ESIC2024 Posted: 16/04/2024 DOI: 10.70082/esic/8.1.078

Sustainable Construction Project Management - A Proposed Conceptual Framework from Systematic Literature Review

Suwarno[1], Diena Dwidienawati[2], Mohammad Ichsan[3]

[1]Management Department, Binus Business School Undergraduate Program, Bina Nusantara University, Jakarta 11480, Indonesia
[2]Business Management, Binus Business School International Undergraduate Program, Binus University, Jakarta, Indonesia
[3]Digital Business Program, Binus Business School International Undergraduate Program, Binus University, Jakarta, Indonesia
Email: suwarno002@binus.ac.id

Abstract

The construction industry is estimated to contribute to huge stimulation to improve health, economy, and poverty with investment globally up to US$94 trillion by 2040. However, at the same time construction industry is also a huge risk to sustainability, where most of the activities are performed in form of projects. It causes an incredible threat to the environment and community, which leads to the new concept of sustainable project management. Regardless of the impact, the literature on the topic is still limited and is mostly a systematic review in nature. This study aims to review the currently available literature on sustainable project management, specifically in construction/infrastructure projects, and finally propose the conceptual framework of Sustainable Project Management. A literature review of fifty-eight full articles on sustainability project management especially in the construction industry was performed. The result of the study showed that apart from the limitation of its definition, it covered the importance of how the project management approach should be shifted from the traditional methods. It also showed that leadership, stakeholder engagement, organization policies and practices, technology innovation, and professional association are among the factors that influence the implementation of sustainability projects as new insights in project management research.

Keywords: leadership, project management, sustainability.

At present, sustainability is inevitable for all organizations. Sustainability plays an essential role in every aspect of the organization either for SMEs as well as big corporations. Sustainability has become one of the main concerns and key indicators of business success (Chofreh et al., 2019).

Project management is on the rise. According to Talent Gap Report 2021, there is an estimated growth of the total GDP of projected industries globally from US$ 24.7 trillion in 2019 to US$ 34.5 trillion in 2030. This forecasted incremental GDP has led to an opportunity of 2.3 million job openings annually to fulfill the demand for

project management-oriented employees (PMOE). The major increase in global PMOE is in the Information and Publishing sector and followed by Financial Services and Manufacturing/Construction. This significant importance of the phenomenon has been emphasized again by Project Management in its report to respond to the megatrend and one of them is to have more social impact projects in the area of sustainability, diversity, equity, and inclusion as a strategic priority that shall be considered in implementing Project Portfolio Management in the organization (Ichsan and Hamsal, 2019)

One of the hot trends in management currently is project management and sustainability (Armenia et al., (2019); Li et al., (2022)). Regardless that the link of project management is under-examined, the evidence of the link itself is clear. Projects are tasks about resource consumption and delivering expected benefits. Sustainability refers to criteria of appropriate usage of resources and outputs assessment in the impact of economy, society, and environment. Traditional projects usually prioritize seeking an optimal mix of time, cost, and quality in maximizing the benefits of stakeholders. Most of the time, project management does not put the consideration of social and environmental issues (Armenia et al., 2019). However, Schoper et al. in (Toljaga-Nikolić et al., 2020). predicted that sustainability would play important role in project management development until the year 2025.

The pressure on project management to practice sustainability is increasing. Pe-rez-Lombard et al., (2008) in (Hwang and Tan, 2012) stated that commercial and residential buildings contributed 20% to 40% of the world's energy consumption. Therefore, the processes of sustainable construction are keys to achieving sustainable communities and environment.

However, there are barriers to the implementation of sustainable project management. [9] identified three barriers to incorporating sustainability in construction projects which are a lack of understanding of the potential benefits, insufficient cooperation among practitioners, research institutions, and environmental organizations, and a lack of a systematic approach to pursuing sustainability goals. Hwang and Tan (2012) argue that some challenges in implementing sustainable construction project management are such as higher cost, technical difficulty, risk of project delivery, and unfamiliarity with sustainable technology. Hwang and Ng (2013) mentioned skills of project management, stakeholder management, coordination, and decision-making as ones of identified challenges.

Regardless of the need to implement sustainable construction project management and the high pressure of its implementation, the literature linking the environment and sustainability within construction projects is still lacking (Shah and Naghi Ganji, 2019). Most of the available literature on sustainable project management is a systematic literature review (SLR) and qualitative studies in nature. There is a limited quantitative study to support generalizing the research findings and interpretation of broader use actions (Ullah et al., 2020).

This study aims to review the currently available literature on sustainable project management, specifically in construction/infrastructure projects to answer these re-search questions: "What is the definition of Sustainable Project Management?"; "What are observed Gaps and Key Success factors in implementing Sustainable Project Management in the construction industry?" The main goal of the study also aims to come up with a conceptual framework for Sustainable Project Management.

This study aims to contribute to updating the currently available study on sustainable project management. Based on the current knowledge then developing a conceptual framework for sustainable project management. After the conceptual frame-work is confirmed, it can help the construction industry to identify critical

variables which influence the implementation of sustainable project management.

The structure of this article starts with an introduction where background, gaps, and objectives are addressed. Then followed by a literature review and the methodology of the research. Afterward, results including the proposed framework and discussion are presented. This article will be closed with a conclusion, study limitation, and recommendation.

Literature Review

Sustainability

The classic definition from World Commission on Environment and Development 1987 (Brundtland Report) is "Sustainable Economic Development meets the needs of current generations without compromising the ability of future generations to meet their own needs (Sanders and Wood). Sustainability consists of two premises, which are that the activity of the economy should promote social welfare and protect the natural resource base, and it should consider impacts on future generations and steward the natural resource-based, so it is productive for future use.

At present, sustainability is inevitable for all organizations. Sustainability plays an essential role in every aspect of the organization, either for SMEs as well as big corporations. It touches all parts of the business from product development, operation, marketing, supply chain, and finance. It covers all industries, from food and beverages to mining. Starting in 1980, the concept of sustainability has become a major concern in doing business. Customer mindset has changed to become more ethical minded requiring industries to adapt to be sustainable. Industries need to re-think, re-design, and re-develop business practices to become more sustainable (Chofreh et al.,2019). Further, it is argued that a sustainable way of doing business has become a competitive advantage. Sustainability has become one of the main concerns and key indicators of business success.

Construction Project Management

Construction activity in developing countries has remained critical as infrastructure investment from national and multinational financial institutes that support socio-economic development (Fathalizadeh et al.). The construction industry plays important role in contributing a huge impact to the targets of 2030 sustainable development goals (SDG). The construction industry is estimated to contribute to huge stimulation to improve education, health, economy, poverty, and gender equality with investment globally up to US$94 trillion by 2040. However, the demand for sustainability has brought new challenges to construction project management (Grosse and Femenias, 2020).

As mentioned earlier, traditional projects usually prioritize seeking an optimal mix of time, cost, and quality in maximizing the benefits of stakeholders. The sustainability approach has known to associate with the increasing cost and delay of time. Therefore, the integration of sustainability to project management is not easy due to conflicting interests. Madureira et al (Madureira et al., 2022) raised the issue on how importance it is for project management to change the paradigm with such as embracing the current challenge, facilitating new assessment, promoting benefits to stakeholder, being more transparent, fair, and ethical, and enhancing project deliverables with lesser environmental, social, and environmental impacts. Nevertheless, the fact is that sustainability is not mandated at the managerial level; it is the stakeholder's demands as an incentive in introducing sustainability into the organization (Shah and Naghi Ganji, 2019). (Madureira et al., 2022) raised the constraint of lack of standard guideline. One of the most influenced and commonly used guideline books of Project Management best practices, the Project Management Body of Knowledge (PMBOK) still does not well address the topic of sustainability (Armenia et al., 2019).

At present, however, there is increasing pressure to ensure the adoption of sustainability for construction project management. Sustainability has been key in stakeholders' expectations for the infrastructure project. It is shareholders' incentive in introducing sustainability into the organization (Grosse and Femenias, 2020). Qualitative characteristics such as environmental friendliness, safety, and the efficiency of resources become a customer value for construction projects (Shah and Naghi Ganji, "Sustainability Adoption in Project Management Practices within a Social Enterprise Case"). The adoption and embedment of sustainability practices by the contractors are mainly because of the regulation from the government and the pressure from the client to meet environmental standards (Ershadi et al., 2021). Nevertheless, the implementation phase of construction projects alone has been known to cause stress to the surrounding community and environment (Kivilä et al., 2017). Previous studies stated that the building construction industry causes a large part of the ecological burden (Jonasson et al., 2020). Furthermore, it also caused an incredible threat to the environment (Li et al., "Disentangling the Failure of Benefits Realization in Public Institutional Building Projects: A Paradoxical Understanding of Formalization"). The negative impacts of construction activities on the environment and ecological are such a sizeable amount of waste created on construction sites (Ershadi et al., 2021). Perez-Lombard et al., (2008) in (Hwang and Tan, "Sustainable Project Management for Green Construction") stated that commercial and residential buildings contributed 20% to 40% of the world's energy consumption. Therefore, the processes of sustainable construction are key to achieving sustainable communities and the environment.

To achieve the integration of sustainability and project management, Sustainable Project management should be approached as a "new school of thought in project management" ((Ullah et al., (2020) Borg et al., (2020). The delivery of project management cannot only address the traditional triple constraint (time, cost, quality) but should also consider another triple constraint (triple bottom line – TBL; people, planet, and profit). In other words, sustainable project management should deal with double-triple constraints. There are two important goals here. The first one is minimizing the infrastructure project's impact on the current environment. The second is minimizing the waste from resources in the phase of project execution (Af Hällström and Bosch-Sijtsema, (2020). The importance on the skill of project manager in implementing sustainable project management was stated by Madureira et al (2022). Shehadeh et al., (2022) in their study showed that the capacity of the construction company in dealing sustainable and resilient depend on the size of the company. The bigger the size the higher the capacity of construction company to deal will disruption and challenge.

Methods

This systematic review was conducted based on Prisma Systematic Review (Liberati et al., 2009). There were 26 checklists on Prisma guidance. However, since this study will not conduct any synthesis, therefore, there were only 22 checklists used in this study. Protocol and Registration, Eligibility Criteria, Data Items, and Study Characteristics were 4 checklists not used in this study.

Information sources

The data source for this study is Scopus. Scopus database was selected because Scopus is one of the largest curated databases. It has a wide global and regional scientific coverage of journals, conference proceedings, and books. The quality of the publication is indexed through rigorous selection and revaluation (Baas et al., 2020).

The objective is to have a broad search of recent sustainable project management. The following terms to search all studies in the source database: "Sustainable Project Management".

The search was conducted on 3rd May 2021. The search period is 3 years period (2018-2020).

The search was limited to journal publications. Books, handbooks, reference works, and book series were excluded. Since the objective of the study is to review current studies and the direction of future research, therefore, review articles and research articles were included in the search term. To ensure the availability of the publication, the authors only include Open Access publications. The search only limit to Engineering and Business, Management and accounting subject are. The above criteria search term gave results to a total of 439 articles.

Study Selection

All abstract articles were printed. The further selection criteria were applied to include or exclude the articles from the review. The first criterion was duplication. If duplication was found, it would count only as 1 paper. The second criterion was topic-related studies. The studies chosen in to be included are studies on the topic of sustainable project management and its implementation. A topic such as logistics, application, chemical-related, energy-related, etc. will be excluded from the review.

After reviewing the 439 abstracts from Scopus, a total of 194 articles were chosen for further analysis based on relevancy. The next step was reviewing the full articles of 194 publications. The full articles were reviewed to analyze whether they were suitable for the research questions. A total of 58 articles were chosen for this study analysis. Note from this search result that not all literature are all about construction sustainable project management. However, all articles contain construction or infrastructure, project management, sustainability or green.

Data items and collection process

A simple excel table was used to collect all data items. The data items include definitions of Sustainable Project Management, Gaps and Key Success Factors in implementing sustainable project management, and the design of the study.

A two-stage approach was applied to data collection. One reviewer will review the full paper. Afterward, another reviewer will review the same study. The compilation then was tabulated for the report.

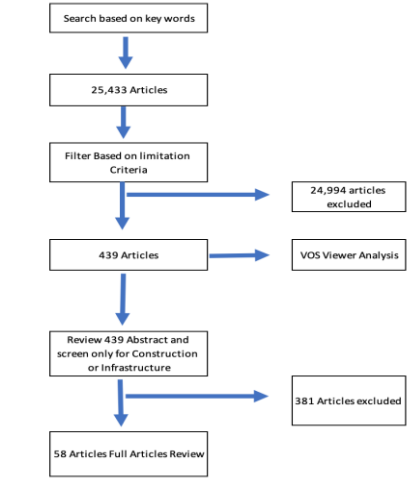

Figure 1. Screening Flow

Analysis Method

The collected data were kept in excel and were analyzed simply with the quantity and the frequency of data for each date item and thematic categorization. Cluster analytics with VOSviewer from 439 studies.

Result

The VOSviewer Analytics from 439 studies showed that there are 5 big clusters which are “sustainable development”, “sustainability”, “project management”, “decision making”, and “life cycle”. Cluster 1 Sustainable Development as the biggest cluster has 185 links with link strength 1184 and 220 occurrences. Cluster 2 Sustainability has 135 links 448 link strength and 93 occurrences. Cluster 3 Project Management has 127 links with 472 link strengths and 93

occurrences. Cluster 4 life cycle has 101 links 380 link strength and 48 occurences. Cluster 5 decision-making has 107 links, 291 ling strengths, and 43 occurrences.

The relatedness between project management and sustainability and sustainable management is also not that close. Other related topics such as "decision making", "stakeholders", "sustainable management", "managers", and "key performance management" are still limited based on the cluster size. This analytics showed that only a few literature is available in sustainable project management, its key indicators, and the role of managers.

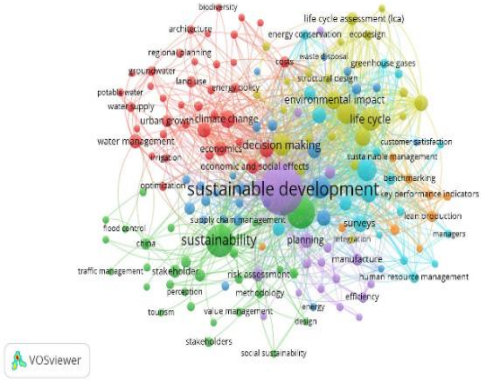

Figure 2. VOSviewer Analytics

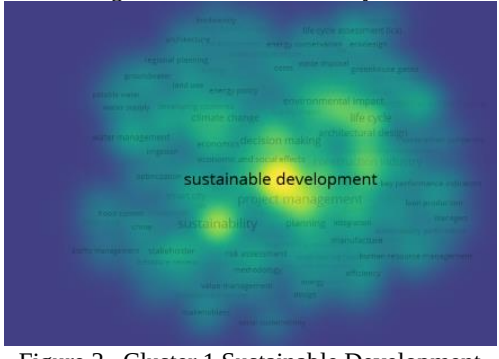

Figure 3. Cluster 1 Sustainable Development

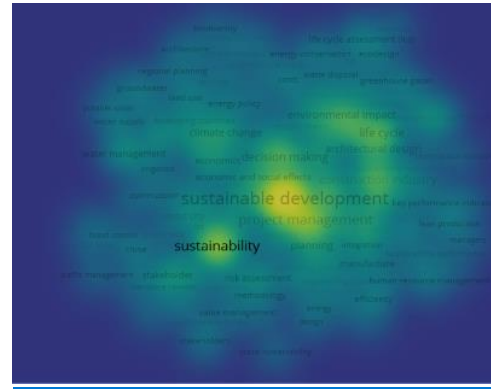

Figure 4. Cluster 2 Sustainability

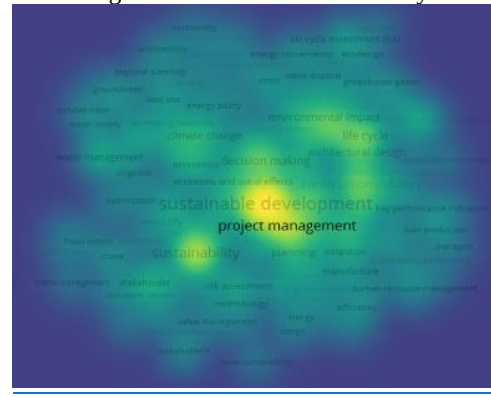

Figure 5. Project Management

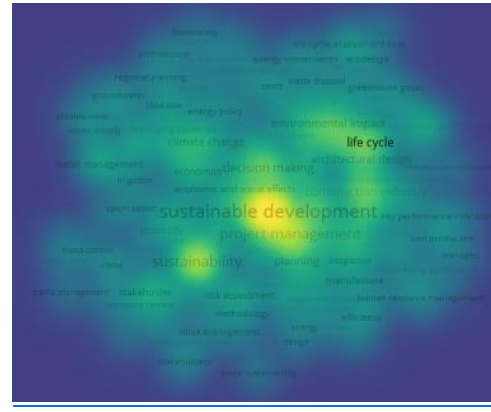

Figure 6. Life Cycle

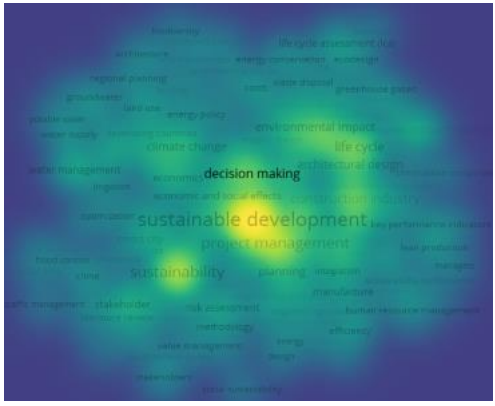

Figure 7. Decision Making

Authors have undergone a review of a total of 58 articles that specifically discussed construction and infrastructure. Based on the full paper analysis and synthesis, the authors identified (1) the Definition of Sustainable Project Management, and (2) the Gaps and Key Success Factors in implementing Sustainable Project Management in the construction industry.

Definition

It is still difficult to find the definition of sustainable project management (Díaz-Piloneta et al., 2021). The review of 58 articles showed that there were only nine articles that mentioned ten definitions of sustainable project management. The first five definitions were about sustainable project management in general, and the following five were about the definition of construction/infrastructure sustainable project management. Defined sustainability project management by referring to green project management from (Shah and Naghi Ganji, 2019). It is defined as a model which is aimed and designed, so that project management will think green for the whole lifecycle of projects and always put into consideration the impacts of the project on the wider environment. Further, it is stated that it aims to incorporate the environment practice with routine methods of project management. Armenia et al (2019) quoted the definition that "Sustainable Project Management is the planning, monitoring, and controlling of project delivery and support processes, with consideration of the environmental, economic, and social aspects of the life cycle of the project's resources, processes, deliverables and effects, aimed at realizing benefits for stakeholders and performed in a transparent, fair, and ethical way that includes proactive stakeholder participation".

The third article from Kivilä et al (2017) claimed that sustainable projects are the practice to ensure that the project delivers profitability, and at the same time it also offers fairness, transparency, safety, ethics, and environmentally friendly project delivery (at project delivery, it should be acceptable in term of social and environmental throughout its lifecycle). In other words, sustainable project management has two perspectives, which are it is sustainable project delivery and sustainable project deliverables. Ullah et al., (2020) defined sustainable project management (SPM) as the management of a project that gives priority to the aspects of the environment, economy, and society and in the same also puts effort into managing projects. Sustainable project management refers to "the planning, monitoring, and controlling of project delivery and support processes, considering the environmental, economic, and social aspects of the life cycle of a project's resources, processes, deliverables, and effects, to create benefits for stakeholders in a transparent, fair, and ethical way that includes proactive stakeholder participation".

Meng et al (2015), stated that infrastructure Sustainability can be defined as how to sustain and effectively maintain the function of the system for the development of urban economy, society, and ecology within the entire infrastructure life cycle. "Infrastructure projects that are planned, designed, constructed, operated, and decommissioned in a manner to

ensure economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire life cycle of the project" (Mansell et al., 2020). Francis and Thomas (2020) in (Qazi et al., 2021) define construction sustainable project management as a project which necessities all project stakeholders' involvement to ensure that during all project stages and the entire lifecycle of the product, the project management methods adopt techniques and materials that foster sustainability. Qazi et al (2021) defined sustainable construction practice as a project which provides a balance of the performance of economy, society, and environment during the implementation of the construction projects. Sustainable Construction is defined as "a construction concept which aims to minimize the impact to the environment to balance the capabilities of the environment to the current needs of human life and as well as preserve it for future generations (Farida et al., 2021). Sustainable construction is also defined as the practice to create facilities and apply procedures that are environmentally friendly and use efficient resources throughout the life cycle of a building (Dasović et al., 2020). It covers all the stages of construction processes such as siting to design, construction, operation, maintenance, renovation, and deconstruction.

All definitions covered the importance of how the project management approach should be shifted from the traditional methods. Sustainable construction project management requires the incorporation of the routine into a new approach that should consider not only economic and financial concerns but also social and environmental. Interestingly, all definitions emphasize how the coverage of sustainability should last for the entire product lifecycle. As mentioned by Kivilä et al (2020) there are two perspectives on sustainable construction projects. The first one is the delivery of a sustainable project, and the second is the sustainable project deliverable.

Factors Influencing Sustainability Project Management

Leadership

Meng et al (2015),stated that an important key success factor for the project's success is the relationship between leadership and infrastructure sustainability (Mansell et al., 2020) claimed that implementing sustainable project management is similar to change management. Since project team needs to move forward from the traditional approach of project management to give more focus to sustainability. Therefore, Mansell argued that there is a need for strong leaders who can drive and motivate the team to drive toward changing the behavior of the team. Leadership qualities were also raised by Ullah et al (2020) as important factors in sustainable project management. (Sujana) further emphasized that leadership was a must competency that should be posted in leading sustainability construction to ensure subordinate engagement and organizational learning.

Organization Capability

Another aspect raised in the analysis was the capability of the organization, especially the project management team (Toljaga-Nikolić et al., 2020; Armenia et al., 2019; Ullah et al., 2019; Jonasson et al., 2020; Borg et al., 2020; Gackowiec et al., 2020). All authors raised the importance of project management know-how and skills in implementing sustainability projects argued that one of the challenges in sustainable project management was the requirement of team training. Jonasson et al (2020) strengthen the argument from (Borg et all, 2020; Gackowiec et al., 2020 argument with a statement that one factor that influenced the difficulty of implementing and carrying through complex sustainability projects was to lack of competence (Ullah et al., 2019). Mentioned several factors that influence the ability to implement sustainable project management. These are such as the project team's abilities, leadership quality, and internal and external stakeholders such as government regulation, suppliers, and professional bodies. Researchers pointed out

that lack of expertise and lack of training can be one of the main obstacles to implementing sustainability construction. Team learning is one of the most important criteria. Sustainability team training and learning should be provided by the companies. A good understanding of the concept can increase team commitment, engagement, and performance of sustainability (Armenia et al., 2019)..

Stakeholders' involvement

From 58 articles, several factors influenced the gaps or becoming the barriers to the implementation of Sustainable Project Management in Construction. Stakeholders' commitment was raised by (Armenia et al., 2019; Shah and Naghi Ganji, 2019; Af Hällström and Bosch-Sijtsema., 2020; Gackowiec et al., 2020). Construction, especially infrastructure projects are mostly involved a high degree of complexity which also means involving various stakeholders. From the client's standpoint, sustainable project management implementation means the increase of capital, from the firm point of view it involves the requirement of further training. Nevertheless, they feel that there is a lack of incentives for them to implement the sustainability of projects.

Af Hällström and Bosch-Sijtsema (2020), argued that the management of the complexity of sustainability of the project is difficult due to too many actors' involvement often having different goals. Most of them focused on companies' profitability and performance. Shah S agreed that stakeholders are the key factor in driving the implementation of sustainability project management (Shah and Naghi Ganji, 2019). According to Shah S, the key is gaining strong commitment, engagement, and participation from all related stakeholders to advance toward sustainability.

Corporate Policies and Practice

The importance of having a sustainable value as one of the important factors was argued by four authors. This value should be held by various stakeholders. (Gade and Madsen, 2020) pointed out that the value of all involved actors will ensure the ownership and responsibility to the project sustainability, Toljaga-Nikolić et al (2020), argued that in implementing sustainability in project management, the project team should have the ethics, fairness, and righteousness value in managing the projects. How corporate policies and practices emerge as important factors in sustainable construction project management was raised by (Armenia et al., 2019). The awareness and the behavior of individuals, teams, and corporations toward sustainability were considered important resources to ensure the implementation of sustainability projects.

Technology

The analysis also resulted in the role of technology in sustainable project management. (Bracken et al., 2020) raised the importance of technology together with society and politics as the drivers of sustainability. Gackowiec et al (2020) pointed out that technology is an important enabler to ensure that projects acquire measurable process parameters. (Ershadi et al., 2021) also claimed that the insufficient application of technology will limit the capacities of the project team in embedding sustainability. (He et al., 2020) claimed that the availability of technology innovation was one of the key challenges for the project team in implementing sustainable construction. Technology innovation enables project management to perform better by providing new ideas and process improvement. It also provides the best and fastest way (Doost Mohammadian and Rezaie, 2019).

Resource Management

Ohiomah et al (2019) argued that the difficulty for construction projects to implement sustainability is because they face restricted time and resources to meet the requirement of sustainability. Oguntona et al (2019) also raised the issue of resources as a challenge in implementing sustainable construction project management. Resources management was one of five dimensions claimed by Armenia et al (2020) that emerged as key success factors for

sustainable construction along with corporate policies and practices, lifecycle orientation, stakeholder engagement, and organizational learning.

Other factors

Other factors that influence the implementation of sustainability project management were also found in the results of the analysis. The conventional project management practice is to blame for the difficulty of implementation (Toljaga-Nikolić et al., 2019). As mentioned earlier that one of the most influenced and commonly used guideline books on Project Management best practices, the Project Management Body of Knowledge (PMBOK) still does not well address the topic of sustainability (Armenia et al., 2020). How organization resistance to change is also a culprit of the difficulty of implementing sustainable project management. The project team was hesitant to change from traditional practices to adopting innovative technologies as the key barrier toward adopting sustainable practices in construction (Qazi et al., 2021). Another concern in the implementation of sustainable construction project management was the difficulty to reconcile the short-term financial interest and sustainability aspects. The implementation of sustainability projects implies incremental cost which will hurt the profitability of the project if the philosophy of project management is merely to profit, (Dong et al, 2019). The scope of the project was also highlighted as the difficulty factor in sustainable projects argued that the impact of the project to sustainability might occur long after the project results. Therefore, the project team might think that the further ahead impact is not the project's responsibility. (Oguntona et al., 2019; Hsiao et al., 2019) addressed the importance of financial rewards as a driver in the implementation of sustainable construction.

Discussion

The result of the literature review of this study can be anchored to three big theories. The first one is Natural Resource Based View (NRBV), change management and the second one is the Stakeholder theory. NRBV is the extension of Resource Based View (RBV). RBV of the firm suggests that the competitive advantage of a firm is a function of the strategic resources that the firm has (Barney, xx). RBV possess a firm-centric approach in establishing the firm competitive advantages (Andersen, 2021). In strategic management RBV is used to explain on how internal organization strengths and weakness can relate to competitiveness and organization performance (Shahzad, 2021).

NRBV has extended RBV and realized that the relationship between the firm and the environment can contribute to the firm competitive advantages. NRBV argues that organizational resources can influence the firm strategy which benefits and is favorable to environmental results (Shahzad, 2021). NRBV further suggest that firms need to integrate environmental issue to their strategic planning (Adomako, 2020).

The systematic review result showed a few variables that are considered factors influencing sustainable construction project management implementation. The first one is leadership style, supported that leadership plays important role in the implementation of sustainable construction project management. Sustainable project management is a “new school of thought in project management”. It is a new approach; therefore it should be managed by change management. The contingency theory of leadership states that the effectiveness of leadership behavior will vary across different condition. How leaders interact with their subordinates by the situation will determine the performance of the team or individuals. The leader will influence subordinates through motivation and context. A leader has to be able to influence and explain to subordinates the importance of the project. Therefore, leaders’ motivational competency and adjusting their

style accordingly will influence team behavior which will lead to team performance. Transformation leadership is known as a leadership style which able to motivate and transform individual and team members (Dwiedienawati et al. 2020). Therefore, in the implementation of sustainable construction project management, transformational leadership will play an important role.

The change management theory emphasizes the importance of organization readiness as an important factor for people to change. Carnall (2014) stated that it is not because people are resistant to change, it is more that people are resistant to uncertainty. Therefore, if the uncertainty is reduced by increasing readiness, people will be likely more adaptive to change. Increasing understanding and knowledge with training or experience are ways to reduce uncertainty. Since sustainability construction project management should be managed as change management therefore competency is one important factor in the implementation. The issue of organization capability was raised by many researchers. It can be concluded that organizational capability plays an important role in the implementation of sustainable construction project management. Shaukat et al (2022) argued that SPM has a positive impact on project success. It indicates that the capability of firm in implementing SPM is critical to the project's success. However, this study still has not touched the role of leadership and Organization practices. The moderation effects of stakeholder engagement and team building were found insignificant. Yet, the SLR of this study showed that stakeholder engagement is one of key success factor. Therefore, this study proposed that the relationship of stakeholder engagement is not as moderator, but as direct influence.

The stakeholder theory explains the multiple constituencies that impact and are impacted by business entities such as employees, suppliers, local communities, and creditors. Stakeholder theory suggests that there are relationships between a business and groups and individuals who can influence or are influenced by the business therefore, the business can have a better way to deal effectively. From the perspective of the stakeholder, the business is a set of relationships among groups that have to share the business activities. To know how these relationships work and change over time is the way to understand how a business works. In the big change approach of sustainable construction project management, understanding the role of each stakeholder and engage as well as getting their commitment. The importance of stakeholders' role has been emphasized by Armenia et al (2020) the theory of planned behavior (TPB) is a theory borrowed from psychology that relates to how people believe in their behaviors. It is said that people's behaviors will be influenced by their intention which is based on their beliefs which includes attitude, subjective norm, and perceived behaviors control (Ajzen). If people have a strong belief in one particular issue, they will translate it into their behaviors. The implementation of sustainable construction management involves the trade of short-term financial benefits, which is still the main focus of the current project's approach, with long-term sustainability benefits. This trade-off will only be effective if it is supported by the value held by stakeholders, studies emphasized how organizational policies and practices will be a key driver of the implementation of the project.

Technology has been known to help people increase their productivity. Pointed out that technology is an important enabler to ensure that projects acquired measurable process parameters. Technology innovation enables project management to perform better by providing new ideas and process improvement. It also provides the best and fastest way.

Other important points taken from analysis definitions of sustainable project management are the needs to shift the project management approach. The traditional approach of project management is addressing the traditional triple

constraint (time, cost, quality). However, when dealing with sustainability, project but should also consider another triple constraint (triple bottom line – TBL; people, planet, and profit). In other words, sustainable project management should deal with double-triple constraints (Kivilä et al., 2017),. Aligned with the VOS Viewer analysis, in the Sustainable Project Management journal analysis, one of the cluster is the life cycle. It means there are considerable amount of literature talking about the life cycle of project management.

Sustainable construction project management requires the incorporation of the routine to a new approach that should consider not only economic and financial concerns but also social and environmental concerns. All available definitions of sustainable construction project management emphasize how the coverage of sustainability should last for the entire product lifecycle. As mentioned by Kivilä et al (2017), there are two perspectives of sustainable construction project. The first one is the delivery of sustainable project, and the second is the sustainable project deliverable. Therefore, the sustainable construction project management is no longer only delivering output, but they must deliver outcome.

The proposed framework is as follows:

P1: Transformational leadership style positively influences an Organization's Capability of sustainability

P2: Transformational leadership style positively influences Technology Innovation

P3: Transformational leadership style positively influences Organization Policies and Practices

P4: Transformational leadership style positively influences sustainable construction project management

P5: Organization Capability of Sustainability positively influences sustainable construction project management

P6: Technology Innovation positively influences sustainable construction project management

P7: Organization Policies and Practices positively influence sustainable construction project management

P8: Stakeholder Commitment positively influences sustainable construction project management

P8: Change in PM life cycle moderate the relationship between Transformational Leadership to SCPM

P9: Change in PM life cycle moderate the relationship between Organizational Capability to SCPM

P10: Change in PM life cycle moderate the relationship between Technology Innovation to SCPM

P11: Change in PM life cycle moderate the relationship between Organizational Policies and Practices to SCPM

P12: Change in PM life cycle moderate the relationship between Stakeholder engagement to SCPM

All propositions are depicted in the proposed framework as has been depicted in Figure 2.

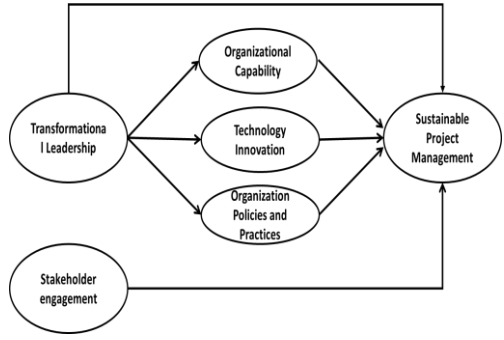

Figure 8. Proposed Conceptual Framework of Sustainable Project Management

Conclusion

Sustainability shall play an important role in project management from practical and theoretical perspectives. The construction projects have been causing a large part of the ecological burden. It also caused an incredible

threat to the environment. The negative impacts of construction activities on the environment and ecology are such a sizeable amount of waste created on construction sites. Therefore, the new perspective of sustainable projects shall not be considered only on the final products but also on processes of sustainable construction that are keys to achieving sustainable communities and environment. The process of construction project management shall be enriched by the perspective of sustainability such as using non-carbon power generation that is required for construction works or defining the process of reducing the construction wastes.

The construction industry bears a huge risk to sustainability, apart from its contribution to human wealth. Although the concern about sustainability has been raising lately, the implementation of sustainable construction is still far behind. The result of the analysis mirrors the condition. There are limited works of literature on the definition alone. However, fortunately, the available definition agreed with one another. All definitions covered the importance of how the project management approach should be shifted from the traditional to a new method that takes the issue of sustainability to the highest attention. Sustainable project management requires the incorporation of the routine into a new approach that should consider not only economic and financial concerns but also social and environmental. All definitions emphasize how the coverage of sustainability should last for the entire product lifecycle. This study also showed that many factors influence the successful implementation of sustainable construction project management. Leadership, stakeholder, competency, value, technology, and professional association are among the factors that influence the implementation of sustainability projects.

Limitations and further research

This study has several limitations. This study is only a conceptual study. A quantitative study to confirm the relationship among variables should be conducted for further study. This study is only using Systematic Literature Review with thematic analysis to review the available theme and topic of the study. The used of other analysis tools to gain more insight can be conducted for further study.

WORKS CITED

Af Hällström, A., and P. Bosch-Sijtsema. "Collaborative Governance Models towards Sustainable Infrastructure Projects: The Case of Resources." IOP Conference Series: Earth and Environmental Science, vol. 588, no. 5, 2020, https://doi.org/10.1088/1755-1315/588/5/052047.

---. "Collaborative Governance Models towards Sustainable Infrastructure Projects: The Case of Resources." IOP Conference Series: Earth and Environmental Science, vol. 588, no. 5, 2020, https://doi.org/10.1088/1755-1315/588/5/052047.

Ajzen, Icek. "From Intentions to Actions: A Theory of Planned Behavior." Action Control, 1985, pp. 11–39, https://doi.org/10.1007/978-3-642-69746-3_2.

Armenia, Stefano, et al. "Sustainable Project Management: A Conceptualization-Oriented Review and a Framework Proposal for Future Studies." Sustainability, vol. 11, no. 9, 2019, p. 2664.

---. "Sustainable Project Management: A Conceptualization-Oriented Review and a Framework Proposal for Future Studies." Sustainability (Switzerland), vol. 11, no. 9, 2019, https://doi.org/10.3390/su11092664.

Baas, Jeroen, et al. "Scopus as a Curated, High-Quality Bibliometric Data Source for Academic Research in Quantitative Science Studies." Quantitative Science Studies, vol. 1, no. 1, 2020, pp. 377–86, https://doi.org/10.1162/qss_a_00019.

Borg, Ruth, et al. "Building Sustainably: A Pilot Study on the Project Manager's Contribution in Delivering Sustainable Construction Projects—a Maltese and International Perspective." Sustainability (Switzerland), vol. 12, no. 23, 2020, pp. 1–15, https://doi.org/10.3390/su122310162.

---. "Building Sustainably: A Pilot Study on the Project Manager's Contribution in Delivering Sustainable Construction Projects—a Maltese and International Perspective." Sustainability (Switzerland), vol. 12, no. 23, 2020, pp. 1–15, https://doi.org/10.3390/su122310162.

Bracken, Louise J., et al. "The Role of Innovation in Advancing Understanding of Hydrological Processes." Hydrological Processes, vol. 34, no. 23, 2020, pp. 4404–16, https://doi.org/10.1002/hyp.13890.

---. "The Role of Innovation in Advancing Understanding of Hydrological Processes." Hydrological Processes, vol. 34, no. 23, 2020, pp. 4404–16, https://doi.org/10.1002/hyp.13890.

Carnall, Colin, and Rune Todnem By. Managing Change in Organisations. Sixth, Pearson, 2014, https://doi.org/10.4324/9781315562933-10.

Chofreh, Abdoulmohammad Gholamzadeh, et al. "The Imperative and Research Directions of Sustainable Project Management." Journal of Cleaner Production, vol. 238, 2019, p. 117810.

---. "The Imperative and Research Directions of Sustainable Project Management." Journal of Cleaner Production, vol. 238, 2019, https://doi.org/10.1016/j.jclepro.2019.117810.

Dasović, Borna, et al. "A Survey on Integration of Optimization and Project Management Tools for Sustainable Construction Scheduling." Sustainability (Switzerland), vol. 12, no. 8, 2020, https://doi.org/10.3390/SU12083405.

Díaz-Piloneta, Marina, et al. "Monitoring the Implementation of Exponential Organizations through the Assessment of Their Project Portfolio: Case Study." Sustainability (Switzerland), vol. 13, no. 2, 2021, pp. 1–20, https://doi.org/10.3390/su13020464.

Dong, Na, et al. "Sustainable Construction Project Management (SCPM) Evaluation-A Case Study of the Guangzhou Metro Line-7, PR China." Sustainability (Switzerland), vol. 11, no. 20, 2019, pp. 1–17, https://doi.org/10.3390/su11205731.

Doost Mohammadian, Hamid, and Fatemeh Rezaie. "Sustainable Innovative Project Management: Response to Improve Livability and Quality of Life: Case Studies: Iran and Germany." Inventions, vol. 4, no. 4, 2019, https://doi.org/10.3390/inventions4040059.

Dwiedienawati, Diena, et al. "Transformational Leadership, Communication Quality Influences to Perceived Organization Effectiveness and Employee Engagement and Employee Retention during the Covid-19 Pandemic." Journal of Advanced Research in Dynamical and Control Systems, vol. 12, no. 7 Special Issue, 2020, pp. 773–87, https://doi.org/10.5373/JARDCS/V12SP7/20202169.

Ershadi, Mahmoud, et al. "Achieving Sustainable Procurement in Construction Projects: The Pivotal Role of a Project Management Office." Construction Economics and Building, vol. 21, no. 1, 2021, pp. 45–64, https://doi.org/10.5130/AJCEB.v21i1.7170.

---. "Achieving Sustainable Procurement in Construction Projects: The Pivotal Role of a Project Management Office." Construction Economics and Building, vol. 21, no. 1, 2021, pp. 45–64, https://doi.org/10.5130/AJCEB.v21i1.7170.

Farida, N., et al. "Developing Indicators of Green Construction of Green Supply Chain Management in Construction Industry: A Literature Review." IOP Conference Series: Materials Science and Engineering, vol. 598, no. 1, 2019, https://doi.org/10.1088/1757-899X/598/1/012021.

Fathalizadeh, Ali, et al. "Barriers to Sustainable Construction Project Management: The Case of Iran." Smart and Sustainable Built Environment, no. July, 2021, https://doi.org/10.1108/SASBE-09-2020-0132.

Gackowiec, Paulina, et al. "Review of Key Performance Indicators for Process." Energies, vol. 13, no. 5196, 2020, pp. 1–20.

---. "Review of Key Performance Indicators for Process." Energies, vol. 13, no. 5196, 2020, pp. 1–20.

Gade, Anne N., and Mette B. Madsen. "Early Prioritization of the United Nation's Goals for Sustainable Development in Construction Projects." IOP Conference Series: Earth and Environmental Science, vol. 588, no. 5, 2020, https://doi.org/10.1088/1755-1315/588/5/052054.

Hwang, Bon-Gang, and Wei Jian Ng. "Are Project Managers Ready for Green Construction?-Challenges, Knowledge Areas, and Skills-." Smart and Sustainable Built Environments, vol. 25, 2013.

Hwang, Bon-Gang, and Jac See Tan. "Sustainable Project Management for Green Construction." Challenges, Impact and Solutions, no. June, 2012, p. 9.

---. "Sustainable Project Management for Green Construction: Challenges, Impact and Solutions." World Construction Conference, Sri Lanka Colombo, 2012, pp. 171–79.

Ichsan, Mohammad, and Mohammad Hamsal. "The Importance of PMO Practices in Strategic Initiative Implementation: An Empirical Study of Indonesian Banks." Pertanika J. Soc. Sci. Humanit, vol. 27, no. 2, 2019, pp. 49–61.

Jonasson, Jonas, et al. "Knowledge Management of Sustainable Construction Processes." IOP Conference Series: Earth and Environmental Science, vol. 588, no. 2, 2020, https://doi.org/10.1088/1755-1315/588/2/022030.

---. "Knowledge Management of Sustainable Construction Processes." IOP Conference Series: Earth and Environmental Science, vol. 588, no. 2, 2020, https://doi.org/10.1088/1755-1315/588/2/022030.

Kivilä, Jesse, et al. "Sustainable Project Management through Project Control in Infrastructure Projects." International Journal of Project Management, vol. 35, no. 6, 2017, pp. 1167–83, https://doi.org/10.1016/j.ijproman.2017.02.009.

---. "Sustainable Project Management through Project Control in Infrastructure Projects." International Journal of Project Management, vol. 35, no. 6, 2017, pp. 1167–83, https://doi.org/10.1016/j.ijproman.2017.02.009.

Li, Yadi, et al. "Disentangling the Failure of Benefits Realization in Public Institutional Building Projects: A Paradoxical Understanding of Formalization." Journal of Asian Architecture and Building Engineering, vol. 21, no. 2, 2022, pp. 575–87.

---. "Disentangling the Failure of Benefits Realization in Public Institutional Building Projects: A Paradoxical Understanding of Formalization." Journal of Asian Architecture and Building Engineering, vol. 00, no. 00, 2021, pp. 1–13, https://doi.org/10.1080/13467581.2020.1869015.

Liberati, Alessandro, et al. "The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Healthcare Interventions : Explanation and Elaboration." BMJ, vol. 399, 2009, pp. 1–28, https://doi.org/10.1136/bmj.b2700.

Liu, Bingsheng, et al. “How Project Management Practices Lead to Infrastructure Sustainable Success: An Empirical Study Based on Goal-Setting Theory.” Engineering, Construction and Architectural Management, vol. 27, no. 10, 2020, pp. 2797–833, https://doi.org/10.1108/ECAM-08-2019-0463.

Madureira, Raquel Castro, et al. “Think Twice to Achieve a Sustainable Project Management: From Ecological Sustainability towards the Sustainable Project Management Cube Model.” Sustainability (Switzerland), vol. 14, no. 6, 2022, https://doi.org/10.3390/su14063436.

Mansell, Paul, et al. “Development of a New Business Model to Measure Organizational and Project-Level SDG Impact-Case Study of a Water Utility Company.” Sustainability (Switzerland), vol. 12, no. 16, 2020, https://doi.org/10.3390/SU12166413.

---. “Development of a New Business Model to Measure Organizational and Project-Level SDG Impact-Case Study of a Water Utility Company.” Sustainability (Switzerland), vol. 12, no. 16, 2020, https://doi.org/10.3390/SU12166413.

Meng, Junna, et al. “Relationships between Top Managers’ Leadership and Infrastructure Sustainability a Chinese Urbanization Perspective.” Engineering, Construction and Architectural Management, vol. 22, no. 6, 2015, pp. 692–714, https://doi.org/10.1108/ECAM-01-2014-0013.

---. “Relationships between Top Managers’ Leadership and Infrastructure Sustainability a Chinese Urbanization Perspective.” Engineering, Construction and Architectural Management, vol. 22, no. 6, 2015, pp. 692–714, https://doi.org/10.1108/ECAM-01-2014-0013.

Mostafa, Golam, and Monowar Mahmood. “Eurasian Economic Union: Evolution, Challenges and Possible Future Directions.” Journal of Eurasian Studies, vol. 9, no. 2, July 2018, pp. 163–72, https://doi.org/10.1016/j.euras.2018.05.001.

Oguntona, O. A., et al. “Benefits and Drivers of Implementing Green Building Projects in South Africa.” Journal of Physics: Conference Series, vol. 1378, no. 3, 2019, https://doi.org/10.1088/1742-6596/1378/3/032038.

Ohiomah, I., et al. “An Assessment on the Drivers and Obstacles of Sustainable Project Management in South Africa: A Case Study of Johannesburg.” IOP Conference Series: Materials Science and Engineering, vol. 640, no. 1, 2019, https://doi.org/10.1088/1757-899X/640/1/012022.

Parmar, Bidhan L., et al. “Stakeholder Theory: The State of the Art.” Academy of Management Annals, vol. 4, no. 1, 2010, pp. 403–45, https://doi.org/10.1080/19416520.2010.495581.

Qazi, Abroon, et al. “Prioritizing Risks in Sustainable Construction Projects Using a Risk Matrix-Based Monte Carlo Simulation Approach.” Sustainable Cities and Society, vol. 65, no. August, 2021, p. 102576, https://doi.org/10.1016/j.scs.2020.102576.

---. “Prioritizing Risks in Sustainable Construction Projects Using a Risk Matrix-Based Monte Carlo Simulation Approach.” Sustainable Cities and Society, vol. 65, no. August, 2021, p. 102576, https://doi.org/10.1016/j.scs.2020.102576.

Sanders, Nada R., and John D. Wood. Foundations of Sustainable Business: Theory, Function, and Strategy. Wiley, 2020.

Shah, Satya, and Elmira Naghi Ganji. “Sustainability Adoption in Project Management Practices within a Social Enterprise Case.” Management of Environmental Quality: An International Journal, vol. 30, no. 2, 2019, pp. 346–67.

---. “Sustainability Adoption in Project Management Practices within a Social Enterprise Case.” Management of Environmental Quality: An International Journal, vol. 30, no. 2, 2019, pp. 346–67, https://doi.org/10.1108/MEQ-03-2018-0050.

Shaukat, Mohammad Bilal, et al. “Revisiting the Relationship between Sustainable Project Management and Project Success: The Moderating Role of Stakeholder Engagement and Team Building.” Sustainable Development, vol. 30, no. 1, 2022, pp. 58–75, https://doi.org/10.1002/sd.2228.

Shehadeh, Ali, et al. “A Gaussian Mixture Model Evaluation of Construction Companies’ Business Acceptance Capabilities in Performing Construction and Maintenance Activities during COVID-19 Pandemic.” International Journal of Management Science and Engineering Management, vol. 17, no. 2, 2022, pp. 112–22, https://doi.org/10.1080/17509653.2021.1991851.

Sujana, Caroline Maretha. “Contractor Project Manager Leadership Style Based on Path Goal Theory to Support Construction Sustainability.” IOP Conference Series: Earth and Environmental Science, vol. 426, no. 1, 2020, https://doi.org/10.1088/1755-1315/426/1/012007.

Toljaga-Nikolić, Danijela, et al. “Project Management and Sustainability: Playing Trick or Treat with the Planet.” Sustainability, vol. 12, no. 20, 2020, p. 8619.

---. “Project Management and Sustainability: Playing Trick or Treat with the Planet.” Sustainability (Switzerland), vol. 12, no. 20, 2020, pp. 1–20, https://doi.org/10.3390/su12208619.

Ullah, Mehfooz, et al. “A Structural Model for the Antecedents of Sustainable Project Management in Pakistan.” Sustainability, vol. 12, no. 19, 2020, p. 8013.

---. “A Structural Model for the Antecedents of Sustainable Project Management in Pakistan.” Sustainability (Switzerland), vol. 12, no. 19, 2020, pp. 1–19, https://doi.org/10.3390/su12198013.

---. “A Structural Model for the Antecedents of Sustainable Project Management in Pakistan.” Sustainability (Switzerland), vol. 12, no. 19, 2020, pp. 1–19, https://doi.org/10.3390/su12198013.

Zhang, Yanchun, et al. “How Does Transformational Leadership Promote Innovation in Construction? The Mediating Role of Innovation Climate and the Multilevel Moderation Role of Project Requirements.” Sustainability (Switzerland), vol. 10, no. 5, 2018, https://doi.org/10.3390/su10051506.