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**CASE STUDY ON HOW TO ENSURE SUSTAINABILITY IN
CONSTRUCTION SITES USING PROJECT MANAGEMENT IN
KINGDOM OF SAUDI ARABIA**

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ABSTRACT

Construction industry contributes to the environmental crises the world living in as a result of consumption of raw materials, land filling and green gases emission, but it also contributes to the economic growth in the world to manage both side the positive and negative the professionals have had developed a new concept of sustainable project management which not only focuses on the three main constraints cost, time, quality but also have a wider perspective of including environment, people and economy to maintain the needs of the present and without compromising the future generations to meet their own needs. The aim of this study is to Investigating integration of sustainability in project management in construction project in Saudi Arabia and research was data collected through survey questionnaire. The findings have shown that the knowledge about sustainability concept have increased significantly among organizations and professionals but it also faces challenges in cost, material availability, and increase of construction time and those challenges was found to be as a result of lack of experts, enforced roles and lack of sustainable technologies.

ملخص

تساهم صناعة البناء والتشييد في الرحلات البيئية التي يعيشها العالم نتيجة استهلاك المواد الخام وطمير الأراضي وانبعاث الغازات الخضرء، ولكنها تساهم أيضاً في النمو الاقتصادي في العالم لتعكس الجانب الإيجابي والسلبي لدى المهنيين. طورت مفهوماً جديداً لإدارة المشاريع المستدامة والذي لا يركز فقط على القيود الرئيسية الثلاثة : التكلفة والوقت والجودة ولكن أيضاً لديه منظور أوسع يضم البيئة والأشخاص والاقتصاد للحفاظ على احتياجات الحاضر وعدم التأثير على الأجيال القادمة لتلبية احتياجاتهم الخاصة. الهدف من هذه الدراسة هو تحقيق في اندماج إدارة المشاريع المستدامة في المشاريع الانشائية في المملكة العربية السعودية وتم جمع البيانات من خلال استبيان . أظهرت النتائج أن المعرفة بمفهوم الاستدامة قد زادت بشكل كبير بين المنظمات والمهنيين ولكنها تواجه أيضاً تحديات في التكلفة وتوافر المواد وزيادة وقت البناء وتبين أن تلك التحديات كانت نتيجة لنقص الخبراء والأدوار المفروضة والافتقار إلى التكنولوجيات المستدامة.

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CHAPTER 1

INTRODUCTION

1.1.Overview

Climate change is the main topic in tremendous meetings and environmental conferences around the world such as united nations – UNEP, environment ministers in the Islamic world, Saudi Environmental Society – SENS, etc. which discusses how to implement new methodology to overtake the effects of the 21st century life style implies on the environment.

Construction industry have a direct impact on the environment where it contributes in the emissions of green gas, generate waste material, consumption of raw material and to overcome the negative impact of the industry researchers, governments, and Engineers are working together to find innovative solutions.

In the kingdom of Saudi Arabia and toward accomplishing the kingdom's 2030 vision, one of its main focuses are to maintain sustainability through waste recycle, solar power etc. according to the environmental protection in the kingdom of Saudi Arabia.

In this study there are three key words will be focused on sustainability, project management, and construction industry where in chapter 2 these words will be discussed in the literature review to understand the correlation between them and to mitigate a way to maintain it in the industry. The search engine used to find articles cited in chapter 2 mainly Google Scholar, Research Gate, Science Direct, etc. to get the most recent articles.

Chapter 3 will be the methodology, and this chapter the chosen technique will be discussed in order to maintain the answers of the research objectives and questions.

Chapter 4 through chapter 6 it will include discussion and results, recommendation and limitation, and conclusion sequentially.

At the end references used and appendixes will be listed.

1.2.Problem Statement

industry significantly impact the environment, economy and people both in good and in a bad; construction industry contributes to half of the economic income in Saudi Arabia but also it affects the environment dramatically.

The aim of this research is to find a way to mitigate the disadvantages through the implantation of sustainability and project management principles that is used in the market.

1.3.Research importance

Finding a way to ensure implementation of sustainable project management in construction industry in the kingdom of Saudi Arabia.

1.4.Research Objectives

The objectives of this research are:

1. Investigate the general understanding of sustainability concept among professionals
2. Investigate the current state of sustainable project management in the organizations.
3. Investigate the challenges facing integrating sustainability in construction project management.
4. Investigate the level of integration sustainability in project management in Saudi Arabia

1.5.Research Questions

By the end of this research the answers of the following questions will be gathered:

1. How to ensure general understanding of sustainability concept among professionals?
2. What is the current state of sustainable project management in the organizations?
3. What are the challenges facing integrating sustainability in construction project management?
5. At what level of integration sustainability in project management in Saudi Arabia is?

CHAPTER2

LITRETURE REVIEW

2.1.Introduction:

On way to generate new values in the modern era is through projects which creates assets that then can derive benefits to people and economics; where half of all the assets created come from construction industry.(Graham M. Winch, 2010) in KSA about 5.5% of the national income generated through construction industry in 2023.(DATA SAUDI, 2024); on the other hand, one important factor is missing environment, where construction industry is a main factor in causing air pollution, landfill wastes, climate change, carbon emission, waste generations.(Alwan et al., 2017; Tabassum Ira, 2021)

To over come the disadvantages of these industries an updated idea saw light that focuses on environment, economics and social referred to in term of three dimensions/pillars which known as sustainability. (Kuhlman & Farrington, 2010; Moshood et al., 2024)

The impact of environmental crises can be managed with full responsibility of the whole society individuals and organizations.(Scopelliti et al., 2018). To maintain the aspects of sustainability and to ensure it effective implementation during the project life cycle project management have to be addressed.

2.2.Sustainability:

The interpretation of United Nation Brundtland Commission, 1987, Sustainability is the ability to fulfilling the needs of present generation without compromising the future generations to meet their needs.

According to (Hasna, 2012), the main challenge with Brundtland commission's definition lays in defining "needs"; where the needs are different from person to another as well it is difficult to define the needs of the future generations; despite the argument on the definition some factors will affect both the future and present generations if not control for example environmental issues.

On the other hand, in modern definitions sustainability became more elaborative and mostly introduced as three pillars which are environmental, economic and social.(Silvius & Schipper, 2014)

2.3.Sustainability dimensions:

As discussed earlier to maintain the needs of the present without affecting the future generation to meet their own needs the, three dimensions or pillars of sustainability was developed also as construction industry generates both profit in money and cause harm to

the environment, understanding the implementation of sustainability in the industry is needed.

2.3.1. Environmental sustainability benefits

Adapting sustainable techniques will be reflected in reducing environmental impact enhancing and improving it by implementing systems like Green Building techniques that uses renewable materials that can be recycled after it period due, also implementing green roofs and more efficient energy systems which will help in reducing the carbon footprint, enhancing ecosystem and saves resources. (Elkington, 1997; Edwards et al, 2023 Kibert, 2016; Purvis et al, 2019).

2.3.2. Economic sustainability benefits

Also, the benefits extend to economy, were energy efficient, the usage of sustainable materials may directly influence in reduction of utility and maintenance cost subsequently as well as increasing property values; also, it contributes in job creation and economic growth as skilled labors are needed to meet the demand and invigorate competitiveness. (Elkington, 1997; Edwards et al, 2023 Kibert, 2016; Purvis et al, 2019).

2.3.3. Social sustainability benefits

Also, for people, sustainable construction projects provide quality ecosystem in which it depends on natural light, better and more natural ventilation systems, usage of nontoxic materials, as well as sustainable construction designed to be safer and have longer life span, in general the system puts the community life style as priority. (Elkington, 1997; Edwards et al, 2023 Kibert, 2016; Purvis et al, 2019).

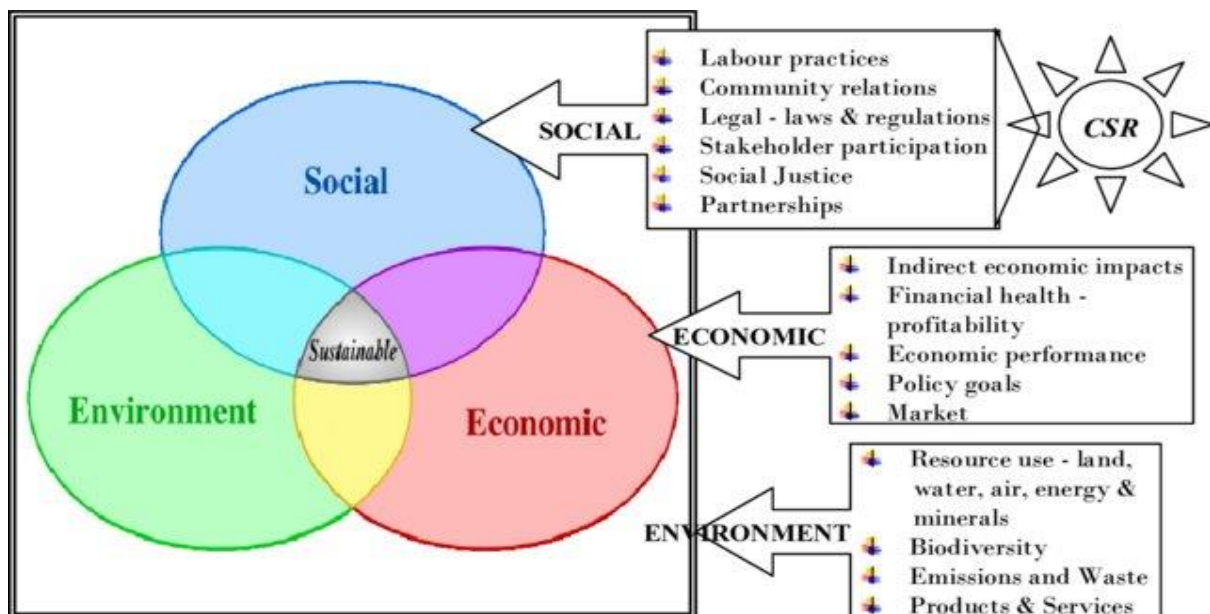


Figure1 : Sustainability concept

2.4.Sustainable development

Sustainability development show the evaluation of society from responsible economic perspective in compliance with environmental and natural process.(Glavič & Lukman, 2007)

2.4.1. United nation sustainable development goals

United Nations (UN) has adapted by all of its members states in 2015 agenda for sustainable development to be accomplished in year 2030 which focuses on “peace and prosperity for people and planet for now and future”. As a result of the agenda UN 17 sustainable development goals illustrated in the figure below have been set which all the members have to implement an immediate action toward them. (United Nations, 2024).

The following are the 17 sustainable development goals: -

1. No poverty.
2. Zero hunger.
3. Good health and well-being.
4. Quality education.
5. Gender equality.
6. Clean water and sanitation.
7. Affordable and clean energy.
8. Decent work and economic growth.
9. Industry, innovation, and infrastructure.
10. Reduced inequalities.
11. Sustainable cities and communities.
12. Responsible consumption and production.
13. Climate action.
14. Life below water.
15. Life on land.
16. Peace, justice, and strong institutions.
17. Partnerships for the goals.

The goals set by the UN have contained all the sustainability dimension which carried about environment, social, and economy. As per UN latest progress report 2024, the countries participating have shown a huge progress despite of the drawback that have hit the world such COVID-19 Pandemic and the unstable situation the world facing.(UNITED NATIONS, 2023).



Figure2 : UN Sustainability Goals

2.5.Sustainable construction

In continuation to UN SDG, construction industry has the most effect on environment, people, and economy. Therefore, sustainable construction are focusing on achieving the required objective of project success with least impact on the environment while motivate social and economic improvement at local and global level.(Häkkinen, 2007).

In addition, sustainable construction involve practices of adopting effective, efficient, better, and healthier ways in planning, construction with focusing on optimizing construction resources and using recycled and renewable materials for an enhanced environment and life quality.(Oke & Aigbavboa, 2017).

2.5.1. Principle of sustainable construction

Achieving sustainable construction is challenging and to ensure achieving it, acts such as Climate Change Act,2013 came out with 7 principles of sustainable construction: -

1. Sustainable design – including sustainability in the initial planning and design will lead to long-term environmentally benefits throughout the project life span.
2. Durability – using durable material will positively affects the environment and economy.
3. Energy efficiency – depending on energy efficient technology throughout the implementation of the construction project and after completion will positively affect the economy by reducing cost and environment by decreasing the gas emissions.

4. Waste reduction - considering using recycled material from other demolished project to new construction project.
5. Indoor air quality – as we implement better ventilation in the new designs the cost of using fuel will reduce also the gas emission will reduce as will.
6. Water conservation – considering recycling water in new construction project such as using rain water and sink water to irrigate plants or car washes.
7. Sustainable building materials – depending on sustainable material such adding glass waste material in to concrete and reduce cement etc. it will be beneficial to economy and environment. (BuildPASS,2024).

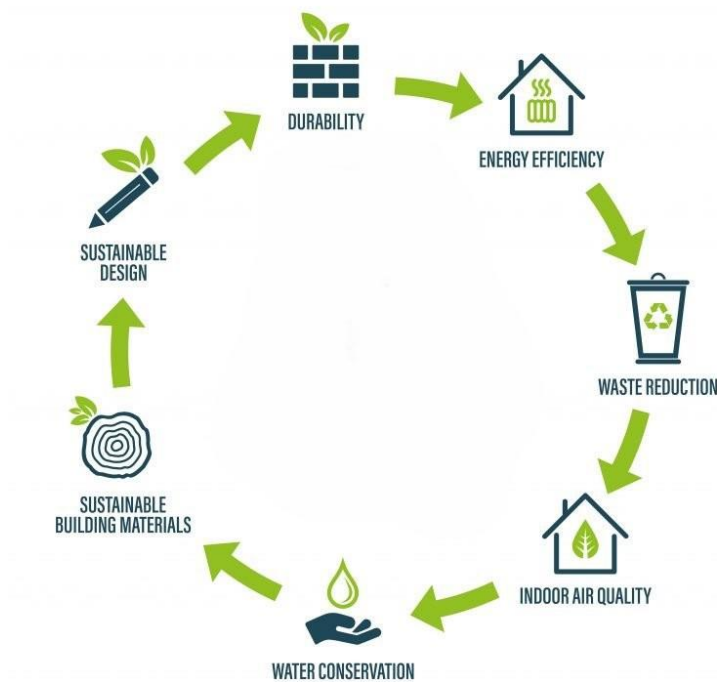


Figure3 : 7 Principles of sustainable construction (BuilsPass, 2024)

2.6.Sustainability in Saudi Arabia

To address the challenges, sustainability has been integrated as a core pillar of vision 2030, the shift in perspective has paved the way for the adoption of green building practices, energy efficient technologies, and the use of sustainable materials. (Saudi construction consulting, 2024).

Moreover, Saudi Arabia and toward accomplishing the 2030 vision, sustainable construction has taken a big part, with developing new cities, buildings, parks that aim to provide environmental, social, and economical improvement some of the project such as: -

1. NEOM
2. The Red Sea Project

3. Amaala
4. King Salman Park
5. KAEC

2.7. Project management

As human developed from cave's man to building the pyramid to landing on the moon to the construction of tallest building in the world and as projects moved to be more sophisticated and tremendous number of people working together toward achieving common goal, without a proper management it will not be possible to achieve.

So, introducing project management is the key to success. (Take the reference from phone ultimate guide to pm) but before diving in; first understanding projects is essential it can be unique or repetitive work that achieving the organization or customer's goals within constrains of time, budget, and specifications.(KERZNER, 2017)

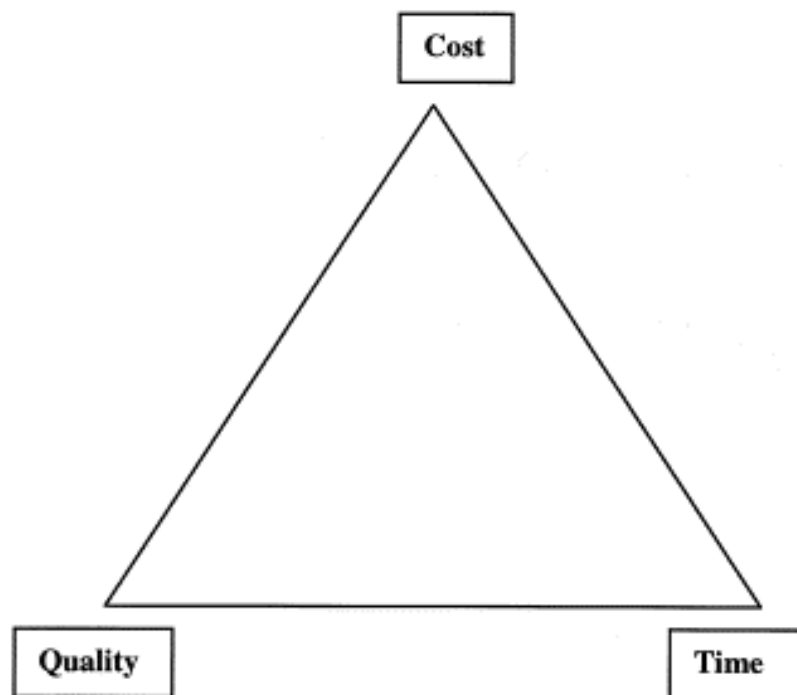


Figure4 : Three PM Constrains

In addition, projects are different than any regular standard business activities as they:

- Are unique, every project has its own set of rules and processes however it may seem to regular people it is the same for example construction work.
- Have specific timescale, each project as a preset start and end date whin the objective have to be met.

- Have approved budget, projects allocate a specific cash flow to handover the deliverable to the end user.
- Achieve beneficial change,
- Have limited resources, a limited equipment, material, work man power are allocated for the project beforehand to successfully deliver it within time and budget.
- Involve a degree of risk, projects have high level of uncertainty through the project's lifecycle especially at the beginning as illustrated in figure. (Project Management Institute., 2008; Westland, 2006)

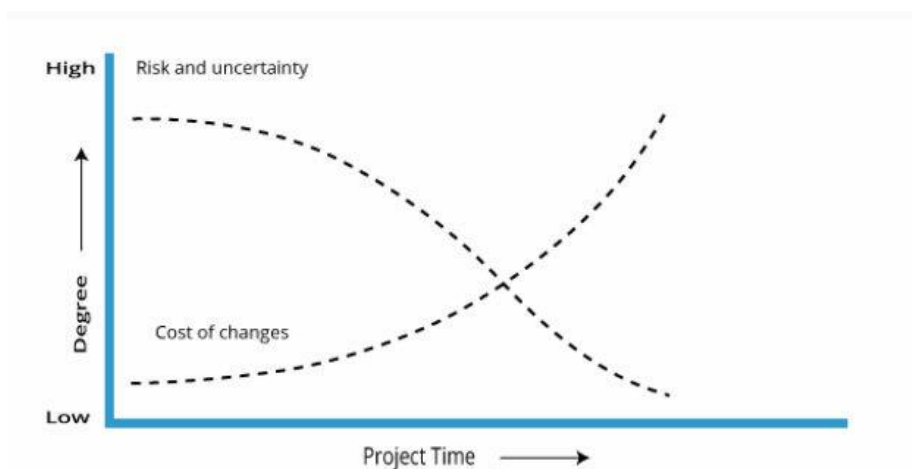


Figure5 : Uncertainty levels PM

Project management can be referred to as the application of skills, knowledge, and tools compulsory to complete the project's requirements and to the customers satisfaction. Usually the skills, knowledge, and tools are grouped into activities or processes.(KERZNER, 2017). That can be explained as project life cycle that consist of five stages. (Project Management Institute., 2008)

2.8. Project life cycle

All construction projects follow a systematic step known as project lifecycle, this systematic approach is crucial for a successful project management in which it affirms the efficient allocation of resources, risk control, and successful delivery within the pre-set constrains of cost, time, quality.

As mentioned, approve project lifecycle consist of five phases:

- Project initiation

Initiation phase marks the start of a project, in this phase the project's scope and objectives are established, needs are identified, project team chosen, and the feasibility is assessed, and this phase consider the foundation of the entire project.

- Project planning

Planning phase, is second in order were a detailed projects plans, work requirements and quality, resources needed, schedules, budgets, and risk evaluations are developed.

- Project execution

Execution phase, in this phase the real work starts, project manager and team member are fully active, material and equipment procured. This phase required high level of attention to details and effective coordination between the project team and stakeholders to maintain successful deliverables.

- Project monitoring and controlling

As illustrated in the **figure** below this phase begins from planning phased and throughout execution phase, were tracking progress, comparing the actual outcomes to assumed outcome, analyzing variance and impacts, and making adjustments as it goes to maintain the project objectives, schedule and cost.

- Project closure

This phase marks the completion of the project, verifying that all the work is done, contractual closure, financial closure, and administrative closer of the paperwork. (KERZNER, 2017; Project Management Institute., 2008; Westland, 2006)

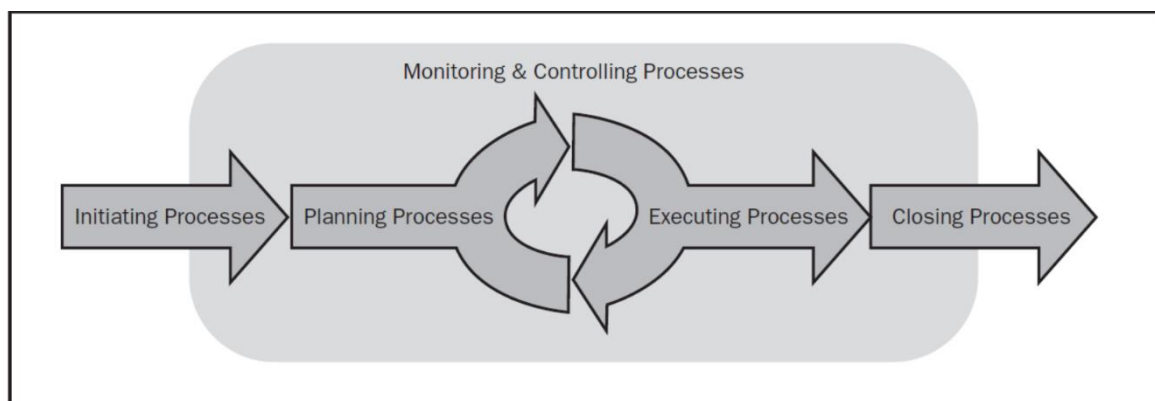


Figure6 : PM lifecycle phases

To sum up, project life cycle is a process that guide the project from intention to closure; by following this structure project professionals can enhance project efficiency, mitigate risks and deliver high end results.

2.9. Project management types

There are three main types of project management traditional or waterfall, agile and hybrid, in the construction industry where the objectives are well defined from the start and doesn't have numerous scope changes in the project, waterfall approach is followed as it is sequentially done and easily represented in Gant chart, a downside of it it may take long time for the approval of scope changes.

On the other hand, agile approach, are more flexible and mostly adopted in software development projects as the requirements are not fully understood at the start and may need some degree of experimentation which causes change in the scope, there for the customer involvement is needed to address Quick changes and have to have collaborative involvement by all participants as the project begun with a fixed budget and schedule it may need to reevaluate it. For this type of project more flexible approach is needed.

As the project became to be more complex (e.g. The construction of The line in Saudi Arabia) this cognitive city is stretching across 170 kilometers and planned to accommodates nine million people (Neom, 2024), such a project is first time to be done in the world for these types of innovative project which carries a high level of uncertainty, depending on a rigid approach such waterfall nor flexible approach as agile may be beneficial for the project. Hybrid approach is the most beneficial for such projects where it easily to follows a specific order of work and flexibility if any change has to be done.(KERZNER, 2017; Project Management Institute, 2021)

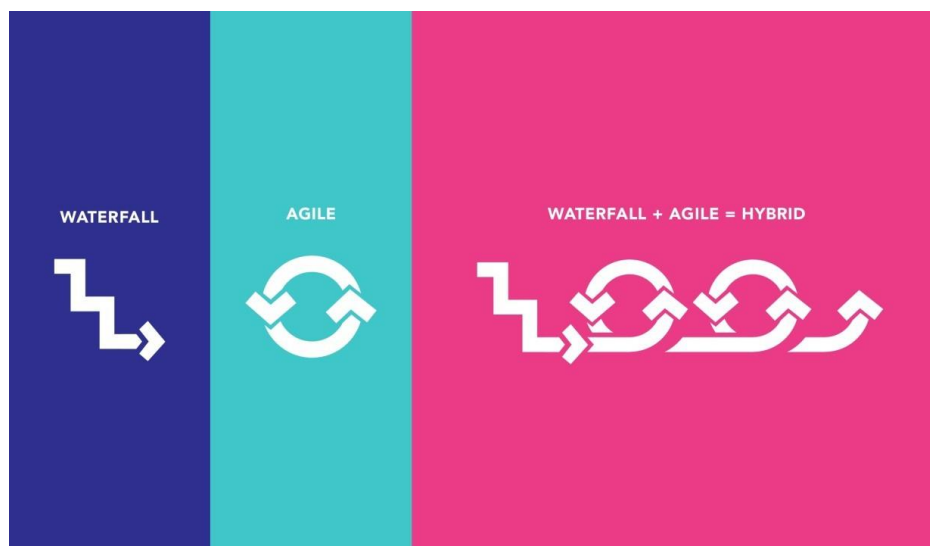


Figure7 : Different Types of PM

2.10. Project management office

To ensure the best project execution and resource allocation within any project, a new structure has been emerged in organizations which project management office (PMO).(Monteiro et al., 2016), PMO can be defined as follow “An organizational body or entity who are assigned various responsibilities related to the centralized and coordinated management of those projects under its domain. The responsibilities of the PMO can rang from providing project management support functions, to actually being responsible for the direct management of a project”.(Project Management Institute, 2021).

Moreover, over the last ten years many organizations have implemented one or multiple project management offices as integral part of organizational project management, attributing a variety of operational, tactical, and strategic levels of their PMOS.(Aubry et al., 2010). At an operational level, PMO provides essential centralized support to individual projects, and guarantying professionalism and excellence through the application of vast range of accepted principles and preferred project management practices to each one. (Hill, 2004). At a tactical level, PMO services provides much more added value by coordinating multi-project and the management of cross-project dependencies. This can involve integrating resources across project and ensuring adherence to project management disciplines. Lastly, at strategic level, PMO includes all functions of the operational and tactical PMO and it is also armed with authority to properties projects according to the organization objectives and strategic goals, it also advises senior management on the feasibility of project investment.(Desouza & Evaristo, 2006).

Sustainable project management office (SPMO) cab be defined as project management office that integrates stainability principles into its practices, framework, and governance structure. Sustainability concept does not focus just on environmental aspects but also social and economic aspects ensuring the project positive commitment to social goals, ethical guideline, and have minimal negative impact on the environment.

In addition, SPMO characteristic includes integration of environment, social, governance criteria into project selection, implementation, and evaluating process, also it encourages long-term value creation for present stakeholders and the futures generations, and resources efficiency by optimizing resource usage, waste minimization, and environmental footprint reduction of projects. (PMO Global Institute,2024).

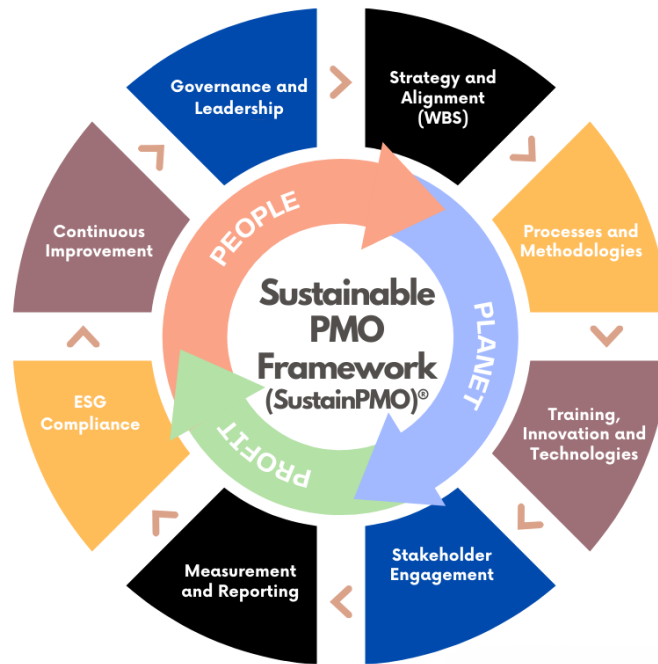


Figure8 : Sustainable PMO framework (PMO Global Institute,2024).

2.11. traditional project management VS sustainable project management

As mentioned above in section 2.7, traditional project is a sequential order of event that utilize five phases; initiating, planning, executing, monitoring / controlling, and closing.(RICHARD, 2021). Furthermore, the success of traditional construction project management depends mainly on the construction project objectives to all forms of contractors, subcontractors, and team; the successful delivery of the project in consideration to the client requirement and acceptable standards, within the assumed cost, and specified duration; measures in return for profit to the organization.(Oke & Aigbavboa, 2017).

Moreover, the construction industry significantly affecting the environment from sourcing raw material to generating and disposal of wastes during or after construction, the impact of construction projects cannot be described. The use of materials or parts of demolished project and recycle them for example is a positive move toward sustainability and this phase should be integrated into the planning stage of any construction projects to ensure that the projects will be beneficial to the environment not only for its intended purpose but also after its expected life due.

In recent years designs have become more competitive and the addition of those regulations such as sustainability, and other measures have added more complexity to the construction projects and as a result of the shift in construction and its related activities sustainable construction have risen which provided projects that are environmentally, socially, and economically useful for the stakeholders, including this generation and the future generation. In addition, the Studies shown that for a better management focusing on environmental aspects should not be enough but a wider view which include social and economy as well.(Oke & Aigbavboa, 2017)

Here sustainable project management comes in place which contributes not only to cost, quality and time but also to the environment, people and economy as illustrated in the figure below.



Figure9 : the integration of sustainability in to project management Snoey, A. (2013).

2.12. Integrating sustainability into project management

As project management profession evolved it is diverting what project success is, organizations are moving away from its traditional objective focusing on time, cost, and quality to assert on delivering objectives in a business frame maintaining the life cycle asset as illustrated in the figure below.(Carboni et al., 2018).

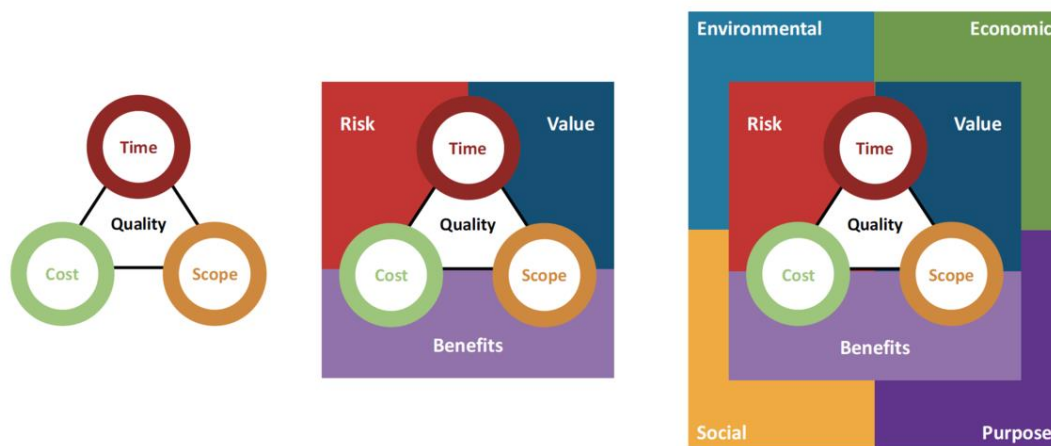


Figure10 : Integrating sustainability to PM life cycle

Moreover, sustainable project management is important because it ensures the effective and efficient utilization of project resources. Also, sustainable project management ensure achieving project goals and long-term impact are delivered, as Sustainable project management is not focusing only on short term benefits of the projects. Ensuring the success of projects that adopt sustainable principles helps also in securing future fund opportunities to the organization. (LINQ Consulting, 2023).

2.13. Sustainable project managers

Sustainable projects management cannot exist without highlighting the ethics of the project manager and his team and the commitment toward long-term and short-term objective to the organization which are finishing the project to the client standards, defined duration, and within the cost and to sustainability three bottom line principles which focuses generating a project that will be environmentally beneficial, socially pleasing and efficient economically.(Marcelino-Sádaba et al., 2015).

In contrary, there are few challenges that project manager encounters to integrate sustainability principles in the projects few of those challenges are related to planning, project client, project team, labors, and external challenges they explained briefly, hereunder: -

1. Planning related challenges

planning related challenge focuses more on the organizational environment were project manager facing difficulties in adopting to different project delivery contract forms also it is hard to narrate the sustainable specification into the contracts, structure of the building, planning of different construction sequence, approval process for sustainable techniques takes longer time, and require longer time during preconstruction. (Aghaegbuna et al., 2020).

2. Project related challenges

Project related challenges lies in selecting suppliers and sub-contractors that provide sustainability services also it takes more time to design and construct on site sustainable construction projects. (Aghaegbuna et al., 2020).

3. Client related challenges

Client related challenges, the clients maybe hesitant to take decision as the uncertainty level is high in relation to the new principle and it depend on the risk that the client is willing to take in consideration to the specific budget and durability for construction sustainability project. (Aghaegbuna et al., 2020).

4. Project team related challenges

As sustainable building is considered to be new team may face difficulty in dealing with the specification, material, and equipment regarding sustainable principles, also the meeting and approvals from the sustainability specialists require more time. (Aghaegbuna et al., 2020).

5. Labor related challenges

The main challenge in relation to labors is encouraging them to change the traditional techniques and training them to be more sustainable the project manager have to work harder in monitoring to ensure the correct adoption of the principles without affecting the project objectives. (Aghaegbuna et al., 2020).

6. External challenges

External challenges are mainly focusing on changing the interception of the public toward the sustainable principles by good advertising and to deduce the uncertainty level to make its implementation in any project casual. (Aghaegbuna et al., 2020).

2.14. Previous studies

In this section of chapter 2 of literature review, some of the previous studies that are related to the sustainable project management, findings and authors recommendations will be discussed, and alter will be used to compare it with the results gained from this research.

2.14.1. Sustainable project management in Saudi Arabia

A study done by (Alharithi, 2022), aimed to investigate the integration of sustainability in project management for non-profit organization (NPOs) in the Kingdom of Saudi Arabia, the author in this research rely on two method to collect responses regarding the research objectives, and research questions were interviews and survey questions, were the author have divided in five parts, first part explained the Sustainable project management (SPM), second parts explored how the workers implemented SPM, third part investigate the development of sustainable three bottom line (environment, social, and economic), fourth part drivers and barrier to implement sustainability in project management in NPOs, and fifth part focused on identifying stage of the implementation of SPO in the responses own organizations. The he five parts finding is sequential, the participants were aware of the sustainable project management concept, NPOs organization depend on sustainability in its strategy to overcome the limited support of the government, employes shows a lack of knowledge about environmental sustainability aspect on the other hand, social and economical sustainability aspect were adopted one because they were experts in social science and second to generate income as government suspended the support on NPOs, drivers won over barriers with the

highest percentage as a result of the long term project success, finally the staff were aware of the benefits of applying SPM in NPOs.

Another study was carried by (Alzahrani, 2015), amid to develop a model to evaluate the sustainable project management implementation by organization in Saudi Arabia, method obtained by the author to collect the responses was via interviews and survey questions which targeted population of 494 individuals where the main focus was on project managers the study found that Saudi Arabia have no mature in sustainable project neither internally nor externally, also founds that Saudi Arabia organization lack the connection between project management and sustainable development, also it lacked the connection between project stockholders and project management in addition the connection between strategic management and organizational culture in Saudi organization was lacked as a result the existing promise no future continuity in relation to sustainable development.

According to (Al-Yami & Price, 2006), the aim of this study is to investigate sustainability in Saudi Arabia, the study conclusion drowns through literature review and interviews questions, the study fundings were the lack of awareness for sustainable construction project management principles within Saudi Arabia construction industry appear to be a problem, also that the public and agencies unaware of sustainable development implementation both in public and private sector in Saudi Arabia, author recommendations was to build a framework that reduce the conflict of interest the may happen among Government agencies, also set a particular authorities and duties for each agency.

2.14.2. Sustainable project management in other Countries

A study done by (Abdelkhalik & Azmy, 2022), aimed to investigate the role of project management in sustainable construction project success in Egypt, the author depends on qualitative method which includes online questionnaire and interview with sustainability specialized consultants and project managers that included 18 questions to define their point of view and the obstacles they faced throughout their experience; the finding were that movement toward suitable construction in Egypt is slow, according to the author it was as a result of lack knowledge or awareness by professionals in the industry toward certain elements, principles, or even criteria when it comes to SPM also, the lack of clear methodology governing SPM in Egypt, project manger is the sustainability consultant at most times, both the project manager and sustainability consultant have unclear roles regarding SPM; the author recommend the industry in Egypt have to develop simplified applied management methods, tools and techniques, there should be a set of indistinct roles and responsibility between project manager and sustainability consultant.

Another study done by (Khalil et al., 2021), aimed to investigate the difficulties regarding integrating sustainability in construction industry in Libya, the author carried out a survey and interview questionnaires they includes government commitment and support, building codes, government legislation and policies, the awareness of stockholders on sustainability; the findings were that the stockholders are unaware or lack knowledge about sustainability and the key factor to its success is to educate the public about the sustainable development and the importance of sustainability have be raised among Libya's construction organizations also, the government implement a stronger policies to enforce sustainability in all aspects, also adopting new technology and materials was a challenge due to high cost.

Another study held by (Mohammad et al., 2017), aimed to investigate how the integration of sustainability in project management will impact the construction project performance in UAE, the author carried out a qualitative analysis of structured interviews with project managers; the author founds that theoretically sustainability have been integrated in the industry however it's not been put into practice in UAE as it should be; the author for see that for a better construction and performance within the industry it's a mutual responsibilities on the government and organizations to enable to generalize sustainability on project management furthermore, the author recommend to include sustainability in to the training programs to all project managers, keep guideline improvement regarding SPM, enforce government legislation.

In a study done by (Atombo et al., 2015), aimed to explore the construction professionals' views on the integration of sustainable construction in projects in Ghana, the author depend on a survey questionnaire to answer the research questions, the finding of the author focused in environmental aspects in which Ghana lacked the efficient use of material or recycled material, material wastage is high as most of the material came from non-renewable materials and that returned to the growth in population and economic factors as well as lack of knowledge about sustainability principles; the author recommend a waste management plan have to be enforced by the government as well as monitoring sustainable construction polices.

In summary, in this chapter it was divided in to three parts firstly, an overview about sustainability, sustainability bottom three lines, sustainable construction, and suitability in Saudi Arabia were discussed , secondly a detailed discussion about project management, project lifecycle, project management types, project management office and its relation to sustainable project management, a comparison between traditional project management and sustainable project management, and integrating sustainability into project management, lastly previous study regarding integrating sustainability in to project management held by 7 authors dated from 2015 to 2022 where the first 3 regarding Saudi Arabia and the 4 other studies was from different countries including UAE, Egypt, Libya, and Ghana, where it found as the years progressed the integration of sustainability in to project management and knowledge have increased but not to the degree in which it is fully developed also it depend on the financial situation of the country, and the political situation as well.

Chapter 3

METHODOLOGY

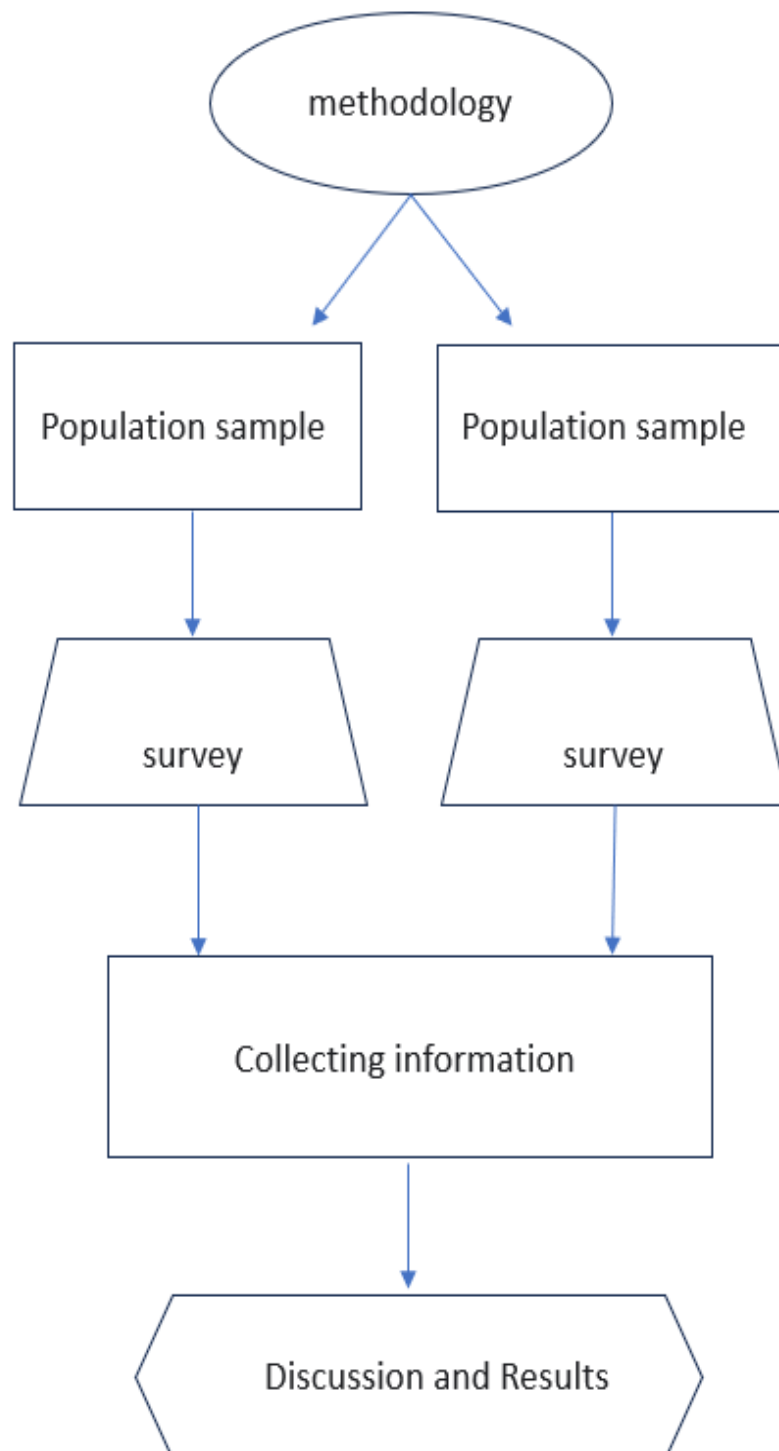
3.1.Introduction

This chapter illustrate the methodology adopted to attine the research pre-set objectives, figure 3.1 is a methodology flow chart that will encapsulate the process which was taken to obtain the research, which methodological approach is chosen to gather date, till discussion and conclusion.

Also, in this chapter consist of an overview of the research methods, their advantages and drawbacks, and explain the reason for choosing a particular research approach/method, furthermore, in this chapter the research instrument used in gathering the data and how the date was collected treated and analyzed will be dementated as well as the reliability and validity of the implemented research method.

According to (Kumar & Ranjit, 2015), research process is defined as a process of gathering, analyzing and clarify information to answer specific questions or objectives, this process must go under controlled, systemic, valid and verifiable, empirical and critical framework to be qualified as research.

3.2.Methodology flow chart



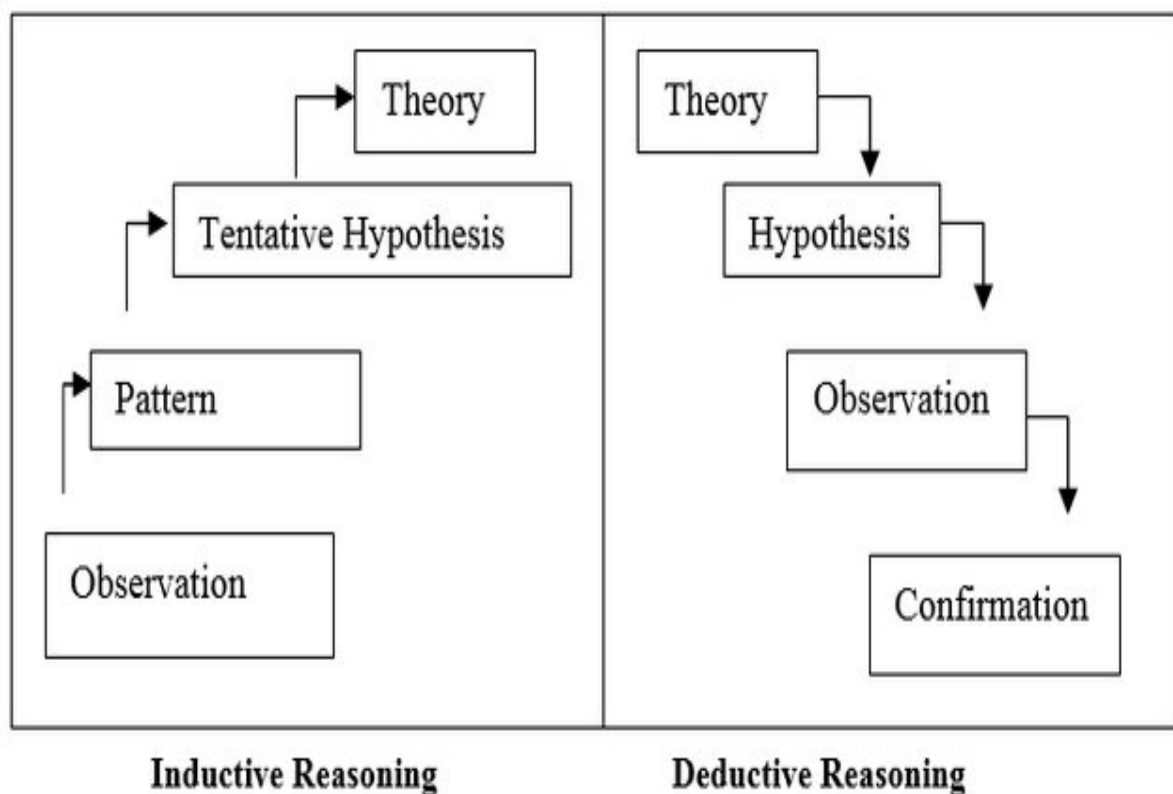
3.3. Research approach

Research management have two major types of research approach first known as inductive and second is deductive approaches, inductive research approach mainly concerned in developing theory while deductive research approach focusing on testing existing theory or model (Saunders et al., 2020).

Inductive research approach also it can be defined as inductive reasoning since it begins with observations and ends with developing a theory. The developed theory developed as result of collecting data in the research. The main goal of this research approach is producing meaning through the collected data base for developing a relationships and pattern in terms of constructing a theory or theoretical insights. In addition, using an existing theory to articulate the research questions or objective which need exploration is not prevented by inductive approach (Neuman, 2014).

On the other hand, deductive research approach works its way from established theory or hypothesis and design strategy to collect data and test to come with observation and conclusion, according to Goddard and Melville (2004), this research approach strategy is designed in this philosophical theory in order to test specific hypothesis.

In simpler terms, inductive research approach begins with the observation to articulate a specific patten within them where as deductive research approach begins with a known pattern which is tested against observation through examinations and evidence the figure below summarizes both research approach.



According to (Richards, 1993), it is impossible for a researcher to realistically separate the two processes of deduction and induction. As “both are always involved often simultaneously” and “it is impossible to go theory free in to any study”. Also, the researchers facing a challenge of mixing more than one research approaches or strategies when it comes to testing theories or the development of a pacific study. As a result, abduction research approach was developed it is a mix of inductive and deductive research approach (Awuzie & McDermott, 2017).

In this research, a combination of inductive and deductive (abductive) research approaches were used, as the research concept or hypothesis based on an existing theory of “sustainable project management” is developed and tested on Saudi Arabia construction sites and as a result of the data analysis collection a theoretical insight or conclusion was produced. Therefore, this study uses both deductive and inductive research approaches or adductive approach in short for the application of conceptual framework in Saudi Arabia construction sites and develop new theory or conclusion based on the outlining of sustainable project management as a result of data analysis.

The abductive research approach is beneficial as it integrates both inductive and deductive methods (Flick, 2018), the systematic literature review (SLR) enhanced the development of the theoretical framework applied in to the empirical research to investigate the integration of sustainability in project management in construction project in Saudi Arabia from multidimensional approach of sustainability concept (environment, social. And economic sustainability). The framework includes both of the main themes of the research; project management and sustainability. Data collection instrument was developed based on this framework. Then the data collected were analyzed to produce theoretical insight (inductive).at the same time deductive approach were carried out to explain the analyzed data outcome. Hence, this research uses a combination of both approaches and the complete each other.

3.4.Research methods

Research methodology it is a framework that shapes the strategic process that is undertaken by the researcher to collect, observe and analysis data collected. There are two main types of data collection primary and secondary data (collis and hussey,2003), the term primary data refers to direct evidence or information collected by the researcher for a particular purpose of the study such as interview, questionnaire, survey, and observation. On the other hand, secondary data refers to the previous studies that been done by other researchers such as books, academic journals, governmental report, and online database. In this section three main research method will be discussed quantitative, qualitative, and mixed methods.

3.4.1. Quantitative method

Quantitative method depends on collecting data and analyzing the data using statical methods, this method aims to produce objective and factual data that can be numerically measured and expressed (Mcleod, 2023), quantitative is also beneficial to in determining the relation between two or more variables. (Denscombe, 2010) have identified some advantages of utilizing this method includes, the data analyzed provides a trusted ground for description and analysis as the findings are based on measured numerical value rather than impression, it quick to analyze a large volume data providing good preparation and planning, moreover, the

data collected and analyzed can be checked for authenticity which give confidence to author and the reader that data given is accurate.

On the contrary, there are some limitations such as the data gathered is not taken in neutral sittings in addition the participant can express their thoughts on the questions, the applicant may have limited knowledge about the subject, and larger sample is needed for accuracy (Mcleod, 2023). A questionnaire survey is applied in this research to collect quantitative data; the survey strategies allow achieving the objectives of the research and obtain results that can be implemented, in this research an online survey conducted to investigate integrating sustainability in to construction projects in Saudi Arabia, Google form was used to generate the survey and gather the statistics of participants answers.

3.4.1.1. Quantitative data collection

The questionnaire survey allows gathering the required and in the best manner, in this research the data is numerical to investigate integrating sustainability in to construction projects in Saudi Arabia its challenges, level of knowledge about the subject, the suitable project management implementation in Saudi Arabia, the personnels working in construction were targeted in order to collect data they includes projects managers, project engineers, site engineers, planning engineers, and quality engineers.

The main motivation of using online survey is the cost efficiency, the duration and the variety in location that the survey can reach, as far the questionnaires asked were closed ended question and was designed on basis on multiple choice.

The participants were invited through a link to complete the online questionnaire required to collect the data. The questionnaire consists of four sections. The first section covers the participant background through five questions, the second section cover the general knowledge of the participant regarding sustainability, the third section veil the current state on implementing sustainable project management in the organization, and lastly the fourth section what are the current state of integrating sustainability in project management in Saudi Arabia. Survey questions were formulated based on sustainability project management concept in which the research questioned can be answered and fulfill the research objectives. The link was sent to 120 participant and 80 responses were collected. Check appendix 1 for the survey questions.

3.4.2. Qualitative method

Qualitative method aims to understand the aspects that the participant really experiences in the natural settings, this method following qualitative approach focuses in exploring and explanation on “how” and “why” particular phenomena occur. There are different types of qualitative methods it includes in-depth interviews, case studies, documents such as journals and books (Mcleod, 2023).

According to (Scott and garner,2013), the effective and popular method in qualitative approach is interviewing, the interviews should not be a question-and-answer format so that the interviewer asks and interviewee answers it have to be more like a discussion to explore

the depth of the subject (Kvale, 1996), as the data generated from the whole discussion not the answers to questions (Kvale, 1996; Block, 2000).

Unfortunately, and due to the short time of the research, it was not possible to arrange one to one interview as most of the people asked were either on holiday or busy.

The figure below explains the difference between quantitative and qualitative methods in a simple visual way.

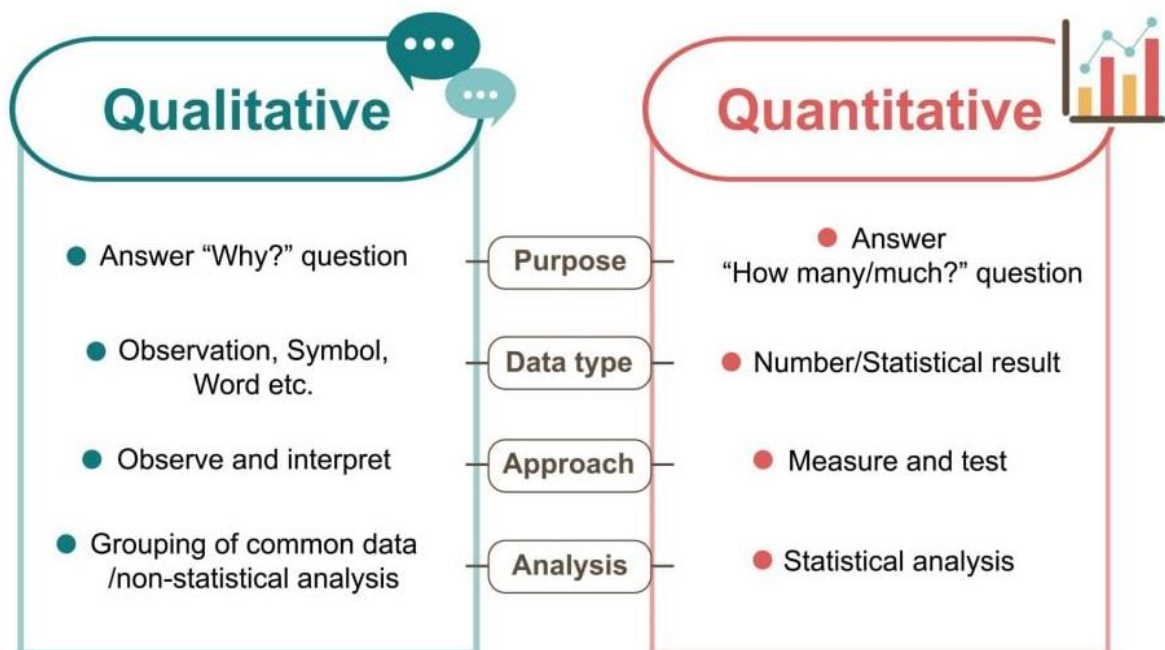


Figure 13 quantitative vs qualitative (McLeod, 2023)

3.4.3 Mixed method

A mixed method can be defined as a combination and integration of both quantitative and qualitative methods in a single study in order to answer the research questions. Implementing mixed method shows the strength of both methods while neutralizes the weaknesses researchers use it to expand the evidence, boost credibility and illustrate the data analyzed in one method rather than scattered in two. (Robson & McCartan, 2016).

Advantages of this method: -

- 1) Reached more comprehensive outcome.
- 2) Answers the question that qualitative and quantitative cannot answer alone.
- 3) Encourage researchers to multi paradigms.
- 4) Gives the researchers freedom to use all methods to come with best data to fulfill the research objectives.

3.5. Research Population and Sampling

The research population were Saudi Arabian construction sector and snowball technique was used in this study. The potential participants involved in this study were employees in the construction sector in Saudi Arabia who involve in project and project management. There are two primary sampling methods, first known as probability sampling which includes random sampling and the second known as non-probability sampling technique. To get the maximum responses rate in the questionnaire a snowball sampling technique was used. Initially the questionnaire was sent via a link to the targeted participants in the construction sector in Saudi market and then snowball effect was achieved. The sample size was estimated initially for the quantitative questionnaire study was around 100 participants. A significant effort was undertaken to attain the highest possible response rate in order to fulfill the research objective together with ensuring validity and reliability.

In addition, pilot research was carried out with the following primary objectives in mind:

- (i) To determine the degree to which the quantitative survey is applicable.
- (ii) To assess cooperation and response rate.
- (iii) To evaluate the quality of the data from quantitative source.
- (iv) To gather additional data that could aid in modifying the survey to better meet the research objectives.

Therefore, the questionnaire survey was sent to three doctors who are working at SEGI university, and university technology PETRONAS, who have huge experience in the construction industry and relative experience in Saudi Arabia construction sector to complete the questionnaire survey and to send their feedback. They have had sent their treasured feedback and the modification have been made accordingly. Their comments and permission are attached in the appendix 1.

3.6. Data analysis tools

The most important aspect of every research project is the data analysis, which must be directed toward the objectives and research questions. The process of analyzing data is shaped by the objectives of the research. The method used to collect, determine, evaluate and presented shall determine the outcome of the study; in order to accomplish the study purpose and objectives, it is critical to support the selected research while displaying the data analyzed.

Google documents forms, have an integrated statistical package used to analyses the quantitative data statistically. Descriptive statistics were generated using regression analysis and relationships between important variables.

3.7. Quality criteria – Validity, Reliability, and Generalizability

The quality of both quantitative and qualitative research is evaluated using the criteria of validity, reliability, and generalization. Monitoring the quality requirements must be done in a practical and efficient way. According to (Gray, 2010) validity is focusing on whether the

gathered data and findings of the research are intended to the research objectives. According to Denscombe (2010), validity demonstrates that the research techniques used and the data used are accurate, and the data offer genuine insights into the phenomena (in this case, SPM).

The data collection method in this research were chosen based on specific objectives, which require both breadth and depth to investigate the degree to which sustainability have been integrated in project management in construction project in Saudi Arabia.

According to Yin (2009), reliability means if any researcher adopts a similar research approach as the original author, the researcher should be able to have similar outcome and conclusion. Therefore, to ensure that there would be no bias and that the results would provide an accurate picture of the state of SPM in the Saudi Arabian construction project sector, great attention was given both in the design of the data collection tools and in the data analysis. To ensure the all data from literature review and data collection are reliable and authentic only authentic and trustworthy sources were used. The survey questions were added in the appendix and the statical figures will be included in chapter 4 the discussion.

3.8.Ethical consideration in the research

According to (sales and Folkman,2000) Studies that involve human subjects are delicate when it comes to ethical standards and considerations. This research considered all the ethical issues that may arise, (Denscombe, 2010) stated that ethical manners are expected to conducted by researchers in any research. Informed permission, confidentiality, data protection, data security, and participant anonymity are the main ethical concerns in this study. To ensure that the study's participants, individuals and organizations do not suffer any bodily, psychological, or reputational harm, appropriate measures were taken to address the ethical concerns.

3.9.Summary

In this chapter, methodology flow chart was provided where it visualizes how the research was conducted then the research approach was discussed in details and what approach this research flows and research approach, research population and sampling, data analyzing tools, quality criteria reliability and generalization, finally the ethical consideration approached in this research.

The research follows a quantitative method approach where data was collected via questionnaire survey distributed via link the population targeted was 120 participants but only 80 responses came back. The research tried to meet the research objectives form the prospective of the professionals in construction industry in Saudi Arabia. Quantitative data collected helped to generate research outcomes which are valid, reliable and generalizable. Finally, ethical consideration of the collected data is clearly explained in accordance to Saudi Arabia guidelines.

Chapter 4

Result and discussion

4.1. Introduction

This chapter shows the quantitative data analysis from the study. To achieve the four objectives of this research, the data collected are analyzed regarding to the main themes. First an overview of the collected data is presented, including the demographic details of the research participants, the second section, the data regarding the participants level of understanding about sustainable development concept are analyzed, the third part focuses on the analysis of the current state of sustainable project management in the participants organizations and management processes. The fourth section discusses the challenges that face the organization to integrate sustainability in to project management in construction project in Saudi Arabia, the fifth section will analysis to which level the integration of sustainable project management in construction project in Saudi Arabia have reached, finally the last section is a brief summary of the findings from this chapter.

4.2.Data collection overview

A total of 80 questionnaire respondents participated in the current study, who were used for the analysis to produce findings. These participants have had experience in construction projects and project management and have had different employment position in Saudi Arabia.

The data were collected in Saudi Arabia from 25 July 2025 to 8 august 2024. Google form was used to design the descriptive and collect the required data and google a have integrated a statical instrument to demonstrate the results. The total number of questions was 19 questions and total answers were 80 answers which were constructed according to the objectives of this study. The specific research objectives were: 1) investigate the general understanding of sustainability concept among professionals, 2) the current state of sustainable project management in the organizations, 3) the challenges facing integrating sustainability in construction project management, 4) the level of integration sustainability in project management in Saudi Arabia.

In the questionnaire, the author adopted end closed multiple choice question type. Additionally, the data regarding the work position of the participants and their level of education, as well as their work experience, are presented in the following subsections based on the data collected.

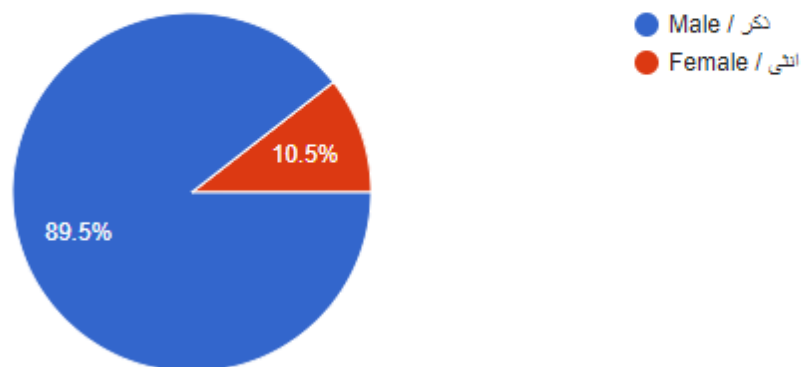
4.2.1. Participant's general information

In this chapter the participant's general information will be analyzed and that's include the sex, age, education level, years of experience, and current employment position.

4.2.1.1. Sex and Age

The participants SEX and Age are demonstrated in the figures below which shows the predominant sex participated was male with an percentage of 89.5% and females was only 10.5% and that percentage is somewhat logical as the higher percentage of employee in construction industry in Saudi Arabia are males according to ALWATAN NEWS paper on 4.5% of the total workers in construction industry are females, while the ages varied less than 24 years was 10% which considered to be fresh graduate with limited experience, the age 25 to 30 years was 21.1% , the age 31 to 35 years was 21.1 % and those are the category was targeted as they have the experience in the field as well as they are considered to be the decision makers in the sustainability field, the age 36 to 40 years was 21.1% both they are considered seniors in their profession and have the same percentage, the age 40 and more years was the highest 26.3% and they considered to be the expertise. Seeing this variety of participants gives us assurance that the outcomes of the survey responses is adequately reliable.

Sex / الجنس



Age / العمر

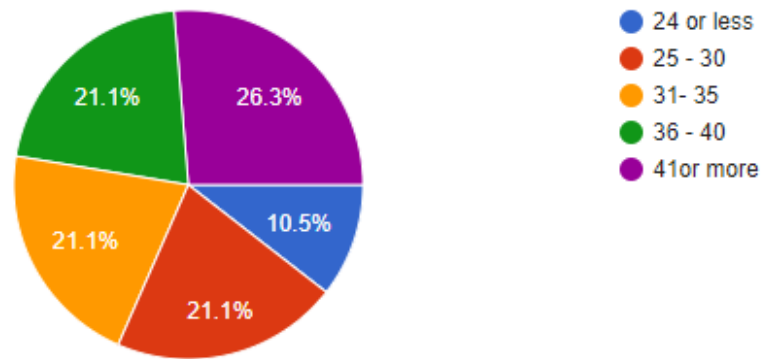


Figure14 : sex and age of participants

4.2.2. Education level

This section shows the participant's education level, in the figure below it shows the percentages, where the highest percentage was bachelors with percent of 52.6% after those masters with percentage of 42.1% and PHDs was 5.3%. the result obtained are logical as most of the professional who have PHDs service in the academic sector.

Education Level / مستوى التعليم

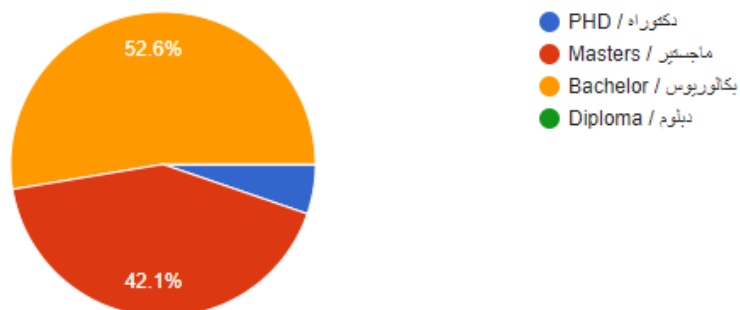
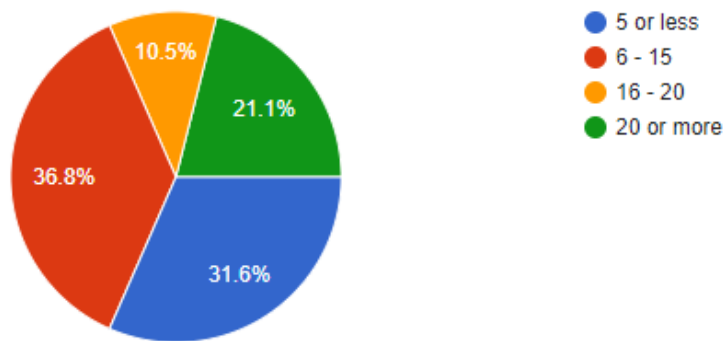


Figure15 : education level

4.2.3. Years of experience and current positions

In this section the level of education and current employment position will be discussed and the percentages are shown in the figures below, the participants with the highest percentage was 6 to 15 years of experience with 36.8%, 5 or less year was 31.6%, 20 or more was 21.1% and 16 to 20 years was 10.5% for the current employment position the highest level was others with 31.6% when I contacted them it cleared the most of them are project managers and unfortunately it was not include at first then it was added after that structural engineers with 21.1%, project engineers with 15.8%, site engineers and project managers was equal 10.5% and these percentage and the variation among them considered to be valid.

Years of Experience / سنوات الخبرة



Current Employment Position

الوظيفة الحالي

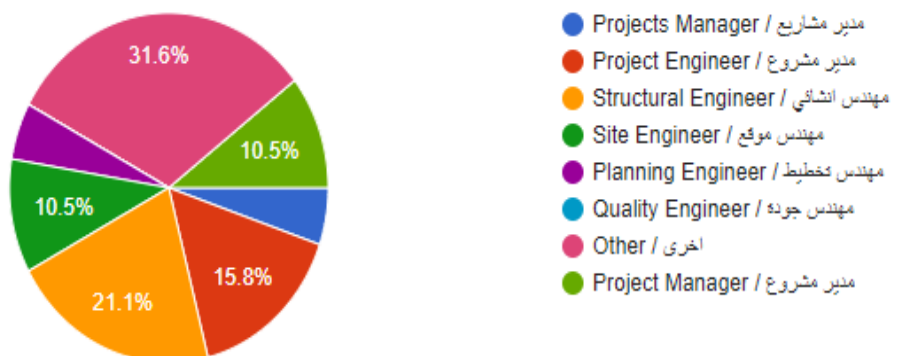


Figure16 : years of experience and employment position

4.3. Investigate the general understanding of sustainability concept among professionals.

In this section the level of participants understanding of the sustainability concept will be analyzed through three questions were asked to the participants. All the percentages will be illustrated in the figures below.

First question was “are you aware of sustainability concept?” the majority of the participants answers yes with parentage 54.3% after that with 45.8% answered to some extent and this percent is a positive as the awareness have increased compared to the studies discussed in the literature review were most of the participants in those studies have limited knowledge of sustainability.

are you aware of "Sustainability" Concept?

هل لديك معرفة عن مفهوم الاستدامة؟

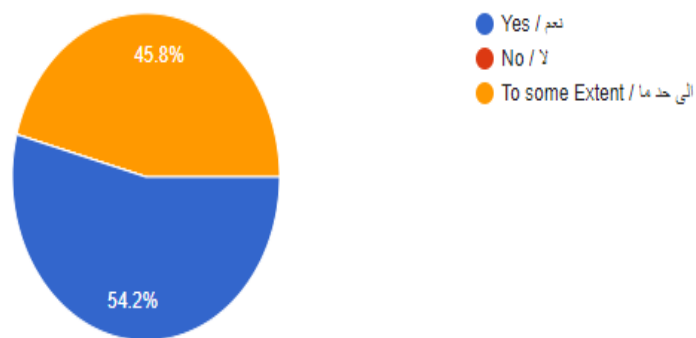


Figure 17: Participants awareness of sustainability

Second question was “In which phase of the project management Should "Sustainability" concept be implemented?” in this question the aim was to analyses that in which phase in the project management lifecycle phases sustainability most likely to be utilized the highest percentage was at planning phases with percent of 41.7% then whole lifecycle of project management phases with percent of 37.5% then 12.5% in the initial phase and in monitoring and control phase and closure was equal at percent of 5.3%. those outcomes show variety on the responses in which and to the author opinion sustainability have to be considered in the whole life of the project management life cycle where it has to be implemented highly in the planning and execution phases.

In which phase of the project management Should "**Sustainability**" concept be implemented?

في اي مرحله من مراحل ادارة المشروع يجب تطبيق مفهوم الاستدامة؟

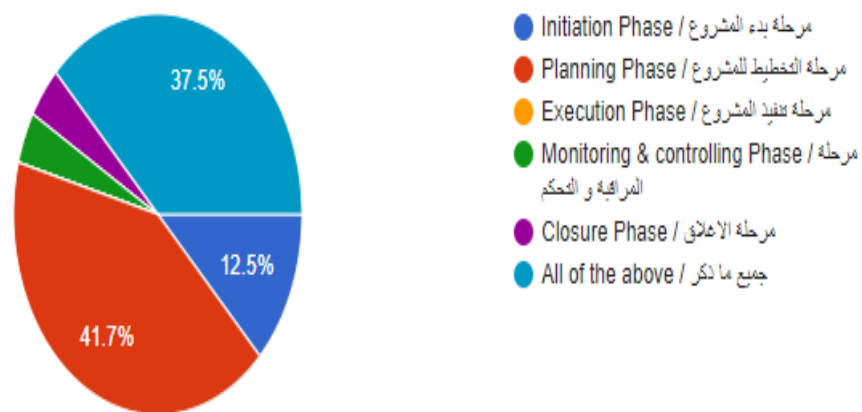


Figure18 : implementing sustainability in which phase?

Third question was “To what extent you think integrating "Sustainability" in to Project management will contribute to the project Success?” this questions aim to analysis the encouragement of the professionals to implement sustainability in project management, which shows that most of the professionals was strongly agreed that it will be beneficial to integrate sustainability in to project management with percent of 50% and 37.5% agreed and that shows that the professional in Saudi Arabia are encouraged to integrate sustainability into construction project management.

To what extent you think integrating "**Sustainability**" in to Project management will contribute to the project Success?

الى اي مدى تعتقد ان اضافة مفهوم الاستدامة الى ادارة المشاريع سيحقق نجاح للمشروع؟

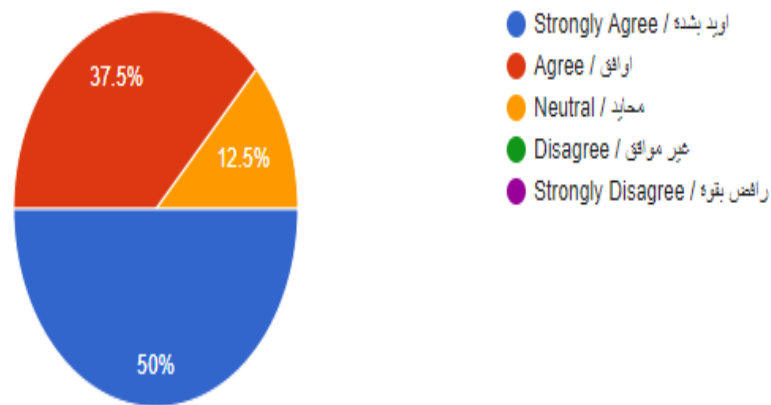


Figure19 : Integrating SPM and project success

4.4.current state of Sustainable project management practices in the organization

In this section was aiming to check the state of sustainable project management in the organizations and this section is divided in to 4 questions all the percentages will be illustrated in the figures below.

First question was “Do you think that project management has a role in delivering "Sustainability"?” this question aimed to explore if the participants agree that project management have a role in delivering sustainability the most of participants agreed with 83.3% and the participants who agreed to some extent was 12.5% and the rest either disagreed or not sure, and this percentages prove that project management if implemented right it will sustain the integration of the sustainability into construction project management.

Do you think that project management has a role in delivering "Sustainability"?

هل تعتقد ان ادارة المشاريع لها دور في تحقيق الاستدامة؟

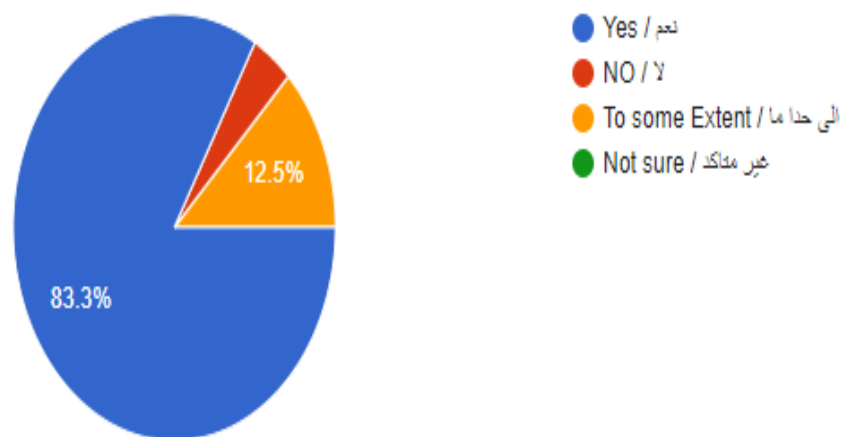


Figure20 : Role of CPM in delivering sustainability

Second question was “Do your company encourage its team to use "sustainability" in construction project?” this questioned aim to check if the top management was able to see the benefits of integrating sustainability in to project management the highest percent agreed with percent of 33.3%, 29.2% partially agreed and 12.5% were not sure and it is a positive outcome that shows the development of integrating sustainability in the market.

Do your company encourage its team to use "sustainability" in construction project?

هل الشركة التي تعمل بها تشجع فريق المشروع على استخدام مفهوم الاستدامة في مشاريع الانشاء؟

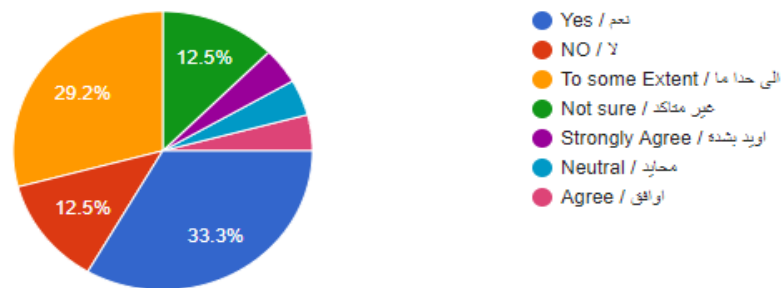


Figure21 : Company encourages its team to integrate SPM

Third question “Do your company seek any sustainability or green building Certification?” this aim to see if the organization are moving toward sustainability really or not were the percentage agreed with percent of 37.5% and 25% to agreed to some extent which a positive value that indicate that organization in Saudi Arabia moving toward sustainability.

Do your company seek any sustainability or green building Certification?

هل تسعى شركتكم على الحصول على اي شهادة خاصة بالاستدامة او المباني الخضراء؟

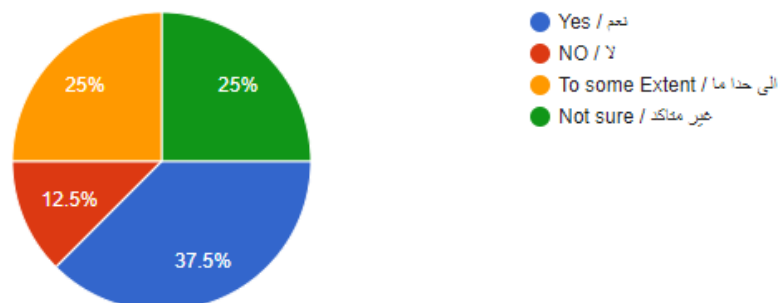


Figure 22: Seeking sustainability certification

Fourth question was” do your organization have available "sustainability" strategy?” this question aims to check whether the organization have fixed strategy to move toward sustainability the participants agreed with percent of 29.2% and the organization which was under development was the second with percentage of 29.2% and this indicate a positive outcome as the company started to implement strategies to force and encourage the employee to integrate SPM.

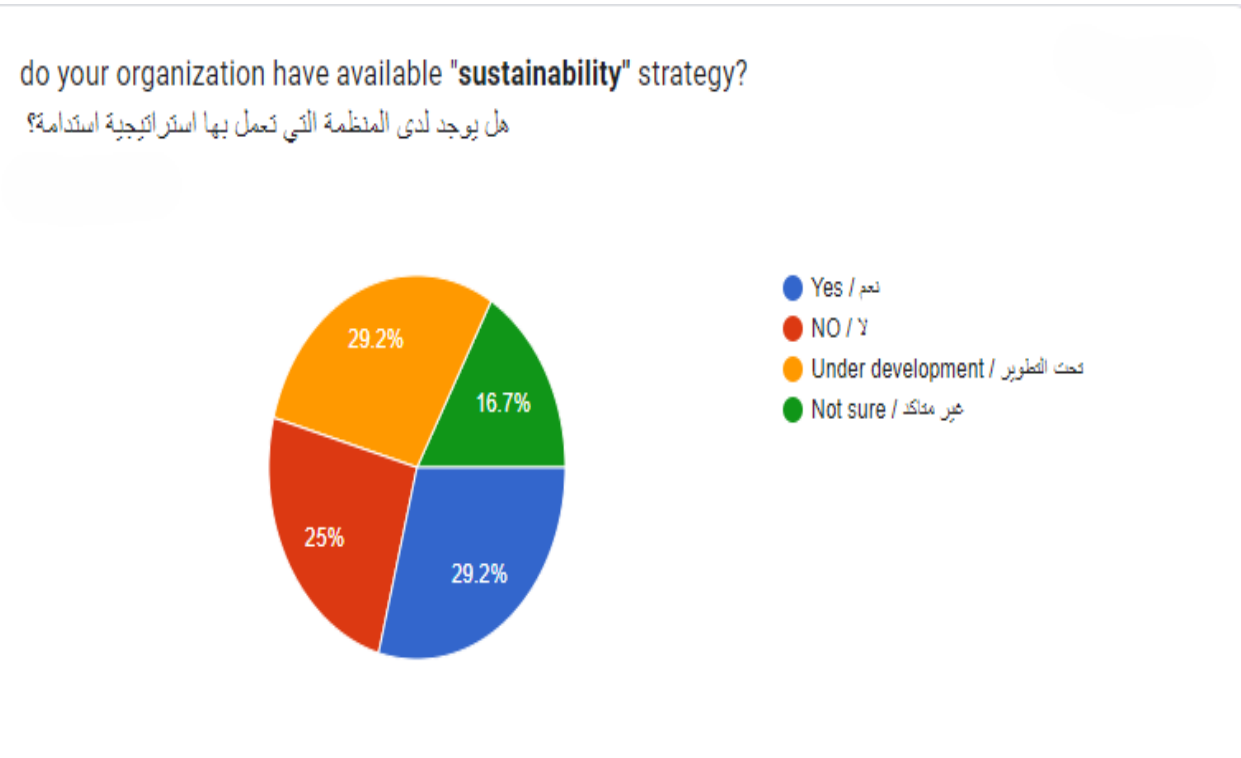


Figure23 : Sustainability strategy SPM

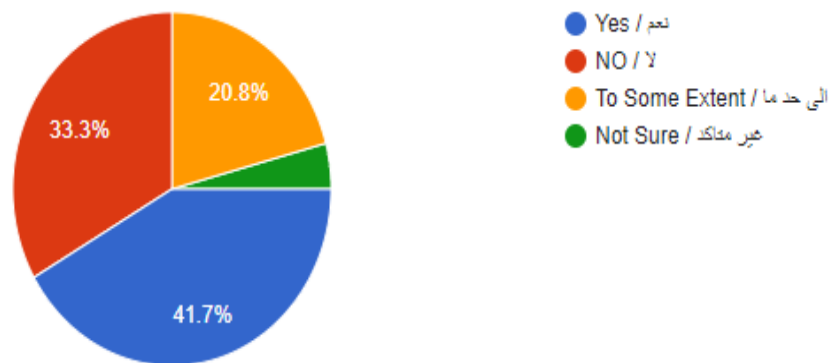
4.5.challenges facing integrating "sustainability" in construction project management

In this section the challenges that facing the organization with implementing sustainability in to project management and this section include three questions and the percentages will be illustrated in the figure below.

First question was do you see that integrating "sustainability" in construction project management will increase construction cost?, Second was Is it easy to find sustainable materials or renewable material when needed?, And the third was In general do adopting sustainable project management will increase the duration of construction projects?,

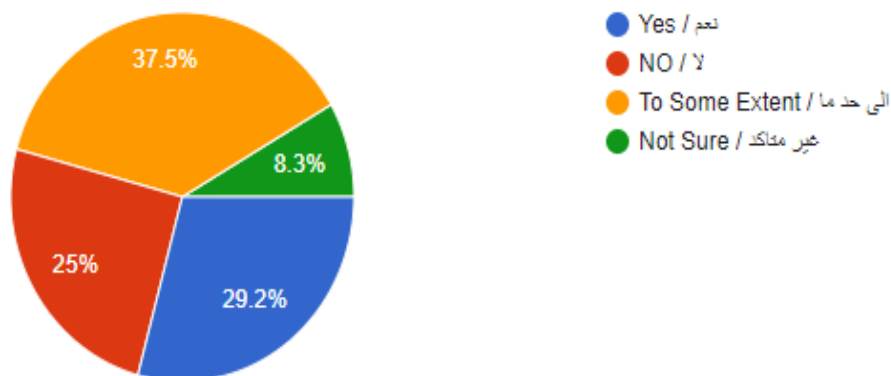
do you see that integrating "sustainability" in construction project management will increase construction cost?

هل ترى ان اضافة مفهوم الاستدامة الى ادارة المشاريع الانشائية ستزيد تكلفة البناء؟



Is it easy to find sustainable materials or renewable material when needed?

هل من السهل ايجاد المواد المستدامة او المتجددة وقت الحاجة؟



In general do adopting sustainable project management will increase the duration of construction projects?

في المجمل هل تبني إدارة المشاريع المستدامة ستزيد مدة المشروع؟

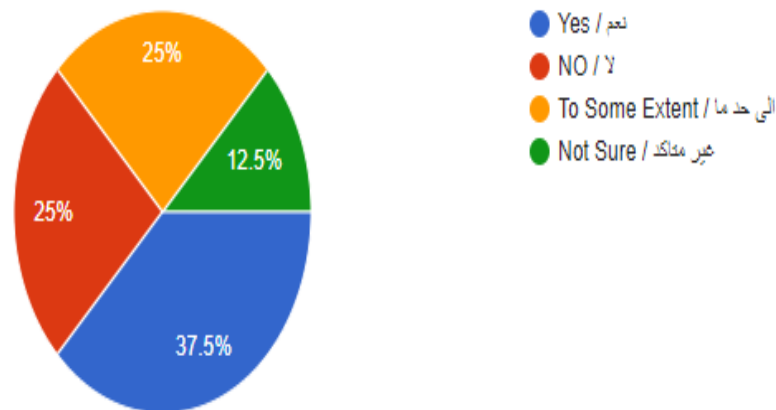


Figure 24: The constrains with implementing SPM

For the cost the majority agreed that implementing sustainability will increase the cost with percent of 41.7% then the next challenge was the material which also the majority answered to what extent that sustainable material is easy to find in the market with percent of 37.5% and 29.2% agreed and also 37.5% agreed that implementing sustainability to project management will increase the duration of the project. And those challenge are the constrains that facing implementing sustainable project management in Saudi Arabia.

4.6.Integrating Sustainability in project management in The Kingdom of Saudi Arabia?

The aim of this section is to see the current state of implementing sustainable project management in Saudi Arabia as whole, four questions were asked in this section and the figure below will illustrate the percentages

First question was “What the current state of implanting sustainable development principles in Saudi Arabia?” the highest percentage was that it still under development with percentage of 41.7% then intermediate with percentage of 25% and advanced with 20.8% these percentages was showed the level of integrating sustainable concept into the system as Saudi Arabia walk toward 2030 vision it is expected to be mature enough to fully integrate sustainability in to the system.

What the current state of implanting sustainable development principles in Saudi Arabia?

ما هو الوضع الحالي لتفنيذ مفهوم الاستدامة في المملكة العربية السعودية؟

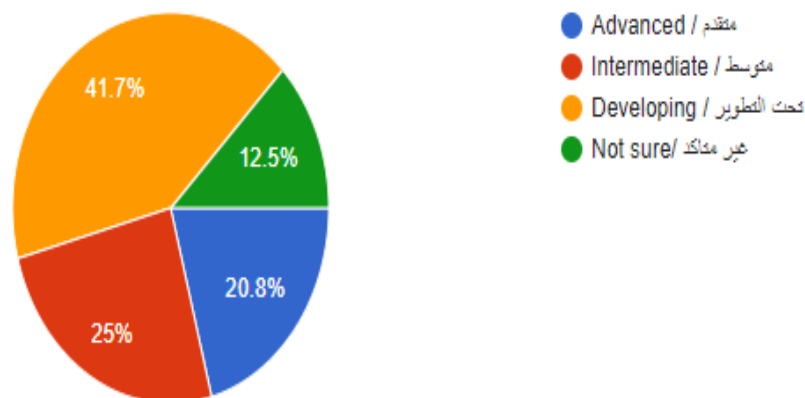


Figure25 : State of sustainability in Saudi Arabia

Second question was” Does Saudi Arabia enforce the implementation of Sustainability in construction Project Management?” aimed to check if Saudi Arabia is enforcing organizations to implement sustainability the participants who was not sure came to be highest at percentage of 33.3% second agreed with percent of 25% which is equal to the percent of participants who mostly agreed with the statement ,participants who does not agree was 16.7% these percentages was shocking as the kingdom moves toward 2030 vision Saudi Arabia have to come with guidelines that enforce organization to implement sustainability.

Does Saudi Arabia enforce the implementation of Sustainability in construction Project Management?

هل المملكة العربية السعودية تلزم استخدام مفهوم الاستدامة في ادارة المشاريع الإنشائية؟

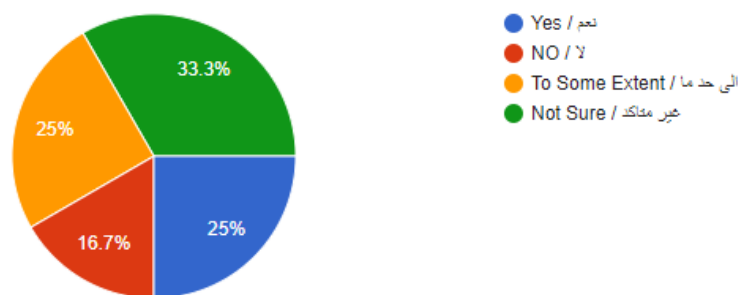


Figure26 : KSA enforcement of sustainability

Third question was” To what extent do you think Sustainable development principles contributes to project success in Saudi Arabia?” this questioned aim to see to if the professionals think that implanting sustainable project management contributes to project success in Saudi Arabia or not the majority agreed that it will contribute the project success with percentage of 50% and 29.2% highly agreed.

To what extent do you think Sustainable development principles contributes to project success in Saudi Arabia?

الى اي مدى تعتقد ان مفهوم الاستدامة يساهم في نجاح المشاريع في السعودية؟

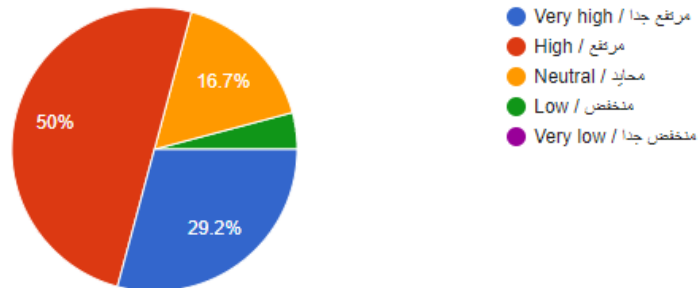


Figure 27: SPM Contribution to the Success of Projects in KSA

And lastly the fourth question was “what are the challenges facing organizations in Saudi Arabia to implement sustainable project management?” aimed to check what are the reasons that cause the integration of sustainable project management to be late and the highest percentage was lack of knowledge with 54.2% and lack of experts 25% and lack of management support among organizations in Saudi Arabia was at 16.7%.

what are the challenges facing organizations in Saudi Arabia to implement sustainable project management?

ما هي التحديات التي تواجه المنظمات في السعودية لتنفيذ ادارة المشاريع المستدامة؟

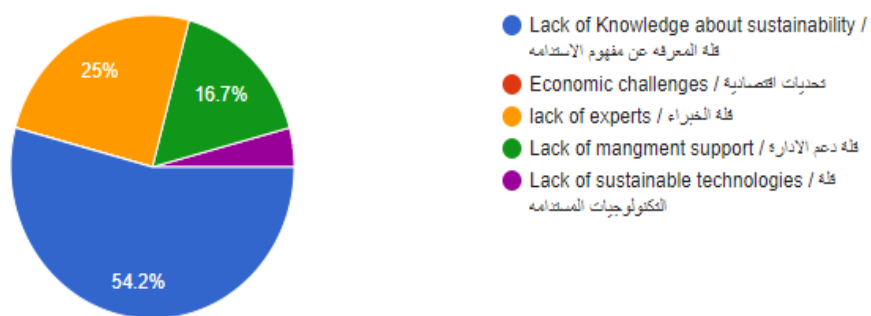


Figure28 : challenges facing organization in KSA to implement SPM

Chapter 5

Conclusion and Recommendations

5.1. Conclusion

To summarize all, as the world is developing sustainability is a huge part of this development as the main goal of it to sustain environment, economic, social for present generation and don not compromise the future generation to obtain their own needs, project management always focuses on implementing the project within the three constraints of time, quality, and cost but as the demand increase it have been notice that the quality of life and environment was degrading fast and here sustainability have to be integrated in the project management lifecycle phases. The aim of this study is to investigate to which level sustainable concept and the concept of sustainable project management reached in the construction industry in Saudi Arabia the findings were amazing to see how the awareness about sustainability increased among the professionals and organization in Saudi Arabia compared to the previous years but at the contrary there was some challenges which facing the organization and professionals in Saudi Arabia cost increases with the implementation of sustainability as a result of rare suppliers who provides sustainable material in Saudi Arabia also it was found the duration increase as a result of the following challenges, one of the major challenges facing sustainable project management is the lack of knowledge on how to implemented and lack of expertise. But on the positive side the outcomes show an accelerating adoption of the sustainable project management concept in Saudi Arabia as the movement toward 2030 vision still going.

5.2. Recommendations

in this section and after result was discussed a few recommendations have raised listed as follow:

- 1) To ensure implementing of sustainability in to construction industry the foundation have to be laid correctly were the governments around the world have to enforce roles.
- 2) The organizations have to come with a strategy to implement sustainability in to project management.
- 3) Organization and governments around the world have to spread the knowledge among professionals and public.

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APPENDIX 1

1. Sex / الجنس

Male / ذكر

Female / انثى

2. Age / العمر

24 or less

25 - 30

31- 35

36 - 40

41 or more

3. Education Level / مستوى التعليم

PHD / دكتوراه

Masters / ماجستير

Bachelor / بكالوريوس

Diploma / دبلوم

4. Years of Experience / سنوات الخبرة

or less 5

15 - 6

20 - 16

20 or more

5. Current Employment Position

الوظيفة الحالي

Projects Manager / مدير مشاريع

Project Engineer / مدير مشروع

Structural Engineer / مهندس انشائي

Site Engineer / مهندس موقع

Planning Engineer / مهندس تخطيط

Quality Engineer / مهندس جودة

Other / اخرى

6. Are you aware of "Sustainability" Concept?

هل لديك معرفة عن مفهوم الاستدامة؟

Yes / نعم

No / لا

To some Extent / الى حد ما

7. In which phase of the project management Should "Sustainability" concept be implemented?

في اي مرحله من مراحل ادارة المشروع يجب تطبيق مفهوم الاستدامة؟

Initiation Phase / مرحلة بدء المشروع

Planning Phase / مرحلة التخطيط للمشروع

Execution Phase / مرحلة تنفيذ المشروع

Monitoring & controlling Phase / مرحلة المراقبة و التحكم

Closure Phase / مرحلة الاغلاق

All of the above / جميع ما ذكر

8. To what extent you think integrating "Sustainability" into Project management will contribute to the project Success?

الى اي مدى تعتقد ان اضافة مفهوم الاستدامة الى ادارة المشاريع سيحقق نجاح للمشروع؟

Strongly Agree / اويد بشدة

Agree / اوافق

Neutral / محايد

Disagree / غير موافق

Strongly Disagree / رافض بقوة

9. Do you think that project management has a role in delivering "Sustainability"?

هل تعتقد ان ادارة المشاريع لها دور في تحقيق الاستدامة؟

Yes / نعم

NO / لا

To some Extent / الى حد ما

Not sure / غير متأكد

10. Do your company encourage its team to use "sustainability" in construction project?

هل الشركة التي تعمل بها تشجع فريق المشروع على استخدام مفهوم الاستدامة في مشاريع الانشاء؟

Yes / نعم

NO / لا

To some Extent / الى حد ما

Not sure / غير متأكد

11. Do your company seek any sustainability or green building Certification?

هل تسعى شركتك على الحصول على اي شهادة خاصة بالاستدامة او المباني الخضراء؟

Yes / نعم

NO / لا

To some Extent / الى حد ما

Not sure / غير متأكد

12. do your organization have available "sustainability" strategy?

هل يوجد لدى المنظمة التي تعمل بها استراتيجية استدامة؟

Yes / نعم

NO / لا

Under development / تحت التطوير

Not sure / غير متأكد

13. do you see that integrating "sustainability" in construction project management will increase construction cost?

هل ترى ان اضافة مفهوم الاستدامة الى ادارة المشاريع الإنشائية ستزيد تكلفة البناء؟

Yes / نعم

NO / لا

To Some Extent / الى حد ما

Not Sure / غير متأكد

14. Is it easy to find sustainable materials or renewable materials when needed?

هل من السهل ايجاد المواد المستدامة او المتجددة وقت الحاجة؟

Yes / نعم

NO / لا

To Some Extent / الى حد ما

Not Sure / غير متأكد

15. In general do adopting sustainable project management will increase the duration of construction projects?

في المجمل هل تبني ادارة المشاريع المستدامة ستزيد مدة المشروع؟

Yes / نعم

NO / لا

To Some Extent / الى حد ما

Not Sure / غير متأكد

16. What the current state of implanting sustainable development principles in Saudi Arabia?

ما هو الوضع الحالي لتففيذ مفهوم الاستدامة في المملكة العربية السعودية؟

Advanced / متقدم

Intermediate / متوسط

Developing / تحت التطوير

Not sure/ غير متأكد

17. Does Saudi Arabia enforce the implementation of Sustainability in construction Project Management?

هل المملكة العربية السعودية تلزم استخدام مفهوم الاستدامة في ادارة المشاريع الانشائية؟

Yes / نعم

NO / لا

To Some Extent / الى حد ما

Not Sure / غير متأكد

18. To what extent do you think Sustainable development principles contributes to project success in Saudi Arabia?

الى اي مدى تعتقد ان فهوم الاستدامة يساهم في نجاح المشاريع في السعودية؟

Very high / مرتفع جدا

High / مرتفع

Neutral / محايد

Low / منخفض

Very low / منخفض جدا

19. what are the challenges facing organizations in Saudi Arabia to implement sustainable project management?

ما هي التحديات التي تواجه المنظمات في السعودية لتنفيذ ادارة المشاريع المستدامة؟

Lack of Knowledge about sustainability / قلة المعرفة عن مفهوم الاستدامة

Economic challenges / تحديات اقتصادية

lack of experts / قلة الخبراء

Lack of mangment support / قلة دعم الادارة

Lack of sustainable technologies / قلة التكنولوجيات المستدامة