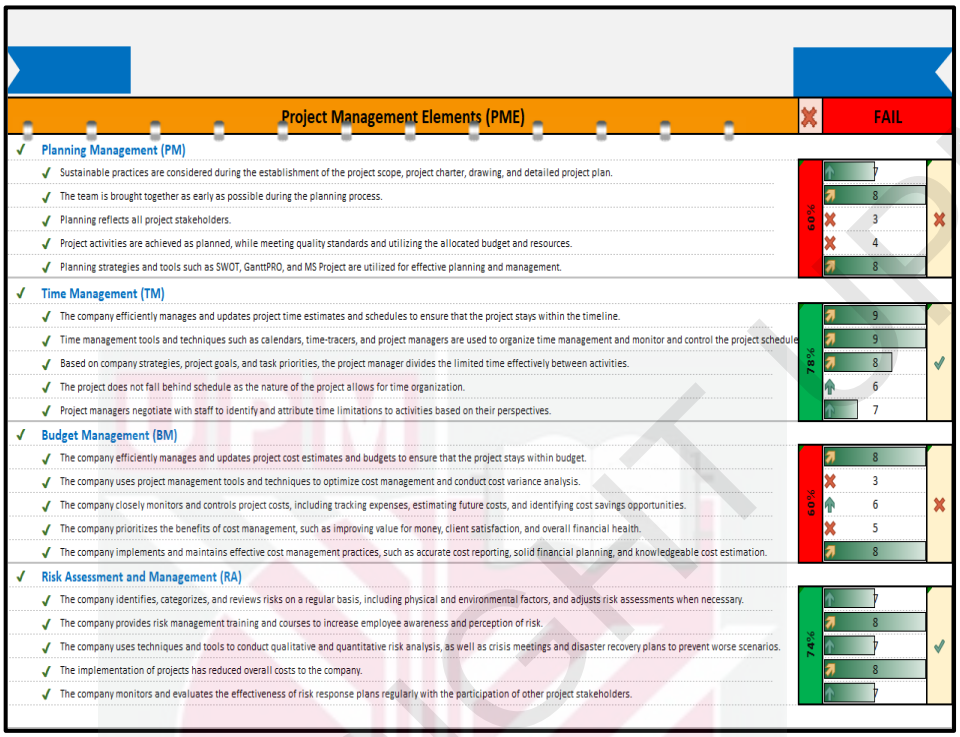
Please encircle one number for each question that reflects your opinion about Sustainable Development in PetroMasila, Yemen.

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

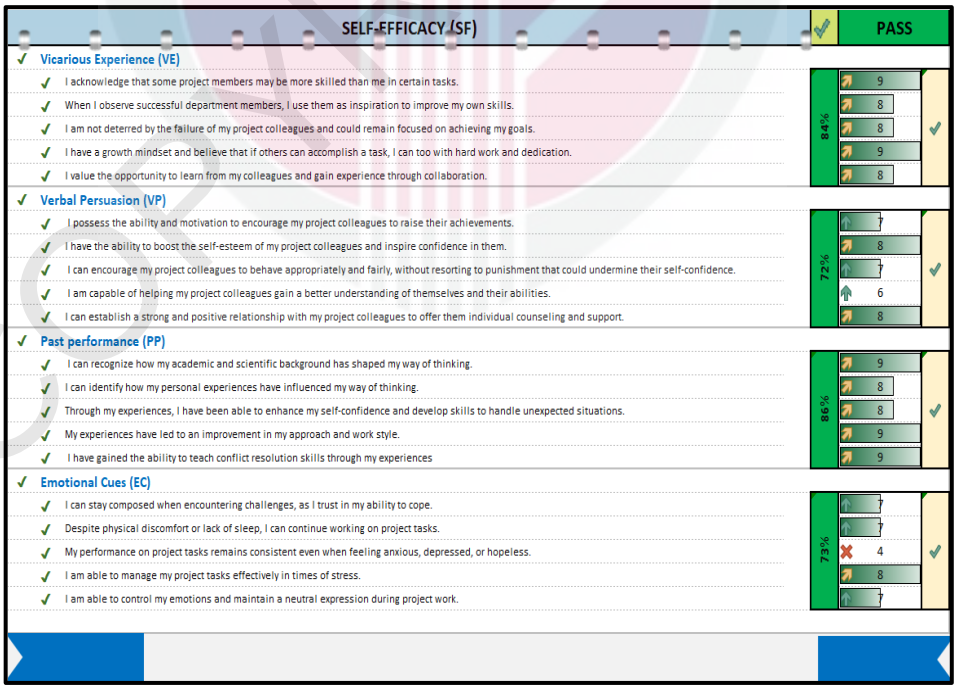
1.0	**Environmental Aspect (EA)**					
1.1	reducing resource consumption, gas emissions, and preserving nature conservation and energy are crucial in achieving sustainable development.	1	2	3	4	5
1.2	the company adheres to ISO 14001 code and implements strict legal requirements and regulations in all project phases to protect the environment.	1	2	3	4	5
1.3	the company has developed a structured action plan and waste management strategy to reduce all types of project waste, both organic and non-organic.	1	2	3	4	5
1.4	the company is committed to the preservation of various natural species during project implementation.	1	2	3	4	5
1.5	the government incentive policies are effective in encouraging sustainable development projects.	1	2	3	4	5
2.0	**Economical Aspect (CA)**					
2.1	the company's economic goals are not aligned with the interests of its stakeholders.	1	2	3	4	5
2.2	the company has implemented strategies to increase profitability and maintain a competitive edge in the market.	1	2	3	4	5
2.3	the company consistently strives to optimize its use of resources and reduce costs while maintaining high-quality performance.	1	2	3	4	5
2.4	the company has established clear financial targets and regularly assesses progress towards achieving them.	1	2	3	4	5
2.5	the company places high value on ethical business practices and is committed to conducting its operations in a socially responsible manner	1	2	3	4	5
3.0	**Social Aspect (SA)**					
3.1	the company prioritizes the health of its project employees and offer incentive programs to promote a good quality of life.	1	2	3	4	5
3.2	the company promotes a culture where conflicts are resolved peacefully through discussion.	1	2	3	4	5
3.3	the company provides equal opportunities for training and employment to both men and women during all phases of the project.	1	2	3	4	5
3.4	the company respects human rights and provide opportunities for employees to engage in labor union elections, social issues, and express their opinions.	1	2	3	4	5
3.5	the company involves local community representatives in supporting their projects.	1	2	3	4	5

4.0	**Technological Aspect (TA)**					
4.1	the company regularly explores and invests in new sustainable technologies to reduce environmental impact.	1	2	3	4	5
4.2	using modern technology has helped the company improve work efficiency and reduce the risk of human error and work-related stress.	1	2	3	4	5
4.3	the company frequently ongoing training to its employees to ensure they are knowledgeable about and able to implement sustainable technologies.	1	2	3	4	5
4.4	the government incentivizes the company to transition towards green technology, as it is a cost-effective measure and promotes environmental preservation.	1	2	3	4	5
4.5	the company partners with sub-contractors companies to develop and share sustainable technologies and best practice.	1	2	3	4	5

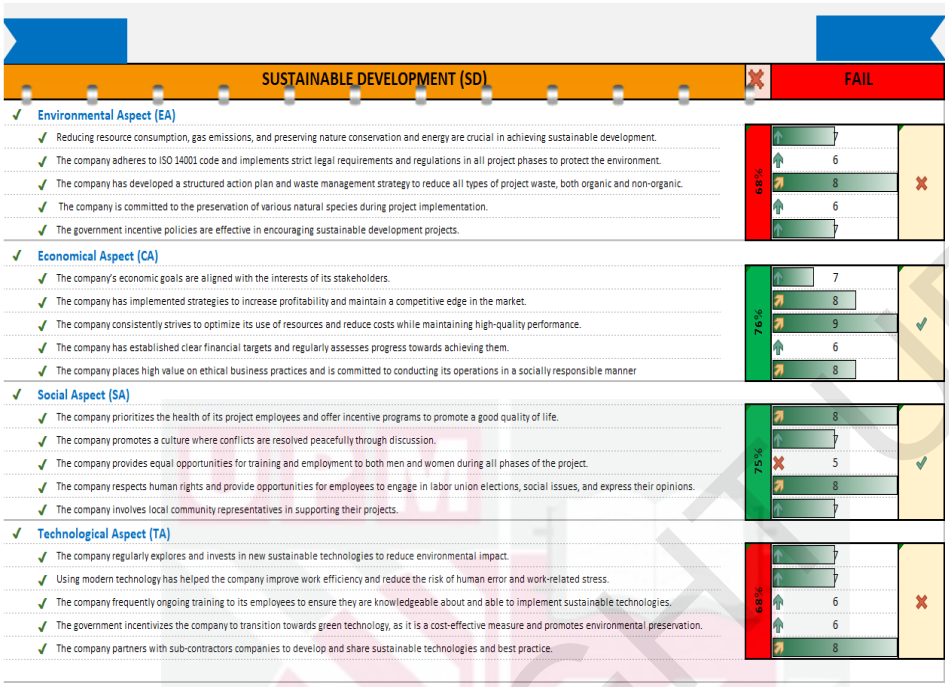
Appendix 4



Project Management Elements (PME)			FAIL
Planning Management (PM)			
Sustainable practices are considered during the establishment of the project scope, project charter, drawing, and detailed project plan.	7		
The team is brought together as early as possible during the planning process.	8		
Planning reflects all project stakeholders.	3	60%	✗
Project activities are achieved as planned, while meeting quality standards and utilizing the allocated budget and resources.	4		
Planning strategies and tools such as SWOT, GanttPRO, and MS Project are utilized for effective planning and management.	8		
Time Management (TM)			
The company efficiently manages and updates project time estimates and schedules to ensure that the project stays within the timeline.	9		
Time management tools and techniques such as calendars, time-tracers, and project managers are used to organize time management and monitor and control the project schedule	9		
Based on company strategies, project goals, and task priorities, the project manager divides the limited time effectively between activities.	8	78%	✓
The project does not fall behind schedule as the nature of the project allows for time organization.	6		
Project managers negotiate with staff to identify and attribute time limitations to activities based on their perspectives.	7		
Budget Management (BM)			
The company efficiently manages and updates project cost estimates and budgets to ensure that the project stays within budget.	8		
The company uses project management tools and techniques to optimize cost management and conduct cost variance analysis.	3		
The company closely monitors and controls project costs, including tracking expenses, estimating future costs, and identifying cost savings opportunities.	6	60%	✗
The company prioritizes the benefits of cost management, such as improving value for money, client satisfaction, and overall financial health.	5		
The company implements and maintains effective cost management practices, such as accurate cost reporting, solid financial planning, and knowledgeable cost estimation.	8		
Risk Assessment and Management (RA)			
The company identifies, categorizes, and reviews risks on a regular basis, including physical and environmental factors, and adjusts risk assessments when necessary.	7		
The company provides risk management training and courses to increase employee awareness and perception of risk.	8		
The company uses techniques and tools to conduct qualitative and quantitative risk analysis, as well as crisis meetings and disaster recovery plans to prevent worse scenarios.	7	74%	✓
The implementation of projects has reduced overall costs to the company.	8		
The company monitors and evaluates the effectiveness of risk response plans regularly with the participation of other project stakeholders.	7		



SELF-EFFICACY (SF)			PASS
Vicarious Experience (VE)			
I acknowledge that some project members may be more skilled than me in certain tasks.	9		
When I observe successful department members, I use them as inspiration to improve my own skills.	8		
I am not deterred by the failure of my project colleagues and could remain focused on achieving my goals.	8	84%	✓
I have a growth mindset and believe that if others can accomplish a task, I can too with hard work and dedication.	9		
I value the opportunity to learn from my colleagues and gain experience through collaboration.	8		
Verbal Persuasion (VP)			
I possess the ability and motivation to encourage my project colleagues to raise their achievements.	7		
I have the ability to boost the self-esteem of my project colleagues and inspire confidence in them.	8		
I can encourage my project colleagues to behave appropriately and fairly, without resorting to punishment that could undermine their self-confidence.	7	72%	✓
I am capable of helping my project colleagues gain a better understanding of themselves and their abilities.	6		
I can establish a strong and positive relationship with my project colleagues to offer them individual counseling and support.	8		
Past performance (PP)			
I can recognize how my academic and scientific background has shaped my way of thinking.	9		
I can identify how my personal experiences have influenced my way of thinking.	8		
Through my experiences, I have been able to enhance my self-confidence and develop skills to handle unexpected situations.	8	86%	✓
My experiences have led to an improvement in my approach and work style.	9		
I have gained the ability to teach conflict resolution skills through my experiences	9		
Emotional Cues (EC)			
I can stay composed when encountering challenges, as I trust in my ability to cope.	7		
Despite physical discomfort or lack of sleep, I can continue working on project tasks.	7		
My performance on project tasks remains consistent even when feeling anxious, depressed, or hopeless.	4	73%	✓
I am able to manage my project tasks effectively in times of stress.	8		
I am able to control my emotions and maintain a neutral expression during project work.	7		



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Al-Zubaidi, R., Ariffin, K. A. B. M., Abdulsamad, A., Raqee, A., Ismail, I. S., & Ahmad, K. A. (2022). The Effect of Self-efficacy on Sustainable Development: The PetroMasila in Yemen. *Advances in Social Sciences Research Journal*, *9*(12), 35–49.

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Abdulhadi, A. R., Ariffin, M. K. A. Bin, Leman, Z. B., Ahmad, S. A. binti M., Al-Zubaidi, R. H., & Abdulsamad, A. (2022). The Impact of Risk Management on The Dimensions of Project Management Among Small and Medium Enterprises in Iraq. *Advances in Social Sciences Research Journal, 9*(11), 469–481.

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